

TONE AND ACCENT IN OKLAHOMA CHEROKEE

by

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ABSTRACT

This dissertation is a study of the tonal and accentual system of Oklahoma Cherokee, which has six possible pitch patterns occurring on a syllable: low, high, low-high, high-low, lowfall and superhigh. This study attempts to provide a comprehensive description and analyses of these patterns: their distribution, their source, the principles which determine their positions, and the nature of tonal alternations. The tonal and accentual system of Oklahoma Cherokee manifests some typologically outstanding features, such as glottal stop as the historical source for both high and lowfall tones, coexistence of both rightward and leftward spreading of a tone, coexistence of tonal and accentual systems, existence of multiple accentual systems, and morphosyntactic use of accents. Studies on tones in general have focused mainly on analytical languages or languages with little morphology, but Cherokee is unique in that it is polysynthetic at the same time as tonal. Emergence of tones in Oklahoma Cherokee is recent and its source is easily traceable, but it has already developed a complex tonal alignment and tonal phonology. Description of the tonal and accentual system of Oklahoma Cherokee will contribute to the deeper understanding of not only the sound system of Cherokee, but also of the historical study of Iroquoian in general, and to the typological study of tonal and accentual systems more generally.

ABBREVIATIONS

A: set A (agentive) pronominal prefix	EX: exclusive	LF: lowfall tone
AMB: ambulative	FL: flexible	LG: long
AN: animate	FOC: focus clitic	LH: low-high tone
AND: andative	FUT.IMP: future imperative	LOC: locative
ASP: aspectual suffix	FUT.PROG: future progressive	LQ: liquid
ASR: assertive	H: high tone	MID: middle
B: set B (patientive) pronominal prefix	HAB: habitual	MOD: modal suffix
CAUS: causative	HL: high-low tone	MOT: motion
CED: Cherokee Electronic Dictionary (Montgomery-Anderson et al. 2010)	H-MET: <i>h</i> -Metathesis	NC: North Carolina Cherokee
CISL: cislocative	H1: high tone from glottal stop (Ch.8-Ch.11)	NEG: negative
CMP: compact	H2: high tone assigned to the final mora of the stem (Ch.12)	NOM: nominal
CN: conjunction clitic	H3: high tone from a pre-pronominal prefix (Ch.13)	OK: Oklahoma Cherokee
COMP: completive	H4: high variant of a superhigh accent (CH.14)	PART: partitive
DAT: dative	IN: inclusive	PCT: punctual
DF: Durbin Feeling	IND: indicative	PFT: perfective
DIM: diminutive	IMP: imperative	PL: plural
DIST: distributive	IMPF: imperfective	POSS: possessive
DJM: DJ McCarter	INST: instrumental	PP: pronominal prefix; passive participle
DU: dual	IRR: irrealis	PPP: pre-pronominal prefix
EJ: Ed Jumper	ITER: iterative	PRS: present
EV: epenthetic vowel	JRS: Junior Scrapper	PTL: Pronominal Tonic Lowering (§7.2)
EVID: evidential	L: low tone	Q: interrogative clitic
		R: resonant

REFL: reflexive

REL: relative

REV: reversive

SG: singular

SH: superhigh

T: plosive/affricate

TGI: Tonic Glottal Insertion
(§7.2)

TRNSL: translocative

UNSP: unspecific

VD: vowel deletion

VEN: venitive

Chapter 1. Introduction

1.1. Tone and accent of Oklahoma Cherokee

This dissertation is a study of the tonal and accentual system of Oklahoma Cherokee. Despite the number of speakers and the attention the history and culture of the Cherokee people have been enjoying, the linguistic aspects of Cherokee are somewhat understudied, possibly due to the optimism on the side of linguists that the language is still vigorous (Pulte 1979, Guyette 1981), which has recently turned out not to be true (Cherokee Nation 2003). Published works include reference grammars (Pulte & Feeling 1975, King 1975, Cook 1979, Montgomery-Anderson 2008) and some in-depth studies on various aspects of the language (see §1.3), but the phonological system has largely been neglected. This is a significant gap, especially since there is an increasing interest in the phonological system of Cherokee within the community, and specifically in its tonal system (cf. NSF award # 1065160, “Collaborative Research: Documenting Cherokee (CHR) Tone and Vowel Length”, Durbin Feeling, PI, June 2011 - November 2013). This dissertation will fill this gap by providing a comprehensive study of the tonal and accentual system of Oklahoma Cherokee. The tonal and accentual system of Oklahoma Cherokee manifests some typologically outstanding features, such as glottal stop as the historical source for both high and lowfall tones, coexistence of both rightward and leftward spreading of a tone, coexistence of tonal and accentual systems,¹ existence of multiple accentual systems, and morphosyntactic use of accents. Studies on tones in general have mainly focused on analytical languages or languages with little morphology (cf. Yip 2002), but Cherokee is unique in that it is polysynthetic at the same time as tonal. Emergence of tones in Oklahoma Cherokee is recent and its source is easily traceable, but it has already developed a complex tonal alignment and tonal phonology. Description of the tonal and accentual system of Oklahoma Cherokee will contribute to the deeper understanding of not only the sound system of Cherokee, but also

¹ In this study, the term ‘accent’ is roughly defined as “an ‘abstract’ mark where a culmination of prosodic features occurs, thereby marking that syllable (or accent bearing unit) with greater salience than surrounding syllables (Hyman 1978: 4).” For a more detailed definition of this term, see §15.1.2.

of the historical study of Iroquoian in general, and to the typological study of tonal and accentual systems more generally.

FIGURE 1-1 gives the schematic representations of the realizations of the six pitch patterns found within a syllable in Oklahoma Cherokee: high tone (H, \acute{a}), low tone (L, a), high-low tone (HL, \hat{a}), low-high tone (LH, \check{a}), lowfall tone (LF, \grave{a}), and superhigh accent (SH, $\acute{\acute{a}}$):

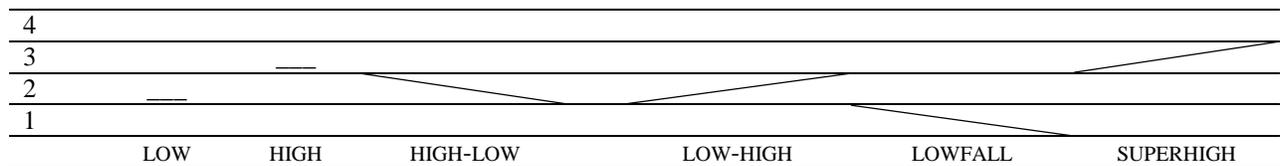


FIGURE 1-1: SCHEMATIC REPRESENTATION OF PITCH PATTERNS IN OKLAHOMA CHEROKEE

FIGURE 1-2 show the spectra and the F0 pitch traces of six Cherokee words, representing each of the pitch patterns in FIGURE 1-1, taken from recordings of a male speaker. The pitch pattern of the final syllable is predictable from the pitch pattern of the preceding syllable and thus is not marked in the orthography (see §2.3.2):

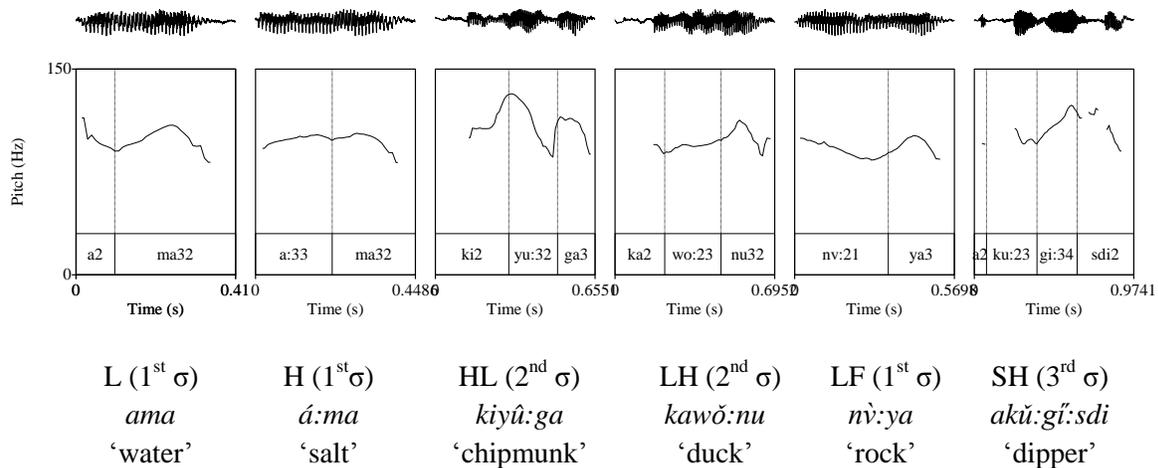


FIGURE 1-2. PITCH PATTERNS OF OKLAHOMA CHEROKEE (DF, male, 2001)

Each syllable is marked with one of the six pitch patterns in FIGURE 1-1, as exemplified in (1.1). For example, the word in (1.1a) has a lowfall tone on the first syllable, a high tone on the second syllable, a low tone on the third syllable, and a superhigh accent on the fourth syllable:

- (1.1)
- a. à:dé:yohv̌:ʔi
 ‘curve’ (Feeling 1975: 9)
 - b. adv̌:ně:lí:sgi
 ‘(he is an) actor’ (Feeling 1975: 14)
 - c. yisgwahtv̌:dà:sdí:ha
 ‘If you listen to me’ (CED-EJ, 2010)

Some words are distinguished solely by a tonal difference (however rare such minimal pairs are), as in (1.2):

- (1.2)
- a. gaʔdvsga
 ‘I am growing.’ (Feeling 1975: 62)
 - b. gaʔdv̌sga
 ‘I am hanging it up.’ (Feeling 1975: 116)

Tonal alternation is also pervasive, and tone and accent can also have morphosyntactic functions. For instance, compare the forms in (1.3); (a), the punctual form, has a high-low tone on the penultimate syllable, while (b), the imperative form, which is segmentally identical to (a), instead has a lowfall tone on the penultimate syllable:

- (1.3)
- a. ho:hwe:ľv̌:ga
 ‘You just wrote it.’ (EJ, July 2011)
 - b. ho:hwe:ľv̌:ga
 ‘Write it!’ (EJ, July 2011)

The main goal of this study is to provide a detailed description and analyses of these tones and accents: their distribution, their source, the principles which determine their positions, and the nature of tonal alternations.

The rest of this chapter contains the following information. First, in §1.2 I will review general information on the Cherokee language (its location, genetic affiliation and speakers). §1.3 reviews previous studies on the Cherokee tonal and accentual system, and §1.4 gives information on the database for this study. §1.5 reviews various orthographic systems used to represent the Cherokee language and

justifies the orthographic system adopted in this study. §1.6 is about the theoretical assumptions made in this study. §1.7 outlines the grammar of Cherokee, which is crucial for understanding the following chapters. §1.8 overviews the structure of this dissertation.

1.2. The Cherokee Language

1.2.1. Geographic location

The Cherokee language (ISO 639-3, chr) is spoken by 16,400 people in the United States (Lewis ed. 2009); by around 10,000 speakers in northeastern Oklahoma in Cherokee Nation, which consists of eight entire counties and parts of six more counties, and by approximately 1,000 speakers in western North Carolina, in Qualla Boundary in Swain and Jackson counties and in the Snowbird Community in Graham county. FIGURE 1-3 shows the current distribution of the Cherokee language, and FIGURE 1-4 shows the major cities with a high Cherokee population (Tahlequah, Stillwell, and Jay) in Cherokee Nation, Oklahoma:

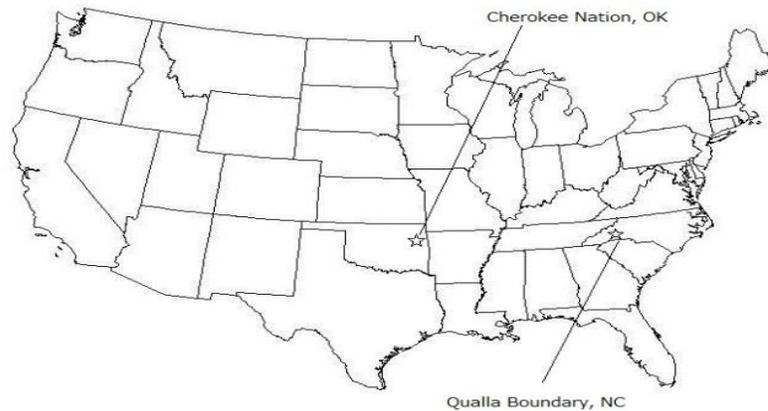


FIGURE 1-3. THE CURRENT DISTRIBUTION OF THE CHEROKEE LANGUAGE



FIGURE 1-4. MAP OF THE MAJOR CITIES WITH HIGH CHEROKEE POPULATION IN CHEROKEE NATION, OKLAHOMA (along with the locations of Tulsa and Oklahoma City)²

Around the time of contact, the Cherokee lived in the mountainous regions of Southern Appalachia and were in contact with Muskogean tribes, especially with the Creek and the Chickasaw on the southwest, with the Shawnee (Algonquian family) on the south, with the Yuchi (isolate) on the west, with the Catawba (Siouan family) and the Tuscarora (Northern Iroquoian) on the east, and with Northern Iroquoian tribes on the north (Mooney 1861/1921: 350-391). In the late eighteenth and the early nineteenth centuries the Cherokee people began moving across the Mississippi. As a result of the Removal in 1838, generally known as “Trail of Tears”, the majority of Cherokee were forced to move to what is now northeastern Oklahoma, but a small portion of Cherokee people remained in their original territory in western North Carolina.

1.2.2. Genetic affiliation

The Cherokee language belongs to the Iroquoian family and is the sole representative of the Southern Iroquoian branch of the Iroquoian family. The other branch, the Northern Iroquoian branch, consists of Mohawk, Oneida, Onondaga, Seneca, Cayuga, Tuscarora, and several extinct languages (Huron, Wyandot, Laurentian, etc.).

² Obtained from http://en.wikipedia.org/w/index.php?title=File:USA_Oklahoma_location_map.svg&page=1, with modifications.

Cherokee is unique among Iroquoian languages in that it is the only language with a clear tonal system. Still, Northern Iroquoian languages share some characteristics with Cherokee. All the Northern Iroquoian languages have some kind of accentual or stress system, which is somewhat reminiscent of the superhigh accent in Cherokee (Ch.14). The system reconstructed for Proto-Northern Iroquoian is a penultimate accent with lengthening of open accented penults except when they are followed by laryngeal consonants (*h* or *ʔ*) (Chafe 1977: 170, Michelson 1988: 52). This original system is further complicated in individual languages mainly due to the pitch effect of laryngeal consonants (Mohawk and Oneida; Chafe 1977: 172, Michelson 1988: 58ff., 71ff), the behavior of epenthetic vowels (Michelson 1988: Ch5, 6), and alternating odd/even syllable counting (Cayuga and Seneca; Chafe 1977: 175ff., Foster 1982).

1.2.3. Speakers and variation

No systematic dialectal survey has been conducted, but in the early historical period there were three major Cherokee dialects (King 1975: 9): the Lower or Elati dialect, which is now extinct, was spoken in what is now northwestern South Carolina and an adjacent area in Georgia; the Middle or Kituhwa dialect, now spoken in Qualla Boundary in North Carolina; and the Western or Otali dialect, now spoken in northeastern Oklahoma. The difference between Oklahoma Cherokee and North Carolina Cherokee is mainly phonological, such as the retention of the glottal stop in more environments (Lindsey 1985: 137, Scancarelli 1987: 28) or the lack of the phoneme *tl* (which merged with *c* [dz]) in North Carolina Cherokee. The variety spoken in the Snowbird Community in North Carolina is said to represent a mixing of elements from the North Carolina and Oklahoma dialects with respect to phonological and morphological characteristics (King 1975: 10). Within Oklahoma Cherokee, which this study focuses on, there may be as many as seven dialects (Kilpatrick & Kilpatrick 1970: 84-85). Some speakers notice phonological and morphological differences among the varieties spoken around Tahlequah, Stilwell, or Jay, in Oklahoma (Durbin Feeling, p.c.). For example, [tʰ] has merged with [t] in most of the environments in Durbin Feeling's dialect (spoken near Jay) but is retained in other speakers' dialects.

While Cherokee has a relatively larger number of speakers as compared with other Native American languages in the United States, it is not spoken by many tribal members under the age of 40 and is no longer being learned by children as a home language (Cherokee Nation 2003, Seay 2003), even in Cherokee Nation, Oklahoma, where the use of the Cherokee language has been considered to be more vigorous than in Western North Carolina (Lewis ed. 2009, Pulte 1979, Guyette 1981, etc.). This places Cherokee at severe risk of becoming highly endangered within a couple of decades. Although the communities are committed to revitalizing the language, such as establishing Cherokee immersion schools since 2001, it is still far from reversing this language shift (Peter et al. 2008). This dissertation project aims to document and describe the tonal and accentual system of Oklahoma Cherokee while the language is still in daily use to a certain extent.

1.3. Previous studies

The first descriptions of Cherokee are from the early 1800s and include Pickering (1831) and von der Gabelentz (1852), both of which are reprinted in Krueger (1963). Modern linguistic works on Cherokee date to the 1940's and are within the post-Bloomfieldian structuralism framework. Bender and Harris (1946) is the first phonological analysis of North Carolina Cherokee; they analyze the tone and accent with two 'junctures' and one contour, and indicate pitch with a single accent mark. William Reyburn published a series of three articles (1953-54), mostly focused on the verbal morphology of North Carolina Cherokee.

Several important works on Cherokee were published in the 1970's. King (1975) and Cook (1979) are reference grammars of North Carolina Cherokee, focusing mainly on Cherokee's complex morphological structure. Huff (1977) is a detailed analysis of the phonology of North Carolina Cherokee, which complements King (1975) and Cook (1979). With regard to the treatment of the tonal and accentual system, one striking characteristic that the studies up to this point have in common is that in general they do not distinguish high tone from the superhigh accent. For this reason, tonal rules that Bender and Harris (1946) or Huff (1977) formulate mostly refer to the superhigh accent (cf. Ch.14), and

not to the high tones discussed in detail in this study (Ch.8 - Ch.13). Whether or not this is due to the dialectal difference between North Carolina Cherokee and Oklahoma Cherokee is not yet understood.³

Feeling (1975) is a dictionary of Oklahoma Cherokee, which includes a detailed grammatical sketch of Oklahoma Cherokee (Pulte & Feeling 1975). The dictionary is extremely useful because of its precise phonetic notations of segments, tones, and vowel length (see §1.4), the number of entries, and the thoroughness such as including various verbal and adjectival paradigms. This is one of the primary data sources of this study.

Foley (1980) includes discussion of phonological variation and its sociological correlates. He posits five underlying tones and contours, but no details of his analysis are given (*ibid.* 144). Scancarelli (1989) is a detailed analysis of grammatical relations in Cherokee, focused particularly on the complex system of pronominal prefixes, but it also contains some insightful phonological and morphophonological analyses.

A breakthrough was achieved by Geoffrey Lindsey, who introduced the first thorough analysis of the tonal and accentual system of Oklahoma Cherokee (Lindsey 1985: Ch. 4, Lindsey 1987). Lindsey (1985) provided the basics of the tonal phonology of Oklahoma Cherokee, such as the inventory of tones, their distribution, sources of some tones and nature of tone spreading, while Lindsey (1987) offered detailed descriptions and analyses of tonal alternations and some phonological rules pertaining to tonal phenomena; and he proposed a pitch-accent analysis. Subsequent studies on Cherokee phonology heavily rely on his analysis, such as Munro (1996b) or Wright (1996), and this study also owes much to his analysis. Lindsey (1985) also has some discussions of (the lack of) the interrogative intonation in Cherokee (p. 139ff).

Subsequent works on phonetics and phonology of Cherokee tones and accent include Haag (1997, 1999, and 2001) and Johnson (2005). These studies involve some important acoustic analyses of Cherokee tones and accents, but mostly the focus is on the word-final boundary tone (§2.3.2) or the superhigh accent (Ch.14). Haag's works concern the interface of the boundary tone with morphology,

³ One important difference between North Carolina Cherokee and Oklahoma Cherokee is the lack of lowfall tone in the former, which still preserves its source segment, glottal stop (Lindsey 1985: 137).

while Johnson (2005) found the primary acoustic correlate of a superhigh accent and provided a pitch-accent analysis of Cherokee superhigh accent.

Durbin Feeling, along with other coauthors, published another dictionary of verbs in 2003 (Feeling et al. 2003). This dictionary contains more verbal paradigms than Feeling (1975) and has some improvements in its orthography, such as the notation of vowel length even in closed syllables. This is another important source for this study. Durbin Feeling is also heading an NSF project to document of tone and vowel length in Cherokee (NSF award # 1065160).

Brad Montgomery-Anderson has been publishing on morphosyntactic aspects of Oklahoma Cherokee (Montgomery-Anderson 2008, among others), as well as some important contributions to the documentation and revitalization projects in the community (Montgomery-Anderson et al. 2010). Chris Koops at University of New Mexico, Albuquerque, has been working on semantic aspects of Oklahoma Cherokee. Frey (2013) is a sociolinguistic study of North Carolina Cherokee.

1.4. Database for this study

The data for this study has the following five main sources:

- (1.4) Database for this study
 - (i) Durbin Feeling's (1975) *Cherokee-English Dictionary*
 - (ii) Durbin Feeling et al.'s (2003) *A Handbook of the Cherokee Verb: A Preliminary Study*
 - (iii) Montgomery-Anderson et al.'s (2010) *Cherokee electronic dictionary (CED)*
 - (iv) An unpublished set of recordings collected by Keith Johnson, Marcia Haag and Durbin Feeling from 2000 and 2001, provided by courtesy of Dr. Keith Johnson at University of California, Berkeley
 - (v) My own data based on the fieldwork conducted in Tahlequah, Oklahoma in summer 2011 (4 weeks) and in summer 2012 (3 weeks).

The first three are published sources. Other published sources (with recordings) were occasionally consulted (Robinson 1989, Holmes & Smith 1976). Another source of data was provided by informal personal communications with some native speakers, most notably with Durbin Feeling (especially the

lecture notes from his Cherokee Linguistics class at Northeastern State University, Tahlequah, Oklahoma in July 2011). All of the sources are based on the Oklahoma Cherokee dialect.

Feeling (1975) lists about 700 verbs, each with six inflected forms, along with nominals and adjectives, while Feeling et al. (2003) lists only verbs, around 130 of them, each with nine inflected forms. In both sources, all the phonemic distinctions of Cherokee are represented: in addition to all the consonantal and vowel phonemes (including *h* and *ʔ*, which are not represented by the Cherokee Syllabary invented by Sequoyia (§1.5.3) and which are often omitted in writing by other speakers), vowel length and tones are also represented. The phonetic notations by Durbin Feeling have in general been accepted as very reliable in the previous literature (such as, Lindsey 1985, 1987, Munro ed. 1996, Uchihara 2009), except for some minor points such as the notation of atonic superhigh accent when it does not occur on the penultimate syllable (Lindsey 1987: 2, Johnson 2005: 9) and vowel length in closed syllables in Feeling (1975) (§2.1.2, Scancarelli 2005: 362). His notations were checked with various recordings, such as Robinson (1989), Johnson et al. (2000, 2001), Montgomery-Anderson et al. (2010), as well as with the data collected during my fieldwork in 2011 and 2012, and are found to be consistent with these data.

Montgomery-Anderson et al. (2010) lists around 430 verbs, each with up to five inflected forms, along with nominals and adjectives. The forms are represented both in the Cherokee Syllabary and in its Romanized transcription. Although neither of the orthographies they employ distinguishes all the phonemic distinctions in Cherokee (such as vowel length or tones), almost all the forms come with recordings from three native speakers of Oklahoma Cherokee, Durbin Feeling (DF), Marion “Ed” Jumper (EJ) and Anna Sixkiller (AS).

Johnson et al.’s unpublished recordings from 2000 and 2001 contain recordings from five speakers, three male speakers (DF, DM, EN) and two female speakers (AH, EW). The recordings were made in Cherokee Nation, Oklahoma. The recordings consist mainly of nouns.

My own data was collected during my fieldwork in Tahlequah, Oklahoma in the summer of 2011, 2012, and 2013, funded by the Department of Linguistics at the University at Buffalo, SUNY; Mark Diamond Research Fund from the University at Buffalo, SUNY (2011); and Phillips Fund, American Philosophical Society (2012). I worked mainly with three native speakers of Oklahoma Cherokee: Marion “Ed” Jumper (EJ); Marion “Junior” Scrapper (JRS), with occasional assistance from his wife, Ida Scrapper (IS); and DJ McCarter (DJM). In addition, I occasionally consulted Durbin Feeling (DF). EJ is from Barber, near Tahlequah, Cherokee County, Oklahoma; JRS was born in Bunch, near Stillwell, Adair County, Oklahoma, and was raised in Welling, Cherokee County, Oklahoma; DJM was born in the community of Pumpkin Hollow, and now lives in Briggs, Cherokee County, Oklahoma. DF is from a community near Kenwood, Oklahoma, and now lives in Tahlequah, Oklahoma. All of the speakers are over the age of 50 and their first language is Oklahoma Cherokee. The elicitation sessions were conducted mainly using English, for two hours a day, four days a week, for three weeks in 2011 and two weeks in 2012, and one week in 2013. Recordings and field notes of around forty-five hours were made.

The sources of the data cited in this study are always provided. The names of the speakers I have consulted are abbreviated as follows: DF: Durbin Feeling, EJ: Marion “Ed” Jumper, JRS: Marion “Junior” Scrapper, DJM: DJ McCarter. The sources of the recordings can be inferred from the years: recordings from 2001 are from Johnson et al. (2000-2001), recordings from 2010 are from Montgomery-Anderson et al. (2010), and recordings from 2011 and 2012 are from my own fieldwork.

1.5. Orthography

Cherokee has been represented with various orthographic systems. First, there is a discrepancy between the orthographic system prevalent among community members and the linguistic orthography. Second, there are as many orthographic systems as the number of linguists and publications. In this chapter, I lay out the orthographic conventions that I adopt in this study. §1.5.1 discusses the segmental orthography, and §1.5.2 the conventions for writing tones and accents. §1.5.3 briefly mentions the Cherokee Syllabary.

In addition, sequences of resonants (*n, l, j, w*) + *h* are realized as voiceless resonants ([$\text{̥}n$], [$\text{̥}l$]~[$\text{̥}j$], [$\text{̥}w$]). Following Feeling's (1975) convention, voiceless resonants are represented as *hR* before a vowel and as *Rh* before a consonant:

	/_V		/_C
(1.6)	a. gahnéha [gaṅéha] kahnéha 'He is holding it (FL).'		b. ganhga [gaṅga] kanhka 'He is lying down.'
	(Feeling 1975: 96)		(Feeling 1975: 107)

1.5.1.2. Vowel length

Some previous works on Cherokee (Lindsey 1985, 1987, Munro ed. 1996, Feeling et al. 2003, Montgomery-Anderson 2008, Uchihara 2009) represent vowel length by doubling the vowels (e.g. [a:] as *aa*), while others (King 1975, Cook 1979, Scancarelli 2005, etc.) represent it with a colon (e.g. [a:] as *a:*). Again, as in the case of *Ch* clusters, I use colon to represent a long vowel in the first lines (which is more prevalent in the community, on the rare occasion when speakers write vowel length), and by doubling the vowels in the second line and in the segmentation line, as in (1.7). Vowel length is not contrastive word-finally in most cases (Scancarelli 1987: 46), and thus word-final vowels are not marked for length.

(1.7)	gu:tíha	← first line, with a colon
	kuuthíha	← second line, by doubling the vowel
	k-uuth-íh-a	← segmented line, by doubling the vowel
	3SG.A-snow-PRS-IND	
	'It is snowing.' (Feeling 1975: 125)	

1.5.2. Conventions for writing tones and accents

As we saw at the beginning of this chapter, the inventory of pitch patterns in Oklahoma Cherokee is as follows: high tone (*á*), low tone (*a*), high-low tone (*â:*), low-high tone (*ǎ:*), lowfall tone (*à:*), and superhigh accent (*ǎ̃:*). Unfortunately, there are as many ways of representing tones in Oklahoma Cherokee as the number of linguists working on Cherokee. This section compares orthographic systems and justifies the orthographic system adopted in this study. TABLE 1-1 compares various orthographic systems employed in past studies on Cherokee tones. TABLE 1-1 has ten pitch patterns, in contrast to six

pitch patterns in FIGURE 1-1; this is because LF, L, H and SH are subdivided into those occurring on short vowels and those on long vowels. The first four pitch patterns occur on a short vowel (two of which, short LF and short SH, are marginal and thus were not included in FIGURE 1-1), while the latter six pitch patterns occur on a long vowel. The roman numerals at the top of the table refer to the types of orthography systems in (1.9) below. The orthographic systems employed in this study (Feeling et al.'s (2003) system and the modified community orthography) are bordered with bold lines:

TABLE 1-1. COMPARISON OF CHEROKEE TONAL ORTHOGRAPHY SYSTEMS

(adopted and modified from Feeling et al. 2003:10)

		(i)	(ii)		(iii)		(iv)	
V LENGTH		Pulte & Feeling (1975)	Scancar elli (1987)	Munro (1996)	Feeling et al. (2003), Uchihara (2009)	Montgomery-Anderson (2008)	Community orthography	Modified community orthography
SHORT	LF (short)	a ¹	ǎ	-	à	à	à	à
	L	a ²	à	à	a	a	ā	a
	H	a ³	á	á	á	á	á	á
	SH (short)	a ⁴	ǎ	-	ǎ	-		
LONG	LF	a ¹ = a ²¹	ǎ:	àa	àà/àa	aà	ǎ:	ǎ:
	LL	a ²	à:	àà	aa	aa	ā:	a:
	HH	a ³	á:	áá	áá	áa	á:	á:
	LH	a ²³	ǎ:	àá	aá	aá	ǎ:	ǎ:
	HL	a ³²	á:	áà	áa	áà	á:	á:
	SH	a ⁴	ǎ:	áa	ǎǎ	áá	ǎ:	ǎ:

A word 'actor', for example, would be represented as follows:⁴

(1.8) 'actor'

- | | |
|-----------------------------------|---|
| a. Pulte & Feeling (1975) | a ² dv ¹ ne ²³ li ⁴ sgi |
| b. Scancarelli (1987) | àtv̄:ně:lí:ski |
| c. Munro (1996) | àdv̄vněélífski |
| d. Feeling et al. (2003) | atv̄v̄neélífski |
| e. Montgomery-Anderson (2008) | atv̄v̄neélífski |
| f. Community orthography | ād̄v̄:nē':lí:sgi |
| g. Modified community orthography | ad̄v̄:ně:lí:sgi |

⁴ The vowel length and the tone of the word-final vowels are predictable and not contrastive, and thus are not marked in the orthography (cf. §2.3.2).

1.5.3. The Cherokee Syllabary

Cherokee has its own syllabic writing system, the Cherokee Syllabary (Table 1-3). The Cherokee Syllabary was devised in the early 1800's by Sequoia, who is reported to have been a monolingual Cherokee speaker. Sequoia was born in the village of Tuskegee (Foreman 1938: 3), in the Western dialect area, which is the current Oklahoma Cherokee, and thus the syllabary reflects the phonemic system of this dialect, which has the lateral affricate *tl*.

Not all current speakers of Cherokee use the Cherokee Syllabary in everyday life. Walker (1969: 151) notes that the syllabary is used today mainly in two settings. First, the Cherokee Bible is widely owned and read. Also, traditional Cherokee doctors use the syllabary to record their prayers or magic formulas. Bender (2007) shows that the Cherokee syllabary is gaining a symbolic significance in education, publications and signage due to recent interest in cultural revitalization among North Carolina Cherokee.

TABLE 1-3 shows the Cherokee Syllabary. The order of the letters follows the conventions: the rows represent the onset consonants, and the columns represent the nucleus vowels:

TABLE 1-3. CHEROKEE SYLLABARY

	a		e		i		o	u	v
V	D a		R e		T i		ᵕ o	ᵕ u	i v
g/k	ᵑ ga	ᵕ ka	ᵑ ge		ᵑ gi		A go	J gu	E gv
h	ᵕ ha		ᵑ he		ᵑ hi		F ho	Γ hu	ᵕ hv
l	W la		ᵕ le		P li		G lo	M lu	ᵑ lv
m	ᵑ ma		ᵕ me		H mi		ᵑ mo	ᵑ mu	
n	ᵕ na, ᵑ hna, G nah		ᵑ ne		h ni		Z no	ᵑ nu	ᵕ nv
gw	ᵑ gwa		ᵕ gwe		ᵑ gwi		ᵑ gwo	ᵕ gwu	ᵑ gwv
s	ᵕ sa	ᵕ s	4 se		ᵑ si		ᵑ so	ᵑ su	R sv
d/t	ᵕ da	W ta	S de	ᵑ te	ᵑ di	ᵑ ti	ᵕ do	S du	ᵕ dv
dl	ᵕ dla	ᵕ tla	L dle		C dli		ᵑ dlo	ᵑ dlu	P dlv
j	G ja		ᵑ je		ᵑ ji		K jo	ᵑ ju	ᵑ jv
w	G wa		ᵑ we		ᵑ wi		ᵑ wo	9 wu	6 wv
y	ᵕ ya		ᵑ ye		ᵑ yi		ᵑ yo	G yu	B yv

The Cherokee Syllabary is neither a systematic phonemic nor an autonomous phonemic writing system for Cherokee (Chafe & Kilpatrick 1962; Pulte 1976; Walker 1981; Scancarelli 1992: 141): vowel

length and tones are never represented, neither are coda *h* or *ʔ* (e.g. *nvhki* ‘four’ is represented as $\text{ŋ}^{\text{v}}\text{Y}$ (*nv-gi*)). Since all the letters represent sequences of a consonant plus a vowel (except for *s*), consonant clusters except those involving *s* are represented using a sequence of two letters to represent them (cf. Appendix to Ch.3; e.g. *kathi* ‘button’ is represented as $\text{ʃ}^{\text{t}}\text{J}^{\text{d}}$ (*ga-ti-di*)). Some of the syllables have different letters for plain plosives and plosive plus *h* clusters (e.g. *ka* (“ga”) vs. *kha* (“ka”)), but others do not (e.g. *ko* “go” is not distinguished from *kho* “ko”; thus, both *khoóla* ‘bone’ and *koóla* ‘winter’ are both represented as AW (*go-la*)). Scancarelli (1992) shows that this difference is accounted for by the frequency of occurrence of the various aspirated sounds in combination with certain vowels.

1.6. Theoretical assumptions

The purpose of this study is to make an empirical contribution based on a comprehensive description of the Cherokee tonal and accentual system. While no linguistic description is atheoretical (Teeter 1964, Dryer 2006, Haspelmath 2010), this dissertation attempts to present the facts of the Cherokee tonal and accentual system without employing a heavily theoretically biased framework that might make this work less accessible.

The segmentation lines give representations from which the surface form can be derived by productive and general phonological rules (according to the “requirement of naturalness” in Anderson 1974: 43); thus, morphophonological allomorphs (such as the 1SG.A pronominal prefix *ci-* ~ *k-*) are not assumed to derive from a generalized underlying representation, and the segmentation lines do not represent forms obtained through internal reconstruction (where relevant, reconstructed segments through internal reconstruction are placed in parentheses in the segmentation line). This is similar to the convention adopted in Lounsbury’s works (1942, 1953), but is somewhat different from the conventions in studies more focused on morphosyntax or in some reference grammars (cf. Montgomery-Anderson 2008, Chafe 1996). In addition, in the segmentation lines, any elements deleted by phonological rules are put in parentheses ().

Phonological rules are assumed to be motivated by general constraints in the language and rules are stated informally. Autosegmental representations (Goldsmith 1976, 1990) are employed to represent tones.

1.7. Structure of Cherokee

The focus of this study is the tonal and accentual system of Oklahoma Cherokee (along with its phonological system in general). However, some of the discussions in the following chapters require some basic background knowledge of the grammatical (especially morphological) structure of Oklahoma Cherokee. In this section I will overview the Cherokee grammar, mainly its morphology, which is crucial for understanding the discussions to follow. The terminology is adopted from Cook (1979). See King (1975), Cook (1979), Scancarelli (2005), Montgomery-Anderson (2008) for more comprehensive descriptions of the Cherokee grammar. In this section, I will first outline the structure of Cherokee verbs, the morphology of which is the most complex (§1.7.1). I will then discuss nouns (§1.7.2) and adjectives (§1.7.3). §1.7.4 looks at two stem alternation processes which will be crucial throughout the dissertation.

1.7.1. The verb

Like other languages of the Iroquoian family, Cherokee exhibits complex derivational and inflectional morphology, particularly for verbs. The structure of Cherokee verbs can be diagrammed as in FIGURE 1-5; optional position classes are in parentheses; position classes which can have multiple morphemes in a sequence are indicated with a raised *n*:

(Pre-pronominal prefix ⁿ)	Pronominal prefix	Reflexive /middle prefix	STEM				Modal Suffix	(Clitic ⁿ)
			BASE			Aspectual suffix		
			(Incorporated noun)	Verb root ⁿ	(Derivational suffix ⁿ)			

FIGURE 1-5. THE STRUCTURE OF CHEROKEE VERBS

Following the convention in Iroquoian linguistics after Lounsbury (1953), the sequence of an incorporated noun + a verb root + a derivational suffix is referred to as a *base*, and the combination of a base plus an aspectual suffix will be referred to as a *stem*.

Some of the position classes in FIGURE 1-5 are illustrated by (1.11); this form has the cislocative (CISL) pre-pronominal prefix *ta-*, a pronominal prefix marking the 3rd person plural actor *anii-*, an etymologically incorporated noun root *-nee-* ‘liquid’, a verb root *-kiʔ-* ‘take’, a dative derivational suffix (DAT) *-ee*, a perfective (PFT) aspectual suffix *-l*, and a motion (MOT) modal suffix *-i*.

- (1.11) dǎ:ní:ne:giʔe:li
 tv́níníneekiʔeeli⁵
 ta-anii-[[nee+kiʔ -ee]_{BASE} -l]_{STEM}-i
 CISL-3PL.A-[[liquid+take-DAT]_{BASE} -PFT]_{STEM} -MOT
 ‘They will take it (liquid) from him.’ (Feeling et al. 2003: 206)

Of these position classes, pronominal prefix, stem and modal suffix are obligatory:

- (1.12) Cherokee minimal verb
 Minimal verb = pronominal prefix + stem + modal suffix

In §1.7.1.1 - §1.7.1.6 below, I will explain each of the categories in FIGURE 1-5.

1.7.1.1. The verb base

The core of a Cherokee verb is the verb base. A base may consist simply of a verb root (1.13a), but more commonly it is etymologically complex. Some verb bases consist of a compound of two verb roots (1.13b), while some verb roots incorporate a body part term (1.13c); neither construction is productive in Cherokee:

- (1.13)
 a. Base = verb root
 à:gíʔa
 ààkíʔa⁶
 a-k-íʔ-a
 3SG.A-eat-PRS-IND
 ‘He is eating it.’ (Feeling 1975: 16)

⁵ The high tones on the first and the second syllables are due to the cislocative (CISL) pre-pronominal prefix.

⁶ The lowfall tone on the first syllable is due to Pronominal Tonic Lowering, which assigns a lowfall tone to the vowel-initial pronominal prefix (§7.2).

b. Base = verb root + verb root
 à:gî:sdoʔa
 ààkíistoʔa
 a-[kí(?) + stoo]-ʔ-a⁷ (< *-kiʔ-)
 3SG.A-[eat+crush]-PRS-IND
 ‘He is chewing it.’ (Feeling 1975: 17)

c. Base = noun root + verb root
 à:sgwo:hal’niha
 ààskwoohal’niha
 a-[skwoohal-vvn]’-(?)ih-a⁸
 3SG.A-[stomach+hit]-PRS-IND
 ‘He is hitting him in the abdomen with a long object’ (Feeling 1975: 53)

Cherokee also has a system of classificatory verbs, and such verbs distinguish the following categories: compact (CMP), long (LG), flexible (FL), liquid (LQ) and animate (AN). Classificatory verbs in Cherokee are described in a number of sources (Pulte & Feeling 1975: 302ff., King 1978, Cook 1979: Chapter 9, Blankenship 1997, Uchihara 2014).

Cherokee verbs can be expanded by derivational suffixes, which in many cases are fused with the aspectual suffix. Some derivational suffixes (such as instrumental/causative or reversive) are attached directly to a verb base, while others (such as dative or ambulative) attach to the perfective stem of the verb. Here I will discuss only the most frequent derivational suffixes.

The instrumental/causative (INST/CAUS) suffix is attached directly to the verb base, the form of which is usually identical with the infinitive aspect suffix (§1.7.1.2), and it adds an instrumental or causee argument to the verb:

⁷ The glottal stop in parentheses will be discussed in Ch.9. The vowel *oo* is shortened due to a general constraint against a sequence of a low-toned long vowel before a glottal stop (§5.3.2.3).

⁸ Some morphemes assign a high tone to the vowel of the preceding morpheme; in such a case, a high tone diacritic is placed above the hyphen (cf. §8.4).

- | | | |
|--------|---|--|
| | No INST | INST |
| (1.14) | a. gawó:niha
kawóóniha
ka-wóo(?)n-ih-a
3SG.A-speak-PRS-IND
'He is speaking.'
(Feeling 1975: 117) | b. gawó:ni:hisdí:sgṽ:ʔi
kawóóniihistíískṽʔi
ka-wóo(?)n-iihist-íísk-vṽʔi
3SG.A-speak-INST-IMPF-ASR
'He was using it to speak with.'
(Pulte & Feeling 1975: 284) |

The dative (DAT) suffix *-e(e)* is attached to the perfective stem of a verb base, and adds a dative or benefactive argument to the verb:

- | | | |
|--------|---|--|
| | No DAT | DAT |
| (1.15) | a. gawó:niha
kawóóniha
ka-wóo(?)n-ih-a
3SG.A-speak-PRS-IND
'He is speaking.'
(Feeling 1975: 117) | b. gawó:ni:hiséha
kawóóniihiséha
ka-wóo(?)n-iihis-éh-a
3SG.A-speak-PFT-DAT:PRS-IND
'He is speaking for him'
(Pulte & Feeling 1975: 286) |

The andative (AND) suffix *-ee* indicates motion toward some location for performing the action:

- | | | |
|--------|---|--|
| | No AND | AND |
| (1.16) | a. gawó:niha
kawóóniha
ka-wóo(?)n-ih-a
3SG.A-speak-PRS-IND
'He is speaking.'
(Feeling 1975: 117) | b. gawó:ni:sé:ga
kawóóniisééka
ka-wóo(?)n-iis-ée(?)k-a
3SG.A-speak-PFT-AND:PRS-IND
'He is going to a certain location in order to speak.'
(Pulte & Feeling 1975: 287) |

The ambulative (AMB) suffix *-iit* indicates that the action is performed at various places:

- | | | |
|--------|---|--|
| | No AMB | AMB |
| (1.17) | a. gawó:niha
kawóóniha
ka-wóo(?)n-ih-a
3SG.A-speak-PRS-IND
'He is speaking.'
(Feeling 1975: 117) | b. gawó:ni:sĩ:dô:hṽ:ʔi
kawóóniisíítóohṽʔi
ka-wóo(?)n-iis-iitóo(?)h-vṽʔi
3SG.A-speak-PFT-AND:PRS-ASR
'He was going around speaking'
(Pulte & Feeling 1975: 286) |

1.7.1.2. Aspectual suffixes

Cherokee verb bases combine with aspectual suffixes to form a 'stem':

(1.18) Stem = Base + Aspectual suffix

Cherokee verbs can occur in up to five different basic stem forms, which distinguish various aspects or moods. The five stems are present (PRS), imperfective (IMPF), perfective (PFT), punctual (PCT) and infinitive (INF). Verbs are categorized into conjugation classes on the basis of the aspectual suffixes they take; the forms of the aspectual suffixes cannot be predicted by purely phonological or semantic factors and thus each verb base must be listed with the conjugation class in the lexicon, although some tendencies can be stated. TABLE 1-4 lists the eight conjugation classes and their subclasses of aspectual suffixes in Oklahoma Cherokee. See Uchihara (2007a: Ch. 7) for justification of the classification into these classes and segmentation of these suffixes. TABLE 1-4 gives the internally reconstructed general forms; in synchronic Oklahoma Cherokee, the glottal stop has a tonal effect and deletes in some cases. *H* represents a laryngeal consonant, *h* or *ʔ*; some verbs take the variant with *h*, while others with *ʔ*, the conditioning factor of which is unknown. The last column shows the corresponding conjugation class in North Carolina Cherokee, described in Cook (1979: ch.4):

TABLE 1-4. ASPECTUAL SUFFIXES

		PRS	IMPF	PFT	PCT	INF	Cook (1979)
CLASS 1	1a	ih	iisk	vvh	Ø-a	vht	A4
	1b	ih	iisk	ahn	Ø-a	oht	A3
	1c	iʔ	iʔsk	aʔn	vʔk-a	oʔt	A2
CLASS 2	2a	iʔ	iʔsk	ʔ	Ø-a	iʔst	A1
	2b	ʔ	ʔsk	ʔ	c-a	ʔst	B3
	2c	aʔ	aʔsk	ʔ	Ø-a	aʔst	
	2d	eʔ	eʔsk	eʔ	Ø-a	eʔt	B2
	2e	iʔ	iʔsk	iʔs	Ø-a/ Ø-i	iʔst	B5
	2f	ʔ	ʔsk	ʔs	n-a	ʔst	B4
CLASS 3	3a	sk	sk	s	h-i	hist	C1
	3b	(i)sk	(i)sk	(i)s	Ø-a	(i)ist	C2
	3c	sk	sk	s	s-a	st	
	3d	sk	sk	s	l-a	st	
	3e	sk	sk	h	h-a	st	C3
	3f	sk	sk	hn	n-a	ht	
	3g	sk	sk	hy	hy	st	
CLASS 4	4a	Heh	Heesk	Heeh	Hvvl-a/ Ø-a	Heht	h: B1; ʔ: D1
	4b	Heh	Heesk	Heehl	Hvvl-a	Heht	
CLASS 5	5a	Hih	Hih	iHl	iHk-a	iHst	h: D2- D4; ʔ D5
	5b	Hoh	Hoh	aHl	ak-a/ ohk-a	Hst	
CLASS 6	6a	Hk	Hk	Hc	Hk-i	Hst	E
	6b	Hk	Hk	Hc	Hk-i	yst	
	6c	Hk	Hk	Hc	Hk-i	Hist	
CLASS 7		h	:ʔs	:ʔs	hvʔk-a	ht	
CLASS 8		hk	hk	ls	:l-a	:hlist	

As can be seen in TABLE 1-4, there can be homonymy among the aspectual suffixes (such as PRS and IMPF of class 3); some verbs (especially stative verbs) are defective and lack some of the aspectual categories. (1.19) shows a sample inflection of the verb -y- ‘pick up LG’, which belongs to Class 1a:

- (1.19) -y- ‘pick up LG’ (Feeling 1975: 63)
- a. PRS à:yíha
 àà:yíha
 a-y-íh-a
 3SG.A-pick.up.LG-PRS-IND
 ‘He is picking it (LG) up.’
- b. IMPF à:yí:sgóʔi
 àà:yí:skóʔi
 a-y-íisk-óʔi
 3SG.A-pick.up.LG-IMPF-HAB
 ‘He habitually picks it (LG) up.’
- c. PFT ù:yv:hǎ:ʔi
 ùù:yvvhvʔi
 uu-y-vvh-vʔi
 3SG.B-pick.up.LG-PFT-ASR
 ‘He picked it (LG) up.’
- d. PCT hiya
 hiya
 hi-y-Ø-a
 2SG.A-pick.up.LG-PCT-IND
 ‘Pick it (LG) up!’
- e. INF uyhdi
 uuyhti
 uu-y-(v)ht-i⁹
 3SG.B-pick.up.LG-INF-NOM
 ‘for him to pick it (LG) up.’

Present stems usually occur with the indicative modal suffix, and indicate a present event or state (1.19a). The imperfective stem can occur with various modal suffixes, including the assertive -vʔi, the habitual -óʔi, or the evidential -éʔi, and indicate an ongoing action (1.19b). The perfective stem can also occur with a variety of modal suffixes and indicates completed action (1.19c). Punctual stems are either used to describe an immediate past event or as an imperative (1.19d). A punctual stem is followed by the modal suffix -a or -i. Infinitive stems express action nominals (1.19e) and they can also denote necessity

⁹ The vowel in parentheses is deleted due to Vowel Deletion (§3.1).

or ability when the stem bears a superhigh accent (§14.2.1.3). The infinitive suffix is usually followed by the nominal (NOM) modal suffix *-i*.

1.7.1.3. Modal suffixes

Modal suffixes are attached to verb stems (= base + aspectual suffix) and serve primarily as evidential and mood markers; in (1.20) the modal suffixes are assertive (ASR) *-vʹʔi* (a) and evidential (EVID) *-ééʔi* (b):

	ASR		EVID
(1.20)	a. ù:wó:ni:sǎ:ʔi ùùwóóniisvʹʔi uu-wóo(?)n-iis-vʹʔi 3SG.B-speak-PFT-ASR 'He was speaking.' (Pulte & Feeling 1975: 290)		b. ù:wó:ni:sé:ʔi ùùwóóniisééʔi uu-wóo(?)n-iis-ééʔi 3SG.B-speak-PFT-EVID 'He reportedly spoke.' (ibid.)

In some cases modal suffixes indicate tense in combination with pre-pronominal prefixes and aspectual suffixes. Modal suffixes include: indicative (IND) *-a*, which forms present tense with the present stem; motion (MOT) *-i*, which occurs with some motion verbs, and denotes the future tense in combination with the cislocative pre-pronominal prefix and the perfective aspect; assertive (ASS) *-vʹʔi*, which usually refers to first hand past tense; evidential (EVID) *-éʔi ~ -ééʔi*, which indicates reportative past (cf. Pulte 1985); and habitual (HAB) *-óʔi ~ óóʔi*, which indicates a habitual action; future imperative (FUT.IMP) *-éé(?)sti*; and negative participle suffix (NEG) *-vʹna*, which occurs on certain negative subordinate verbs, in combination with the partitive pronominal prefix.

1.7.1.4. Reflexive/middle prefix

The reflexive/middle prefix occurs immediately before the verb and after the pronominal prefix. The reflexive prefix has the form *ataat-/ata(a)-/at-* and the middle prefix has the form *ata(a)-/ali-/at-* (Montgomery-Anderson 2008: 343-348), the alternation of which is partly phonologically and partly

lexically conditioned. The reflexive prefix is used with a transitive verb and indicates that the agent that is performing the action is the same as the patient that is being affected by the action (reflexive or reciprocal); compare the forms in (1.21), with (b) and without (a) the reflexive prefix:

	without REFL	with REFL
(1.21)	a. gv:hníha kvvhníha k-vvn-híh-a 3SG.A-hit-PRS-IND 'He is hitting him, it.' (Pulte & Feeling 1975: 296)	b. à:da:dv:hníha ààtaatvvhníha Ø-ataat-vvn-híh-a 3SG.A-REFL-hit-PRS-IND 'He is hitting himself.' (ibid.)

The middle prefix, on the other hand, indicates that the action of the verb is affecting the person or thing that is the agent of the verb (Montgomery-Anderson 2008: 347). In some cases it appears that the reflexive/middle prefix is more lexical and derivational, while in other cases it serves a purely morphosyntactic function of defocusing the object of the verb decreasing the valence of the verb (Scancarelli 1987: 87). The following are some minimal pairs contrasting a reflexive (a) and a middle (b) prefix.

	REFL	MID
(1.22)	a. à:da:sdâ:yv:hv́sga ààtaastáayvvhv́ska Ø-ataa-stáa(?)yvvhv́sk-a 3SG.A-REFL-have.meal:PRS-IND 'She is cooking a meal.' (Feeling 1975: 7)	b. à:lsdâ:yv:hv́sga ààlstáayvvhv́ska Ø-al(i)-stáa(?)yvvhv́sk-a (< *-sta?yvvhv́sk-) 3SG.A-MID-have.meal:PRS-IND 'He is eating a meal.' (Feeling 1975: 41)
(1.23)	a. dà:da:wó:ʔa tààtaawóʔa t-Ø-ataa-woo-ʔ-a DIST-3SG.A-REFL-bathe-PRS-IND 'He is performing baptism.' (Feeling 1975: 67)	b. à:dawó:ʔa ààtawóʔa Ø-ata-woo-ʔ-a 3SG.A-MID-bathe-PRS-IND 'He is bathing.' (Feeling 1975: 9)

1.7.1.5. Pronominal Prefixes

Every verb in Cherokee must have a pronominal prefix, and it indexes the verb's arguments.¹⁰ The categories encoded in the pronominal prefixes are role (agent vs. patient), person (first, inclusive (IN), exclusive (EX), second, third), number (singular (SG), dual (DU), plural (PL)), and animacy (animate (AN) vs. inanimate for third person referents). Intransitive pronominal prefixes encode the single argument (agent (A) or patient (B)), and transitive pronominal prefixes index both the agent and patient in a fusional fashion.

An intransitive verb may take either the set A (agentive) or set B (patientive) pronominal prefix. Most verbs take set A prefixes in the present (a), imperfective (b) and the punctual forms (d) and set B prefixes in the perfective (c) and the infinitive forms (e):¹¹

(1.24) Intransitive, agentive *-loo-* 'pass' (Feeling 1975:102)

- | | |
|---------|---|
| a. PRS | galo:sga
kalooska
ka-loo-sk-a
3SG.A-pass-PRS-IND
'He is passing it.' |
| b. IMPF | galo:sgó:ʔi
kalooskóóʔi
ka-loo-sk-óóʔi
3SG.A-pass-IMPF-IND
'He habitually passes it.' |
| c. PFT | ù:lo:sǎ:ʔi
ùùloosvǎʔi
uu-loo-s-vǎʔi
3SG.B-pass-PFT-ASR
'He passed it.' |
| d. PCT | hilò:hi
hiloóhi
hi-loó-h-i
2SG.A-pass-PCT-IND
'Pass it!' |

¹⁰ Possibly with the exception of *cííya* 'LG is lying' and copula *kèès-*.

¹¹ Northern Iroquoian languages also have this pronominal alternation according to aspect (Chafe 1980).

e. INF u:lo:hisdi
 uuloohisti
 uu-loo-hist-i
 3SG.B-pass-INF-NOM
 ‘for him to pass’

Some intransitive verbs, especially ones with a patientive subject, take set-B pronominal prefixes in all the aspectual forms. The choice between these two types of verbs depend partly on lexical semantics (lexical aspect, agency, etc.), but since the choice is not always predictable it is synchronically best considered as lexical (Scancarelli 1987: Ch. 5, Mithun 1991: 533ff.). This is similar to a Split-S system (Dixon: 1994: 71ff.), where intransitive verbs split into two groups: those which always take ‘active’ set and those which always take ‘inactive’ set.

Transitive verbs with inanimate objects (such as *-k-* ‘eat’) behave the same as intransitive verbs; that is, just like in (1.25), the verb takes set A prefixes in the present, imperfective and punctual forms, while it takes set B prefixes in the perfective and the infinitive forms. Transitive verbs with an animate object take transitive prefixes which encode both the agent and the patient arguments. The selection of appropriate pronominal prefixes is extremely complex and outside the scope of this dissertation; readers are referred to Pulte & Feeling (1975), King (1975), Cook (1979), Montgomery-Anderson (2008), and especially Scancarelli (1986, 1987 and 1988), for a more detail.

TABLE 1-5 lists all the pronominal prefixes in Oklahoma Cherokee, partly adopted from Scancarelli (1987). The set A intransitive series is found under the column ‘Ø/3SG’, which can also indicate combinations with 3SG inanimate patient, and the set B pronominal prefixes are found in the row Ø/3SG. The lighter grey cells are pronominal prefixes of set A, while the darker grey cells are pronominal prefixes of set B. For transitive prefixes, the agent component of the prefix is shown at the left of TABLE 1-5, and the patient component of the prefix is shown at the top of TABLE 1-5. Some pronominal prefixes show phonologically conditioned alternations (such as the deletion of the final vowel or the final glide), and those elements which are deleted are in parentheses; see §5.3.4 for the phonological status of these vowels and glides. Some pronominal prefix show suppletive alternations (‘weak’ or ‘strong’)

according to the phonological environment; in such cases the allomorph occurring before a consonant is listed first, and the allomorph occurring before a vowel is listed after a slash (/).¹² Pronominal prefixes with an asterisk (*) require the glottal grade forms of Laryngeal Alternation, which will be discussed in §1.7.4.1. The abbreviations ‘act.’ and ‘inv.’ stand for pronominal prefixes used in active construction and inverse construction, respectively (for a thorough discussion on this topic, see Scancarelli 1986, 1987). ‘RF’ indicates that a reflexive prefix is employed (§1.7.1.4). DIST indicates that the distributive pre-pronominal prefix is employed (cf. §1.7.1.6).

¹² Except for 3SG.A *a-/Ø-/ka-*, the alternation of which cannot be predicted from a purely phonological environment, and 3SG.B *uu-/uw-*, where stems beginning with *a* take the first allomorph while those beginning with other vowels take the latter allomorph.

Patient Agent	1SG	1DU.EX	1PL.EX	1DU.IN	1PL.IN	2SG	2DU	2PL	Ø/3SG	3SG.AN	3PL.INAN	3PL.AN	
1SG	RF					kvv(y) *	stvv(y)*	iicvv(y)*	ci/k *	cii(y)*	DIST+ ci/k*	kacii(y)*	
1DU.EX		RF				(1/2 DU)			oost(ii)	oost(ii)*	DIST+ oost(ii)	DIST+ oost(ii)	
1PL.EX			RF			(1/2 PL)			ooc(ii)	ooc(ii)*	DIST+ ooc(ii)	DIST+ ooc(ii)	
1DU.IN				RF					iin(ii)	een(ii)*	DIST+ iin(ii)	DIST+ iin(ii)	
1PL.IN					RF				iit(ii)	eet(ii)*	DIST+ iit(ii)	dist. + iit(ii)	
2SG	ski/skw	skin(ii)*	(ii)skii(y)*			RF			h(i)	hii(y)*	DIST+ h(i)	kahii(y)*/ DIST+h(i)	
2DU	(2/1 DU)							RF		st(ii)	eest(ii)*	DIST+ st(ii)	DIST+ st(ii)
2PL	(2/1 PL)								RF	iic(ii)	eec(ii)*	DIST+ iic(ii)	DIST+ iic(ii)
Ø/3SG	aki /akw	ookin(ii)	ook(ii)	kin(ii)	iik(ii)	c(a)	st(ii)	iic(ii)	<u>act.</u> a/Ø /k(a)	<u>inv.</u> uu/uw	<u>act.</u> DIST+ a/Ø/ka	<u>inv.</u> uun(ii)	
3PL	kvvki /kvvkw	kookin(ii)	kook(ii)	keekin(ii)	keek(ii)	keec(a)	keest(ii)	keec(ii)	<u>act.</u> an(ii)	<u>inv.</u> kvvw(a)	<u>act.</u> DIST+ an(ii)	<u>inv.</u> kvvwan(ii)	
UNSP	vvki /vvkw	ookin(ii)	ook(ii)	eekin(ii)*	eek(ii)*	eec(a)	eest(ii)*	eec(ii)*	aci/ak*		keeci/keek*		

TABLE 1-5. PRONOMINAL PREFIXES
(Excerpt from Scancarelli (1987: 71), with orthographical modification and representations of A/B)

1.7.1.6. Pre-Pronominal Prefixes

The pre-pronominal prefixes are a set of morphemes that occur before the pronominal prefixes, and mark a wide range of semantic and grammatical categories. TABLE 1-6 shows the template for the pre-pronominal prefixes in Oklahoma Cherokee, partly adopted from Cook (1979: 58). In TABLE 1-6, alternations that are morphologically conditioned are placed in separate cells separated by a dotted line, while alternations conditioned by phonological factors are indicated by a tilde (~). Vowels in parentheses appear before a consonant, while this vowel does not before a vowel; the glide *y* in a parenthesis appears before a vowel, while it does not before a consonant. On the status of these short vowels and glides in parentheses, see §5.3.4. The conditioning factors for morphological alternations are extremely complex and idiosyncratic (Pulte & Feeling 1975: I-A, Cook 1979: Ch.3); alternation of PART is conditioned by whether the verb is in the nominal form or not ([±NOM]); alternation of DIST is conditioned by the tonicity of the verb ([±TONIC]; §1.7.4.2), as well as by the following pre-pronominal prefix; alternation of CISL and ITER is conditioned by the modal suffix (nominal (NOM), motion (MOT), and assertive (AST)); alternation of NEG is conditioned by whether the pronominal prefix involves the second person agent ([±2nd]).

TABLE 1-6: PRE-PRONOMINAL PREFIXES

IRR	TRNSL	PART	DIST	CISL	ITER	NEG
<i>y(i)-</i>	<i>w(i)-</i>	<i>n(i)-</i> /[-NOM]	<i>t(ee)-</i> / [+TONIC]	<i>ta(y)-</i> /_ NOM <i>-i</i> , MOT <i>-i</i> , ASR <i>-vvʔi</i>	<i>vv-</i> ~ <i>vʔ-</i> <i>√</i> /_ NOM <i>-i</i> , MOT <i>-i</i> , ASR <i>-vvʔi</i>	<i>ka(y)-</i> /[-2 nd]
		<i>ii- ~iy-</i> / [+NOM]	<i>t(i)-~c-</i> / [-TONIC]	<i>t(i)- ~c-</i> / [elsewhere]	<i>ii- ~ iʔ-</i> <i>~√</i> / [elsewhere]	<i>kee-</i> / [+2 nd]
			<i>too-</i> /_ CISL, ITER			
REL						
<i>c(i)-</i>						

Cherokee (and possibly Northern Iroquoian) pre-pronominal prefixes exemplify a classic case of templatic morphology (Simpson & Withgott 1986, Inkelas 1993, Good 2011, etc.): the order of each morpheme within the template appears to be arbitrary and has no functional motivation; some morphemes

belong to the same position class (such as IRR and REL) but they do not necessarily seem to be semantically incompatible; on the other hand, CISL and TRNSL both encode direction or location and appear to be semantically incompatible, but they occupy different slots.¹³

Certain pre-pronominal prefixes assign a floating high tone to the verb, which will be the topic of Ch.13. Pre-pronominal prefixes also determine the ‘tonicity’ of the verb (§1.7.4.2, Appendix A).

The alternations and the functions of pre-pronominal prefixes are extremely complex, and the readers are referred to King (1975), Cook (1979), Pulte & Feeling (1975), Montgomery-Anderson (2008), and Feeling et al. (2010) for detailed descriptions of the forms and functions of each of the pre-pronominal prefixes. Here I only give brief descriptions of each of the pre-pronominal prefixes.¹⁴

Irrealis (IRR) *y(i)-* appears on conditional or negative verbs: *hlá y-akóówhthiha* ‘He is not seeing it.’ (Pulte & Feeling 1975: 241). Relative (REL) *c(i)-* appears on strong assertions or relative clauses: *askaya c-ùùwoóhla* ‘the man who is sitting (Pulte & Feeling 1975: 242).

Translocative (TRNSL) indicates motion away from a reference point: *w-ááʔi* ‘he is walking (away from the speaker)’ (Pulte & Feeling 1975: 244). Partitive (PART) indicates comparison of one event or state with another; the allomorph *ii-* (*_C*) ~ *iy-* (*_V*) occurs with nominalized forms as well as adjectival forms, while the allomorph *n(i)-* occurs elsewhere (Cook 1979: 64). An example is *n-akóówhthiha* ‘He is seeing it (from a lateral position)’ (Pulte & Feeling 1975: 245).

Distributive (DIST) indicates the performance of an action on a number of occasions or on a number of objects. The allomorph *too-* occurs before CISL, or as a result of fusion with ITER (Cook 1979: 67, Pulte & Feeling 1975: 248); the alternation between *t(ee)-* and *t(i)-~c-* is conditioned by the tonicity of the verb (Appendix A). An example of DIST is *t-ààkoowhthiha* ‘He is seeing them’ (Pulte & Feeling 1975: 247).

¹³ A verb may have up to three pre-pronominal prefixes, in the order presented above.

¹⁴ Pulte & Feeling (1975) list additional pre-pronominal prefixes: “negative imperative” and “again imperative” (243-244). I analyze them as combinations of REL and ITER.

Cislocative (CISL) indicates motion toward a reference point; it takes the allomorph *ta(y)-* with the following modal suffixes: nominative *-i*, motion *-i*, and assertive *-vvʔi*. The allomorph *t(i)- ~c-* appears elsewhere (Cook 1979: 72, Pulte & Feeling 1975: 251-252). An example of CISL is *tay-ááʔi* ‘He is walking (in the direction of the speaker)’ (Pulte & Feeling 1975: 251).

Iterative (ITER) indicates repetition; the conditions for its allomorphic alternation is the same as that for CISL: the allomorph *vv- ~ vʔ- ~ V́* (high tone on the initial vowel of the stem initial vowel) with nominative *-i*, motion *-i*, and assertive *-vvʔi*, and the allomorph *ii- ~ iʔ- ~ V́* elsewhere (Cook 1979: 77; Pulte & Feeling 1975: 254). An example is *vʔ-aʔi* ‘He is walking again’ (Pulte & Feeling 1975: 254).

Negative (NEG) occurs in certain negative contexts. It takes the allomorph *ke:-* before a 2nd person pronominal prefix, while it takes *ka(y)-* elsewhere (Cook 1979: 82; Pulte & Feeling 1975: 255). An example is *kvvkikoohvʔi* ‘since I saw it’ (Pulte & Feeling 1975: 255).

1.7.2. The Noun

Nouns have less morphology than verbs. Some non-human nouns are not inflected at all. There are some underived root nouns (such as *ama* ‘water’, *kiihli* ‘dog’), but the majority of nouns are derived from verbs (e.g. *atiithóhti* ‘spoon’ < *-atiihth-* ‘drink’). Some nouns can be marked plural with the distributive prefix (e.g. *khanèèsáʔi* ‘box’, *ti-khanèèsáʔi* ‘boxes’). Human nouns are usually marked according to the person and number of the referent with set A pronominal prefixes (e.g. *a-skaya* ‘man’, *anii-skaya* ‘men’). Nouns denoting body parts take pronominal prefixes of either set A or set B (e.g. *a-hoǒli* ‘his mouth’ (set A),¹⁵ *uw-òðyeěni* ‘his hand’ (set B)), while those denoting clothes take set B pronominal prefixes to mark the possessor (e.g. *uu-(a)hnawo* ‘his shirt’). Kinship terms take transitive pronominal prefixes indicating the relationship between the referent and the possessor (e.g. *kvv-toota* ‘I am your father’). For a full description of nouns in Cherokee, see Pulte & Feeling (1975: 306-330) and Montgomery-Anderson (2008: Ch. 7).

¹⁵ Whether a noun takes set A or set B pronominal prefix is lexically determined (Scancarelli 1987: Ch. 5).

1.7.3. The Adjective

Adjectives can either be underived root adjectives (e.g. *eěkwa* ‘big’, *oōsta* ‘good’) or derived from verbs (e.g. *uutanvvalv̄v̄ta* ‘clean’). Lindsey and Scancarelli (1985) persuasively demonstrate that adjectives constitute an independent lexical category, in contrast to Northern Iroquoian languages (Chafe 2012). The discussion in this section is from their work.

Adjectives resemble nouns more than verbs: adjectives take the nominal allomorph of pronominal prefixes and the distributive pre-pronominal prefix to mark agreement with the nouns they modify; adjectives, like nouns, do not inflect for negation and aspect/ mood; adjectives always have the superhigh accent (cf. Ch.14), while verbs have atonic accent only in subordinate clause.

Adjectives differ from nouns in the following ways: human nouns take only the set A pronominal prefixes to mark the person and number of the referent, while adjectives can take either set A or set B pronominal prefixes (again, whether an adjective takes set A or set B pronominal prefix is lexically determined; Scancarelli 1987: Ch. 5); unlike nouns, all adjectives may be marked for plural; when nouns modify other nouns, the modifier tends to follow the modified, while adjectives usually precede nouns they modify.

1.7.4. Stem alternations

Each stem has maximally four distinct alternants, alternating according to two categories, Laryngeal Alternation (§1.7.4.1) and tonicity (§1.7.4.2).

1.7.4.1. Laryngeal Alternation

The first stem alternation is termed Laryngeal Alternation (Cook 1979: 40, Munro 1996b). It is triggered by certain pronominal prefixes. Most pronominal prefixes take the *h*-grade. In the *h*-grade, the first laryngeal consonant of the stem is *h* (1.21a).¹⁶ Other prefixes (such as those involving 1SG agentive

¹⁶ Not all stems contain a laryngeal consonant.

argument or those with animate patients; marked with * in TABLE 1-5 above) take the glottal grade, where the first laryngeal consonant is a glottal stop (1.25b). *h* in question is underlined:

	<i>h</i> -grade	glottal grade
(1.25)	a. à:de:loho:sga	b. gade:loʔo:sga
<i>VhV</i>	ààteelo <u>h</u> ooska	kateeloʔooska
	Ø-ateelohoo-sk-a	k-ateelohoo-sk-a
	3SG.A-find.out-PRS-IND	1SG.A-find.out-PRS-IND
	'He is finding it out.' (Feeling 1975: 9)	'I am finding it out.' (ibid.)

This is a very productive alternation, and any stem (not only verbs, but also nouns and adjectived) which take a pronominal prefix manifest this alternation. For verbs which manifest Laryngeal Alternation, the stem with *h* is analyzed to be basic (Cook 1979: 40). This is because there are stems with a glottal stop as the first laryngeal consonant in the lexical representation.

In (1.25), the laryngeal is between vowels. When *h* is post-consonantal in the *h*-grade, the corresponding glottal grade has either a pre-consonantal glottal stop (1.26b) or it simply loses the *h* (1.27b). In (1.26b), the *th* sequence in the second line loses *h* in the glottal grade and instead a glottal stop is found before this consonant.

	<i>h</i> -grade	glottal grade
(1.26)	a. hatvhi	b. gaʔdvsga
	hath <u>v</u> hi	kaʔtvska
	h-athv-h-i	k-athv-sk-a
	2SG.A-grow-PCT-IND	1SG.A-grow-PRS-IND
	'Grow up!' (Feeling 1975: 62)	'I am growing.' (ibid.)
(1.27)	a. hakwiya	b. gagwiyíha
	hakw <u>h</u> iya	kakwiyíha
	h-akwhiy-Ø-a	k-akwhiy-íh-a
	2SG.A-pay-PCT-IND	1SG.A-pay-PRS-IND
	'Pay it!' (Feeling 1975: 36)	'I am paying' (ibid.)

When *h* precedes a consonant (1.28a), the corresponding glottal grade form lacks *h* and instead there is a lowfall tone on the preceding vowel (b); again, the stem alternant with *h* is assumed to be basic:

- | | | |
|--------|---|--|
| | <i>h</i> -grade | glottal grade |
| (1.28) | a. à:de:hlohgwáʔa
ààteehlohkwáʔa
Ø-ateehlohkw-áʔ-a
3SG.A-learn-PRS-IND
'He is learning it.' (Feeling 1975: 8) | b. gadè:lohgwáʔa
katèèlohkwáʔa
k-ateehlohkw-áʔ-a
1SG.A-learn-PRS-IND
'I am learning it.' (ibid.) |

Ch.4 describes Laryngeal Alternation in more detail. To summarize the effects of Laryngeal Alternation, *h* in the *h*-grade alternates with a glottal stop between vowels, with a glottal stop or is lost or after another consonant, and with a lowfall tone on the preceding vowel before another consonant:

TABLE 1-7. INCIDENCE OF LARYNGEAL ALTERNATION

<i>h</i> -GRADE	GLOTTAL GRADE
VhV	VʔV
VCh	VʔC, VC
VhC	VVC

Discussions on Laryngeal Alternation are found throughout this study; Appendix B at the end of this dissertation will summarize the various effects of Laryngeal Alternation.

1.7.4.2. Tonicity

Cross-cutting *h*-grade/glottal grade, each verb stem comes in two stem alternants: a tonic form and an atonic form (Cook 1979: 92). First, in a tonic form (1.29a) the vowel-initial pronominal prefix (the first syllable *ùù-*) has a lowfall tone (due to Pronominal Tonic Lowering; §7.2), while in the atonic form (b) this pronominal prefix has an unmarked low tone. Second, in the tonic form (a) the glottal stop is accompanied by a high tone on the preceding vowel, while in the atonic form (b) the glottal stop is not accompanied by a high tone on the preceding vowel:

- | | | |
|--------|---|--|
| | Tonic | Atonic |
| (1.29) | a. ù:dlanv:dáʔdeha
ùùtlanvvtáʔteha
uu-(a)tlanvvtat-ʔeh-a
3SG.B-have.time-DAT:PRS-IND
'He has time.' (Feeling 1975: 161) | b. u:dlanv:daʔdéhdi
uutlanvvtatʔéhti
uu-(a)tlanvvtat-ʔéht-i
3SG.B-have.time-DAT:INF-NOM
'for him to have time' (ibid.) |

Whether the verb stem takes the tonic form or the atonic form depends on extremely complex morphosyntactic factors. First, tonicity depends on the morphosyntactic categories they are in; thus, tonic verbs are in the tonic form, whereas imperative or infinitive forms are in the atonic form. Tonicity is also dependent on pre-pronominal prefixes; thus, REL and ITER always require the verb to be in the tonic form, while other pre-pronominal prefixes require the verb to be in the atonic form. Lastly, the assertive modal suffix always requires the verb to be in the tonic form. A detailed description of these factors is found in Appendix A at the end of this dissertation.

Previous studies (Cook 1979, Lindsey 1985) assumed that atonic forms always carry a superhigh accent (Ch.13), but the tonic/atonic distinction is not always isomorphic with the absence/presence of a superhigh accent; there are forms which are “atonic” but do not have a superhigh accent on the one hand, and there are tonic forms with a superhigh accent on the other. Therefore I do not include presence/absence of a superhigh accent in the definition of tonicity in this study.

1.8. Organization of the dissertation

Part I (Ch.2 - Ch.5) discusses the segmental phonology of Oklahoma Cherokee, which will be crucial in understanding the discussions in Part II. Ch.2 outlines the segmental inventory of Oklahoma Cherokee. Ch.3 and Ch.4 concern phonological and morphophonological alternations involving the laryngeal consonants, *h* and glottal stop. Ch.3 discusses Vowel Deletion and *h*-Metathesis, which are motivated by the constraint against a *CVh* sequence, and which can interact with the distribution of tones and accents in a complex manner. Ch.4 looks at Laryngeal Alternation in more detail, which was briefly discussed in §1.7.4.1. Ch.5 concerns phonotactics, syllable structure and various segmental processes and constraints in Oklahoma Cherokee.

Part II (Ch.6 - Ch.14) constitutes the main part of this dissertation. Ch.6 overviews the tonal and accentual system of Oklahoma Cherokee. Ch.7 looks at various sources of the lowfall tone. Ch.8 - Ch.13 discuss three sources of a high tone: one from a segmental source, and other two which are more

accentual. Ch.8 - Ch.11 concern one type of high tone (H1), which I argue to be an *incipient tone* whose source is a glottal stop (Ch.9). Ch.8 looks at the tonal phonology of H1. Ch.10 outlines the distribution of a glottal stop, looking at various phonological and morphological environments where a glottal is found. Ch.11 looks at the historical sources of various types of tonal alignment of H1. Ch.12 is about the second type of high tone, which is found on the last mora of the stem (H2); it resembles a word-accent in other languages. Ch.13 looks at high tone from a pre-pronominal prefix (H3), describing various complex factors which determine the position and distribution of H3. This chapter also argues that H3 is best viewed as an iambic accent. Ch.14 discusses superhigh accent, providing a detailed account of the factors which determine the position of a superhigh accent and its distribution. I will also show that superhigh accent resembles a cross-linguistically common default-to-opposite accent system.

Chapter 15 concludes this study, first by situating the Cherokee tones and accent in typological perspective. I show that Cherokee tonal and accentual system consists of two incipient tones, one word-tone and two types of accent. Second, I will outline the typologically outstanding properties of Cherokee tones and accents, and attempt to seek implications for the typology of word-prosody systems.

Appendices at the end of this dissertation discuss tonicity (Appendix A) and the summary of various effects of Laryngeal Alternation (§1.7.4.1), which is discussed throughout this dissertation (Appendix B).

PART I. Segmental phonology

Chapter 2. Segmental Inventory

2.0. Introduction

This chapter overviews the segmental inventory of Oklahoma Cherokee. §2.1 looks at the vowel phonemes, and §2.2 consonantal phonemes. §2.3 discusses the complexity surrounding word-final vowels, which in many cases are deleted.

2.1. Vowel phonemes

Cherokee has 6 vowel phonemes (§2.1.1), and a vowel length distinction (§2.1.2).

2.1.1. Vowel quality

Cherokee has the twelve vowel phonemes shown in TABLE 2-1:

TABLE 2-1: VOWEL PHONEMES

	FRONT	CENTRAL	BACK
HIGH	i ii		u uu
MID	e ee	v vv	o oo
LOW			a aa

For an extensive list of minimal pairs contrasting in vowel phonemes, see King (1975: 28-31).

i is an unrounded high front vowel, [i], and occurs anywhere in a word (although no verb stem begins with *i*).¹⁷

e is an unrounded mid front vowel, [e]. Cherokee *e* is rather open (but not as open as [ɛ]), close to Japanese *e*. *e* occurs anywhere within a word.

a is an unrounded low back vowel [a] and occurs anywhere in a word.

u is a weakly rounded high back vowel, [u] ~ [ɯ] and occurs anywhere in a word.

¹⁷ One possible exception is the verb *cííya* ‘it (long) is lying.’ This verb is exceptional in that it does not take a pronominal prefix. However, if *-ííy-* is the verb stem, *c-* may be the pronominal prefix; 3SG.A pronominal prefix does not have allomorph *c-*, but it may be the case that it has the allomorph *k-* of 3SG.A pronominal prefix which subsequently palatalized to *c-* due to the stem-initial *i*.

o is a weakly rounded mid back vowel, [ɔ]. Cherokee *o* is rather open, but not as open as English [ɔ]. *o* occurs anywhere within a word.

v is an unrounded mid back (nasalized) vowel, [ʌ] ~ [ã]. *v* has been described as always nasalized (Huff 1977: 1, Scancarelli 1987: 22), but nasalization is not always present for some speakers (such as EJ), and it sounds very close to *a* sometimes to my ear. *a* and *v* are nevertheless contrastive, as can be seen from the following minimal pair:

- | | | | |
|-------|---|--|--|
| | <i>a</i> | | <i>v</i> |
| (2.1) | a. à:gwv:hníha
ààkwvvhníha
'He is hitting me.'
(Pulte & Feeling 1975: 265) | | b. ò:gwv:hníha
òòkwvvhníha
'I am being hit, someone is beating me.'
(Pulte & Feeling 1975: 300) |

All vowels are phonetically nasalized word-finally, and this nasalization can transfer to a preceding vowel if it is separated by *h* or *ʔ* (Huff 1977: 1-2):

- (2.2) sgǔ:hi [sgǔ:hí]
skoóhi
'ten' (CED-EJ, 2010)

2.1.2. Vowel length

Vowel length is contrastive in Cherokee. Minimal pairs are attested, as in (2.3), which contrast vowel length in the first syllable:

- | | | | |
|-------|--|--|--|
| | short V | | long V |
| (2.3) | a. jigo:lí:yéʔa
cikoolííyéʔa
'I am examining it.' (Feeling 1975: 18) | | b. ji:go:lí:yéʔa
ciikoolííyéʔa
'I am examining him.' (ibid.) |

Cook (1979: 7) states that in addition to a short/long contrast, there is phonetically a third degree of vowel length, an 'extra-short' vowel, which occurs with certain pronominal prefixes with the vowel *a* or *i*. I do not hear the difference between 'extra-short' and 'short' vowels in the speech of the speakers I have consulted, but no acoustic measurement was conducted to confirm this perception.

Long vowels are somewhat rarer in closed syllables, which led Feeling (1975) and Pulte & Feeling (1975) to omit notation of vowel length in closed syllables, assuming all vowels in closed syllables are short. However, long vowels do occur in a closed syllable (Munro 1996a: 5 fn.11, Munro 1996b: 48 fn.7. Scancarrelli 2005: 362); Feeling et al. (2003) notates vowel length even in closed syllables, and some instances of long vowels in closed syllables can be found in Feeling et al. (2003). In (2.4), the sequences in question are underlined, and syllable boundaries are indicated by a period in the second lines:

(2.4)

a. à:go:whtíha¹⁸
 àà.koowh.thí.ha
 ‘He sees it.’ (DF, July 2011)

b. digina:lhtawò:sdi
 ti.ki.naalh.tha.wòò.sti
 ‘for you and I to comb our hair’ (Feeling et. al. 2003: 108)

The vowel length contrast emerges as a result of certain morphophonological and phonological processes. First, some morphemes lengthen the preceding vowel (‘long stems’ or ‘:-stems’ in Cook 1979).¹⁹ In (2.5), such a ‘long stem’ lengthens the preceding vowel of the 3SG.A pronominal prefix, resulting in *kaa-* (a); the 3SG.A pronominal prefix has a short vowel, *ka-*, otherwise (b):

(2.5)	a. ga:jagalíha	b. gané:ʔa
	kaacakalíha	kanééʔa
	ka-:cakal-íh-a	ka-neéʔ-a
	3SG.A-rip-PRS-IND	3SG.A-get.FL:PRS-IND
	‘He is ripping it.’ (Feeling 1975: 97)	‘He is getting it (flexible).’ (Feeling 1975: 104)

The origin of these ‘long stems’ is unclear, but since the allomorphs of the pronominal prefixes that these stems take are almost identical to those for consonant-initial stems, this lengthening might have resulted from a loss of some kind of a consonantal segment (most probably *h* or *ʔ*).²⁰

¹⁸ Durbin Feeling notes that the vowel *oo* is somewhat shorter than *à:* in the initial syllable, but nevertheless he stated it is long.

¹⁹ Morphemes beginning with this feature are marked with a colon (:) in the segmentation lines.

²⁰ One argument for such an analysis is the fact that no verb stem begins with *hT* or *ʔT* (*T* = obstruent).

Some phonological processes, to be discussed in §5.3, shorten long vowels: long vowels in closed syllables in some morphological contexts (§5.3.2.1), low-toned vowels before a glottal stop (§5.3.2.3) and before a coda *h* (§5.3.2.2). Also, some morphemes contain a vowel which alternates between a short vowel and a long vowel, partly depending on the phonological environment. Thus, the habitual (HAB) suffix alternates between an allomorph with a short vowel *-óʔi* and an allomorph with a long vowel *-óóʔi*, and this alternation depends on the tonal configuration of the stem (Montgomery-Anderson 2008: 271).

Since most of the Northern Iroquoian languages lack a vowel length contrast, and since vowel length is not reconstructed for Proto-Iroquoian (Michelson 1988, Mithun 1979), one is curious as to the origin of this vowel length contrast.²¹ However, it appears difficult to trace the origin of the vowel length contrast in Cherokee solely based on its synchronic grammar.

2.2. Consonant phonemes

TABLE 2-2 shows the consonant phonemes in Oklahoma Cherokee.

TABLE 2-2. CONSONANT PHONEMES

		BILABIAL	ALVEOLAR	PALATAL	VELAR	LABIALIZED VELAR	GLOTTAL
STOPS			t		k	kw	ʔ
AFFRICATES	CENTRAL		c				
	LATERAL		tl				
FRICATIVES			s				h
NASALS		m	n				
LIQUID			l				
GLIDES				y		w	

Below, §2.2.1 - §2.2.5 give some details about each of the phonemes in TABLE 2-2, first looking at their distribution and realization: plosives (§2.2.1), affricates (§2.2.2), fricatives (§2.2.3), resonants

Scancarelli (1989: 56) analyzes ‘long stems’ as beginning with empty V slots (Clements & Keyser 1983), but analyzing them as having empty C slots would account for the facts better.

²¹ Rudes (1995) reconstructs a vowel length contrast for Proto-Iroquoian, assuming that Cherokee has preserved the original vowel length contrast. This hypothesis, however, is not widely accepted.

- (2.8) a. i:k [i:k^h] ~ b. i:ga [i:gâ] (ibid.)
 iik(a) iika
 ‘day’ (JRS, Aug 2012) (ibid.)

When followed by *h* or *s*, these plosives are realized as voiceless plosives, [t]~[t^h] and [k]~[k^h], as the following examples show. When followed by a vowel, *kh* and *th* clusters are realized as voiceless aspirated plosives:

- (2.9)
 a. #_V kǒ:l(a) [k^hǒ:l(a)]
 khoóla
 ‘bone’ (JRS, Aug 2012)
 b. V_V á:ta [á:t^ha]
 aátha
 ‘young woman’ (AH, 2001)

Aspiration is weak or non-existent (or unreleased; Foley 1980: 118) when *kh* and *th* clusters occur before another plosive ((a), (b)) or *s* (c):²²

- (2.10)
 a. aktǒ:l [ak^htǒ:l]
 akhthoól(i)
 ‘his eye’ (JRS, Aug 2012)
 b. dé:kdi:ha [dé:k^hdi:hâ]
 téékhtiiha
 ‘She is using them.’ (CED-EJ, 2010)
 c. daks [daks]
 taks(i)
 ‘terrapin’ (JRS, Aug 2012)

The labialized velar plosive *kw* occurs as [g^w] in a careful speech, but often occurs as [ɣ^w] or [w] (Foley 1980: ch.6). *kw* occurs word-initially (2.11a) as well as medially (b), before or after a vowel, and before (c) or after a consonant (d). See §2.2.7.2 for the status of *kw* as a singleton.

²² Speakers (such as Feeling (1975)) also write such instances with *t*, *k*, etc., rather than *d*, *g*, etc. Also, plosives before another plosive result from deletion of a vowel from a *CVhT* sequence (Ch.3), and thus such plosives are phonologically *Ch*.

- (2.11) *kw*
 a. #_V *kwana*
 kwhana
 ‘peach’ (Feeling 1975: 146)
- b. V_V *ě:gwa*
 eěkwa
 ‘huge, large’ (Feeling 1975: 89)
- d_C *nokwsi*
 nokwsi
 ‘star’ (Feeling 1975: 148)
- c. C_ *sgwà:hlě:sdi*
 skwààhleěsti
 ‘ball’ (Feeling 1975: 153)

In this section, we have seen that clusters of a plosive plus *h* are realized as voiceless aspirated plosives (e.g. (2.9), (2.10)). Perceptually, these “aspirated” plosives are no more ‘aspirated’ than their English counterparts. An informal measurement of the VOT for aspirated plosives (FIGURE 2-1) confirms this perceptual impression: the aspiration portion of the *C+h* clusters is around 0.04-0.09 seconds, which falls into the category of “slightly aspirated stops” in Cho & Ladefoged (1999: 223).²³ In FIGURE 2-1, the consonants in the middle (e.g. *th* in *khthV*) are those whose VOT was measured, and the sounds (or the word boundary symbol ‘#’) before and after them (e.g. *kh* and *V* in *khthV*) represent the environments where such consonants are positioned.

²³ The measurement was done under the supervision of Dr. Tsan Huang, using the recordings of four speakers of Oklahoma Cherokee, collected by Keith Johnson, Marcia Haag and Durbin Feeling in 2000 and 2001, provided by courtesy of Dr. Keith Johnson at University of California, Berkeley.

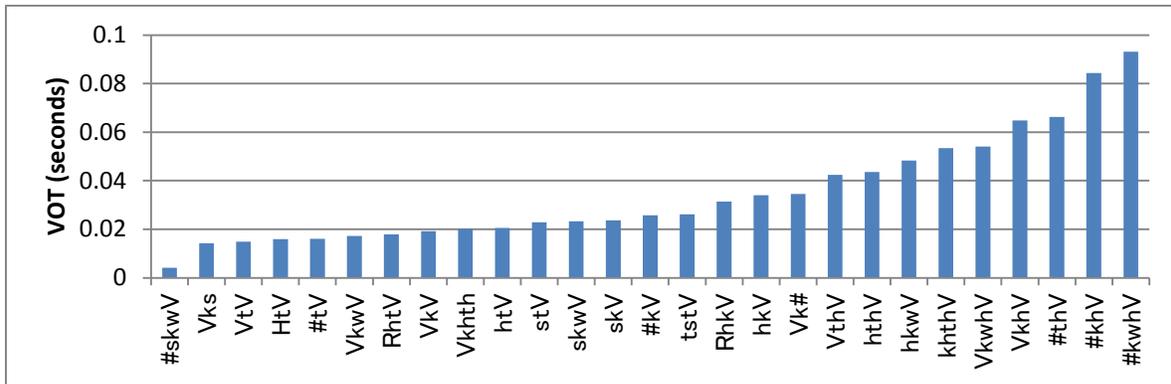


FIGURE 2-1. VOT OF CHEROKEE PLOSIVES.

Note from FIGURE 2-1 that the aspiration is the strongest in word-initial position before a vowel (such as in *#kwhV*), next between vowels (such as in *VkhV*), next after another consonant (such as in *khthV*), and the weakest or non-existent before another consonant (such as in *Vkht*).

Plain plosives (without *h*) are in general unaspirated, as can be seen from FIGURE 2-1 above. Plain plosives are in general voiced between vowels but voicing is weak (or non-existent) after another consonant or word-initially, as can be seen from FIGURE 2-2; FIGURE 2-2 shows the length of voicing during closure of plain plosives in various environments (VDC stands for the voicing during closure, and DC represents the duration of closure).²⁴

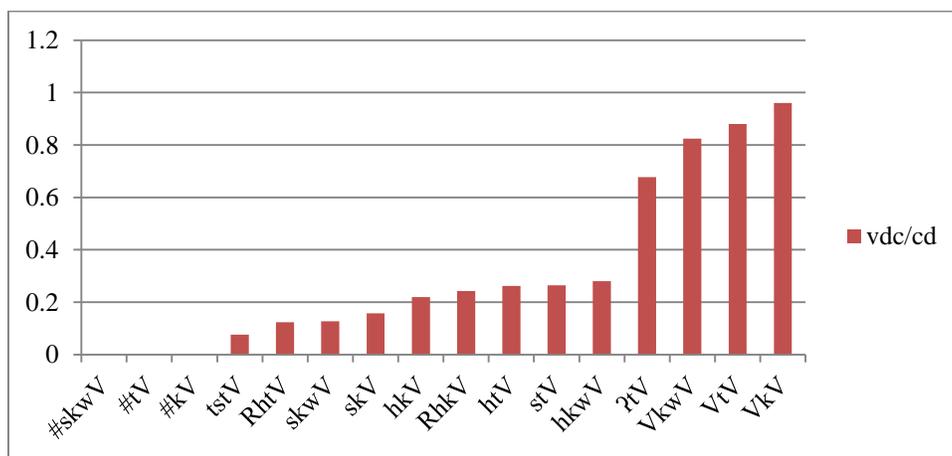


FIGURE 2-2. VOICING OF CHEROKEE PLAIN PLOSIVES

²⁴ The database is the same as for FIGURE 2-1.

2.2.2. Affricates

c is realized either as a voiced alveo-palatal [dʒ] or alveolar affricate [dʒ̥]; the distribution of these is dependent on phonological and sociolinguistic factors as well as inter-speaker variations (Walker 1975: 198; Foley 1980: Ch.6).²⁵ *c* occurs word-initially before a vowel (2.12a), and word-medially before a vowel (b), or rarer after a consonant (c).

- (2.12) *c*
- a. #_V jalagi [dʒalagí]
 calaki
 ‘Cherokee’ (CED-EJ, 2010)
- b. V_V ani:jalagi [ani:dʒalagí]
 aniicalaki
 ‘Cherokee people’ (CED-EJ, 2010)
- c. C_ ahyvhjě:ni
 ahyvhceěni
 ‘his neck, throat’ (Feeling 1975: 29)

Foley (1980) states that the alveo-palatal variant tends to occur in a more formal environment and with older and literate speakers. Most of the speakers of Oklahoma Cherokee I have consulted (including EJ, JRS, and DF) have either [dʒ] or [dʒ̥], while speakers of North Carolina Cherokee tend to have [dʒ]. See §2.2.7.1 for the singleton status of *c*.

When followed by *h*, the *ch* cluster is realized as a voiceless aspirated alveo-palatal affricate [tʃ^h] or postalveolar [tʃ̠]:

- (2.13)
- a. chaně:l [tʃ^haně:l]
 chaneél(a)
 ‘eight’ (CED-DF, 2010)
- b. achú:ja [atʃ^hú:dʒa]
 achuúca
 ‘boy’ (CED-EJ, 2010)

²⁵ Foley (1980: 166) states that the alveo-palatal variant tends to occur word-initially, while the alveolar variant tends to occur intervocalically, but this difference is not observed in the recordings available to me.

tl is a lateral alveolar affricate [dʒ], and occurs word-initially (2.14a) as well as word-medially ((b),

(c)):

(2.14)

- a. dla:me:ha [dʒa:me:há]
tlaameeha
‘bat’ (AH, DF, 2001)
- b. gadlò:yihv:ʔi [gadʒò:jihá:ʔi]
katlòðyihvʔi
‘I was crying.’ (CED-EJ, 2010)
- c. sdladí [sdʒadí]
stlatí(ʔa)
‘You two are putting out a fire’ (JRS, Aug 2012)

tl has merged with *c* in North Carolina Cherokee spoken in Qualla Boundary, but is preserved in the variety spoken in the Snowbird community (Huff 1977: 3). Again, some previous studies treat *tl* as a cluster, but I will argue that it is always a singleton in §2.2.7.2.

When *tl* is followed by an *h*, this *tlh* sequence is realized as a voiceless alveolar affricate [tʃ], as in (2.15). For some speakers of Oklahoma Cherokee, this sound is in free variation with a lateral fricative [ʃ] or voiceless lateral [ɬ] (Feeling 1975: xviii), as (2.16) illustrates:

(2.15) yitinv̂:tlo:híha [jitʰin̂:tlo:híha]
yithinv̂tloohíha
‘You are not applying the brake.’ (EJ, July 2011)

(2.16) a. tla [tʃá] ~ b. hla [ʃá]
tʃla hla
‘not’(EJ, July 2011) ‘not’(DF, July 2011)

2.2.3. Fricatives

Oklahoma Cherokee has two fricatives, *s* and *h*. The *h* will be discussed in §2.2.5. *s* is a voiceless alveolar fricative, and occurs anywhere in a word.

- (2.17) *s*
 a. sě:lu [sě:lú]
 seélu
 ‘corn’ (JRS, Aug 2012)
- b. sgǔ:hi [sgǔ:]
 skoóhi
 ‘ten’ (JRS, Aug 2012)
- c. jǐ:sa [jǐ:sá]
 cíísa
 ‘Jesus’ (JRS, Aug 2012)

Cherokee does not have a voiced alveolar fricative, [z]. *s* is realized as a postalveolar [ʃ] or retroflex [ʂ] in North Carolina Cherokee. *s* cannot be followed by *h*, but after a short vowel *s* is always phonetically preceded by *h* (Feeling 1975: x):

- (2.18) nisdi:weʔa [nihsdi:weʔá]
 nistiiweʔa
 ‘You two are saying it.’ (EJ, July 2011)

One possible analysis is that *s* is always preceded by *h* phonologically as well (Cook 1979, Munro 1996b: 52-53); alternatively the *h* is a result of an automatic postlexical rule and thus not phonemic (Feeling 1975, Montgomery-Anderson 2008). Cook (1979) analyzes the *h* as phonemic and writes it in all cases, while Feeling (1975) does not write the *h* since it is automatic. One argument for the analysis postulating the *h* phonologically is the fact that this *h* behaves the same as other instances of phonemic *h* with respect to Laryngeal Alternation (§1.7.4.1; Munro 1996b: 52-53). As described in §1.7.4.1, when *h* is pre-consonantal in the *h*-grade (2.19a), this *h* is lost in the glottal grade and the preceding vowel is lengthened and this vowel carries a lowfall tone (b). (2.20) shows that *s* behaves as if it has a pre-consonantal *h*, in that in the glottal grade (b) it lengthens the preceding vowel and assigns a lowfall tone on the preceding vowel:

- | | | |
|--------|--|--|
| | <i>h</i> -grade | glottal grade |
| (2.19) | a. hvhda
hvhta
h-vht-Ø-a
2SG.A-use-PCT-IND
'Use it!' (Feeling 1975: 8) | b. gṽ:díha
kṽṽtíha
k-vht-íh-a
1SG.A-use-PRS-IND
'I am using it.' (ibid.) |
| (2.20) | a. jasgõ:sê:s [dʒa ^h sgõ:sê:s]
caskoósées
c-askoó-s-ée(ʔi)=s
2.SG.B-dig-PFT-EVID=Q
'Did you dig it?' (CED-EJ, 2010) | b. gà:sgõ:sg-a
kàaskoóska
k-askoó-sk-a
1SG.A-dig-PRS-IND
'I am digging it.' (Feeling 1975: 51) |

Notwithstanding such a complication, in this study I follow the conventions of Feeling (1975) of not writing *h* before *s* in the orthography (partly because not all the forms with *s* in Feeling (1975) were checked with speakers to confirm the presence of [h]).

2.2.4. Resonants

I call *y*, *w*, *n*, *m* and *l* (as well as their voiceless counterparts) resonants, following the Iroquoian tradition (cf. Lounsbury 1953, Michelson 1988: 10).

m is a marginal phoneme and occurs in only a handful of native words and loanwords, and does not cluster with any other consonants.²⁶ Unlike other resonants, it does not cluster with *h* (or any other consonants).

- (2.21)
- a. *m*
ama
ama
'water' (Feeling 1975: 43)
- b. kama:ma
khamaama
'butterfly, elephant' (Feeling 1975: 138)
- c. asamá:di
asamaáti
'smart' (Feeling 1975: 46)

²⁶ *m* is rare in Northern Iroquoian languages and is not reconstructed for Proto-Iroquoian (Mithun 1979).

n is a alveolar nasal stop and occurs anywhere in the word.

- (2.22) *n*
a. nũ:na [nũ:nâ]
nuúna
'potato' (Holmes & Smith 1976)
b. áʔni
áʔni
'strawberry' (Feeling 1975: 45)

An *hn* cluster is realized as a voiceless alveolar nasal [ɲ]:

- (2.23) hniweʔa [ɲiweʔâ]
hniweʔa
'You are saying.' (EJ, July 2011)

l is an alveolar or dental approximant [l] and occurs anywhere in the word. *hl* cluster is realized either as a lateral fricative [ɬ] (Foley 1980: 123-124) or a voiceless lateral approximant [ɬ̥].

- (2.24) gi:hli [gi:ɬ̥]
kiihli
'dog' (JRS, Aug 2012)

y is a palatal glide [j] and occurs anywhere in the word. *hy* cluster is realized as a voiceless palatal glide [j̥] or a voiceless palatal fricative [ç]:

- (2.25) u:hyv̥:dla [u:j̥ʎ:dɬʒa]
uuhyv̥vtla
'cold' (CED-EJ, 2010)

w is a weakly rounded bilabial or labio-velar glide, [β̥] ~ [w]. An *hw* cluster is realized as a voiceless bilabial or labio-velar fricative, [ɸ] ~ [ɸ̥].²⁷

- (2.26) ahwi [aɸ̥i] ~ [aɸ̥i]
ahwi
'deer' (CED-EJ, 2010)

²⁷ Speakers report that some speakers from the southern part of Cherokee Nation (around Sallisaw) pronounce this as a labio-dental fricative, [f].

2.2.5. Laryngeal Consonants

Laryngeal consonants, *ʔ* and *h*, participate in many phonological processes in Cherokee and they play crucial roles in Cherokee phonology, both segmentally and suprasegmentally.

Articulation of *ʔ* varies from speaker to speaker. Some speakers have a clear glottal stop with a creakiness on the preceding vowel (such as EJ, JRS, DJM), while it is barely audible in some other speakers (such as PR), even intervocalically, where it sounds more like a glide. A glottal stop only occurs intervocalically (2.27a) or less commonly before a consonant (2.27b) in Oklahoma Cherokee, and never after a consonant (§5.3.3.2; Lindsey 1985: 137):

- (2.27) *ʔ*
a. *goʔi*
 koʔi
 ‘grease, oil’ (Feeling 1975: 122)
- b. *áʔni*
 áʔni
 ‘strawberry’ (Feeling 1975: 45)

Glottal stop occurs morpheme-initially, medially and finally, although no verb or noun stem is attested with an initial glottal stop.²⁸

Glottal stop has a wider distribution in North Carolina Cherokee, which retains a post-consonantal glottal stop (Cook 1979). Glottal stop plays a crucial role in Cherokee tonal and accentual phonology, as will be discussed in Ch.8 - Ch.11.

h is a voiceless glottal fricative and occurs anywhere in the word. *h* occurs anywhere in a morpheme, except before or after *s*, *m* or another laryngeal consonant. *h* combines with various consonants and these *C+h* combinations are realized as aspirated plosives/affricates and voiceless resonants (§2.2.6). Various phonological and morphophonological processes target *h* (such as Laryngeal Alternation (§1.7.1.4, Ch.4) and Vowel Deletion/*h*-Metathesis (Ch.3)).

²⁸ Some verb stems begin with *ʔl-* or *ʔn-* sequences, but such sequences are analyzed to be a result of metathesis of *Cʔ* sequences (§5.3.3.2, §9.1).

2.2.6. Phonological status of the *Ch* sequences

In the sections above, we have seen that *Ch* sequences are phonetically realized as aspirated plosives/affricates or voiceless resonants. Speakers strongly prefer to write aspirated plosives/affricates with single letters (*k*, *t*, *kw*, etc.), and some studies on Cherokee have proposed partial phonemicization of the aspirated plosives/affricates and voiceless resonants (Munro 1996b, Flemming 1996). In this section, I give some evidence to show that these sounds are not singletons but are synchronically *C* plus *h* sequences.

In some cases, a *Ch* sequence alternates with a plain *C* due to certain morphophonological processes. In (2.28), the 3SG.A pronominal prefix alternates between *kha-* and *ka-* (as a result of *h*-Metathesis; §3.2), while in (2.29) the verb root alternates between *-akwhiy-* and *-akwiy-* (as a result of Laryngeal Alternation; §1.7.4.1, Ch.4).

- | | | |
|--------|---|--|
| (2.28) | a. kanalu:sga
kha-naluuska
ka-hnaluusk-a
3SG.A-ascend:PRS-IND
'He is ascending.'
(Feeling 1975: 138) | b. gané:ʔa
ka-nééʔa
ka-neéʔ-a
3SG.A-get.FL:PRS-IND
'He is getting it (flexible).'
(Feeling 1975: 104) |
| (2.29) | a. hakwiya
h-akwhiy-a
h-akwhiy-Ø-a
2SG.A-pay-PCT-IND
'Pay it!' (Feeling 1975: 36) | b. gagwiyíha
k-akwiy-íha
k-akwhiy-íh-a
1SG.A-pay-PRS-IND
'I am paying' (ibid.) |

In many cases, phonetically aspirated plosives/affricates as well as voiceless resonants can be shown to result from sequences of a consonant plus *h* (Huff 1977: Ch. 2), just as in other Iroquoian languages. First, sometimes the morpheme boundary comes between them (2.30), and sometimes the

	<i>h</i> -grade	glottal grade
(2.33)	a. gatʰvsɡa	b. gaʔdʰvsɡa
	kathʰvska	kaʔtʰvska
	k-athʰvsk-a	k-athʰvsk-a
	3SG.A-hang.up:PRS-IND	1SG.A-hang.up:PRS-IND
	‘He is hanging it up.’ (Feeling 1975: 116)	‘I am hanging it up.’(ibid.)

See Ch.4 on more on Laryngeal Alternation of *C* + *h* clusters.

In contrast to the arguments in favor of the cluster analysis of the aspirated sounds, there is no convincing evidence in favor of the singleton analysis of these sounds. It is true that *h* (along with *ʔ* and *s*) behaves differently from other consonants phonotactically in that it can occur next to another consonant, while consonant clusters not involving *h* (or *ʔ* or *s*) are in general impermissible (§5.1). This fact might appear to argue for the singleton analysis of aspirated consonants, but note that *s* (and *ʔ* to some extent) behaves the same way as *h* does; *s* can occur next to another consonant (e.g. *hiski* ‘five’, *taksi* ‘terrapin’). If *Ch* were a singleton based on phonotactics, so would be *Cs* such as *ks* or *kws* (as well as *hC* or *sC*), which is highly implausible. Syllable structure does not say much about the status of these consonants either. *Ch* sequences do not close a syllable and counts as an onset cluster, but so do *Cs*, *sC*, even *ChC* sequences (§5.3.2.1). So, I assume the peculiar phonotactic properties of *h*, *ʔ* and *s* are due to their phonetic nature (Kingston 2011: 2312).

2.2.7. Internally complex segments: *c*, *kw* and *tl*

Among the consonantal phonemes in TABLE 2-2, *c*, *kw* and *tl* have been analyzed as clusters by some scholars. In this section, I will argue that all the instances of *c*, *kw* and *tl* are singletons.

2.2.7.1. *c*

Cook (1979) analyzes *c* ([dʒ] ~ [dʒ]) as a *t* plus *s* cluster, but I analyze *c* as a singleton rather than a cluster. First, at least in Oklahoma Cherokee, *c* is realized as a voiced alveo-palatal or alveolar affricate

analysis of aspirated plosives/affricates and voiceless resonants.

[dʒ] ~ [dz], while a *ts* cluster is realized as a voiceless alveolar affricate [ts] (c.f. §5.3.3.5), and thus *c* cannot be analyzed to be a cluster of *ts*.³²

(2.34)

a. *c* ga:ǰagalíha
 kaačakalíha
 ‘He is ripping it.’ (Feeling 1975: 97)

b. *ts* hisgwanù:tsa
 hiskwanùùtsa
 ‘Suck it!’ (Feeling 1975: 53)

The second piece of evidence for the singleton analysis of *c* is external. In the Cherokee Syllabary (§1.5.3), a sequence of a consonant plus *s* is generally represented by two characters. Thus, a word *taksi* ‘terrapin’ is represented as 𐌆𐌃𐌆 da-gi-si (Feeling 1975: 70), where the *ks* sequence is represented by two letters. Syllables beginning with *c*, on the other hand, are represented by just one letter: *calaki* ‘Cherokee’ is represented as 𐌆𐌃𐌆𐌃 *ja-la-gi*. If *c* were a cluster, we would expect it to be represented by letters from the *d*-row and the *s*-row.³³

2.2.7.2. *kw, tl*

King (1975), Feeling (1975), and Cook (1979) treat *kw* and *tl* as clusters *k* plus *w* and *t* plus *l*. Again, I argue that these are singletons, following Huff (1977: 39-40), based on the following arguments. First, Cherokee bans a sequence of **TR* (cf. §5.1; where *T* represents a plosive/affricate and *R* represents any resonant), and thus clusters such as **kl*, **tw* are not found. If *kw* and *tl* were clusters, these would be the only clusters violating the constraint **TR* (cf. Huff 1977: 39-40). Secondly, all CCCC clusters in Oklahoma Cherokee contain at least one *h* (§5.1.3). If we assume that *kw* and *tl* were clusters, this

³² *c* + *h* sequence is realized as a voiceless aspirated alveo-palatal affricate [tʰe] or postalveolar [tʃ] (§2.2.2).

³³ Huff (1977: 38) and Scancarelli (1987) also argue for the singleton analysis, stating that “if /c/ is a /ts/ cluster, ad hoc rules of pronunciation must be formulated to account for the fact that /s/ is always pronounced as [s] except after /t/, where it is pronounced as [z] or [ʒ] (Scancarelli 1987: 24-25)”. Huff (1977: 38-39) also raises the fact that a stop-plus-s cluster is otherwise not found as another piece of evidence, but in fact a stop-plus-s cluster does occur in Oklahoma Cherokee (such as *taksi* ‘terrapin’).

generalization no longer holds: there are forms such as *akwsto* ‘pillow’ (Feeling 1975: 37) or *tskwaléékwalá* ‘whippoorwill’ (Feeling 1975: 157), which would have CCCC clusters without any *h*. The third piece evidence is, again, language external. The Cherokee Syllabary (§1.5.3) employs one letter each for syllables beginning with *kw* or *tl*: thus, *kwa* is represented as \mathbb{T} and *tla* as $\mathbb{8}$. Other consonant clusters are represented using more than one letter.

Scancarelli (1987: 23, 47-48), citing Geoffrey Lindsey’s suggestion, argues that *kw* and *tl* may be either units or *k+w* and *t+l* clusters, on the ground that when they cluster with *h* (*kwh* and *tlh*) they have variations with respect to Laryngeal Alternation (§1.7.4.1). See §4.1.4 for an argument against such an analysis.

2.3. Word-final vowels

Word-final vowels are peculiar in many respects. First, word-final vowels are usually deleted; §2.3.1 looks at this phenomenon, and lays out the environment where this deletion occurs. When the word-final vowel is retained, it bears a boundary HL% or H% tone and vowel length contrast is neutralized (§2.3.2).

2.3.1. Word-final vowel deletion

Final vowels of Cherokee words are generally not pronounced, unless the vowel is in utterance-final position (Bender & Harris 1947: 17; Feeling 1975: xii; Scancarelli 1987: 22, 46; Montgomery-Anderson 2008: 58ff.). Some speakers do not pronounce word final vowels even in utterance-final position. Thus, even in an elicitation setting, JRS or DJM usually give a form without the final vowel, and only occasionally give the ‘longer’, ‘full’ forms:

(2.35)

- a. gă:t [gă:t^h]³⁴
 kaát(a)
 ‘soil, dirt’ (JRS, Aug 2012)

³⁴ The full forms are from Feeling (1975).

- b. sǎ:kʰ [sǎ:kʰtʰ]
svǎkhth(a)
'apple' (JRS, Aug 2012)
- c. sgǔ: [sgǔ:]
skoó(hi)
'ten' (JRS, Aug 2012)
- d. wě:s [wě:s]
weés(a)
'cat' (JRS, Aug 2012)
- e. yǔ:n [yǔ:n]
yoón(a)
'bear' (JRS, Aug 2012)

As can be seen in (2.35c), when the final vowel deletes, an onset *h* (and *ʔ*) of the final syllable is also deleted (Feeling 1975: xii, Scancarelli 1987: 46).³⁵ The onset plosive and affricate of the final syllable is aspirated when the final vowel deletes, whether it is phonologically plain (a) or a cluster with an *h* (b). An onset resonant does not devoice when the final vowel is deleted (e), at least for JRS, although some previous descriptions state that they do (Scancarelli 1987: 26, Montgomery-Anderson 2008: 41). In some cases, a whispered echo vowel is audible when the final vowel is deleted.

The deleted vowel is in many cases *a* or *i*, but other vowels can also delete. (2.36) - (2.37) give some forms where the final *u* is deleted:

	Deletion		No Deletion
(2.36)	a. gù:k [gù:kʰ] kùùk(u) 'bottle' (Holmes & Smith 1976)	~	b. gù:gu [gù:gù] (ibid.)
(2.37)	a. gwa:gw [gwa:kʰw] kwaakw(u) 'Bob' (Homes & Smith 1976)	~	b. gwa:gwu [gwa:gwù] (ibid.)

³⁵ When the penultimate syllable is short, it appears that the laryngeal consonant is retained: *koʔ* [gǔʔ] (< *koʔi*) 'oil', *soh* [soʰ] 'hickory nuts' (< *sohi*) (JRS, July 2013).

Word-final vowels freely delete even from bimoraic words, resulting in a monomoraic forms (coda consonants are not moraic in Cherokee; cf. §5.3.2):

(2.38)

- a. at [at^h]
at(a)
'wood' (JRS, Aug 2012)
- b. am [am]
am(a)
'water' (JRS, Aug 2012)

Some words fluctuate between forms with different vowels (especially between *a* and *i*) when the final vowel is retained, possibly because the forms without the final vowel are far more common:

- | | | | |
|--------|--|---|---|
| | Deletion | | No Deletion |
| (2.39) | a. kó:k [k ^h ó:k ^ʰ]
khóók(a)
'crow' (Holmes & Smith 1976) | ~ | b. [k ^h ó:gâ] (ibid.) ~ [k ^h ó:gî]
(ibid.) |
| (2.40) | a. nũ:n [nũ:n]
nuún(a)
'potato' (Holmes & Smith 1976) | ~ | b. [nũ:nâ] (ibid.) ~ [nũ:nî]
(ibid.) |

Some speakers give forms with the final vowels in an elicitation setting (for instance, DF or EJ), while for some other speakers deletion of the word-final vowel is obligatory and the forms with the word-final vowels are ungrammatical (Chris Koops, p.c.).

Word-final vowels are obligatory when a clitic is attached, even for speakers for whom deletion of the final vowels is the norm (Lindsey 1985: 139). In (2.41) - (2.42), the (a) forms are isolation forms and the final vowels are deleted, while the (b) forms have a clitic =*sk(o)* (interrogative), and thus the final vowels of the words are retained (in exchange, the final vowel of this clitic, *o*, is deleted):

- | | without a clitic | with a clitic |
|--------|---|---|
| (2.41) | a. gʷ:n
kʷv̄n
kʷv̄n(a)
turkey
‘turkey’ (JRS, July 2013) | b. gʷ:násk
kʷv̄násk ³⁶
kʷv̄na=sk(o)
turkey=Q
‘turkey?’ (ibid.) |
| (2.42) | a. aǰ:l
aciíl
aciíl(a)
fire
‘fire’ (JRS, July 2013) | b. aǰ:lásk
aciílásk
aciíla=sk(o)
fire=Q
‘fire?’ (ibid.) |

However, when the final syllable has a laryngeal consonant as the onset (i.e. *hV*, *?V*), it appears that this final syllable can be omitted even before a clitic (Wyman Kirk, p.c. 2013). The (c) form justifies the final syllable *ha*, from a different speaker:

- | | | |
|--------|--|--|
| (2.43) | a. jadu:lí
catuulí
c-atuul-í(h-a)
2SG.B-want-PRS-IND
‘You want it.’ (JRS, July 2013) | b. jadu:lí:sk
catuulí:sk
c-atuul-í(h-a)=sk(o)
2SG.B-want-PRS-IND=Q
‘Do you want it?’ (ibid.) |
| | c. ù:du:líha
ùùtuulíha
uu-atuul-íh-a
3SG.B-want-PRS-IND
‘He wants it.’ (Feeling 1975: 163) | |

Not all the word-final vowels can be deleted, even in the absence of a clitic. As stated in Scancarrelli (1987: 46), when a word ends in a long vowel, this long vowel cannot be deleted but instead is shortened. Thus, as (2.44) - (2.46) show, whenever a word-final vowel is retained in JRS’s speech (a), such vowels are long before a clitic, as shown in (b). Compare these cases with those in (2.41) - (2.42) above:

³⁶ Clitics have various tonal effects on the preceding vowel (Haag 1999, Haag 2001, Johnson 2005, Montgomery-Anderson 2008: 141), but the details of these effects are not yet fully understood.

- | | | |
|--------|---|---|
| | without a clitic | with a clitic |
| (2.44) | a. sě:lu [sě:lú] (*sě:l)
seélu
seéluu
corn
'corn' (JRS, July 2013) | b. sě:lú:sk
seéluúsk
seéluu=sk(o)
corn=Q
'corn?' (ibid.) |
| (2.45) | a. hawi:ya [hawi:yá]
hawiiya
hawiiyaa
meat
'meat' (JRS, July 2013) | b. hawi:yá:sk
hawiiyáásk
hawiiyaa=sk(o)
meat=Q
'meat?' (ibid.) |
| (2.46) | a. di:sũ:lo [di:sũ:ló]
tĩsuúlo
ti-Ø-ààsuúloo
DIST-3SG.A-shoe
'shoes' (JRS, July 2013) | b. di:sũ:ló:sk
tĩsuúlóósk
ti-Ø-ààsuúloo=sk(o)
DIST-3SG.A-shoe-Q
'shoes?'' (ibid.) |

2.3.2. Tone and length of the word-final vowel

When a word-final vowel is retained, it is often nasalized, and this nasalization can transfer to a preceding vowel if these vowels are separated by a laryngeal consonants *h* or *ʔ* (Huff 1977: 1-2).

Furthermore, the word-final vowel is assigned a boundary H% or HL% tone when this vowel is retained (Lindsey 1985: 125, 168, Haag 2001: 414, Johnson 2005: 17):

- (2.47) sgǒ:hi [sgǒ:hí]
skoóhi
'ten' (CED-EJ, 2010)

It appears that an underlying long vowel, which is shortened at the word-final position, is assigned a boundary H% tone, while an underlying short vowel, which can be omitted at the word-final position, is assigned a boundary HL% tone when this vowel is retained. The former case is exemplified by a nominal suffix *-i*; Durbin Feeling (p.c., July 2011) remarked that this vowel is always assigned a high tone, rather than a high-low tone (2.48a). This final vowel is also generally not deleted, and when a clitic attaches to this suffix, this vowel is long, showing that this vowel is underlyingly long (b):

- | | | |
|--------|--|--|
| (2.48) | a. u:yv:sdi [u:yv:sdǐ]
uuyvvsti
uu-yvv-st-i
3SG.B-enter-INF-NOM
‘office’ (DF, July 2011) | b. jalhdà:yhdí:sk
calhtààyhtíísk
c-alistà(?)yvht-ii=sk(o)
2SG.B-eat.meal:INF-NOM=Q
‘do you eat?’ (JRS, 2013) |
|--------|--|--|

When the word-final vowel is retained, the underlying vowel length contrast is neutralized and both short and long vowels are realized as short vowels. The forms in (2.49) and (2.50) have final short vowels in (a), but the underlying vowel length contrast emerges when a clitic is attached, as the (b) forms show:

- | | | | |
|--------|--|--|---|
| | without a clitic | | with a clitic |
| (2.49) | a. i:nada
iinata
iinata
snake
‘snake’ (Feeling 1975: 133) | | b. i:nadásk
iinatásk
iinata=sk(o)
snake=Q
‘snake?’ (JRS, July 2013) |
| (2.50) | a. dala:la
talaala
talaalaa
woodpecker
‘woodpecker’ (Feeling 1975: 72) | | b. dala:lá:sk
talaaláásk
talaalaa=sk(o)
woodpecker=Q
‘woodpecker?’ (JRS, July 2013) |

In this study, following most of the works on Cherokee (Feeling 1975, Montgomery-Anderson 2008, etc.), I do not mark vowel length and tones of word-final syllables, since they are predictable in most cases.

Chapter 3. Vowel Deletion and *h*-Metathesis

3.0. Introduction

A *CVh* sequence is dispreferred in Oklahoma Cherokee, and when such a sequence occurs, it is remedied by deleting the vowel when *h* is followed by a plosive/affricate or by another vowel (henceforth ‘Vowel Deletion’) as in (3.1a), or ‘metathesizing’ *V* and *h* when *h* is followed by a resonant, as in (3.2a) (henceforth ‘*h*-Metathesis’). The (b) forms justify the presence of the deleted vowel or the original position of *h*. Note that the *C* in the dispreferred *CVh* sequence is not also an *h*. The relevant sequences are underlined in the second and the third lines.

- | | | | | |
|-------|----|--|----|---|
| (3.1) | a. | <i>kdf</i> ha
<u><i>kht</i></u> fa
<u><i>k-(v)ht-ih</i></u> -a
3SG.A-use-PRS-IND
‘He is using it.’ (Feeling 1975: 142) | b. | <i>hvd</i> ha
<u><i>hv</i></u> hta
<u><i>h-vht-Ø</i></u> -a
2SG.A-use-PCT-IND
‘Use it!’ (ibid.) |
| (3.2) | a. | <i>kanalu:sga</i>
<u><i>kanalu</i></u> uska
<u><i>ka-hnalu</i></u> -sk-a
3SG.A-ascend-PRS-IND
‘He is ascending.’ (Feeling 1975: 138) | b. | <i>hihnalú:hi</i>
<u><i>hihnalu</i></u> úhi
<u><i>hi-hnalu</i></u> ú-h-i
2SG.A-ascend-PCT-IND
‘Ascend!’ (ibid.) |

From this fact, we can propose that Oklahoma Cherokee has a constraint against a *CVh* sequence:

- (3.3) **CVh*

This chapter outlines the effects of this constraint, **CVh*. First in §3.1 I will discuss Vowel Deletion, as exemplified in (3.1). §3.2 discusses *h*-Metathesis, exemplified in (3.2), and shows that *h*-Metathesis applies when *h* is followed by a resonant. §3.3 discusses cases where the *CVh* sequence cannot be remedied due to constraints ranked higher than **CVh*. §3.4 summarizes the section so far. §3.5 attempts a unified account of Vowel Deletion and *h*-Metathesis. §3.6 concludes. In the Appendix to this chapter, I will discuss how the deleted vowels due to Vowel Deletion are represented in the Cherokee Syllabary.

Vowel Deletion interacts with the tonal and accentual phenomena to be discussed in Part II, such as a tone shift (Ch.13, Ch.14). Moreover, metathesis in general has been a topic of debate due to its apparent phonetic “unnaturalness” (Blevins & Garrett 1998, Blevins & Garrett 2004, Buckley 2011), and *h*-Metathesis in Oklahoma Cherokee has attracted some theoretical attention (Flemming 1995, Blevins & Garrett 1998, and Buckley 2011). This chapter provides a detailed description and analysis of Vowel Deletion and *h*-Metathesis, and attempts a unified coherent account of these two processes.

3.1. Vowel Deletion

3.1.1. Basic facts

A short vowel in the *CVh* sequence is deleted when followed by a plosive or an affricate. Compare the (a) and (b) forms below. The forms in (a) and (b) share the same roots, but in (a) the short vowel which is present in (b) forms is absent (deleted vowels are in parentheses). (b) forms do not undergo Vowel Deletion, due to factors to be discussed in §3.3, or due to Laryngeal Alternation which deletes *h* in (3.6). (3.7) is in free variation.

	Vowel Deletion	No Vowel Deletion
(3.4)	a. à:nhdlí àànhlí an-(v)htl-í(h-a) 3PL.A-sharpen-PRS-IND ‘They are sharpening it.’ (JRS, Aug 2011)	b. hvhdla hvhtla h-vhtl-Ø-a 2SG.A-sharpen-PCT-IND ‘Sharpen it!’ (Feeling 1975: 143)
(3.5)	a. ùwhtánṽ:ʔi ùwhthánṽʔi ³⁷ uw-(v)ht-áhn-vṽʔi 3SG.B-use-PFT-ASR ‘He used it.’ (Feeling 1975: 143)	b. hvhda hvhta h-vht-Ø-a 2SG.A-use-PCT-IND ‘Use it!’ (ibid.)

³⁷ Note that this form undergoes both Vowel Deletion (deletion of *v*) and *h*-Metathesis (metathesis of *a* and *h*).

- (3.6) a. de:gú:kdiha
teekúúkhtíha³⁸
tee-k-uuk(o)ht-íh-a
DIST-3SG.A-decide-PRS-IND
'He is deciding.' (Feeling 1975: 78)
- b. de:gú:gò:díha
teekúúkòtíha
tee-k-uukoht-íh-a
DIST-1SG.A-decide-PRS-IND
'I am deciding.' (ibid.)
- (3.7) a. itlgǔ
itlhkǔ³⁹
i-tl(u)hkvv(ʔi)
I-tree/SH
'tree' (CED-EJ, 2010)
- ~
- b. dluhǔ
tluhkǔ
tluhkvv(ʔi)
tree/SH
'tree' (Holmes & Smith 1976: 100)

The short vowel between a consonant and *h* is completely deleted; it is not a voiceless vowel.

FIGURE 3-1 shows the spectrum and the spectrogram of (3.1) (with DIST *tee-*); no formant structure is found between [k] and [d]:

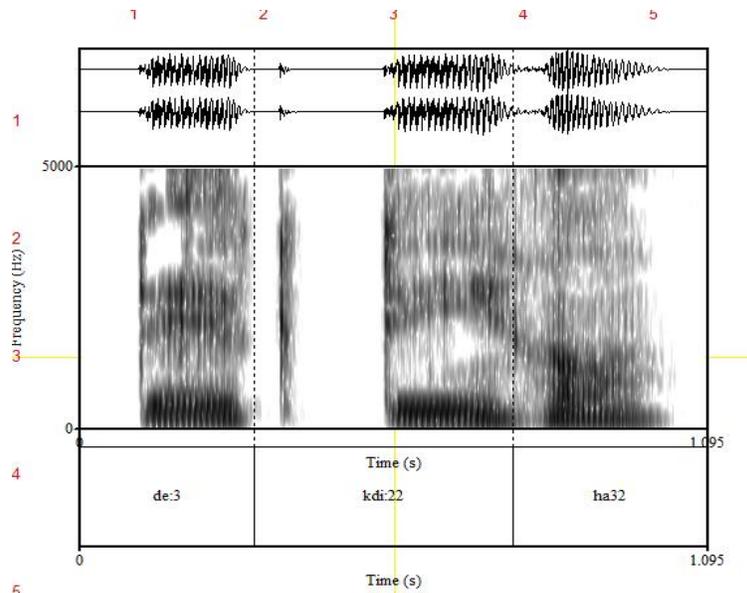


FIGURE 3-1. *téékhtiiha* 'he is using it.' (EJ, male, 2010)

Note that in all of the forms above, *h* is followed by a plosive or an affricate (*k, kw, t, tl, c*). Vowel Deletion is optional when *CVh* is followed by another vowel, and when the *C* is a plosive ($TV_1hV_2 \rightarrow$

³⁸ The high tone on the second syllable is due to the distributive (DIST) pre-pronominal prefix (Ch.13).

³⁹ The initial vowel *i-* is a prothetic vowel to avoid the word-initial *tlhC* sequence.

ThV₂). (3.8b) shows that the 1SG.B pronominal prefix has the vowel *i* before other consonant-initial stems:

- | | Deletion | No Deletion |
|-------|---|--|
| (3.8) | a. à:kawó:sdiha
àà <u>khaw</u> óostíha
a <u>k(i)</u> -hawóo(?)st-ih-a
1SG.B-smother-PRS-IND
‘I am smothering.’ (Feeling 1996: 166) | b. à:giyo:dé:ʔa
àà <u>kiyoo</u> tééʔa
a <u>ki</u> -yooteéʔ-a
1SG.B-be.itching:PRS-IND
‘I am itching’ (Feeling 1996: 185) |
| (3.9) | à:ki:sohdâ:neha
àà <u>hiiso</u> htáaneha
a <u>k(i)</u> -hiisohtáa(?)n-eh-a (< *-hiisohtaʔn-)
1SG.B-be.lonesome-DAT:PRS-IND
‘I am lonesome.’ (Feeling 1996: 166) | |

Vowel Deletion also occurs in a *CVs* sequence when *s* is followed by a plosive or an affricate (*CVsT*; (3.10), (3.11)) or by a vowel (*CVsV*; (3.12), (3.13)). Again, (b) forms do not undergo Vowel Deletion, due to factors discussed in §3.3:

- | | Vowel Deletion | No Vowel Deletion |
|--------|---|--|
| (3.10) | a. à:ksgo:lí:yê:ʔv̆
àà <u>kskooli</u> yééʔv̆
a <u>k-(a)</u> skoolii-ééʔ-v̆(ʔi)
1SG.B-rub-PRS-IND
‘I rubbed it.’ (JRS, Aug 2012) | b. hasgo:lí:ya
<u>haskooli</u> íya
<u>h-askooli</u> y-Ø-a
2SG.B-rub-PCT-IND
‘Rub it!’ (Feeling 1975: 50) |
| (3.11) | a. à:nsgö:sga
àà <u>nsko</u> óska
a <u>n-(a)</u> skoó-sk-a
3PL.A-dig-PRS-IND
‘They are digging it.’ (JRS, Aug 2012) | b. hasgö:la
<u>hasko</u> óla
<u>h-asko</u> ó-l-a
2SG.A-dig-PCT-IND
‘Dig it!’ (Feeling 1975: 51) |
| (3.12) | a. à:ksósga
àà <u>ksó</u> ska
a- <u>k(a)</u> só-sk-a
3SG.A-go.downhill-PRS-IND
‘He is going downhill.’ (Feeling 1975: 34) | b. jigà:sósga
cikààsóska
ci- <u>kasó</u> -sk-a
1SG.A-go.downhill-PRS-IND
‘I am going downhill.’ (ibid.) |

- (3.13) a. gansané:ʔa
 kansanééʔa
 ka-n(a)sanééʔ-a
 3SG.A-pull:PRS-IND
 ‘He is pulling it.’ (Feeling 1975: 111)
- b. jinà:sané:ʔa
 cinààsanééʔa
 ci-nasanééʔ-a
 1SG.A-pull:PRS-IND
 ‘I am pulling it.’ (ibid.)

Vowel Deletion can be summarized as follows (see also Cook 1979: 7 and Flemming 1996: 24).

The following representations are used throughout this chapter: C = any consonant (but see §3.3.2), T = plosives and affricates (k , kw , t , tl , c) and V = short vowel:

- (3.14) Vowel Deletion
- a. $C(V)hT \rightarrow ChT$
 b. $T(V)hV \rightarrow ThV$
 c. $C(V)sT \rightarrow CsT^{40}$
 d. $C(V)sV \rightarrow TsV$

3.1.2. Optionality of Vowel Deletion

Vowel Deletion is optional for some forms, at least for some speakers (Bender & Harris 1946: 17, Huff 1977: 34). First, Vowel Deletion is optional in $TVhV$ sequences; in the following forms, (a) and (b) are in free variation.

- | | Vowel Deletion | ~ | No Vowel Deletion |
|--------|---|---|---|
| (3.15) | a. à:kawó:sdiha
ààk <u>h</u> awóostíha
ak(i)-hawóo(?)st-ih-a
1SG.B-smother-PRS-IND
‘I am smothering.’ (Feeling 1996: 166) | | b. à:gihawó:sdiha
ààk <u>i</u> hawóostíha
aki-hawóo(?)st-ih-a
(Feeling 1996: 166) |
| (3.16) | a. à:ki:sohdâ:neha
ààk <u>i</u> sohtáaneha
ak(i)-h <i>i</i> sohtáa(?)n-eh-a (<*-hiisohtaʔn-)
1SG.B-be.lonesome-DAT:PRS-IND
‘I am lonesome.’ (Feeling 1996: 166) | ~ | b. à:gihi:sohdâ:neha
ààk <u>i</u> h <i>i</i> sohtáaneha
aki-h <i>i</i> sohtáa(?)n-eh-a
(Feeling 1996: 166) |

⁴⁰ If we treat s as always being preceded by h phonologically (hs), and if we include s in T and T is an obstruent, (a) - (c) above can be collapsed to one process, $C(V)hT \rightarrow ChT$. See §2.2.3 for discussion of h before s .

Not all *TVhV* sequences appear to undergo Vowel Deletion. Some forms were never elicited with Vowel Deletion, especially when the *h* is in the last syllable (Cook 1979: 7):

- (3.17) *à:giha*
 ààkiha (**ààkha*)
 aki-h-a
 1SG.B-have.CMP:PRS-IND
 ‘I have a solid object.’ (Feeling 1975: 165)

Secondly, Vowel Deletion is optional with certain pronominal prefixes, such as 2DU *st-* (3.18), 1PL.IN.A *iit-* (3.19), etc. for JRS:

- | | Vowel Deletion | ~ | No Vowel Deletion |
|--------|---|---|--|
| (3.18) | a. <i>stdi:yá</i>
<i>sthtiiyá</i>
<i>st-(v)ht-iiy-a</i>
2DU-use-PRS-IND
‘You two are using it.’ (JRS, Aug 2012) | | b. <i>sdvhd:iyá</i>
<i>stvhtiiyá</i>
<i>st-vht-iiy-a</i>
(<i>ibid.</i>) |
| (3.19) | a. <i>ì:tsgö:sk</i>
<i>ìtskoósk</i>
<i>ìt-(a)skoó-sk(-a)</i>
1PL.IN.A-dig-PRS-IND
‘Y’all and I are digging it.’ (JRS, Aug 2012) | | b. <i>ì:dasgö:sk</i>
<i>ìdasgoósk</i>
<i>ìt-askoó-sk(-a)</i>
(<i>ibid.</i>) |

The motivation for not deleting the vowels in these cases might be either the avoidance of a consonant cluster (2.18), or avoidance of homonymy: (2.19a) would be homonymous with a form with 2PL pronominal prefix *iic-*, due to the merger of *c* and *t* before *s* (§5.3.3.5).

Vowel Deletion appears to be optional between other pronominal prefixes and the stem vowel in some cases for EJ too:

- | | Vowel Deletion | ~ | No Vowel Deletion |
|--------|--|---|--|
| (3.20) | a. <i>kdi:ha</i>
<i>khtiiha</i>
<i>k-(v)ht-iih-a</i>
3SG.A-use-PRS-IND
‘He is using it.’ (EJ, July 2011) | | b. <i>gvhd:iha</i>
<i>kvhtiiha</i>
<i>k-vht-iih-a</i>
(EJ, July 2011) |

- (3.21) a. kdli:ha ~ b. gvhdli:ha
khtlíiha kvhtlíiha
k-(v)htl-iih-a k-vhtl-iih-a
3SG.A-sharpen-PRS-IND
‘He is sharpening it.’ (EJ, July 2011) (EJ, July 2011)

However, Vowel Deletion appears to be obligatory within a stem for EJ; forms without Vowel Deletion were judged to be ungrammatical by EJ:

- (3.22) a. go:ksga b. go:gì:sga
kookkska (*kookiska) kookkìska
k-ook(i)-sk-a k-ooki-sk-a
3SG.A-smoke-PRS-IND 1SG.A-smoke-PRS-IND
‘He is smoking.’ (EJ, July 2011) ‘I am smoking.’ (Feeling 1975: 122)

- (3.23) a. gansané:ʔa b. jìnà:sané:ʔa
kansanéʔa (*kansasanéʔa) cinàsanéʔa
ka-n(a)san-eéʔ-a ci-nasan-eéʔ-a
3SG.A-pull-REV:PRS-IND 1SG.A-pull-REV:PRS-IND
‘He is pulling it.’ (EJ, July 2011) ‘I am pulling it.’ (Feeling 1975: 111)

In some cases, Vowel Deletion appears to be obligatory even between a pronominal prefix and the stem for EJ, and forms without Vowel Deletion were judged ungrammatical. Again, (b) are given for comparison.

- (3.24) a. kdvska b. hvhdvʔṽ:ga
khtvska (*kvhtvska) hvhtvʔṽka
k-(v)ht-vsk-a h-vht-vʔṽ(?)k-a (< *-vʔvʔk-)
3SG.A-put.FL.into.fire-PRS-IND 2SG.A-put.FL.into.fire:PCT-IND
‘He is putting FL into fire.’ (EJ, July 2011) ‘Put FL into fire!’ (Feeling 1975: 144)

- (3.25) a. dé:kgi:ló:ʔa b. tvhgí:lo:ja
téékhkiilóóʔa (*teekṽhkiilóóʔa) thvhkíflooca
tee-k-(v)hkiilóóʔ-a t-h-vhkiiloooc-a
DIST-3SG.A-wash.FL:PRS-IND DIST-2SG.A-wash.FL:PCT-IND
‘He is washing FL.’ (EJ, July 2011) ‘Wash FL!’ (Feeling 1975: 79)

In sum, Vowel Deletion appears to be optional depending on the phonological and morphological contexts, albeit their applicability cannot be stated in absolute terms.

3.2. *h*-Metathesis

Vowel Deletion applies when *h* (or *s*) is followed by a plosive/affricate or a vowel. When *h* is followed by a resonant consonant (*l, n, w, y*), the *CVh* sequence is instead remedied by “metathesizing” *V* and *h* (*CVhR* → *ChVR*).⁴¹ Compare (a) and (b) forms below, with the following morphemes: (3.26) PFT -*ahn*-, (3.27) -*hnoo*- ‘speak’, and (3.28) -*hyvvs*- ‘nose’. The *h* of these morphemes metathesizes with the preceding short vowel in (a). Compare these forms with (b), where *h* remains in the original position. The (b) forms do not undergo *h*-Metathesis due to the factors to be discussed in §3.3. The metathesized *VhR* sequences are underlined.

	<i>h</i> -Metathesis	No <i>h</i> -Metathesis
(3.26)	a. ù:sestánṽ:ʔi ùùsest <u>hán</u> ṽṽʔi uu-(a)sest- <u>áhn</u> -ṽṽʔi 3SG.B-include-PFT-IND ‘He included him.’ (Feeling 1975: 49)	b. ù:wu:tahnṽ:ʔi ùùwuuth <u>ahn</u> ṽṽʔi uw-uuth- <u>ahn</u> -ṽṽʔi 3SG.B-snow-PFT-IND ‘It snowed.’ (Feeling 1975: 125)
(3.27)	a. dà:hliño:héha tàà <u>h</u> liñoohéha ⁴² t-Ø- <u>ali</u> - <u>hnoo</u> -héh-a DIST-3SG.A-MID-speak-PRS-IND ‘He is conversing.’ (Feeling 1975: 69)	b. u:hno:hehdi uuhnoohehti <u>uu</u> - <u>hnoo</u> -heht-i 3SG.B-speak-INF-NOM ‘for him to speak’ (Feeling 1975: 141)
(3.28)	a. à:hliỹṽ:sánà:wsdíha àà <u>hi</u> ỹṽṽsánààwstíha Ø- <u>ali</u> - <u>hyvvs</u> -án(?)àà(?)wst-íh-a 3SG.A-MID-nose-?-PRS-IND ‘He is snorting.’ (Feeling 1975: 22)	b. hiyṽ:só:li <u>hi</u> ỹṽṽsoóli <u>hi</u> - <u>hyvvs</u> -ooli 2SG.A-nose-LOC/SH ‘your nose’ (Pulte & Feeling 1975: 311)

Note that *h*-Metathesis applies whether the preceding consonant is a plosive/affricate ((3.26)) or a resonant ((3.27), (3.28)).⁴³ The vowel that results from metathesis is a fully voiced vowel, unlike

⁴¹ This process superficially looks like a “metathesis”, in that *V* and *h* switch their positions. However, the true nature of this process appears to be the transfer of *h* to the preceding consonant (*C* in the *CVh* template), rather than metathesis of *V* and *h*. In fact, *h*-Metathesis is not observed with a word-initial *Vh* sequence without the onset *C*. I still use the term ‘metathesis’, following previous studies on the topic.

⁴² [dà:hliño:héha]. Voiceless resonants are represented as *hR* between vowels in Feeling’s (1975) orthography, but they are represented as *Rh* in these examples so that the metathesis effect can be easily observed.

metathesis in Cayuga, where the vowel is devoiced (Foster 1982). FIGURE 3-2 shows the spectrum and the spectrogram of (3.2a); the vowel in [k^ha] (*kha*) has a clear voicing and formant structure:

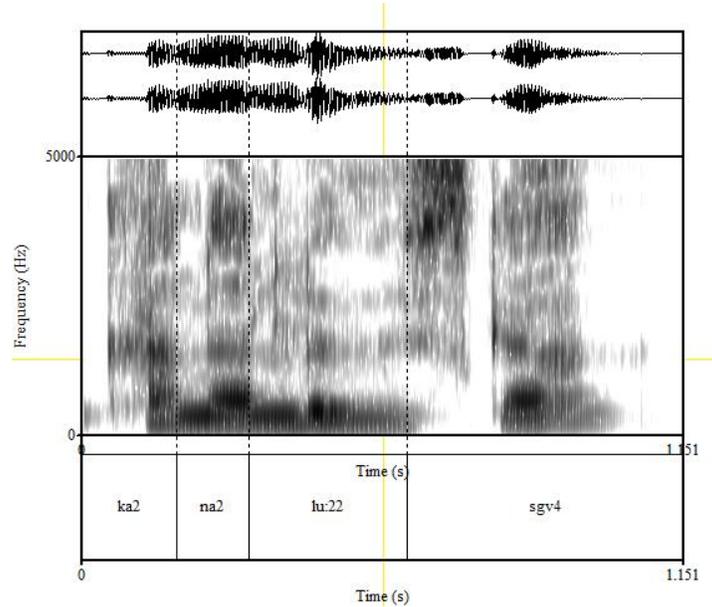


FIGURE 3-2. *khanaluuskv* ‘when he was ascending.’ (EJ, male, 2010)

h-Metathesis can be stated informally as follows; again, *C* = any consonant (but see §3.3.2), *R* = resonants (*l, n, w, y*) and *V* = short vowel:⁴⁴

(3.29) *h*-Metathesis
 $CVhR \rightarrow ChVR$

In contrast to Vowel Deletion, which is optional in some cases, *h*-Metathesis appears to almost always apply, especially morpheme-internally. However, some speakers accept forms without *h*-Metathesis when it occurs across morpheme boundaries (cf. Montgomery-Anderson 2008: 70).⁴⁵

⁴³ Flemming (1996: 30) claims that neither *h*-Metathesis nor Vowel Deletion occur when the vowel is preceded by a resonant (i.e., in the environment *RVhR* (his *NVhN*)), but this is not the case as (3.27) and (3.28) illustrate.

⁴⁴ Huff (1977: 16) suggests that *h*-Metathesis applies only across *a* or *i*. However, there are examples such as *khelátítòðha* ‘he is mingling with him’ (Feeling 1975: 144), where *h* of the stem metathesizes with the stem initial *e* and transfers to the pronominal prefix *k-* (< *k-ehlátítòðha*). It is true that such examples are rare, but this is because an underlying *CVhR* sequence where *V* is neither *a* nor *i* is rare for some unknown reason.

Vowel Deletion and *h*-Metathesis are superficially different processes. However, their motivation is to remedy the sequence **CVh*. Thus Vowel Deletion and *h*-Metathesis are discussed as if they are the same process, following previous studies. See §3.5 for a unified account of Vowel Deletion and *h*-Metathesis.

3.3. When **CVh* cannot be remedied

In this section, I will look at cases where the **CVh* cannot be remedied by either Vowel Deletion or *h*-Metathesis due to various factors which are ranked higher than the constraint **CVh*.

3.3.1. Preceding vowel is long

Vowel Deletion and *h*-Metathesis apply only when the vowel preceding *h* is short (Cook 1979, Flemming 1996: 39-40). Compare the forms in (a) and (b) below; each pair shares the same morpheme: (3.30) *-hmvvtl-* ‘brother’, and (3.31) *-hmvvw-* ‘cure’. (a) forms undergo *h*-Metathesis because *h* is preceded by a short vowel, while (b) forms fail to undergo *h*-Metathesis because *h* is preceded by a long vowel.

	<i>h</i> -Metathesis	No <i>h</i> -Metathesis
(3.30)	a. anahlinǎ:dli analhinǎvtli an-ali-hmvvtli 3PL.A-MID-brother/SH ‘(they are) brothers (pl.).’ (Feeling 1975: 44)	b. di:nada:hnǎ:hli tiinataahnvǎhli ti-an-ataa-hmvvtlhi DIST-3PL.A-REFL-brother/SH ‘(they are) brothers (dual).’ (Feeling 1975: 84)
(3.31)	a. kanǎ:wí:sgó:ʔi <u>khan</u> vǎwíiskóóʔi ka-hmvvw-ii(?)sk-óóʔi 3SG.A-cure-IMPF-HAB ‘He habitually cures him.’ (Feeling 1975: 142)	b. di:da:hmv:wí:sgi tiitaahnvvwíiski ti-Ø-ataa-hmvvw-ii(?)sk-i DIST-3SG.A-REFL-cure-IMPF-NOM/SH ‘medicine man’ (Feeling 1975: 80)

⁴⁵ JRS had one token of *ka-hnookeén* ‘his arm’, where *h*-Metathesis is not applied, rather than *kha-nookeén*. Both JRS and IS accepts forms without *h*-Metathesis when the Metathesis occurs across morpheme boundaries, but not if it occurs within a morpheme.

3.3.2. Preceding *C* = *h*, *ʔ* or *s*

Vowel Deletion and *h*-Metathesis do not apply when the *C* of *CVh* is *h* (3.32), (3.34) or *s* (3.33) (Flemming 1996: 40-41). Compare (a) and (b) forms below; each pair shares the same morpheme: (3.32) -*vht*- ‘use’, (3.33) -*o/ahneéla*, and (3.34) INF -*vht*-. The (a) forms undergo Vowel Deletion/*h*-Metathesis, while the (b) forms fail to undergo Vowel Deletion or *h*-Metathesis because the preceding *C* is *h*, *ʔ* or *s*:

	Vowel Deletion/ <i>h</i> -Metathesis	No Vowel Deletion/ <i>h</i> -Metathesis
(3.32)	a. <i>kđíha</i> <u><i>kh</i></u> <i>tíha</i> <i>k-(v)ht-íh-a</i> 3SG.A-use-PRS-IND ‘He is using it.’ (Feeling 1975: 143)	b. <i>hvhda</i> <u><i>hv</i></u> <i>hta</i> <i>h-vht-Ø-a</i> 2SG.A-use-PCT-IND ‘Use it!’ (Feeling 1975: 143)
(3.33)	a. <i>chaně:la</i> <u><i>chaneéla</i></u> <u><i>c-ahneéla</i></u> DIST-? ‘eight’ (Feeling 1975: 66)	b. <i>sóhně:la</i> <u><i>sóhneéla</i></u> (* <i>shóneéla</i>) <u><i>s-óhneéla</i></u> SG-? ‘nine’ (Feeling 1975: 154)
(3.34)	a. <i>u:di:tdi</i> <u><i>uutiithi</i></u> <i>uu-(a)tiit-(v)ht-i</i> 3SG.B-rise-INF-NOM ‘for him to rise’ (Feeling 1975: 10)	b. <i>u:hwahtvhdi</i> <u><i>uuhwahthvhti</i></u> <i>uu-hwahth-vht-i</i> 3SG.B-find-INF-NOM ‘for him to find it.’ (Feeling 1975: 26)

Vowel Deletion and *h*-Metathesis do not apply when the preceding *C* is a glottal stop (cf. Flemming 1996: 39). Compare the forms in (3.35), which share the morpheme PRS -*hk*-. In (3.35b), the glottal stop metathesizes with preceding *l* due to a general phonological constraint **Cʔ* (§5.3.3.2):

	Vowel Deletion	No Vowel Deletion
(3.35)	a. <i>go:lhga</i> <u><i>koolhka</i></u> <i>k-ool(i)-hk-a</i> 3SG.A-understand-PRS-IND ‘He understands it.’ (Feeling 1975: 121)	b. <i>gáʔluhga</i> <u><i>káʔluhka</i></u> (* <i>káʔlhka</i>) <i>ka-ʔu-hk-a</i> 3SG.A-arrive-PRS-IND ‘He is arriving.’ (Feeling 1975: 102)

This is probably due to the general phonological constraint against two laryngeal consonants ($H = h, \text{ʔ}, s$) in Oklahoma Cherokee ($*HH$).⁴⁶

3.3.3. The resulting sequence is impermissible

Vowel Deletion is blocked when deleting the vowel would result in an impermissible sequence (such as onset $*\sigma[RhT]$ (§5.1); Flemming 1996: 42):

(3.36)

- a. *nvhgi*
 nvhki ($*nhki$)
 ‘four’ (Feeling 1975: 149)

- b. *nohji*
 nohci ($*nhci$)
 ‘pine’ (Feeling 1975: 148)

- c. *wahga*
 wahka ($*whka$)
 ‘cow’ (Feeling 1975: 187)

This conditioning also accounts for the failure of $CVhR$ sequence to undergo Vowel Deletion; deleting the vowel from such a sequence would result in $*ChR$, which is not a permissible sequence in Oklahoma Cherokee (§5.3.3.3). The implication of such an analysis will be discussed in §3.5.

3.3.4. Tone is irrelevant

It has been argued that Vowel Deletion and h -Metathesis are blocked by a high tone (Cook 1979: 7, Flemming 1996: 38). However, there are cases where a high tone does not block these processes. For example, aspectual suffixes PFT (class 1b) $-ahn-$ (3.37) and PFT (class 5) $-ihl-$ (3.38) always metathesize, whether or not they have a high tone. The (b) forms fail to undergo h -Metathesis, since the C of CVh sequence is h or s as described in §3.3.2 above.

⁴⁶ As was discussed in §2.2.3, s is always preceded by a phonetic [h] after a short vowel.

- | | <i>h</i> -Metathesis | No <i>h</i> -Metathesis |
|--------|--|--|
| (3.37) | a. ù:lehtánv̌:ʔi
ùùlehthánv̌v̌:ʔi
uu-(a)leht-áhn-vv̌:ʔi
3SG.B-stand-PFT-ASR
‘He stood a long object.’ (Feeling 1975: 38) | b. dù:le:hĩ:sáhnv̌:ʔi
tùùleehiísáhnv̌v̌:ʔi
t-uu-(a)leehiís-áhn-vv̌:ʔi
DIST-3SG.B-recuperate-PFT-ASR
‘He recuperated.’ (Feeling 1975: 73) |
| (3.38) | a. ù:sv:hnílv̌:ʔi
ùùsvvnhílv̌v̌:ʔi
uu-(a)svvn-íhl-vv̌:ʔi
3SG.B-touch-PFT-ASR
‘He touched it.’ (Feeling 1975: 57) | b. ù:ni:gwâ:tíhlv̌:ʔi
ùùniikwáathíhlv̌v̌:ʔi
uu-niikwáa(ʔ)th-íhl-vv̌:ʔi (< *-niikwaʔth-)
3SG.B-hate-PFT-ASR
‘He hated him.’ (Feeling 1975: 108) |

Floating high tone from a pre-pronominal prefix (H3; Ch.13), or a high variant of a superhigh accent (H4; Ch.14) do not block Vowel Deletion or *h*-Metathesis either. These processes are blocked only by H1, which is due to its source, a glottal stop, as suggested in §9.1.4.

3.3.5. Lexical idiosyncrasies

There are some morphemes that do not allow Vowel Deletion and *h*-Metathesis. First, some of the infinitive suffixes, such as *-oht-* or *-eht-* never undergo Vowel Deletion or *h*-Metathesis (Flemming 1996: 43). In many cases these infinitive suffixes bear a high tone, but as we saw above, high tone itself does not block Vowel Deletion or *h*-Metathesis:

- (3.39)
- a. ádlì:sdohdi
 átlììstohti⁴⁷ (*átlììthdi)
 a-tl-ìì(ʔ)st-oȟt-i (< *-iʔst-)
 3SG.A-pour-CAUS-INF-NOM
 ‘container (for liquid)’ (Feeling 1975: 13)
- b. uwhdóȟdi
 uwhtóhti (*uwhthti)
 uw-(v)ht-óȟt-i
 3SG.B-use-INF-NOM
 ‘for him to use it.’ (Feeling 1975: 143)

⁴⁷ The high tone on the first syllable is a high variant of superhigh accent (Ch.14).

- c. ada:hyo:néhdi
 ataahyoonéhti (*adaahyoonhdi)
 Ø-ataahyoon-éht-i
 3SG.A-commit.adultery-INF-NOM
 ‘adultery’ (Feeling 1975: 4)

Secondly, there are some lexical items which retain the *CVh* sequence for no obvious reason

(Flemming 1996: 43):

(3.40)

- a. ajahda
acahta (*achta)
 ‘Choctaw’ (Feeling 1975: 30)
- b. il^hv^hdl^hv^h:ʔi
 il^hv^hhtlv^hv^h?i (*ilhtlv^h?i)
 ‘somewhere’ (Feeling 1975: 86)
- c. ganhdóhg^hv^h:ʔi⁴⁸
 kanhtóhk^hv^h?i (*kanhthkv^h?i)
 ‘his tooth’ (Feeling 1975: 107)

3.3.6. *h*-Metathesis does not apply to its own output

h-Metathesis does not apply to its own output (Cook 1979: 9, Flemming 1996: 41-42). (3.41) and (3.42) illustrate that a consonant which loses *h* as a result of *h*-Metathesis cannot feed the new environment for another application of this rule. In (3.41), for instance, the root initial *h* transfers from *y* to *l* (the metathesized *h* is underlined in the second line), and now the resulting *yv^hkw* sequence should be an input for Vowel Deletion (> *y^hkw*), but it is not the case. Again, (b) forms justify the underlying positions of *h*'s.

⁴⁸ In Oklahoma Cherokee, consonant clusters with more than four consonants are not attested (§5.1); if Deletion applied to this form, it would result in a five-consonant cluster **nhthk*, which might explain the failure of this form to undergo Deletion.

hl sequences undergo *h*-Metathesis with the preceding vowel (3.44).⁴⁹ The *lh* sequence fails to undergo *h*-Metathesis with the preceding vowel (3.45) (= (3.43)). Such an analysis is further supported by their glottal grade forms; see §4.2.2 for a more detail.

- (3.45) gahlíha
 kahlíha
 ka-lh-íh-a
 3SG.A-sleep-PRS-IND
 ‘He is sleeping.’ (Feeling 1975: 95)

The other additional blocking factor Flemming (1996) discusses is a labiovelar plosive, *kw*, as illustrated by (3.46):

- (3.46) dǒ:dágwohnǎ:ʔi
 toótákwohnvǎʔi (*toótákwhonvǎʔi)
 ‘Monday’ (Feeling 1975: 86)

Flemming (1996: 36) attributes the failure of this form to undergo *h*-Metathesis to the nature of *kw*: for Flemming (1996), *w* of *kw* cannot attract *h* exactly for the same reason as a singleton *w* does not attract *h*. However, such a claim is not empirically supported. First, *kw* does trigger Vowel Deletion:

- (3.47) yákwtv:dà:sdi
 yákwhthvvdààsti
 y-akw-(a)hthvvt-àà(ʔ)st-i (< *-aʔst-)
 IRR-1SG.B-hear-INF-NOM
 ‘I’ll be listening.’ (Pulte & Feeling 1975: 350)

Secondly, *w* itself does attract *h*:

- (3.48) ù:hweladí:dò:lǎ:ʔi
 ùùhwelatíítòòlvǎʔi
 uw-ehlátíítòò(?)l-vǎʔi
 3SG.B-mingle:PFT-ASR
 ‘He mingled with a group.’ (Feeling 1975: 144)

⁴⁹ It could be the case that *hl* and *lh* sequences are phonetically distinct, but a detailed phonetic study has not been conducted.

In my analysis, the blocking factor in (3.46) is a glottal stop (§3.3.2): I analyze (3.46) as having a glottal stop after *kw*, the presence of which is justified by the morphology and by presence of a high tone (H1; Ch.9).

- (3.49) dǒ:dágwohnǎ:ʔi
 toótákwohnǎvǎʔi
 (uun-a)tootakw-(ʔ)-ohn-vvʔi
 3PL.B-be.day?-PFT-COMP-ASR/SH
 ‘Monday’

3.4. Interim summary

(3.50) summarizes the discussions so far. A dispreferred *CVh* sequence is remedied by deleting the vowel when *h* or *s* is followed by a plosive/affricate (*T*) or a vowel (*a*), while it is remedied by ‘metathesizing’ *V* and *h* when *h* is followed by a resonant (*R*). From the discussion in §3.3.1, *V* has to be a short vowel; from the discussion in §3.3.2, *C* cannot be *h*, *ʔ* or *s*:

- (3.50) **CVh* remedies
 a. Deletion: $C(V)hT \rightarrow ChT$
 $T(V)hV \rightarrow ThV$
 $C(V)sT \rightarrow CsT$
 $C(V)sV \rightarrow TsV$
 b. Metathesis: $CVhR \rightarrow ChVR$

Vowel Deletion and *h*-Metathesis are superficially different processes but they are two reactions to a single constraint, **CVh*, and their applicability is subject to the same phonological factors discussed in §3.3 (preceding vowel length, the nature of *C*, etc.). The failure to delete in the case of *CVhR* sequence can be accounted for by a general phonological constraint against **ChR* (§3.3.3, §5.3.3.3); that is, since deleting the vowel from the *CVhR* sequence would result in an impermissible sequence **ChR*, Vowel Deletion is not available, thus the other alternative remedy, namely metathesizing *h* and the vowel, applies to such sequences. Thus Vowel Deletion and *h*-Metathesis are essentially motivated by the same constraint. §3.5 attempts a unified account of Vowel Deletion and *h*-Metathesis.

We have also seen that Vowel Deletion is optional in some cases (§3.1.2), while *h*-Metathesis is less so. This difference in optionality between Vowel Deletion and *h*-Metathesis also appears to correlate with the diachronic facts. Some speakers report remembering older generations not applying Vowel Deletion. For example, Durbin Feeling (p.c., 2012) reported that his grandparents used to pronounce the underlying vowels in forms such as (3.51):

- | | | |
|--------|-------------------------------|--------------------------------|
| | Modern Cherokee | Early 20 th century |
| (3.51) | a. álstdàyhdi | b. alisdayvhdi ⁵⁰ |
| | álstàyhi | alistayvhti |
| | Ø-al(i)-stà(?)y-(v)ht-i | |
| | 3SG.A-MID-eat.meal-INF-NOM/SH | |
| | ‘food’ (DF, Aug 2012) | |

In contrast, *h*-Metathesis is already observable in the Cherokee translation of the New Testament, which was translated in the early 19th century ((b) forms justify the original position of *h*):

- (3.52) ⱖⱗⱤ (Cherokee New Testament, p. 195)
ka-ne-ga

- | | | |
|---------|--------------------------------------|---------------------|
| Modern: | a. kané:ga | b. hihnè:gi |
| | <u>khané</u> éka | <u>hihnè</u> èki |
| | ka-hnéé(?)k-a | hi-hnèè(?)k-i |
| | 3SG.A-speak:PRS-IND | 2SG.A-speak:PCT-IND |
| | ‘He is speaking’ (Feeling 1975: 139) | ‘Speak!’ (ibid.) |

- (3.53) ⱖZPⱖ (ibid. p. 194)
ka-no-he-dv

- | | | |
|---------|------------------------------------|---------------------|
| Modern: | a. kano:hě:da | b. hihno:hǎ:la |
| | <u>khanoo</u> heéda | <u>hihnoo</u> hvǎla |
| | ka-hnoo-heét-a | hi-hnoo-hvǎl-a |
| | 3SG.A-tell-PP-IND | 2SG.A-tell-PCT-IND |
| | ‘news, gospel’ (Feeling 1975: 140) | ‘Tell it!’ (ibid.) |

These diachronic facts cast doubt on Blevins & Garrett’s (1998) contention that Cherokee went through the devoicing of the vowel first (as in Cayuga), and then the metathesized consonant was

⁵⁰ The tone and length are not known.

reanalyzed as originating on the other (nonhistorical) side of the vowel in question (i.e. $*CVh \rightarrow C\bar{V} \rightarrow ChV$); if vowel devoicing preceded Metathesis, it would be more natural for Deletion to occur before Metathesis, but this appears not to be the case. A further philological study will reveal the details of the historical development of the Deletion and the Metathesis rules.

3.5. Towards a unified account of Vowel Deletion and *h*-Metathesis

In this chapter, I have been arguing that both Vowel Deletion and *h*-Metathesis are two remedies to a general constraint against *CVh* sequences. In §3.5.1, I will attempt at a unified account of Vowel Deletion and *h*-Metathesis with a constraint-based approach. §3.5.2 argues against analyzing *h*-Metathesis as a combination of deletion and epenthesis.

3.5.1. Constraint-based account

As was seen in §3.1 and §3.2, Vowel Deletion and *h*-Metathesis are two apparently different processes: Vowel Deletion applies to a *CVhT* (*T* = plosive or affricate) sequence (3.54) or optionally to a *CVhV* sequence (3.55), while *h*-Metathesis applies to a *CVhR* (*R* = resonant) sequence (3.56). (b) forms show the original positions of *h* (the examples are repeated from the sections above):

(3.54)	a. kdfha khtíha k-(v)ht-íh-a 3SG.A-use-PRS-IND 'He is using it.' (Feeling 1975: 142)	b. hvhda hvhta h-vhd-Ø-a 2SG.A-use-PCT-IND 'Use it!' (ibid.)
(3.55)	a. à:kawó:sdiha ààkhawóósdiha ak(i)-hawóo(?)st-ih-a 1SG.B-smother-PRS-IND 'I am smothering.' (Feeling 1996: 166)	~ b. à:gihawó:sdiha ààkihawóósdiha aki-hawóo(?)st-ih-a (ibid.)

(3.56)	a. kanaluusga	b. hihnaluuhi
<i>CVhR</i>	khanaluuska	hihnaluuhi
	ka-hnaluu-sk-a	hi-hnaluu-h-i
	3SG.A-ascend-PRS-IND	2SG.A-ascend-PCT-IND
	‘He is ascending.’ (Feeling 1975: 138)	‘Ascend!’ (ibid.)

A natural question is whether Vowel Deletion and *h*-Metathesis are two independent processes or essentially the same phenomenon and the apparent difference emerges from general phonological constraints. In §3.3.3 and §3.4, I proposed that the failure of *CVhR* sequence to undergo Deletion is accounted for by the general phonotactic constraint in Oklahoma Cherokee which bans **ChR* sequences (§5.3.3.3); if the vowel from a *CVhR* sequence were deleted, it would result in a **ChR* sequence.

If this is really the motivation for superficial difference between a *CVhR* sequence on the one hand and *CVhT* or *CVhV* sequences on the other, Vowel Deletion and *h*-Metathesis can now be interpreted as resulting from a conflict of several competing phonological constraints in Oklahoma Cherokee. First, as was mentioned in (3.3), we can propose that Vowel Deletion and *h*-Metathesis in general is motivated by the avoidance of a *CVh* sequence (Flemming 1996: 31):

(3.57) **CVh* (= (3.3))

(3.57) has phonetic motivations, according to Flemming (1996): first, when *h* is followed by a sonorant (a resonant or a vowel), aspiration on a sonorant is undesirable because it conflicts with the realization of sonorancy and voicing (Stevens & Keyser 1989, Flemming 1996: 31). Second, when *h* is followed by a plosive, this is also problematic since post-vocalic *h* preceding a stop has the same spectral shape as the preceding vowel and thus will be substantially masked by it (Bladon 1986, Flemming 1996: 31). Such sequences need to be remedied either by deleting the vowel or metathesizing *V* and *h* from such a sequence, as long as the vowel is short (§3.3.1) and the preceding consonant is non-laryngeal (§3.3.2).

Second, as we saw above, there is an inviolable phonotactic constraint against a **ChR* sequence, which forces a *CVhR* sequence to undergo *h*-Metathesis, rather than Vowel Deletion, to remedy the *CVh* sequence:

(3.58) *ChR

We also need to account for the fact that the *CVhT* sequence undergoes Vowel Deletion, rather than *h*-Metathesis. This is due to LINEARITY-IO, which bans metathesis:

(3.59) LINEARITY-IO (Kager 1999: 63)

The output reflects the precedence structure of the input, and vice versa.

The failure of *CVhV* sequence to undergo *h*-Metathesis is due to the general constraint against a vowel sequence (§5.3.1):

(3.60) *V₁V₂

The constraints introduced above are ranked as in (3.61):

(3.61) *ChR, *V₁V₂ » *CVh » *LINEARITY-IO

The following tableaux justify the ranking in (3.61). (3.62) illustrates that *h*-Metathesis is optimal with a *CVhR* sequence:

(3.62) *CVhR*

<i>ka-hnaluuska</i>	*ChR	*V ₁ V ₂	*CVh	LINEARITY-IO
a. kahnaluu <u>s</u> ka			*!	
☞ b. kha <u>n</u> aluuska				*
c. kh <u>n</u> aluuska	*!			

(3.63) illustrates Vowel Deletion is optimal with a *CVhT* sequence:

(3.63) *CVhT*

<i>k-vhtíha</i>	*ChR	*V ₁ V ₂	*CVh	LINEARITY-IO
a. kvhtí <u>h</u> a			*!	
b. khvtí <u>h</u> a				*!
☞ c. khtí <u>h</u> a				

Lastly, (3.64) illustrates Vowel Deletion is optimal with a *CVhV* sequence:

(3.64) *CVhC*

<i>aki-hawóóstiha</i>	* <i>ChR</i>	* <i>V₁V₂</i>	* <i>CVh</i>	LINEARITY-IO
a. ààkihawóóstiha			*!	
b. ààkhiawóóstiha		*!		*
c. ààkhawóóstiha				

3.5.2. Against Deletion plus Epenthesis

An alternative to the account in §3.5.1 is to assume a derivational approach and to analyze Vowel Deletion and *h*-Metathesis as both involving Vowel Deletion or as both involving *h*-Metathesis. Metathesis in some languages has been analyzed as the result of two distinct, independent phonological processes, deletion and epenthesis (Blevins & Garrett 1998: 522ff.), and such an analysis is also adopted by Flemming (1996: 33) to account for *h*-Metathesis in Cherokee. According to such an analysis, *h*-Metathesis in an example such as *khanééka* would be derived as follows:

(3.65) Derivation of *khanééka*

1. UR ka-hnééka
2. V Deletion khnééka
3. Epenthesis khanééka
4. Phonetic [k^hanééga]

It is true that Vowel Deletion is the default remedy for **CVh*, in that Vowel Deletion applies whenever the resulting sequence does not violate the constraint **ChR*. However, this does not mean that *h*-Metathesis necessarily involves Vowel Deletion. Such an analysis has three problems.

First, such an analysis has to postulate an intermediate stage where **ChR* sequences are temporally allowed, and this is not a permissible sequence in Oklahoma Cherokee.

Secondly, the status of vowels which metathesize with *h* as “epenthetic” is also problematic. First, the quality of such an “epenthetic” vowel is said to copy the quality of the deleted vowel (Flemming 1996: 33), but such an account is somewhat abstract in that the speakers have to have access to the information of the “deleted” vowels. Also, tonal and accentual phenomena cast doubt on the epenthetic status of these vowels, since these “epenthetic” vowels can be assigned accents. See Ch.13 and Ch.14 for details.

Lastly, the deletion plus epenthesis account appears to be at odds with the synchronic, as well as diachronic, facts of Vowel Deletion and *h*-Metathesis that we saw above. Synchronically, we saw that Vowel Deletion is optional in some environments, while Metathesis appears to be less so. If all the sequences which undergo *h*-Metathesis were to undergo Vowel Deletion first, we would have to postulate that Vowel Deletion is obligatory *only when it is followed by ‘epenthesis’*, but such an account involves a ‘look-ahead’. Diachronically, *h*-Metathesis has been observed at least from the early 19th century, while Vowel Deletion did not appear to occur until the beginning of the 20th century. If *h*-Metathesis involves Vowel Deletion, we would expect Vowel Deletion to occur first historically as well. Moreover, ‘deletion + epenthesis’ analysis of *h*-Metathesis would not be able to capture the synchronic situation of the time period when only *h*-Metathesis was in effect but not Vowel Deletion (before the 20th century).

An alternative would be to apply Epenthesis first and Deletion second, as in (3.66):

- (3.66) Derivation of *khanééka*
- | | |
|---------------|-------------------------|
| 1. UR | ka-hnééka |
| 2. Epenthesis | kahanééka |
| 3. V Deletion | khanééka |
| 4. Phonetic | [k ^h anééga] |

Such an analysis is equally problematic. First, Epenthesis as in (3.66) is not motivated, since *hn* sequence (or, voiceless nasal) is a licit sequence, and such an analysis would predict that a word-initial voiceless resonant or a *VhRV* sequence not preceded by a consonant would require epenthesis ($\#(V)hRV \rightarrow \#(V)hVRV$), but this is not the case. Also, if the form were to undergo step 2 in (3.66), we would predict forms such as in (3.66) to manifest free variation between the form with and without step 3 (*khanééka* ~ **kahanééka*), as *CVhV* sequences do (§3.1.2), but again this is not the case.

On the other hand, these problems can easily be accommodated with the constraint-based analysis outlined in §3.5.1. First, such an analysis does not postulate an intermediate stage where Vowel Deletion applies, and hence there is no need to temporally allow a *ChR* sequence. Secondly, since my analysis does

not involve epenthesis, the problems concerning “epenthesis” that confront the deletion plus epenthesis analysis is avoided.

Lastly, the synchronic variation and historical facts shown can also be accounted for in the constraint-based analysis. First, the synchronic optionality of Vowel Deletion and (relative) obligatoriness of *h*-Metathesis can be interpreted as reflecting a difference in the relative ranking within the constraint **CVh* (3.57): we divide this constraint into three parts, **CVhR*, **CVhT* and **CVhV*, and re-rank them as in (3.67); we also need to introduce another constraint, MAX-IO (Kager 1999: 67), which bans deletion of a vowel, in order to account for the fluctuation between Deletion and no Deletion:

$$(3.67) \quad *ChR, *V_1V_2 \gg *CVhR \gg *LINEARITY-IO \gg *CVhT, *CVhV, \text{MAX-IO}$$

The diachronic fact that Metathesis preceded Deletion can be accounted for by assuming that MAX-IO, which bans deletion of the vowel, was ranked higher than LINEARITY-IO before the 20th century.

3.6. Conclusion

In this chapter, I illustrated Vowel Deletion (§3.1) and *h*-Metathesis (§3.2) in Oklahoma Cherokee, and showed that both are motivated by the avoidance of a *CVh* sequence. Whether the sequence undergoes Vowel Deletion, *h*-Metathesis, or neither (§3.3), is the result of complex interactions of various phonological constraints, namely the nature of the surrounding sounds. I have also shown that such a constraint-based analysis is superior to analyzing *h*-Metathesis as the result of two processes, deletion and epenthesis (§3.5).

Appendix to Chapter 3. How deleted vowels are represented in the syllabary

As we saw above in §3.1, Vowel Deletion is a productive and regular phonological process; moreover, the relevant vowel surfaces in certain environments (i.e. when Vowel Deletion is optional, in the glottal grade, and when various factors block Vowel Deletion), and in some cases it is in free variation with the forms without Vowel Deletion (§3.1.2). This is a situation where even a radical “concrete” analysis, such as Natural General Phonology (Hooper 1976: Ch. 7), would postulate an underlying vowel. In fact, when speakers write in the syllabary, these underlying vowels are reflected in the majority of the cases, as expected, but not always.

In the Cherokee Syllabary, each letter represents a *CV* sequence (§1.5.3). In representing a consonant cluster such as *khth*, a sequence of two letters are used, such as *ᏍᏈ* (*ga-ta*). In principle, speakers can choose any letter from the “*ga*” row to represent the first consonant of the sequence, since the vowel does not surface; in this case, speakers can use either *Ꮝ* (*ga*), *Ꮖ* (*ge*), *Ꮗ* (*gi*), *Ꮘ* (*go*), *Ꮙ* (*gu*), or *Ꮚ* (*gv*) to represent the first consonant of the *khth* sequence. However, in many cases such a consonant cluster derives from the deletion of a vowel, and it is predicted that speakers would choose to use the letter of that deleted vowel. For example, if the sequence *khth* derives from *kahth*, it is predicted that a speaker would use the syllabary *Ꮝ* (*ga*), rather than others such as *Ꮖ* (*ge*), to represent the first consonant of this sequence. This section explores whether such a prediction is borne out by looking at how two speakers represent these deleted vowels in the syllabary.

Below, for each verb, I will present the forms which undergo Vowel Deletion (with the 3SG.A pronominal prefix) in the second column, and the forms which fail to undergo Vowel Deletion either due to Laryngeal Alternation (in the glottal grade, *h* is replaced by a lowfall tone; §1.7.4.1) or other factors that block application of Vowel Deletion (§3.3) in the third column. The fourth column shows the underlying representation of the stems, with the deleted vowel in parentheses. The fifth and sixth columns

give syllabary representations of the second column by two speakers, DF (Feeling 1975) and EJ.⁵¹ Forms in the second column and the third column are from Feeling (1975).

TABLE 3-1 shows how the speakers write a deleted *a* in the Cherokee Syllabary. For (3) ‘LG is hanging’, both Feeling (1975) and EJ has <*v*> instead of underlying <*a*>. The same is true for (4) ‘crawl’ for Feeling (1975), but not for EJ.

TABLE 3-1. *a*

MEANING	VD	NO VD	UNDERLYING	Feeling (1975)	EJ, July 2011
1. close eyes	tààkhtháastíha	teekákààtháastiha	-ak(a)hthaʔstíh-	ᵐᵛᵂᵒᵔᵕᵒᵔ (dagatasdiha)	ᵐᵛᵂᵒᵔᵕᵒᵔ (dagatasdiha)
2. head to	wakhthi	wicikáathi	-k(a)hth-	ᵑᵛᵕᵕ (wagati)	
3. LG is hanging	khthóóʔa	hathóóʔésti	-(a)hthooʔ-	Eᵕᵕᵕ (gydoa)	Eᵕᵕᵕ (gydoa)
4. crawl	ààtansiíni	katanààsiíni	-atan(a)siín-	ᵕᵕᵒᵔᵕᵕ (adany ^s ini)	ᵕᵕᵒᵔᵕᵕ (adan ^s ini)
5. go downhill	ààksóska	cikààsóska	-k(a)sósk-	ᵕᵕᵕᵕᵕᵕ (agasosga)	ᵕᵕᵕᵕ. (agaso..)
6. make smoke	tààksvístíha	teecíkààsvístíha	-k(a)svvvʔstíh-	ᵐᵛᵕᵕᵕᵕᵕᵕ (dagasv ^s diha)	ᵐᵛᵕᵕᵕᵕᵕᵕ (dagasv ^s diha)
7. pull it	kansanééʔa	cinààsanééʔa	-n(a)saneeʔ-	ᵕᵕᵕᵕᵕᵕ (ganasanea)	ᵕᵕᵕᵕᵕᵕ (ganasanea)

TABLE 3-2 shows how an underlying *i* is written in the syllabary. For (4) ‘smoke’, Feeling (1975) has <*a*> instead of underlying <*i*>; for (5) ‘understand,’ EJ has <*v*> instead of underlying <*i*>:

⁵¹ Feeling (1975) gives the transcriptions in the Cherokee Syllabary along with the phonetic transcriptions. The transcriptions by EJ were obtained during my fieldwork in Oklahoma in 2011.

TABLE 3-2. *i*

MEANING	VD	NO VD	UNDERLYING	Feeling (1975)	EJ, July 2011
1. dance	ààlskííʔa	kalìskííʔa	-al(i)skiiʔ-	DPóDYD (alìsgia)	DPóDYD (alìsgia)
2. eat meal	ààlstáayvvhvska	kalìstáayvvhvska	- al(i)staʔyvvhvsk-	DPóLBóóóóó (alìsdayvvhvsga)	DPóLBóóóóó (alìsdayvvhvsga)
3. sew	kaayeewska	ciieewìska	-.yeew(i)sk-	ᖃᖃᖃᖃᖃ (gayewìsga)	ᖃᖃᖃᖃᖃ (gayewìsga)
4. smoke	kookska	kookìska	-ook(i)sk-	Aᖃᖃᖃᖃ (gogàsga)	Aᖃᖃᖃᖃ (gogìsga)
5. understand	koolhka	koolìka	-ool(i)hk-	APᖃ (golìga)	Aᖃᖃ (golìga)

TABLE 3-3 shows how a deleted *o* is written; both Feeling (1975) and EJ have <*i*> instead of underlying <*o*> for (2) ‘put it into container’:

TABLE 3-3. *o*

MEANING	VD	NO VD	UNDERLYING	Feeling (1975)	EJ, July 2011
1. decide	teekúúkhtíha	teekúúkòòtíha	-uuk(o)htíh-	ᖃJA.ᖃᖃᖃ (degugòdiha)	ᖃJA.ᖃᖃᖃ (degugòdiha)
2. put it into container	kalhtíha	cilòòtíha	-l(o)htíh-	ᖃP.ᖃᖃᖃ (galìdiha)	ᖃP.ᖃᖃᖃ (galìdiha)
3. melt it	kvvnawhtíha	kvvnawòòtíha	-vvnaw(o)htíh-	Eᖃᖃ.ᖃᖃᖃ (gvnawòdiha)	Eᖃᖃ.ᖃᖃᖃ (gvnawòdiha)

TABLE 3-4 illustrates forms with underlying *v*. All of the instances have the underlying vowel for both of the speakers:

TABLE 3-4. *v*

MEANING	VD	NO VD	UNDERLYING	Feeling (1975)	EJ, July 2011
1. think	ààtaan \dot{h} théha	kataan \dot{v} théha	-atan(v)hthéh-	DŁ0 ^b ṬoṬ (adanyteha)	DŁ0 ^b ṬoṬ (adanyteha)
2. wash FL	téék \dot{h} kiilóó?a	teek \dot{v} kiilóó?a	-(v)hkiiloo?-	SEYGD (degv \dot{g} iloa)	S(E)YGD ⁵² (de(gv \dot{g} iloa)
3. handle LQ	kanh \dot{c} iítóoha	cin \dot{v} ciítóoha	-n(v)hciitoo?h-	Š0 ^b FrΛoṬ (ganyjidoha)	
4. use it	khtíha	k \dot{v} vtíha	-(v)htíh-	E.ŁoṬ (gv \dot{d} iha)	E.ŁoṬ (gv \dot{d} iha)
5. sharpen	khtlíha	k \dot{v} vtlíha	-(v)htlíh-	ECoṬ (gv \dot{d} liha)	ECoṬ (gv \dot{d} liha)
6. put FL into fire	kht \dot{v} ?vska	k \dot{v} vt \dot{v} ?vska	-(v)htv \dot{v} ?vsk-	Eo ^o iooṬŠ (gv \dot{d} vvs \dot{g} a)	Eo ^o iooṬŠ (gv \dot{d} vvs \dot{g} a)
7. put him inside	ààyhtíha	ciiy \dot{v} vtíha	-y(v)htíh-	DB.ŁoṬ (ay \dot{v} diha)	DB.ŁoṬ (ay \dot{v} diha)

As can be observed, the underlying and deleted vowels are in the majority of the cases reflected in the syllabary, but not always. It does not seem to be the case that there are ‘default’ letters for use in the case when the speakers are not sure which one to use, either. It is worth mentioning that speakers note that they do not necessarily pay attention to the selection of letters when representing a consonant cluster, unless confusion would arise due to the existence of another word with a different surface vowel (DF, EJ, p.c.). For example, ààl \dot{s} kíí?a in TABLE 3-3 (1), written as DPo^oYD (al \dot{s} gia) by both speakers, cannot be written as DWo^oYD (al \dot{s} gia), since there is a different word ààláaskíí?a ‘take a step’, with the surface vowel *a*. However, it is still interesting that in the majority of the cases speakers choose the letter with the underlying vowel even when using other letters would not result in confusion.

⁵² EJ crossed out E after writing it.

Chapter 4. Laryngeal Alternation of *Ch* clusters⁵³

4.0. Introduction

Laryngeal Alternation was first introduced in §1.7.4.1, and it interacts with the tonal and accentual phenomena to be discussed in Part II (Ch.6 - Ch.14) in a complex way.

Certain pronominal prefixes trigger an alternation in the stem form; most pronominal prefixes take the *h*-grade, in which the first laryngeal consonant is *h*, while others (such as those involving 1SG agentive argument or those with an animate patient) take the glottal grade, where the first laryngeal consonant is instead a glottal stop.⁵⁴ Compare the forms in (4.1); the first *h* is underlined:

	<i>h</i> -grade	glottal grade
(4.1)	a. à:de:loho:sga ààteel <u>h</u> ooska Ø-ateelohoo-sk-a 3SG.A-find.out-PRS-IND 'He is finding it out.' (ibid.)	b. gade:loʔo:sga kateeloʔooska k-ateelohoo-sk-a 1SG.A-find.out-PRS-IND 'I am finding it out.' (Feeling 1975: 9)

However, as was briefly mentioned in §1.7.4.1, when *h* is adjacent to another consonant, the stem manifests various forms in the glottal grade (Munro 1996b). For example, a pre-consonantal *h* in the *h*-grade is lost in the so-called glottal grade (b) and the preceding vowel is assigned a lowfall tone:

	<i>h</i> -grade	glottal grade
(4.2)	a. à:de:hlohgwáʔa ààteeh <u>h</u> lohkwáʔa Ø-ateehlohkw-áʔ-a 3SG.A-learn-PRS-IND 'He is learning it.' (Feeling 1975: 8)	b. gadè:lohgwáʔa katèèlohkwáʔa k-ateehlohkw-áʔ-a 1SG.A-learn-PRS-IND 'I am learning it.' (ibid.)

⁵³ This chapter is a heavily revised and expanded version of a paper published as *Laryngeal Alternation, Laryngeal Metathesis and Aspirated Consonants in Oklahoma Cherokee* in Tokyo University Linguistics Papers 26 in 2007.

⁵⁴ Not all the stems contain a laryngeal consonant.

In this chapter, I will illustrate how plosive/affricate plus *h* clusters (§4.1) and resonant plus *h* clusters (§4.2) are realized in the glottal grade. The different realizations correlate with certain anomalies to Vowel Deletion/*h*-Metathesis (Ch.3), as I will show in this chapter.

4.1. Plosive/affricate plus *h* clusters

Clusters of a plosive/affricate plus *h* (*th*, *kh*, *kwh* and *tlh*) show various behaviors with respect to Laryngeal Alternation (Munro 1996b). Some such clusters undergo Vowel Deletion, while others do not. Thus, in (4.3) - (4.6) below, all the forms have clusters of a plosive plus *h* in the *h*-grade in the (a) forms, but they have various realizations in the glottal grade (b): (4.3b) has a pre-consonantal glottal stop and the *th* loses its *h*; (4.4b) retains the *h* but does not have a glottal stop, and instead a lowfall tone is assigned to the preceding vowel; in (4.5b) the *kwh* cluster simply loses *h* without any tonal effect; in (4.6b), a lowfall tone is assigned to the preceding vowel and the *th* loses its *h* as well. Moreover, (4.3) does not undergo Vowel Deletion (c), as expected, while (4.4c) does. The plosive plus *h* clusters in question are underlined in the second lines. Morpheme segmentations are not given here, but will be given when each type is discussed in the following subsections.

	<i>h</i> -grade	glottal grade	(Vowel Deletion)
(4.3)	a. hatvhi <u>hathvhi</u> 'Grow up!' (Feeling 1975: 62)	b. gaʔdvsga kaʔtvska 'I am growing.' (ibid.)	c. à:gwatvsǎ:ʔi ààkwathvsvǎ:ʔi 'I grew up.' (CED-DF, 2010)
(4.4)	a. hatv:dà:sda <u>hathvvtààsta</u> 'Listen to it!' (Feeling 1975:61)	b. gà:tv:dâ:sdiha kààthvvtààstiha 'I am listening to it.' (ibid.)	c. yákwvtv:dà:sdi yákwthvvtààsti 'I'll be listening.' (ibid.)
(4.5)	a. hakwiya <u>hakwhiya</u> 'Pay it!'	b. gagwiyíha kākwiyíha 'I am paying.'(Feeling 1975: 36)	
(4.6)	a. gv:tǎsga kvvthǎska 'He is putting it into fire.'	b. gv:dǎsga kvǎvtǎska 'I am putting it into fire.' (Feeling 1975: 128)	

Forms containing clusters of a plosive/affricate plus *h* can be categorized into four types, based on their behavior with respect to Laryngeal Alternation and Vowel Deletion (VD). TABLE 4-1 summarizes the behavior of the four types of clusters, in addition to that of a plosive/affricate preceded by *h* (Type (i)). The latter is included here in order to facilitate the discussion later. Type (ii) is a cluster exemplified by (4.3), Type (iii) by (4.4), Type (iv) by (4.5) and Type (v) by (4.6). *T* represents a plosive/affricate:

TABLE 4-1: *T + h* CLUSTERS

TYPE	<i>h</i> -GRADE	ʔ-GRADE	VD	NOTES
(i)	VhT	V̇VT	YES	
(ii)	VTh	VʔT	NO	
(iii)	VTh	V̇VTh	YES	
(iv)	VTh	VT	N/A	Most of the <i>T</i> 's are <i>kw</i> or <i>tl</i> .
(v)	VTh	V̇VT	N/A	

In the following, I will look at each of the types of the clusters in TABLE 4-1.

4.1.1. Type (i): *hT*

Before moving on to the plosives/affricates followed by an *h*, I look at the behavior of a plosive/affricate preceded by *h* (i.e. *hT* cluster; **Type (i)**), since the behavior of such a cluster helps us understand the following discussion. Plosives/affricates preceded by *h* have the expected glottal grade form $V̇VT$ (i.e. *h* is lost and the preceding vowel is assigned a lowfall tone; §1.7.4.1), as the (b) forms show:

(4.7)	a.	<i>h</i> -grade	glottal-grade
		hvhda hvhta h-vht-Ø-a 2SG.A-use-PCT-IND ‘Use it!’ (Feeling 1975: 143)	gv̇:díha kv̇v̇tíha k-vht-íh-a 1SG.A-use-PRS-IND ‘I am using it.’ (ibid.)

- (4.8) a. tvhgí:lo:ja
 thvhkíílooca
 t-h-vhkiiloo-c-a
 DIST-2SG.A-wash.FL-PCT-IND
 ‘Wash flexible objects!’ (Feeling 1975: 79)
- b. de:g̃ṽ:gi:ló:ʔa
 teekvkiilóóʔa⁵⁵
 tee-k-vhkiiloo-ʔ-a
 DIST-1SG.A-wash.FL-PRS-IND
 ‘I am washing flexible objects.’

This *h* before a plosive/affricate conditions Vowel Deletion, as expected (b):

- (4.9) a. no VD
 hvhda
hvhta
 h-vht-Ø-a
 2SG.A-use-PCT-IND
 ‘Use it!’ (Feeling 1975: 143)
- b. VD
 kdíha
khtíha
 k-(v)ht-íh-a
 3SG.A-use-PRS-IND
 ‘He is using it.’ (ibid.)
- (4.10) a. tvhgí:lo:ja
 thvhkíílooca
 t-h-vhkiiloo-c-a
 DIST-2SG.A-wash.FL-PCT-IND
 ‘Wash flexible objects!’ (Feeling 1975: 79)
- b. dé:kgi:ló:ʔa
 téékhkiilóóʔa
 tee-k-(v)hkiiloo-ʔ-a
 DIST-3SG.A-wash.FL-PRS-IND
 ‘He is washing flexible objects.’ (ibid.)

4.1.2. Type (ii): *Th*

The following forms illustrate some verbs containing **Type (ii)** clusters; 12 verbs in Feeling (1975) belong to this type. In the glottal grade forms in (b), the *Th* cluster of the *h*-grade in (a) loses *h* and instead a glottal stop appears before the plosive(*VʔT*):⁵⁶

- (4.11) a. *h*-grade
 gatv́sga
 kath́vska
 k-ath́vsk-a
 3SG.A-hang.up:PRS-IND
 ‘He is hanging it up.’ (Feeling 1975: 116)
- b. glottal grade
 gaʔd́vsga
 kaʔt́vska
 k-ath́vsk-a
 1SG.A-hang.up:PRS-IND
 ‘I am hanging it up.’ (ibid.)

⁵⁵ A high tone from DIST pre-pronominal prefix is assigned to the vowel with a lowfall tone and surfaces as a high-low tone (Ch. 13).

⁵⁶ This type has the form *VT* in the glottal grade in Munro (1996b: 55), which may reflect dialectal differences.

- (4.12) a. *hatvhi*
hathvhi
 h-athv-h-i
 2SG.A-grow-PCT-IND
 ‘Grow up!’ (Feeling 1975: 62)
- b. *gaʔdvsga*
 kaʔtvska
 k-athv-sk-a
 1SG.A-grow-PRS-IND
 ‘I am growing.’ (ibid.)
- (4.13) a. *ge:tvsɡa*
 keethvska
 k-eethvsk-a
 3SG.A-set.LG:PRS-IND
 ‘He is setting a post into the ground.’
 (Feeling 1975: 119)
- b. *geʔdvsɡa*⁵⁷
 keʔtvska
 k-eethvsk-a
 1SG.A-set.LG:PRS-IND
 ‘I am setting a post into the ground.’
 (ibid.)

Clusters of this type (type (ii)) do not condition Vowel Deletion (b), as expected, since we do not have a *CVh* sequence which has to be remedied by Vowel Deletion:

- (4.14) a. *hatv:ga*
hathv̀̀v̀ka
 h-athv̀̀(?)k-a (< *-athvʔk-)
 2SG.A-hang.up:PCT-IND
 ‘Hang it up!’ (Feeling 1975: 116)
- b. *gatvsɡa*
kathvska (*khthvsɡa)
k-athvska
 3SG.A-hang.up:PRS-IND
 ‘He is hanging it up’ (ibid.)
- (4.15) a. *hatvhi*
hathvhi
 h-athv-h-i
 2SG.A-grow-PCT-IND
 ‘Grow up!’ (Feeling 1975: 62)
- b. *à:gwatvsǎ:ʔi* (*à:kwtvsǎ:ʔi)
 ààkwathvsvǎʔi
 akw-athv-s-vǎʔi
 1SG.B-grow-PFT-ASR
 ‘I grew up.’ (Feeling 1975: 138)

Postulating a simple *Th* sequence accounts for the facts concerning both Vowel Deletion and Laryngeal Alternation. First, as expected, this sequence does not undergo Vowel Deletion because the *CVTh* sequence does not satisfy the condition for Vowel Deletion (i.e. *CVh* sequence). The glottal grade form is accounted for as follows. The first *h* of the stem should be replaced by a glottal stop in the glottal grade according to Laryngeal Alternation; in both examples this would be the *h* of the *Th* cluster. The expected glottal grade form would be *Tʔ*. However, Oklahoma Cherokee has a general phonological constraint against the sequence **Cʔ* (§5.3.3.2), so this sequence is regularly metathesized to give the form *ʔT*.

⁵⁷ A long vowel before a glottal stop is shortened by a regular phonological constraint (cf. §5.3.2.3).

4.1.3. Type (iii): *hTh*

The forms below give some of the verbs containing **Type (iii)** clusters; 56 verbs of this type are listed in Feeling (1975), the largest type of all.⁵⁸ These sequences keep the post-consonantal *h* in the glottal grade form and have a lowfall tone, i.e. $\dot{V}\dot{V}Th$:

- | | <i>h</i> -grade | glottal grade |
|--------|---|---|
| (4.16) | a. hatv:dâ:stanv:ʔi
hathvvtâasthanvʔi
h-a(h)thvvtâa(ʔ)st-ahn-vvʔi
2SG.A-listen-PFT-FUT.IMP
'Listen later!' (Feeling et al. 2003: 164) | b. gâ:tv:dâ:sdiha
kâathvvtâastiha
k-ahthvvtâa(ʔ)st-ih-a (< *-athvvtaʔst-)
1SG.A-listen-PRS-IND
'I am listening to it.' (Feeling 1975: 61) |
| (4.17) | a. ható:saʔdv:ʔi
hathóósaʔtvvʔi
h-a(h)thóo(ʔ)sat-ʔ-vvʔi ⁵⁹
2SG.A-hang.up.LG-PFT-FUT.IMP
'Hang it up later!' (Feeling et al. 2003: 139) | b. gâ:tó:sadíʔa
kâathóósatíʔa
k-ahthóo(ʔ)sat-íʔ-a
1SG.A-hang.up.LG-PRS-IND
'I am hanging it up.' (Feeling 1975:) |
| (4.18) | a. hakilv̌:da
hakhilv̌vta
h-a(h)khilv̌v(ʔ)t-Ø-a
2SG.A-ride-PCT-IND
'Ride it!' (Feeling 1975: 33) | b. gâ:kilv̌:diha
kâakhilv̌vtiha
k-ahkhilv̌v(ʔ)t-ih-a (< *-ahkhilvʔt-)
1SG.A-ride-PRS-IND
'I am riding it.' (ibid.) |

In contrast to Type (ii), the vowel before this type of plosives/affricates plus *h* cluster unexpectedly undergoes Vowel Deletion, as in the forms in (b):

- | | | |
|--------|--|--|
| (4.19) | a. hatv:dâ:sda
hathvvtâàsta
h-a(h)thvvtâ(ʔ)st-a
2SG.A-listen:PCT-IND
'Listen to it!' (Feeling 1975:61) | b. yákwtv:dâ:sdi
yákwthvvtâàsti
y-akw-(a)hthvvtâ(ʔ)st-i (< *-ahthvvtaʔst-)
IRR-1SG.B-hear:INF-NOM
'I'll be listening.' (Pulte & Feeling 1975: 350) |
|--------|--|--|

⁵⁸ Scancarelli (1987: 26-27) argues that *Th* clusters are necessarily preceded by *h*, but the observations in this and the preceding sections suggest rather that there is a distinction between *Th* and *hTh* sequences.

⁵⁹ The high tone before PFT is not realized due to the OCP (§8.2)

- (4.23) a. hahkilv̂:di:sgv̂:s
 hahkhilv̂vtiiskv̂vs
 h-ahkhilv̂v(?)t-iisk-v̂v(?)=s
 2SG.A-ride0IMPF-ASR=Q
 ‘Were you riding it?’ (CED-EJ, 2010)
- b. hakilv̂:da
 hakhilv̂vta
 h-a(h)khilv̂v(?)t-Ø-a (< *-ahkhilv̂v?)
 2SG.A-ride-PCT-IND
 ‘Ride it!’ (Feeling 1975: 33)

4.1.4. Type (iv): *Th* ($T = kw, tl$)

The following verbs contain **Type (iv)** clusters; six such verbs are listed in Feeling (1975). All of the *T*'s in this type are either *kw* or *tl*. In the glottal grade (b), the *Th* cluster of this type loses *h* just like Type (ii) *Th*, but does not have a lowfall tone on the preceding like Type (iii) *hTh*, or a glottal stop like Type (ii) *Th*.⁶¹ Note that in (4.25a) underlying the *tlh* sequence is realized as *hl* (§2.2.2; Feeling 1975: xviii):

- | | | |
|--------|---|--|
| | <i>h</i> -grade | glottal grade |
| (4.24) | a. hakwiya
hakhwiya
h-akwhiy-Ø-a
2SG.A-pay-PCT-IND
‘Pay it!’ (Feeling 1975: 36) | b. gagwiyíha
kakwiyíha
k-akwhiy-íh-a
1SG.A-pay-PRS-IND
‘I am paying.’ (ibid.) |
| (4.25) | a. hahlawĩ:da
hahlawíita
h-atlhawiit-Ø-a
2SG.A-take.off-PCT-IND
‘Take off flying!’ (Feeling 1975: 21) | b. gadlawi:díha
katlawiitíha
k-atlhawiit-íh-a
1SG.A-take.off-PRS-IND
‘I am taking off flying.’ (ibid.) |

I do not know whether Vowel Deletion has applied to this type or not, since all of the instances of this type cluster listed in Feeling (1975) happen to be preceded by long vowels, or are preceded by *h* as in (a) above.

I postulate for this type the same underlying sequence as for Type (iii), *Th*. The difference from Type (iii) is that all forms of Type (iv) have complex segments (*kw* or *tl*) as *T*, as noted above. The

⁶¹ This type has the form $\check{V}\check{V}T$ in glottal grade in Munro (1996b: 55). Again, this difference may reflect dialect differences.

different behavior of *kw* and *tl* as opposed to other plosives/affricates may be due to their internally complex nature (Clements & Keyser 1983: 85, Clements & Hume 1995: 254).

Not all the combinations of *kw* or *tl* and *h* manifest this type of alternation in the glottal grade; for example, the following verb has a Type (iii) *hTh* glottal grade form (i.e. it keeps the post-consonantal *h* and assigns a lowfall tone to the preceding vowel in the glottal grade (b)):

	<i>h</i> -grade		glottal grade
(4.26)	a. ga:kwe:nv:sga kaak <u>w</u> heenvvska ka-:(h)kwheenvvsk-a 3SG.A-wrap:PRS-IND 'He is wrapping him.' (Feeling 1975: 98)	b.	ji:yà:kwe:nv:sga ciiyà <u>àk</u> wheenvvska ciiya-:hkwheenvvsk-a 1SG>3SG.AN-wrap:PRS-IND 'I am wrapping him.' (ibid.)

Lindsey and Scancarelli (1987) attribute this difference to the underlying representations of *kw* and *tl*, claiming that *kw* and *tl* in 'wrap' are underlying units (i.e. *kw*), and these behave like Type (iii) with the glottal grade form $\check{V}\check{V}Th$, as in (4.26). But those behaving like Type (iv) with the glottal grade form *VT*, as in (4.24) and (4.25), are underlyingly clusters (*k+w*, *t+l*). However, the logic behind such an analysis is unclear (cf. Munro 1996b: 56 footnote 24). Instead, I analyze the forms in (4.24) and (4.25) as having *tlh* and *kwh*, while I analyze the forms in (4.26) as having *hkwh* and *htlh*.

4.1.5. Type (v): exceptions

The following verbs contain the last type, **Type (v)**; 4 such verbs are listed in Feeling (1975). In the glottal grade (b), Type (v) clusters lose the post-consonantal *h*, as Type (ii) *Th* and (iv) *Th* do, but have a lowfall tone on the preceding vowel, as Type (i) *hT* or Type (iii) *hTh* do (the stems are separated with hyphens):

	<i>h</i> -grade		glottal grade
(4.27)	a. à:de:t'vsga ààte <u>e</u> h'vsk-a 'He is diving.' (Feeling 1975: 9)	b.	gadè:d'vsga k-at <u>è</u> t'vsk-a 'I am diving' (ibid.)

- (4.28) a. gv:tʷsɡa
k-vvthʷsk-a
'He is putting it into fire.'
(Feeling 1975: 128)
- b. gʷ:dʷsɡa
k-ʷʷtʷsk-a
'I am putting it into fire.'
(ibid.)
- (4.29) a. u:tawě:dô:sdi
uu-thaweétó-osti
'for him to kiss her.' (Feeling 1975: 58)
- b. jì:dawě:dóʔvsɡa
cì-thaweétó-ʔvska
'I am kissing her.' (ibid.)

Again, since all the clusters of this type listed in Feeling (1975) are preceded by long vowels, I do not know about the applicability of Vowel Deletion. For this Type (v), I cannot postulate any underlying form. The expected glottal grade form for this type would be the same as for Type (ii) ($VʔT$), but a lowfall tone is found on the preceding vowel instead of a glottal stop. This might be an indication of language change (see §4.3).

4.1.6. Summary

In this section, I presented various behaviors of plosives/affricates plus h clusters with respect to Laryngeal Alternation, as well as Vowel Deletion, and argued that such variations can be accounted for mostly by the relative order of h and its adjacent consonants and the status of the adjacent consonant (whether internally complex or not). h is shown to be able to either precede (hT , Type (i)), follow (Th , Types (ii), (iv)), or flank (hTh , Type (iii)) a plosive/affricate. To summarize, the five types of plosives/affricates + h clusters presented in TABLE 4-1 are now interpreted as in TABLE 4-2:

TABLE 4-2: REPRESENTATIONS OF $T + h$ CLUSTERS

TYPE	UNDERLYING	h -GRADE	$ʔ$ -GRADE	VD	NOTES
(i)	hT	VhT	$\check{V}\check{V}T$	YES	
(ii)	Th	VTh	$VʔT$	NO	
(iii)	hTh	V(h)Th	$\check{V}\check{V}Th$	YES	
(iv)	Th	VTh	VT	N/A	$T = kw, tl.$
(v)	(?)	VTh	$\check{V}\check{V}T$	N/A	

The fact that *Th* (Type (ii)) and *hTh* (Type (iii)) are contrastive disproves Scancarelli's (1987: 26-27) statement that Cherokee *Th* clusters are necessarily preceded by *h* (cf. Munro 1996b: 56-57).

Based on similar facts as we saw in this section, Munro (1996b) concludes that "Cherokee has a contrast between two types of aspirated stops: aspirated stops derived by coalescence of a sequence of a stop plus *h*, and underlying aspirated stops (1996b: 57)". Her analysis can be summarized as in TABLE 4-3; the fifth column shows her analysis.⁶² Munro (1996b) analyzes plosives/affricates plus *h* clusters of Type (iii) as underlying aspirated stops, *T^h*, while Type (ii) as aspirated stops derived by coalescence of the sequence of a stop plus *h*, i.e., *Th*. Munro implies that Type (iv) is identical to Type (ii), i.e. *Th* (1996b: 56, fn. 24). Compare her analysis with mine, in the sixth column:

TABLE 4-3: REPRESENTATIONS OF *T + h* CLUSTERS (Munro 1996b)

TYPE	<i>h</i> -GRADE	?-GRADE	VD	MUNRO	UCHIHARA	NOTES
(ii)	VTh	V?T	NO	<i>Th</i>	<i>Th</i>	
(iii)	VTh	ṼṼTh	YES	<i>T^h</i>	<i>hTh</i>	
(iv)	VTh	VT	N/A	<i>Th</i>	<i>Th</i>	T = <i>kw, tl</i> .

Although I agree with Munro's (1996b) contention that Cherokee aspirated consonants may be on the way of phonemicization (§4.3), our analyses of each type of cluster are different, as is evident from TABLE 4-3. I argue that my analysis is superior in that it not only accounts for their various behaviors with respect to Laryngeal Alternation, but also to Vowel Deletion. That is, with Munro's (1996b) analysis it is not immediately clear why Type (iii) undergoes Vowel Deletion, while Type (ii) fails to.

4.2. Resonant plus *h* clusters

Resonants plus *h* clusters (*Rh*) are all realized as voiceless resonants, but show various manifestations with respect to Laryngeal Alternation and *h*-Metathesis, as do plosives/affricates plus *h*

⁶² As was mentioned in footnotes 56 and 61, glottal grade forms for Types (ii) and (iv) in Munro (1996b) are just the reverse of those in Feeling (1975). Munro (1996b) does not discuss Type (v).

clusters.⁶³ Thus, forms in (4.30), (4.31) and (4.32) all have an *hl* cluster, but they have different glottal grade forms (b).⁶⁴ In (4.30), *hl* in (a) loses *h* in (b) and leaves a tonal effect (lowfall tone) on the preceding vowel; in (4.31), *hl* in (a) also loses *h*, but is preceded by a glottal stop in (b), and there is no tonal effect; in (4.32), *hl* keeps the *h* but the tonal effect is found on the preceding vowel in (b). These various types of *hl* also exhibit different behaviors with respect to *h*-Metathesis (c): (4.30) undergoes Metathesis with the preceding vowel, while (4.31) does not. Below, the clusters in question are underlined in the second lines. Again, morpheme segmentations are not given here but will be given in the subsections to follow.

	<i>h</i> -grade	glottal grade	(<i>h</i> -Metathesis)
(4.30)	a. tihl ^h hgwadù:ga thih ^h l ^h kwatùuka 'Turn it over!' (Feeling 1975: 79)	b. de:ǰi:lihgwadé:ga teec ^h í ^h l ^h kwatééka 'I am turning it over.' (ibid.)	c. de:kálihgwadé:ga teekh ^h á ^h l ^h kwatééka 'He is turning it over.' (ibid.)
(4.31)	a. hihl ^h ǰ:na hih ^h lv ^h na 'Sleep!' (Feeling 1975: 95)	b. ǰi ^h l ^h íha ci ^h l ^h íha 'I am sleeping.' (ibid.)	c. gah ^h l ^h íha kah ^h l ^h íha 'He is sleeping.' (ibid.)
(4.32)	a. gani:hládíʔa kani ^h í ^h l ^h átíʔa 'He is setting up a bed.'	b. jini:hládíʔa cini ^h í ^h l ^h átíʔa 'I am setting up a bed.' (Feeling 1975: 108)	

TABLE 4-4 summarizes the phonological behaviors of each type of *Rh* cluster: Type (i) is exemplified by the forms in (4.30), Type (ii) by (4.31), Type (iii) by (4.32). Type (iv) is an *Rh* cluster which has the same glottal grade form as Type (ii) but unlike Type (ii) it undergoes *h*-Metathesis:

⁶³ As for North Carolina Cherokee, King (1975) and Cook (1979) seem to recognize this distinction, although they do not explicitly mention this: King (1975) distinguishes *Rh* sequence from *hR* sequence in the dictionary section, and Cook (1979: 11) accounts for the apparent exception to *h*-Metathesis rule with the difference between underlying *Rh* and *hR*. In either case, Laryngeal Alternation is not taken into account.

⁶⁴ Following the orthography in Feeling (1975) and other materials, I represent voiceless resonants as *Rh* (*hn*, *hl*, *hy*, *hw*) when followed by a vowel and as *hR* (*nh*, *lh*, *yh*, *wh*) when followed by a consonant.

TABLE 4-4: *R + h* CLUSTERS

TYPE	<i>h</i> -GRADE	<i>ʔ</i> -GRADE	H-MET	NOTES
(i)	VRh	V̄VR	YES	
(ii)	VRh	VʔR	NO	
(iii)	VRh	V̄VRh	N/A?	R = <i>l</i>
(iv)	VRh	VʔR	YES	

In the following, I will look at each type of cluster in detail.

4.2.1. Type (i): *hR*

The following verbs contain Type (i) clusters; many verbs belong to this type, the greatest in number of all the types. This type has the form $\check{V}\check{V}R$ in the glottal grade (b) (i.e. the *Rh* cluster loses *h* and has a lowfall tone on the preceding vowel), parallel to Type (i) plosives/affricates (*hT*) we saw in §4.1.1.

All types of resonants but *m* (i.e. *n, l, w, y*) are attested with this pattern:

	<i>h</i> -grade	glottal grade
(4.33)	a. hihnalũ:hi hi <u>h</u> naluūhi hi-hnaluū-h-i 2SG.A-ascend-PCT-IND 'Ascend!' (Feeling 1975: 138)	b. jì:nalu:sga cì <u>h</u> naluuska ci-hnaluu-sk-a 1SG.A-ascend-PRS-IND 'I am ascending.' (ibid.)
(4.34)	a. hihno:hǎ:la hi <u>h</u> noohv̄la hi-hnoo-hv̄l-a 2SG.A-tell-PCT-IND 'Tell it!' (Feeling 1975: 141)	b. jì:no:héha cì <u>h</u> noohéha ci-hnoo-héh-a 1SG.A-tell-PRS-IND 'I am telling it.' (ibid.)
(4.35)	a. hihwahta hi <u>h</u> wahtha hi-hwahth-Ø-a 2SG.A-find-PCT-IND 'Find it!' (Feeling 1975: 26)	b. jì:wahtíha cì <u>h</u> wahthíha ci-hwahth-íh-a 1SG.A-find-PRS-IND 'I am finding it.' (ibid.)

This type undergoes *h*-Metathesis, again like Type (i) plosives/affricates *hT* above, as the (b) forms show (the relevant sequences are underlined):

- | | | |
|--------|---|---|
| (4.36) | a. hihnalü:hi
<u>hih</u> naluuhi
hi- <u>hn</u> aluu-h-i
2SG.A-ascend-PCT-IND
‘Ascend!’ (Feeling 1975: 138) | b. kanalu:sga
<u>khan</u> aluuska
ka- <u>hn</u> aluu-sk-a
3SG.A-ascend-PRS-IND
‘He is ascending.’ (ibid.) |
| (4.37) | a. hihno:hv̌:la
<u>hih</u> noohv̌la
hi- <u>hn</u> oo-hv̌l-a
2SG.A-tell-PCT-IND
‘Tell it!’ (Feeling 1975: 141) | b. dà:hlino:héha
tàà <u>h</u> inoohéha
t-Ø- <u>ali-hn</u> oo-héh-a
DIST-3SG.A-MID-tell-PRS-IND
‘He is conversing.’ (Feeling 1975: 69) |

I postulate an underlying form *hR* for this type; i.e. a resonant preceded by *h*. This is justified by the fact that this type shows exactly the same behavior as Type (i) plosives/affricates (*hT*; §4.1.1) both with respect to Laryngeal Alternation and *h*-Metathesis.

4.2.2. Type (ii): *Rh*

The following verbs contain **Type (ii)** clusters. 10 such verbs are found in Feeling (1975). This type has the glottal grade form with *V?R*, parallel to Type (ii) plosives/affricates, *Th* in §4.1.2:⁶⁵

- | | | |
|--------|---|--|
| | <i>h</i> -grade | glottal grade |
| (4.38) | a. gahné:ga
ka <u>hn</u> ééka
ka-nhéé(?)k-a
3SG.A-carry.FL:PRS-IND
‘He is carrying it (FL).’ (Feeling 1975: 96) | b. ji?né:ga
ci?nééka
ci-nhéé(?)k-a
1SG.A-carry.FL:PRS-IND
‘I am carrying it (FL).’ (ibid.) |
| (4.39) | a. gahlíha
ka <u>h</u> líha
ka-lhíh-a
3SG.A-sleep:PRS-IND
‘He is sleeping.’ (Feeling 1975: 95) | b. ji?líha
ci?líha
ci-lhíh-a
1SG.A-sleep:PRS-IND
‘I am sleeping.’ (ibid.) |

This type does not undergo *h*-Metathesis as the (a) forms above illustrate, unlike the Type (i) *hR* cluster, but like Type (ii) plosives/affricates *Th*.

⁶⁵ EJ has *VR* for the glottal grade for this type.

I postulate the underlying form *Rh* for Type (ii); i.e. a resonant followed by *h*. This is supported again by its parallelism to Type (ii) plosives/affricates, *Th* (§4.1.2). First, the failure of *h* of this type to undergo *h*-Metathesis can easily be explained if *h* is positioned after the resonant (*Rh*). Second, the glottal grade form of this type, *VʔR*, can be explained naturally too by postulating a post-resonant *h*, (i.e. *Rh*). The *h* in an *Rh* cluster alternates with a glottal stop in the glottal grade, resulting in the glottal grade form *VRʔ*. The sequence *Rʔ* undergoes metathesis due to the general phonological constraint against such a sequence in Cherokee, **Cʔ* (§5.3.3.2).⁶⁶

4.2.3. Type (iii): *htlh*

The following verbs contain **Type (iii)** clusters. 5 verbs of this type are listed in Feeling (1975). Type (iii) has the form $\check{V}\check{V}Rh$ in the glottal grade: a lowfall tone is assigned to the preceding vowel, like Type (i) *hR* cluster, but the *h* is kept, unlike Type (i) *hR* or Type (ii) *Rh* clusters:

	<i>h</i> -grade	glottal grade
(4.40)	a. <i>hihlahṽ:ga</i> <i>hihlahṽvk-a</i> <i>hi-htlha-hṽṽ(?)k-a</i> (< <i>*-hvʔk-</i>) 2SG.A-place.on-PCT-IND 'Place on it!' (Feeling 1975: 21)	b. <i>ji:hlahṽsga</i> <i>cihlahṽska</i> <i>ci-htlha-hṽsk-a</i> 1SG.A-place.on-PRS-IND 'I am placing it on s.thg.' (ibid.)
(4.41)	a. <i>gani:hládíʔa</i> <i>kaniihlátíʔa</i> <i>ka-niihtlhatíʔ-a</i> 3SG.A-set.up.bed:PRS-IND 'He is setting up a bed.' (Feeling 1975: 108)	b. <i>jinì:hládíʔa</i> <i>cinìhlátíʔa</i> <i>ci-niihtlhatíʔ-a</i> 1.SG.A-set.up.bed:PRS-IND 'I am setting up a bed.' (ibid.)

All examples but one (*kanhkwáʔeeha* 'agitate LQ') in this type have *l* as their *R*. I do not know whether this type undergoes *h*-Metathesis or not in the *h*-grade, since no example in Feeling (1975) satisfies the condition for *h*-Metathesis.

⁶⁶ Flemming (1996: 36-37) argues that this can be explained by assuming that *hl* in this case is an underlying *hl* unit. See §3.3.7 for an argument against such an analysis.

It seems reasonable to postulate a resonant flanked by *h*'s (*hRh*) for this type: just as in the case of Types (iii) *hTh* (§4.1.3), the glottal grade form for this type, $\check{V}Rh$, is most naturally explained by postulating *hRh*, with the first *h* triggering a lowfall tone but the second *h* remaining intact. However, as Munro (1996b: 58) suggests, the surface voiceless lateral fricative [ɬ] (*hl* in the orthography of Feeling (1975)) in this type may in fact be an underlying *tl* preceded and followed by *h*'s (i.e. *htlh*). Many Oklahoma Cherokee speakers are changing a lateral affricate [tɬ] to a fricative [ɬ] in many words (§2.2.2; Feeling 1975: xviii). The expected surface sound for *htlh* is [htɬ], but as a consequence of this change, [htɬ] results in [hɬ]. This *h* might be absorbed into [ɬ] and thus underlying *htlh* surfaces as [ɬ].

A support for postulating underlying *htlh* for this type comes from the fact that some speakers do have a surface [htɬ] for these forms; compare (4.42) with (4.40a) above:

- (4.42) hihtlahvsga
 hihtlhahvaska
 hi-htlhahvsk-a
 2SG.A-place.on:PRS-IND
 ‘You are placing it on a raised surface.’ (EJ, July 2011)

Another support for postulating underlying *htlh* for this type comes from the fact that this type only has *l* as its *R*, and not other resonants, namely *n*, *y*, or *w*. If Type (iii) were underlying *hRh*, we would expect there to be *hnh*, *hyh* and *hwh* as well. If such an analysis is correct, it suggests that a resonant cannot be flanked by two *h*'s (*hRh*), unlike plosives/affricates.

4.2.4. Type (iv): exceptions

The following verbs contain Type (iv) clusters; only 3 verbs in Feeling (1975) belong to this type. The glottal grade form (b) of **Type (iv)** is the same as that for Type (ii) *Rh* cluster, $V\check{R}R$ (the *Rh* cluster loses *h* and a glottal stop is found before the resonant):

- | | | |
|--------|--|---|
| | <i>h</i> -grade | glottal grade |
| (4.43) | a. hahwo:ladagi
ha- <u>h</u> woolat-aki
‘Breathe!’ (Feeling 1975: 142) | b. gaʔwo:ladé:ʔa
ka- <u>ʔ</u> woolat-ééʔa
‘I am breathing.’ (ibid.) |

- (4.44) a. keládí:dò:ha
 k-he_látíídòòha
 ‘He is mingling with a group.’
 (Feeling 1975: 144)
- b. geʔladí:dò:ha
 k-e_ʔlátíídòòha
 ‘I am mingling with a group.’
 (ibid.)

On the other hand, this type undergoes *h*-Metathesis, as (b) forms show, like Type (i) *hR*, but unlike Type (ii) *Rh*:

- (4.45) a. hahwo:ladagi
h-ahwoolat-aki
 ‘Breathe!’ (Feeling 1975: 142)
- b. kawo:ladé:ʔa
k-hawoolat-ééʔa
 ‘He is breathing.’ (ibid.)
- (4.46) a. heladí:da
h-elátíít-a⁶⁷
 ‘Mingle with a group!’ (Feeling 1975: 144)
- b. keládí:dò:ha
k-helátíít-dòòha
 ‘He is mingling with a group.’ (ibid.)

I cannot postulate any underlying form for this type. From its interaction with Laryngeal Alternation (its glottal grade is *VʔR*), it would seem that the underlying sequence is *Rh*; however, it undergoes *h*-Metathesis with the immediately preceding vowel, which suggests that the underlying sequence would rather be *hR*. This might be an indication of a language change, where a phonological contrast between *Rh* and *hR* is disappearing, which is all the more plausible given the fact that *hR* and *Rh* are phonetically identical (Flemming 1996: 26), and that it is an instance of absolute neutralization (Kiparsky 1968). See §4.3 for more on this.

4.2.5. Summary

In this section, I showed that voiceless resonants manifest various behaviors with respect to Laryngeal Alternation and *h*-Metathesis, and that postulation of both a resonant preceded by *h* (*hR*, Type (i)) and that followed by *h* (*Rh*, Type (ii)) accounts for their different behaviors with respect to Laryngeal Alternation and *h*-Metathesis. To summarize, the four types of *R* plus *h* clusters presented in TABLE 4-4 can now be analyzed as follows:

⁶⁷ For an unknown reason, *l* is found in this form, rather than expected *hl*.

TABLE 4-5: REPRESENTATIONS OF $R + h$ CLUSTERS

TYPE	UNDERLYING	h -GRADE	? -GRADE	H-MET	NOTES
(i)	hR	VRh	$\check{V}\check{V}R$	YES	
(ii)	Rh	VRh	$V\text{?}R$	NO	
(iii)	$htlh$	VRh	$\check{V}\check{V}Rh$	N/A?	$R = l$
(iv)	(?)	VRh	$V\text{?}R$	YES	

This is in contrast to Flemming's (1996) or Munro's (1996b: 49, 59) analyses, which resort to phonemicization of voiceless resonants. The discussion of Type (iii) also suggests that a resonant cannot be flanked by two h 's (hRh) in Oklahoma Cherokee, in contrast to plosives/affricates.

4.3. Conclusion

In this chapter, I have presented the various behaviors of consonant plus h clusters with respect to Laryngeal Alternation, as well as to Vowel Deletion/ h -Metathesis. I have argued that most of the cases can be naturally accounted for by the relative order of h and its adjacent consonant alone, without resorting to phonemicization of aspirated consonants (Flemming 1996, Munro 1996b) or a featural association of aspiration to a consonant (Lindsey 1987, Scancarelli 1992).

However, we have also observed that there are some exceptional, unexplained types of clusters: Type (v) plosives/affricates (§4.1.5) and Type (iv) resonants (§4.2.4). Type (v) plosive/affricate + h cluster loses h in the glottal grade, suggesting they are plosives/affricates followed by an h (Th), while they also have a lowfall tone on the preceding vowel, which suggests they are plosives/affricates preceded by an h (hT). Type (iv) resonant + h clusters behave like resonants followed by h (Rh) with respect to Laryngeal Alternation, in that their glottal grade is $V\text{?}R$ ($< VR\text{?}$), rather than $\check{V}\check{V}R$ ($< V\text{?}R$), but like resonants preceded by h (hR) with respect to h -Metathesis, in that this h undergoes h -Metathesis with the preceding vowel. Such a situation is in fact not totally unexpected, since this involves a case of absolute neutralization (the cases of hR vs. Rh , both realized as voiceless resonants) as well as contextual

neutralization (the cases of *hCh* vs. *Ch*), and in such cases exceptions are highly likely to emerge (Kiparsky’s (1968) “instability”).

Moreover, some forms show inter- and intra-speaker variations with respect to which type they belong to. First, an inter-speaker variation is found for the contrast between *hn* and *nh*; for EJ, the voiceless *n* behaves as if it is *hn* in that it undergoes *h*-Metathesis with the preceding vowel (a), while for Feeling (1975) this voiceless *n* fails to undergo *h*-Metathesis and thus it behaves as if it is *nh* (b):

- | | | | |
|--------|--|--|---|
| | EJ, July 2011 | | Feeling (1975: 96) |
| (4.47) | a. de:káné:ga
teekhánééka
tee- <u>ka-hnéé</u> (?)k-a
DIST-3SG.A-carry.FL:PRS-IND
‘He is taking a flexible object somewhere by hand.’ | | b. gahné:ga
<u>káhnéé</u> ka
<u>ka-nhéé</u> (?)k-a
3SG.A-carry.FL:PRS-IND |
| (4.48) | a. kani:dó?a
<u>khaniitó</u> ?a
<u>ka-hniitó</u> ?-a
3SG.A-handle.FL:PRS-IND
‘He is handling a flexible object.’ | | b. gahnĩ:dô:ha
<u>kahnĩitó</u> oha
<u>ka-nhiitó</u> (?)h-a
3SG.A-handle.FL:PRS-IND |

Even an intra-speaker variation is found for this contrast; Feeling (1975) lists two forms for the glottal grade of the verb in (4.49), thus fluctuating between *hn* (b) and *nh* (c).

- | | | | |
|--------|---|---|--|
| | <i>h</i> -grade | glottal grade (i) | glottal grade (ii) |
| (4.49) | a. gahnéha
<u>kahné</u> ha
ka-nhéh-a
3SG.A-hold.FL:PRS-IND
‘He is holding it (FL).’ | b. jì:néha
<u>cìnné</u> ha
ci-hnéh-a
1SG.A-hold.FL:PRS-IND
‘I am holding it (FL).’ (Feeling 1975: 96) | c. ji?néha
<u>ci?né</u> ha
ci-nhéh-a |

Chapter 5. Phonotactics, Syllable Structure and Segmental Processes

5.0. Introduction

This chapter lays out the possible consonant clusters and syllable structure, as well as various phonological processes in Oklahoma Cherokee. Previous accounts of syllable structure and phonotactics include King (1975: 32-33), Huff (1977: Ch. 4), and Montgomery-Anderson (2008: 98-103), but this is the first comprehensive detailed description. § 5.1 discusses consonant clusters, and §5.2 lays out the syllable structure of Oklahoma Cherokee. Then, §5.3 will discuss various segmental processes which remedy illicit clusters. Since vowel length in Oklahoma Cherokee is contrastive, both the mora and the syllable are relevant phonological units; §5.4 summarizes which phonological processes refer to the mora and which ones to the syllable.

5.1. Phonotactics

Oklahoma Cherokee allows (surface) consonant clusters of up to four consonants. In this section, I will look at the possible *CC* (§5.1.1), *CCC* (§5.1.2) and *CCCC* (§5.1.3) clusters

5.1.1. *CC* sequence

TABLE 5-1 shows the possible word-medial *CC* clusters that are found in entries in Feeling (1975). An asterisk (*) indicates that the impossibility of the sequence is supported by positive evidence, such as insertion of an epenthetic vowel to break up impermissible clusters which occur in loanwords or which occur as a result of morpheme concatenation (see §5.3.3.1). Sequences in parentheses indicate that the clusters in those particular cells are not found in Feeling (1975) (or occur only marginally) but regularly occur in other speakers' speech, such as EJ (see §5.1.1.3 for a more detail). Period indicates a syllable boundary.

TABLE 5-1. WORD-MEDIAL CC CLUSTERS

C2 C1	k	kw	t	c	tl	l	n	m	y	w	s	h	?
k						*					ks	kh	*
kw											kws	kwh	
t	*		*								ts	th	*
c												ch	
tl	*		*									tlh	*
l	*/(l.k)		*/l.t	l.c					(l.y)		l.s		*
n	*/(n.k)	(n.kw)	(n.t)	(n.c)		(n.l)					n.s		*
m													
y	*/(y.k)		(y.t)			(y.l)					y.s		*
w	*/(w.k)		(w.t)			(w.l)					w.s		
s	sk	skw	st		stl	sl		*				*	*
h	h.k	h.kw	h.t	h.c	h.tl	hl	hn		hy	hw			
?	?k		?t		?tl	?l	?n		?y				

Some of the gaps in TABLE 5-1 are only superficial: the absence of *kw*, *tl* sequences is because such sequences are analyzed as singletons (§2.2.7.2); the absence of *Rh* clusters (*lh*, *nh*, *yh*, *wh*) is because both *hR* sequences (*hl*, *hn*, *hy*, *hw*) and *Rh* sequences are realized as voiceless resonants, represented as *hR* (cf. §4.2); the absence of *hs* sequence is because the [h] portion of a phonetic [hs] sequence is analyzed to be the result of automatic process (§2.2.3, Feeling 1975: x). *c* plus *s* sequences are realized as *ts* (cf. §5.3.3.5) and the *tl* plus *s* sequence is realized as *ls*.

Besides such superficial gaps, the following generalizations can be drawn from TABLE 5-1: one of the members has to be *s*, *h* or *?* (§5.1.1.1), and the Sonority Sequencing Principle (§5.1.1.2). In §5.1.1.3 we will see some speakers allow *RR* and *RT* sequences.

5.1.1.1. One of the members has to be *s*, *h* or *?*

First, from TABLE 5-1 it is clear that one of the members of a cluster has to be *s*, *h* or *?* (except for *l.t* and *l.c*, which are marginal and exceptional in Feeling (1975)). Their behavior could be accounted for by analyzing them as being in the “auxiliary template” (Selkirk 1982: 347), as in the case of English *s*, or as being “underparsed and realized as secondary articulation” (Dyck 1990).⁶⁸ Thus, **TT* or **TR* sequences

⁶⁸ These consonants are anomalous in the Cherokee Syllabary too (§1.5.3): *s* is the only consonant segment which has its own letter without the following vowel (all the other letters represent (C)V

(*T* = plosive/affricate, *R* = resonant) are never allowed in any speakers. *RR* and *RT* sequences are not found in Feeling (1975), but some speakers regularly have such sequences (§5.1.1.3).

Not all the sequences with *h* or *s* are attested; the following sequences containing *h* or *s* are not allowed: **sn*, **sy*, **sw*, **sm*, **sʔ*, **sh*, **ss*, **mh*, **ʔh*, **hh*, and *hʔ*. These gaps are explained by general phonotactic constraints: *s* can only be followed by a plosive/affricate or *l*; *m* can never be a member of a cluster (*m* is a marginal phoneme); and a sequence of two laryngeal consonants (or *s*) is not allowed (**HH*).

Not all the sequences are equally frequent. The sequences in (5.1) are rare (two instances with *sIV*, and only one instance of *stIV* among all the entries in Feeling 1975). In the following examples, the first line is represented with *d/t* system, and the second line is with *t/th* system (see §1.5.1), with syllable boundaries indicated by periods. Morphological segmentations for examples in this chapter are found in the Appendix at the end of this chapter.

- (5.1) rare sequences
- a. *sl* à:sladí [à:sladí]
 àà.sla.tí
 ‘He is roping him’ (JRS, Aug 2012)
- b. *stl* dâ:sdlû:sga
 tàà.stlúu.ska
 ‘He is splitting it’ (Feeling 1975: 75)
- c. *stl* sdladí [sdʒadí]
 stla.tí
 ‘You two are putting out fire’ (JRS, Aug 2012)

5.1.1.2. Sonority Sequencing Principle

The second generalization we can draw from TABLE 5-1 is the fact that most of the sequences obey the *Sonority Sequencing Principle* (Clements 1990: 285, Blevins 1995: 210, Zec 2007: 177):

syllables), and coda *h* and *ʔ* are not represented in the syllabary.

- (5.2) *Sonority Sequencing Principle* (Blevins 1995: 210)
Between any member of a syllable and the syllable peak, a sonority rise or plateau must occur.

Sounds in a language are ordered in the following hierarchy; the higher the sound is in the hierarchy, the more sonorous it is (Clements 1990: 286, Blevins 1995: 211):

- (5.3) Sonority hierarchy
vowels > glides > liquids > nasals > fricatives > oral stops

When a cluster occurs across syllable boundaries, it is subject to the Syllable Contact Law (Murray & Vennemann 1983, Clements 1990: 287)

- (5.4) *The Syllable Contact Law* (Clements 1990: 287)
In any sequence C_a \$ C_b there is a preference for C_a to exceed C_b in sonority.

In TABLE 5-1, most of the combinations obey either (5.2) or (5.4). However, there are a couple of *CC* clusters which do not obey the Sonority Sequencing Principle (5.2), namely *sC* sequences (5.5), in addition to (5.1b) and (c) :

- (5.5) Violation of SSP
- a. sdù:di
stùù.ti
'door, gate' (Feeling 1975: 152)
 - b. sgǒ:hi
skoó.hi
'ten' (Feeling 1975: 152)
 - c. sgwe:hnǘ:ʔi
skwee.hnvǘ.ʔi
'first' (Feeling 1975: 153)

However, onset *sC* sequences are commonly observed cross-linguistically (Selkirk 1982: 346ff., Clements 1990: 288ff., Blevins 1995: 211). In fact, onset *Cs* sequences, illustrated in (5.6), which obey the Sonority Sequence Principle, are much rarer than *sC* sequences in Oklahoma Cherokee. In (5.6), the syllable boundaries are justified by notation in Feeling (1975):

- (5.6) Onset *Cs* sequences
- a. *ks* à:ksósga
 àà.ksó.ska
 ‘He is going down hill’ (Feeling 1975: 34)
- b. *kws* dakwsáni
 ta.kwsáni
 ‘turnip’ (Feeling 1975: 72)

5.1.1.3. *RR* and *RT* sequences

Feeling (1975) is consistent in not having sequences which do not involve *h*, *s* or *ʔ*. However, he exceptionally has *RT* sequences (*R* = resonant, *T* = plosive/affricate) in a couple of words (*RT* sequences are underlined):⁶⁹

- (5.7) *RT* sequences in Feeling (1975)
- a. à:ljí:kwsga
 ààl.cií.kwska
 ‘he is spitting’ (Feeling 1975: 40)
- b. adě:ldiyhdí:ʔi
 a.teél.tiyh.tií.ʔi
 ‘bank’ (Feeling 1975: 9)

Also, some speakers (including EJ) regularly have *RT* and *RR* sequences (Scancarelli 2005: 363).

The *wt* sequence in (5.8a) corresponds to *wat* in Feeling (1975):

- (5.8) *RT*, *RR* sequences in EJ
- a. yasdâ:wdé:ga
 ya.stáaw.téé.ka
 ‘He is not following him’ (EJ, July 2011)
- cf. à:sdâ:wadé:ga
 àà.stáa.wa.téé.ka
 (Feeling 1975: 47)
- b. yo:gínlâ:sdaʔe:ha
 yo:kín.lâà.sta.ʔee.ha
 ‘He is not tromping on him and me’ (EJ, July 2011)
- c. yigv:wlâ:sdaʔe:ha
 yi.kvv.lâà.sta.ʔee.ha
 ‘They are not tromping on me.’ (EJ, July 2011)

⁶⁹ I owe Chris Koops for reminding me of these examples.

These clusters synchronically result from the deletion of a vowel; this can be shown from the displacement of the floating high tone from a pre-pronominal prefix (H3; Ch.13).

5.1.2. CCC sequences

TABLE 5-2 shows word-medial CCC clusters. Again, the sequences which do not occur in Durbin Feeling's speech but occur in other speakers' speech are in parentheses:

TABLE 5-2. WORD-MEDIAL CCC CLUSTERS (ORGANIZED BY INITIAL CC)

C2 \ C1	k	kw	t	c	tl	l	n	m	y	w	s	h	?
k											ksk kst ksl	khk kht khc khtl	
kw											kwsk kwst	kwht	
t											tsk tskw tst tsl	thk tht (thtl)	
c													
tl													
l			(l.th)								l.sk l.skw l.st	lh.k lh.kw lh.t lh.c	
n			(n.th) (n.ts)								n.sk n.st n.sl	nh.k nh.kw nh.t nh.c nh.tl	
m													
y											y.sk y.st	yh.k yh.t yh.c	
w											w.sk w.st	wh.k wh.t wh.c wh.tl	
s	skh		sth										
h	h.kh		h.th		(h.tlh)								
?						?lh							

TABLE 5-2 shows that one of the consonants has to be *s*, *h* or *ʔ*, as in *CC* clusters. Many *CCC* sequences do not follow the Sonority Sequencing Principle; (5.9) illustrate examples that go against the Sonority Sequencing Principle. When the cluster does not occur word-initially, the syllable boundaries are justified by Feeling’s (1975) notations and by the failure to condition Closed Syllable Shortening (§5.3.2.1). The sequences in question are underlined in the second line.

- (5.9) Sequences violating SSP
- a. *ksk* ksgo:lǐ:yê:
kskoo.lií.yée
 ‘You are rubbing me’ (JRS, Aug 2012)
- b. *kst* ksdě:la⁷⁰
ksteé.la
 ‘Help me!’ (JRS, Aug 2012)
- c. *kwsk* à:lǐ:kwsɡa
 ààl.cí.kwska
 ‘He is spitting’ (Feeling 1975: 40)
- d. *kwst* akwsdo
 a.kwsto
 ‘pillow’ (Feeling 1975: 37)
- e. *tsk* tsgǒ:sǎ
tskoó.sǎ
 ‘You dug it.’ (JRS, Aug 2012)
- f. *tskw* tsgwalé:ɡwala⁷¹
tskwa.léé.kwa.la
 ‘whippoorwill’ (Feeling 1975: 157)
- g. *tst* tsdǎ:nǎ:
tstǎǎ.nǎǎ
 ‘You have put it (FL) into fire’ (JRS, Aug 2012)
- h. *khk* dé:kǐ:ló
 téé.khkii.ló
 ‘He is doing laundry’ (DJM; JRS, Aug 2012)

⁷⁰ Some speakers do not pronounce the first consonant of a word-initial #CsC sequence (Wyman Kirk, p.c. 2013). However, these speakers have this first consonant when this sequence is not word-initial.

⁷¹ JRS has *skwaléékwala* instead.

- i. *kht* kdi:yá⁷²
 khtii.yá
 ‘He is using it’ (JRS, Aug 2012)
- j. *khtl* kdlíha
 khtlí.ha
 ‘He is sharpening it’ (Feeling 1975: 143)
- k. *kwht* ù:lǎ:kwdi
 ùù.lvǎ.kwhti
 ‘He likes him, it’ (Feeling 1975: 175)
- l. *thk* ù:hyvhjinv:tga
 ùù.hyvh.ci.nvv.thka
 ‘He is choking on it’ (Feeling 1975: 169)
- m. *tht* ì:tdí
 ìì.thtí
 ‘We are using it’ (JRS, Aug 2012)
- n. *thtl* ì:ttlí⁷³ [ì:ˈtɬí]
 ìì.thtlí
 ‘We are sharpening it’ (JRS, Aug 2012)

The following sequences do not violate the Sonority Sequencing Principle (5.2) or Syllable Contact

Law (5.4), but are rare:

- (5.10) Rare sequences
- a. *ksl* ksladí [ksladí]
 ksla.tí
 ‘You are roping me’ (JRS, Aug 2012)
- b. *tsl* tslv:hǎ [tslv:hǎ]
 tslvv.hǎ
 ‘You sharpened it’ (JRS, Aug 2012)
- c. *nh.tl* à:nhdladí [à:ndɬadí]
 àành.tla.tí
 ‘They are putting out fire’ (JRS, Aug 2012)

⁷² In JRS’s speech, *kht* sequence sounds more like a geminate (word-initial geminates are attested in other languages; Ladefoged & Maddieson 1996: 93-94) or like a Korean ‘fortis’ (stiff voice) plosive, [*t].

⁷³ As if the underlying form was *ìthǎhi*, rather than *ìthǎi*.

d. *wh.k* dù:whgi:ló:ʔv [dù:ʔgi:ló:ʔʌ]
 tùùwh.kii.lóó.ʔv
 ‘He did laundry.’ (JRS, Aug 2012)

e. *wh.tl* ù:whdládʋ [ù:ʔdlʒádʋ]
 ùùwh.tlá.tv
 ‘He put out fire’ (JRS, Aug 2012)

5.1.3. CCCC sequence

The only attested word-medial CCCC sequences in Feeling (1975) are the following. All of them contain two *h*’s, two *s*’s or one *h* and one *s*:

TABLE 5-3. WORD-MEDIAL CCCC CLUSTERS BY INITIAL CC

C2 \ C1	k	kw	t	c	tl	l	n	m	y	w	s	h	ʔ
k											ksth	khth khtlh	
kw													
t												thtlh	
c													
tl													
l											l.sth	lh.kh lh.th	
n											n.sth	nh.th	
m													
y											y.sth	yh.th	
w											w.sth	wh.th	
s			sthk										
h													
ʔ													

(5.11) illustrate examples with CCCC clusters; again, the syllable boundaries are justified by Feeling’s (1975) notations:

(5.11)

a. *ksth* dù:kstanʋ:ʔi
 tùù.kstha.nʋʋ.ʔi
 ‘He vomited.’ (Feeling 1975: 87)

b. *khth* któ:ʔa
khthóó.ʔa
 ‘it (long object) is hanging.’ (Feeling 1975: 145)

- c. *thtlh* dv:ttli⁷⁴ [dλ:'tʰi]
 tvv.thtlhi
 ‘He is running toward here’ (DJM, Aug 2012)
- d. *sthk* à:liyê:su:stgí:ʔa
 àà.li.yée.suu.sthkíí.ʔa
 ‘He is taking off a ring.’ (Feeling 1975: 40)
- e. *l.sth* ù:to:lstánv:ʔi
 ùù.thool.sthá.nvv.ʔi
 ‘He loaned it to him.’ (Feeling 1975: 60)

5.2. Syllable structure

This section lays out the syllable structure in Oklahoma Cherokee. The following three criteria are employed in order to determine the syllable boundaries and syllable shapes, and in general these three criteria were found to converge:

- (5.12) Justification for syllable structure
- (i) Maximal Onset Principle
 - (ii) Segmental processes
 - (iii) Native speaker judgment.

The first criterion, Maximal Onset Principle (Selkirk 1982: 359), is observed in many languages (“Law of initials” in Vennemann 1972: 11, and “Onset First Principle” in Clements & Keyser 1983: 37):

- (5.13) *Maximal Onset Principle* (Selkirk 1982: 359)
 In the syllable structure of an utterance, the onsets of syllables are maximized, in conformance with the principles of basic syllable composition of the language

In this study, I maximize the onsets of the syllable as long as such onsets are permitted word initially.

The second criterion is the various segmental processes to be discussed in §5.3. For example, the syllabification of sequences such as *ThT(h)* or *sC* as onset clusters, rather than as coda and onset, is justified by the fact that Closed Syllable Shortening (§5.3.2.1) does not apply to the vowels preceding these sequences (i.e., the first member of these clusters are not syllabified as the coda consonant of the

⁷⁴ Feeling (1975: 59) has *ààtlhi*.

preceding syllable and thus the preceding syllable is treated as open). Sequences such as *h.T, Rh.T*, etc. cause the preceding vowel to be shortened, and thus are treated as clusters across syllable boundaries.

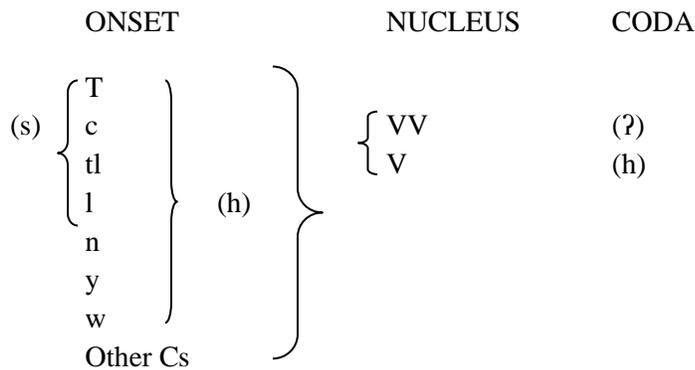
The last criterion for determining the syllable shape comes from native speaker judgments. Feeling (1975) marks tones by raised numbers at the syllable boundary (Feeling 1975: ix-x), as in (5.14), and thus we can tell where he believes the syllable boundary is:

(5.14) a¹któ²³sdi
 àà.khthoó.sti
 ‘He is looking at him.’ (Feeling 1975: 36)

In (5.14), the sequence *khth* is treated as the onset cluster of the second syllable since the tonal notation for the lowfall tone, [1], is written before this sequence in Feeling (1975).

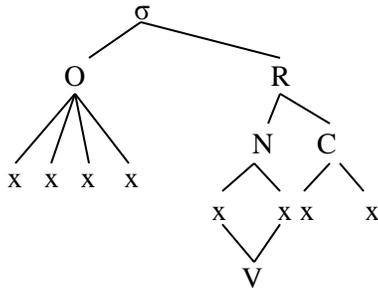
Cherokee morphemes have the syllable structure as in (5.15), before application of various phonological and morphophonological processes (most importantly Vowel Deletion (§3.1)); in (5.15), *T* represents plosives (*t, k* and *kw*):

(5.15) Syllable structure before adjustments



Application of Vowel Deletion (§3.1) and morpheme concatenation to (5.15) results in a more complex syllable structure, as given in (5.16). This is the (surface) maximal syllable structure obtained based on the criteria in (5.12). In (5.16), O = onset, R = Rhyme, N = nucleus, C = coda, and V = vowel.

(5.16) Maximal Syllable Template in Oklahoma Cherokee



An onset can contain up to four consonants, while nucleus and coda are maximally binary branching. Below, I will look at each of the components of the syllable.

5.2.1. Onset

A syllable onset may not always be present word-initially; many words begin with a vowel:

(5.17)

- a. ě:gwa
 eě.kwa
 ‘big’ (Feeling 1975: 89)
- b. áktohdi
 á.khthoh.ti
 ‘telescope’ (Feeling 1975: 36)

An onset glottal stop does not occur word-initially, but can occur word medially before a vowel:

(5.18)

- a. goʔi
 ko.ʔi
 ‘grease’ (Feeling 1975: 122)
- b. à:hlíʔilí:dô:ha
 àà.hlí.ʔi.líí.tóo.ha
 ‘It is taking time.’ (Feeling 1975: 22)

An onset can contain up to four consonants. See §5.1 for possible consonant clusters. Some consonant sequences do not occur as onset clusters, but they occur word-medially as sequences across syllable boundaries: *h.T*, *ʔ.T*, *ʔ.R*, *ʔ.s*, *Rh.T*, and *R.s*. A prothetic vowel is sometimes inserted when such sequences occur word-initially (e.g. *lhkvʔi* ‘tree’ (Feeling 1975: 130) ~ *ilh.kʔ* [iłgvʔ] (DJM, Aug 2012)).

As can be seen in (5.15), the only onset clusters allowed in the underlying level are clusters consisting of *s* + plosive, *s*+ *tl*, *s* + *l*, or *Ch* sequences. Other onset clusters that can occur in the surface forms in (5.16) emerge as a result of Vowel Deletion or morpheme concatenation. Vowel Deletion creates clusters of the type *ChT(h)* from a sequence *CVhT(h)* (§3.1), as in (5.19) and (5.20); the (b) forms justify the presence of the underlying vowels. The relevant sequences are underlined:

- | | VD has applied | VD has not applied |
|--------|--|---|
| (5.19) | a. kdlo:sga
<u>kht</u> loo.ska
k-(v)htloo-sk-a
3SG.A-fire.goes.out-PRS-IND
'It (fire) is going out.' (Feeling 1975: 143) | b. hvhdłõ:hi
<u>hvh.t</u> loó.hi
h-vhtloó-h-i
2SG.A-fire.goes.out-PCT-IND
'Go out!' (ibid.) |
| (5.20) | a. kdíha
<u>khtí</u> .ha
k-(v)ht-íh-a
3SG.A-use-PRS-IND
'He is using it.' (Feeling 1975: 143) | b. hvhda
<u>hvh</u> .ta
h-vht-Ø-a
2SG.A-use-PCT-IND
'Use it!' (ibid.) |

Morpheme concatenation creates clusters of the type *ChT(h)* by juxtaposition of the final *-Ch* of the first morpheme and the initial *C(h)-* of the second morpheme, *-Ch + T(h)-* → *ChT(h)*:

- (5.21) à:liyê:su:stgí:ʔa
 àà.li.yée.suu.sthkíí.ʔa
 Ø-aliyéé(?)suusth-kííʔ-a (< *-aliyééʔsuusth-)
 3SG.A-put.on.ring-REV:PRS-IND
 'He is taking off a ring.' (Feeling 1975: 40)

5.2.2. Rhyme

There is one subtle selectional restriction between the nucleus and the coda: *h* can occur as coda only when the nucleus is short. On the other hand, no selectional restrictions between the onset and the nucleus are found. Cherokee thus supports, however weak the evidence may be, a hierarchical syllable structure (Blevins 1995), rather than a flat syllable structure (Clements & Keyser 1983).

Besides the selectional restriction that a coda *h* can only be preceded by a short vowel, nucleus and coda do not interact. Long vowels are somewhat rarer in closed syllables, which led Feeling (1975) and

Pulte & Feeling (1975) to omit notation of vowel length in closed syllables, assuming all vowels in a closed syllable are short. However, a long vowel does occur in a closed syllable (Munro 1996a: 5 fn.11, Munro 1996b: 48 fn.7. Scancarelli 2005: 362); Feeling et. al (2003) notates vowel length even in closed syllables, and some instances of long vowels in closed syllables can be found in Feeling et al. (2003) (the sequences in question are underlined):

(5.22)

- a. à:go:whtíha
 àà.koowh.thí.ha
 ‘He sees it.’ (DF, July 2011)
- b. digina:lhtawò:sdi
 ti.ki.naalh.tha.wòò.sti
 ‘for you and I to comb our hair’ (Feeling et. al. 2003: 108)

That a long vowel can occur in a closed syllable is also evident from the fact that the superhigh accent, which can occur only on a long vowel, can occur on a closed syllable, as in (5.23):

(5.23)

- a. u:ní:yht
 uu.nííyht
 ‘They have to receive it (something long).’ (JRS, Aug 2011)
- b. alsdé:lhdohdi
 al.steé^hlh.toh.ti
 ‘aid, assistance’ (Feeling 1975: 41)

5.2.2.1 Nucleus

Only vowel phonemes can constitute the nucleus in Oklahoma Cherokee. The nucleus can be either a short or long vowel, i.e. one mora or two moras. Oklahoma Cherokee does not allow any diphthongs or vowel sequences (§5.3.1):

(5.24)

- a. á:ma
 áá.ma
 ‘salt’ (Feeling 1975: 43)

- b. u: no: le
 uu. noo. le
 ‘wind’ (Feeling 1975: 177)

5.2.2.2 Coda

Only resonants except for *m* and laryngeal consonants (*ʔ* and *h*) can occur in the coda. This is because any consonant sequences whose first member is *s* or a plosive/affricate are parsed as an onset cluster in Oklahoma Cherokee. (5.25) show some examples with coda consonants:

(5.25)

- a. Coda *l* kalsě:ji
 khal. seé. ci
 ‘sugar’ (Feeling 1975: 138)
- b. Coda *n* kansdaji
 khan. sta. ci
 ‘sassafras’ (Feeling 1975: 142)
- c. Coda *y* ada: jǎ: ysgí
 a. taa. cvǎy. ski
 ‘something that stings’ (Feeling 1975: 4)
- d. Coda *w* ga: ye: wsgí: ʔi
 kaa. yeew. skií. ʔi
 ‘sewing machine’ (Feeling 1975: 118)
- e. Coda *ʔ* ajaʔdi
 a. caʔ. ti
 ‘fish’ (Feeling 1975: 30)
- f. Coda *h* nvhgi
 nvh. ki
 ‘four’ (Feeling 1975: 149)

The coda can have up to two consonants, and all such sequences are resonant + *h* (*Rh*), as illustrated in (5.22) and (5.23) above.

(5.15) shows that the only possible coda consonants before adjustments (i.e., in the underlying forms) are the laryngeal consonants *h* and *ʔ* (Munro 1996b: 50). Other coda consonants (i.e. resonants or *Rh* clusters) in surface forms emerge mostly from Vowel Deletion, which deletes a vowel from *CVhT*

sequences (§3.1), as in (5.26) and (5.27); the (b) forms justify the underlying vowel (in these cases, Vowel Deletion does not apply since the forms are in the glottal grade (§1.7.4.1)):

	VD applied	VD not applied
(5.26)	a. à:da:nhtéha àà.taanh.thé.ha Ø-ataan(v)ht-héh-a 3SG.A-think-PRS-IND ‘He is thinking.’ (Feeling 1975: 5)	b. gada:nv:téha ka.taa.nv̀v̀. thé.ha k-ataanvht-héh-a 1SG.A-think-PRS-IND ‘I am thinking.’ (ibid.)
(5.27)	a. galhdíha kalh.tí.ha ka-l(o)ht-íh-a 3SG.A-put.into.container-PRS-IND ‘He is putting it into a container.’ (Feeling 1975: 95)	b. jilò:díha ci.lò̀. tí.ha ci-loht-íh-a 1SG.A-put.into.container-PRS-IND ‘I am putting it into a container.’ (ibid.)

5.3. Segmental processes and constraints

This section looks at the various processes which remedy illicit sequences that result from morpheme concatenation, or from the phonological and morphophonological processes discussed in Ch.3 (Vowel Deletion) and Ch.4 (Laryngeal Alternation), or that apply in loanwords. Some constraints function to trigger the application of rules, while others block the application of rules. §5.3.1 concerns a constraint on vowel sequences, §5.3.2 discusses constraints on the combinations of a vowel and a consonant, and §5.3.3 is about constraints on consonant sequences. In §5.3.4, I review vowels and glides of certain prefixes which have been analyzed as “epenthetic” by various authors, and provide evidence that they are apparently neither epenthetic nor underlying.

5.3.1. * V_1V_2

Cherokee has a general inviolable constraint against sequences of vowels of different qualities. Historically, three strategies have been employed in order to remedy vowel sequences of different qualities that resulted from morpheme concatenation or sound change: elision, consonant epenthesis and

fusion. These processes are no longer productive, and all of the processes discussed in this section are specific to particular morphemes.

5.3.1.1. Elision

Elision occurs between a pre-pronominal prefix and a pronominal prefix, or between a pronominal prefix and the initial vowel of the stem. Either the first (5.28) or the second vowel (5.29) - (5.30) is eliminated; (5.30) illustrates that the vowel is lengthened when two short vowels come together. The (b) forms justify the underlying vowels of each morpheme:

- | | | |
|--------|--|---|
| | Deletion of the first vowel | |
| (5.28) | <p>a. dà:hv:tvsga
tààhvthv́ska⁷⁵
t(ee)-a-hvthv́sk-a
DIST-3SG.A-put.into.fire.LG:PRS-IND
'He is putting fuel into the fire'
(Feeling 1975: 69)</p> | <p>b. de:gé:tvsga
teekééthv́ska
tee-k-eethvsk-a
DIST-3SG.A-endure:PRS-IND
'He is enduring it.'
(Feeling 1975: 78)</p> |
| | Deletion of the second vowel | |
| (5.29) | <p>a. ù:jo:náta
ùùcoonátha
uu-(a)coonáth-a
3SG.B-rattle:PRS-IND
'It is rattling' (Feeling 1975: 171)</p> | <p>b. hajo:natv̀:ga
hacoonathv̀v̀ka
h-acoonath-v̀v̀(?)k-a (< *-v̀k-)
2SG.A-rattle:PCT-IND
'Rattle!' (ibid.)</p> |
| (5.30) | <p>a. di:dá:hihi
tiitaáhihi
ti-Ø-(a)taa-hih-i
DIST-3SG.A-REFL-kill:IMPF-NOM/SH
'murderer' (Feeling 1975: 80)</p> | <p>b. di:nadá:hihi
tiinataáhihi
ti-(a)n-ataa-hih-i
DIST-3PL.A-REFL-kill:IMPF-NOM/SH
'murderers' (ibid.)</p> |

Whether the first vowel or the second vowel is deleted depends on the vowel quality and the morphemes involved. Thus, vowels *u*, *o*, or *v* never delete, while vowels *e*, *a*, and *i* delete depending on which morpheme they belong to. However, which vowel deletes cannot be predicted from a general phonological hierarchy or prominence (i.e. whether the morpheme is an affix or the base; Casali 1997, Hopkins 1987).

⁷⁵ The lengthening of the pronominal prefix *a-* is due to Pronominal Tonic Lowering (or TGI; §7.2).

5.3.1.2. Consonant epenthesis

A glottal stop is inserted between the iterative (ITER) pre-pronominal prefix and a vowel-initial pronominal prefix (Pulte & Feeling 1975: 254):

- (5.31) íʔu:go:hé:ʔi
 íʔuukoohééʔi
 i-uu-kooH-ééʔi
 ITER-3SG.B-see:PFT-EVID
 ‘He reportedly saw it again’ (Pulte & Feeling 1975: 254)

Insertion of a glottal stop is not attested with any other morphemes, and it appears that this is a lexical peculiarity of the iterative pre-pronominal prefix.

Glides *y* and *w* also show up between some pre-pronominal prefixes and between some pronominal prefixes and vowel-initial stems; see §5.3.4.4.

5.3.1.3. Fusion

In some cases, when two vowels come to be next to each other, these vowels coalesce to produce another vowel of a different quality. One example of such fusion in Oklahoma Cherokee is when the cislocative (CISL) or negative (NEG) pre-pronominal prefixes (*ta-* and *ka-*) are combined with a pronominal prefix beginning with *a* (3SG.A *a-*, 3PL.A *an(ii)-*, 1SG.B *aki-/akw-* etc.) , in which case this sequence results in *vv* (Cook 1979: 74, 84):

- (5.32) $a + a \rightarrow vv$

(5.33) shows the fusion with CISL and (5.7) with NEG. The (b) forms show the forms without these pre-pronominal prefixes for comparison (the relevant sequences are underlined):

- | | | | | |
|--------|----|---|----|---|
| (5.33) | a. | dv:gó:whti:sgṽ:ʔi
<u>tyvkóóhwhthiiskṽ</u> ʔi
<u>ta-a-kooHw(a)hth-iisk-vv</u> ʔi
CISL-3SG.A-see-IMPF-ASR
‘He was seeing it (facing the speaker).’
(Pulte & Feeling 1975: 253) | b. | à:go:whtí:sgṽ:ʔi
ààkooHw(a)hthiískṽʔi
a-kooHw(a)hth-iísk-vvʔi
3SG.A-see-IMPF-ASR
‘He was seeing it.’
(ibid.) |
|--------|----|---|----|---|

tautosyllabic *h*. §5.3.2.3 looks at a constraint against a sequence of a long vowel followed by a glottal stop.

5.3.2.1. *VVC]σ

As is observed in many languages (Blevins 1995: 224, Zec 2007: 175), Oklahoma Cherokee has a rule of Closed Syllable Shortening.⁷⁶ In (5.39), the vowel of 1DU.IN.B pronominal prefix *kinii-* is shortened in a closed syllable (a); the underlying form *kinii-*, with a long vowel, is supported by (b) (the pronominal prefix is separated by a hyphen in the first line, and the second line shows the syllable boundaries):

	V shortened	V not shortened
(5.39)	a. gini-hdi ki.nih.ti 'for you and I to set it (CMP) down' (Feeling et al. 2003: 201)	b. gini:-n̄v̄:di ki.nii.n̄v̄.ti 'for you and I to set it (FL) down' (Feeling et al. 2003: 198)

This process only applies in certain restricted environments, and not all long vowels in closed syllables are shortened; closed syllables can have both a short and a long vowel (§5.2.2), as (5.40) shows:

(5.40)

a.	à:go:whtíha àà.koowh.thí.ha 'He sees it.' (DF, July 2011)
b.	digina:lhtawò:sdi ti.ki.naalh.tha.wòò.sti 'for you and I to comb our hair'(Feeling et. al. 2003: 108)

One environment where a long vowel is shortened in a closed syllable is when the vowel in question belongs to the pronominal prefix, as was shown in (5.39). Closed Syllable Shortening is given in (5.41):

⁷⁶ Huff (1977: 30-31) states that the shortening occurs only before *s*, but as we see in this section, this is not the case.

- (5.41) Closed Syllable Shortening
 $VV \rightarrow V/C]_{\sigma}$ (when VV belongs to PP)

Whether or not Closed Syllable Shortening applies tells us the syllable boundary of consonant clusters. Consonant clusters such as *Ch*, *sC*, *ChC*, or *Rh* (as well as singletons *kw* or *tl*) do not condition shortening of the preceding vowel and thus are treated as onset clusters. In (5.42), the underlying long vowel of the 1DU.IN.B pronominal prefix *kinii-* or 3SG.B prefix *uu-* are not shortened before these stem-initial consonant clusters:

- (5.42)
- a. *Ch* gini:-kahv̀:sdì
 ki.nii.kha.hv̀v̀.stì
 ‘for you and I to move it’ (Feeling et al. 2003: 174)
- b. *sC* gini:-sdĩ:gî:sdì
 ki.nii.stíí.kíí.stì
 ‘for you and I to eat it.’ (Feeling et al. 2003: 116)
- c. *ChC* u:-kta
 uu.khtha
 ‘seed’ (Feeling 1975: 172)
- d. *Rh* gini:-hni̋:dâ:sdì
 kinii.hni̋í.tâa.stì
 ‘for you and I to handle it’ (Feeling et al. 2003: 133)
- e. *tl* gini:-dlì:sdì
 ki.nii.tlìì.stì
 ‘for you and I to pour it in’ (Feeling et al. 2003: 184)

When consonant clusters such as *h.C* or *Rh.C* occur after the vowel of a pronominal prefix, the vowel is shortened, suggesting that the first members of these clusters are in the coda position of the preceding syllable. In (5.43), the same pronominal prefix *kinii-* that we have seen above has a short vowel before these consonant clusters:

- (5.43)
- a. *h.C* gini-hdì
 ki.nih.tì
 ‘for you and I to set it down’ (Feeling et al. 2003: 201)

b. *Rh.C* gini-nhjǒ:hí:sti
 ki.ninh.coó.hí.sti
 ‘for you and I to bring it’ (Feeling et al. 2003: 103)

b. *Rh.C* gini-yhdi
 ki.niyh.ti
 ‘for you and I to pick it up’ (Feeling et al. 2003: 178)

We can propose a (weak) constraint in Oklahoma Cherokee against a long vowel in a closed syllable, depending on the specific morphological environment:

(5.44) ***VVC]**σ
 No long vowel in a closed syllable

The constraint cannot be formulated as a ban on trimoraic syllables, *3μ (Kager 1999: 268). Such a constraint would imply that the coda consonant is moraic, but coda consonants in Oklahoma Cherokee are not moraic: first, coda consonants cannot bear tones, and second, a superhigh accent (Ch.14) can only be carried by a bimoraic long vowel, and not by a monomoraic short vowel followed by a tautosyllabic coda consonant.

Closed Syllable Shortening does not apply to vowels that have the superhigh accent, which must occur on a long vowel (Ch.14). Thus in (5.45) the vowel of the pronominal prefix *ii* is in a closed syllable and should be shortened, but because it carries the superhigh accent, it stays long:

(5.45) u:ní:-yht
 uu.níiyht
 ‘They have to receive it (something long).’ (JRS, Aug 2011)

5.3.2.2. ***VVh]**σ

Oklahoma Cherokee has a general constraint against a sequence of a long vowel followed by a tautosyllabic *h* (Scancarelli 1987: 27):

(5.46) ***VVh]**σ
 h cannot be preceded by a tautosyllabic long vowel.

One remedy for such a sequence is to shorten the vowel before a coda *h*. Compare the (a) and (b) forms below. Long vowels in (b) correspond to short vowels in (a) (the vowels in question are underlined in the second line):

- | | Vowel shortening | No shortening |
|--------|--|---|
| (5.47) | a. gini:nehdi
ki.nii. <u>neh</u> .ti
kinii-nee-ht-i
1DU.IN.B-LQ-set:INF-NOM
‘for you and I to set it (LQ) down.’
(Feeling et al. 2003: 199) | b. hine:hnv:ʔi
hi. <u>nee</u> .hnav.ʔi ⁷⁷
hi-nee-hn-vvʔi
2SG.A-LQ-set:PFT-ASR
‘Set it (LQ) down later!’
(ibid.) |
| (5.48) | a. ginasúhdi
ki.na.s <u>úh</u> .ti
kin-asúú-ht-i
1.DU.IN.B-fish-INF-NOM
‘for you and I to fish’
(Feeling et al. 2003: 127) | b. sdasu:hv̄:ga
sta.s <u>uu</u> .hv̄v̄.ka
st-asuu-hv̄v̄(?)k-a (< *-hvʔk-)
2DU-fish-PCT-IND
‘Fish, you two!’
(ibid.) |

Note here that this constraint is more general than Closed Syllable Shortening (5.44) in that $*VVh]σ$ applies regardless of the phonological and morphological environments, while Closed Syllable Shortening applies in limited environments, such as when the long vowel belongs to a pronominal prefix.

$*VVh]σ$ can also be remedied by deleting the coda *h*.⁷⁸ (5.49) illustrates such a case; the underlying stem-initial *h* is deleted after a long vowel *uu* in the same syllable (Scancarelli 1987: 27). The presence of *h* is justified by the form in (b). (In (b) the vowel is deleted according to Vowel Deletion, Ch 3.)

- | | | |
|--------|--|--|
| (5.49) | a. ù:dl̄v̄:ga (*ù:hdl̄v̄:ga)
ùù.tl̄v̄v̄.ka
uu-(h)tl̄v̄v̄(?)k-a
3SG.B-be.sick:PRS-IND
‘He is sick.’ (Feeling 1975: 162) | b. à:kdl̄v̄:ga
àà.khtl̄v̄v̄.ka
ak(i)-htl̄v̄v̄(?)k-a
1SG.B-be.sick:PRS-IND
‘I am sick.’ (ibid.) |
|--------|--|--|

$*VVh]σ$ applies only when the *h* is the coda consonant after a long vowel. An onset *h* can be preceded by a long vowel:

⁷⁷ *hn* is syllabified as an onset cluster.

⁷⁸ It is still unclear to me when the vowel is shortened and when the *h* is deleted. In most of the cases, vowel shortening is employed when *h* belongs to the aspectual suffix.

(5.50)

- a. awǔ:háʔli
a.woó.háʔ.li
'eagle' (Feeling 1975: 62)
- b. gv:he
kvv.he
'bobcat' (Feeling 1975: 126)

5.3.2.3. *VVʔ

Oklahoma Cherokee has a constraint against a long vowel followed by a tautosyllabic glottal stop:

(5.51) *VVʔ]σ

One remedy for such a sequence is to shorten the vowel before the glottal stop (Vowel Shortening), as in (5.52b). (a) justifies the underlying long vowel; the alternation of *h* in (a) with a glottal stop in (b) is due to Laryngeal Alternation (§1.7.4.1, Ch.4)

- | | | | |
|--------|---|--|--|
| | <i>h</i> -grade | | glottal grade |
| (5.52) | a. ge:tvsga
kee.thv.ska
k-eethvsk-a
3SG.A-set.LG:PRS-IND
'He is setting a post into the ground.'
(Feeling 1975: 119) | | b. geʔdvsga
keʔ.tv.ska (*keeʔ.tv.ska)
k-eethvsk-a
1SG.A-set.LG:PRS-IND
'I am setting a post into the ground.'
(ibid.) |

Another remedy for *VVʔ]σ is deletion of the coda glottal stop (ʔ-Deletion). (5.53) illustrates this process in operation; we observe that the glottal stop, found after a short vowel in (a) forms, is not found in the (b) forms, where the glottal stop is preceded by a tautosyllabic long vowel:

- | | | | |
|--------|---|--|---|
| | /V_ | | /VV_ |
| (5.53) | a. hiʔni:ya
hiʔ.nií.ya
hi-ʔniíy-Ø-a (< -nʔiíy-) ⁷⁹
2SG-catch-PCT-IND
'Catch it!' (ibid.) | | b. hi:ni:ya
hii.nií.ya (*hiiʔ.nií.ya)
hii-(ʔ)niíy-Ø-a (< -nʔiíy-)
2SG>3SG.AN-catch-PCT-IND
'Catch him!' (Feeling 1975: 109) |

⁷⁹ Underlying Cʔ sequence surfaces as [ʔC] (§5.3.3.2).

- (5.54) a. gáʔluhga
káʔ.luh.ka
ka-ʔlu-hk-a (< -lʔu-)
3SG.A-arrive-PRS-IND
'He is arriving.' (Feeling 1975: 102)
- b. u:lúhísdí
uu.lú.hí.stí
uu-(ʔ)lú-híst-i (< -lʔu-)
3SG.B-arrive-INF-NOM
'for him to arrive' (ibid.)
- (5.55) a. jíʔni:yíha
cíʔ.nii.yí.ha
ci-ʔniiy-íh-a (< -nʔiiy-)
1SG.A-catch-PRS-IND
'I am catching it.' (Feeling 1975: 109)
- b. jí:ni:yíha
cǐi.nii.yí.ha
cii-(ʔ)niiy-íh-a (< -n(ʔ)iiy-)
1SG>3SG.AN-catch-PRS-IND
'I am catching him.' (ibid.)

The constraint $*VVʔ/\sigma$ applies to a tautosyllabic glottal stop in the coda position, regardless of the tone on the long vowel. When a long vowel is followed by an *onset* glottal stop in the following syllable (i.e. when the glottal stop is between vowels; $VVʔV$), the tone on the long vowel comes into play: a long vowel cannot occur before an onset glottal stop, *unless it carries a high tone*:

- (5.56) $*VVʔV$
|
[-H]

A long vowel cannot be followed by an onset glottal stop unless it has a high tone

When the long vowel does not carry a high tone, the vowel is shortened as in (5.57b) - (5.58b). The underlying long vowels are justified by their corresponding *h*-grade forms (a). Note that the $VVʔV$ sequence cannot be remedied by deleting the glottal stop, since that would result in a vowel sequence $*V_1V_2$ (§5.3.1).

- (5.57) a. *h*-grade
à:de:hǒ:sga
àà.tee.hoó.ska
Ø-ateehoó-sk-a
3SG.A-be.embarassed-PRS-IND
'He is embarrassed.' (Feeling 1975: 8)
- b. glottal grade
gadeʔǒ:sga
ka.te.ʔoó.ska (*kateeʔoóska)
k-ateehoó-sk-a
1SG.A-be.embarassed-PRS-IND
'I am embarrassed.' (ibid.)
- (5.58) a. go:hosga
koo.ho.ska
k-ooho-sk-a
3SG.A-fall-PRS-IND
'It is falling.' (Feeling 1975: 121)
- b. goʔosga
ko.ʔo.ska
k-ooho-sk-a
1SG.A-fall-PRS-IND
'I am falling.' (ibid.)

However, when the long vowel carries a high tone, the long vowel is not shortened, even when it is followed by an onset glottal stop, as in (5.59a); the fact that the high tone on this long vowel is the crucial factor is evident from (b), where the same verb root, *-stoo-*, fails to carry a high tone due to the Obligatory Contour Principle (§8.2), and *oo* is shortened:

- (5.59) a. à:sdó:ʔa
 ààstóʔa
 a-stoo-ʔ-a
 3SG.A-crush-PRS-IND
 ‘He is crushing it.’ (Feeling 1975: 48)
- b. à:gî:sdoʔa
 ààkístoʔa
 a-[kí(ʔ)+stoo]-ʔ-a (< *-kiʔ-)
 3SG.A-[eat+crush]-PRS-IND
 ‘He is chewing it.’ (Feeling 1975: 17)

A sequence in (5.56) does not occur frequently, since a glottal stop accompanies a high tone on the preceding vowel in most cases (Ch.9). However, in cases where a high tone cannot be assigned to the preceding long vowel due to various phonological (OCP) and morphological factors to be discussed in §8.2 and §9.2, such a sequence has to be remedied.

5.3.3. Constraints on consonant sequences

This section looks at various constraints and processes concerning illicit consonant clusters which are found in loanwords, or which result from morpheme concatenation or from other phonological and morphophonological processes (Vowel Deletion (§3.1) and Laryngeal Alternation (§1.7.4.1, Ch.4)). §5.3.3.1 discusses (historical) vowel epenthesis processes which break up illicit consonant clusters. §5.3.3.2 is on a general phonological constraint against post-consonantal glottal stop, **Cʔ*, and §5.3.3.3 on a sequence of a consonant plus voiceless resonant, **ChR*. §5.3.3.4 looks at a constraint on **TSTS* sequence. Lastly, §5.3.3.5 discusses various sources of alveolar affricate *ts*.

5.3.3.1. Vowel epenthesis

In this section, I will discuss illicit consonant clusters which are remedied by vowel epenthesis. In general, Oklahoma Cherokee (at least for some speakers, including Durbin Feeling) does not allow a consonant cluster where none of its members is either *h*, *ʔ* or *s* (§5.1) and thus sequences of plosives/affricates or resonants are not allowed:

(5.60) **TT*, **RR*, **TR*, **RT*

Even when the first member of a consonant cluster is *s*, if the other member is not a plosive/affricate or *l* the cluster is impermissible:

(5.61) **sy*, **sw*, **sm*, **sn*, **sH*, **ss*
s can only be followed by a plosive/affricate or *l*.

When such sequences occur in loanwords or as a consequence of morpheme concatenation, an epenthetic vowel is inserted. Historically speaking, the epenthetic vowel was either *a* or *i* possibly depending on the environment:

(5.62) Vowel epenthesis
 $\emptyset \rightarrow a, i / C_1_C_2$ (where C_1C_2 is an illicit sequence)

In the following, I will discuss each of the epenthesis processes. As was mentioned in §5.1.1.3, some speakers allow *RR* or *RT* sequences, and thus (5.62) does not apply to such sequences for such speakers.

5.3.3.1.1. *a*-epenthesis

When an illicit cluster occurs in loanwords (5.63), or as a result of verb compounding (5.64) - (5.66) or body part noun incorporation (5.67), neither of which is productive in Cherokee (Uchihara 2014), an epenthetic vowel *a* is inserted. In (5.64) - (5.67), (b) forms show the vowel *a* is not part of the preceding morpheme, and (c) forms, where available, show that this vowel is not part of the following morpheme either. The epenthetic vowels are underlined.

(5.63) Loanwords
a. o:galahǒ:ma
ookalahoóma
'Oklahoma' (Feeling 1975: 150)
< English 'Oklahoma' or Choctaw⁸⁰

⁸⁰ *oklushi* 'tribe, people' + *humma* 'red' (Haag & Willis 2001)

- b. asamá:di
 asamaáti
 ‘smart’ (Feeling 1975:)
 < English ‘smart’

Verb Compounding

- (5.64) a. gv:sgaládí?a
 kvvskalátí?a
 k-vvskal-a-t-í?-a
 3SG.A-hide-EV-set.LG-PRS-IND⁸¹
 ‘He is hiding a long object’
 (Feeling 1975: 128)
- b. gv:sgahlvsga
 kvvskahlvska
 k-vvskal-h^vsk-a
 3SG.A-hide-set.CMP:PRS-IND
 ‘He is hiding CMP.’
 (Feeling 1975: 128)
- c. jídí?a
 cítí?a
 ci-t-í?-a
 1SG.A-set.LG-PRS-IND
 ‘I am laying LG down.’ (Feeling 1975: 10)
- (5.65) a. galádí?a
 kalátí?a
 ka-l-a-t-í?-a
 3SG.A-put.into.contrn-EV-set.LG-PRS-IND
 ‘He is putting it (long) into a container.’
 (Feeling 1975: 99)
- b. gahlvsga
 kahlvska
 ka-l-h^vsk-a
 3SG.A-put.into.contrn-set.CMP:PRS-IND
 ‘He is putting it in a container.’
 (Feeling 1975: 96)
- (5.66) a. hn^v:nhdági
 hn^vvnhtáki
 n-h-vv(?)nht-a-k-i
 PART-2SG.A-put.on-EV-REV:PCT-IND
 ‘Take it off!’ (Feeling 1975: 147)
- b. nígv:nhdíha
 nígvnhtíha
 ni-k-vv(?)nht-íh-a
 PART-3SG.A-put.on-PRS-IND
 ‘He is putting it on.’ (Feeling 1975: 147)
- c. hígi
 híki
 hi-k-i
 2SG.A-pick.up:PCT-IND
 ‘Pick it up!’ (Feeling 1975: 16)

⁸¹ This kind of classificatory verb had been analyzed as a remnant of noun incorporation (Mithun 1984, Blankenship 1996, etc.), but Uchihara (2014) analyzes them as instances of verb compounding.

Body part incorporation

- (5.67) a. kanâ:sâʔdǎ:ʔi
 khanáasaʔtvǎʔi
 ka-hnáa(ʔ)s-a-tʔ-vvʔi (< *-hnaʔs-)
 3SG.A-toe-EV-set.LG-PFT-ASR/SH
 ‘toe’ (Feeling 1975: 139)
- b. ù:hnâ:sgwaló:ʔa
 ùhnáasgwalóʔa
 uu-hnáa(ʔ)s-kwaloo-ʔ-a
 3SG.A-toe-break-PRS-IND
 ‘He is stubbing his toe.’ (Feeling 1975: 167)

Since neither verb compounding nor incorporation is productive, *a*-epenthesis is not a synchronic process.

5.3.3.1.2. *i*-epenthesis

In other cases when an illicit cluster occurs in a loanword, an epenthetic vowel *i* is inserted:

- (5.68) a. gili:si
 kiliisi
 ‘English’ (Feeling 1975: 120)
 < English ‘English’
- b. kě:míli
 kheémíli
 ‘camel’ (Feeling 1975: 144)

Huff (1977: 4.2) and Cook (1979: 28) analyze the short *-i* of some pronominal prefixes (such as 2SG.A *hi-*, 1SG.A *ci-*, etc.) and pre-pronominal prefixes (such as IRR *y(i)-*, TRNSL *w(i)-*, PART *n(i)-*) as being epenthetic. There is, however, some evidence that *i* in these cases is not epenthetic. See §5.3.4 for a more detail.

The quality of the epenthetic vowel in loanwords is unpredictable. It may be the case that it copies the quality of the vowel of the adjacent syllable, but the data is too scarce to generalize.

5.3.3.2. *Cʔ

Oklahoma Cherokee has an inviolable constraint against a post-consonantal glottal stop (Munro 1996b: 59):

- (5.69) *Cʔ

An underlying $C?$ is remedied by metathesis or deletion of the glottal stop. In some cases the glottal stop and the preceding consonant metathesize, as exemplified below. The underlying (or at least historical) post-consonantal position of the glottal stop is justified by morphology (5.70), or by Laryngeal Alternation (5.71). In (5.71), h occurs after t in the h -grade (a); this h alternates with a glottal stop in the glottal grade (b) due to Laryngeal Alternation (§1.7.4.1, Ch.4), and we expect the glottal stop to occur after t , the same position as h in h -grade. However, the glottal stop is instead found before t :

(5.70) híʔgv:ʔi
 híʔkvvʔi
 hi-kʔ-vvʔi
 2SG.A-eat-PFT-ASR
 ‘Eat it later!’ (Feeling et al. 2003: 113)

(5.71)	a. gatʔvsga (<i>h</i> -grade)	b. gaʔdʔvsga (glottal grade)
	kathʔvska	kaʔtʔvska
	k-athʔvsk-a	k-athʔvsk-a
	3SG.A-hang.up:PRS-IND	1SG.A-hang.up:PRS-IND
	‘He is hanging it up.’ (Feeling 1975: 116)	‘I am hanging it up.’ (ibid.)

The original post-consonantal position of the glottal stop is preserved in North Carolina Cherokee:

	OK	NC
(5.72)	a. ò:gí:ʔgv:ʔi	b. u:gʔe:ʔi
	òòkííʔkvʔi	uukʔeeʔi
	ookii-kʔ-vvʔi	uu-kʔ-eeʔi
	1PL.EX.B-eat-PFT-ASR	3SG.B-eat-PFT-EVID
	‘They and I ate it’ (Feeling et al. 2003: 113)	‘He has eaten it.’ (Cook 1979: 133)

See §10.1 for more on justifications for the underlying (or at least historical) position of the glottal stop in Oklahoma Cherokee. This process of Metathesis can be informally stated as follows:

(5.73) Metathesis
 $C? \rightarrow ?C$

Metathesis of $C?$ to $?C$ appears phonetically natural. In general, it is easier to articulate a glottal stop after a vowel than after a consonant.

In other cases, an underlying $Cʔ$ sequence is remedied by just deleting the glottal stop (in most cases the glottal stop has left its trace by assigning a high tone to the preceding vowel; Ch.9); the presence of the post-consonantal glottal stop is justified by (b) forms, which are forms that vary freely with the forms in (a):

- | | | |
|--------|---|--|
| (5.74) | a. ù:gǔ:ʔi
ùùkvǔʔi
uu-k-(ʔ)-vvʔi
3SG.B-eat-PFT-ASR
‘He ate it.’ (Feeling 1975: 16) | b. híʔgv:ʔi
híʔkvvʔi
hi-k-ʔ-vvʔi
2SG.A-eat-PFT-ASR
‘Eat it later!’ (= 6.40a) |
| (5.75) | a. hágohvsdí
hákohvstí
h-ák(ʔ)ohvst-í(h-a)
2SG.A-burn-PRS-IND
‘You are burning it.’ (JRS, Aug 2012) | b. higóʔvhvsdí
hikóʔvhvstí ⁸²
hi-kóʔvhvst-í(h-a)
2SG.A-burn-PRS-IND
‘You are burning it.’ (DJM, Aug 2012) |

This process can be stated as follows:

- (5.76) $ʔ$ -deletion
 $ʔ \rightarrow \emptyset / C_$

Whether Metathesis (5.73) or $ʔ$ -deletion (5.76) is employed is subject to complex phonological and morphological factors to be discussed in Ch.10, as well as inter- and intra-speaker variations.

5.3.3.3. *ChR

A sequence of a consonant plus a voiceless resonant, *ChR, is not allowed, either within or across syllable boundaries. Phonological processes that would result in such sequences are blocked. One process that is blocked due to this constraint is Vowel Deletion discussed in Ch.3. Vowel Deletion is a phonological process whereby a CVhT (T = plosive/affricate) sequence loses its vowel to become ChT (5.77) (‘Vowel Deletion’). CVhR sequence, however, fails to undergo Vowel Deletion and instead metathesizes Vh sequence to become ChVR (5.78) (h-Metathesis). The (b) forms illustrate the original positions of h:

⁸² For an unknown reason, this is a consonantal-initial stem for DJM, but an *a*-stem for other speakers.

- | | | |
|--------|---|---|
| (5.77) | a. <i>kdfha</i>
<u><i>khtfha</i></u>
<i>k-(v)ht-fh-a</i>
3SG.A-use-PRS-IND
‘He is using it.’ (Feeling 1975: 142) | b. <i>hvhda</i>
<u><i>hvhta</i></u>
<i>h-vht-Ø-a</i>
2SG.A-use-PCT-IND
‘Use it!’ (ibid.) |
| (5.78) | a. <i>kanalu:sga</i>
<u><i>khanaluuska</i></u> (* <i>khnaluusga</i>)
<i>ka-hnaluu-sk-a</i>
3SG.A-ascend-PRS-IND
‘He is ascending.’ (Feeling 1975: 138) | b. <i>hihnalũ:hi</i>
<u><i>hihnaluúhi</i></u>
<i>hi-hnaluu-h-i</i>
2SG.A-ascend-PCT-IND
‘Ascend!’ (ibid.) |

This difference between plosives/affricates and resonants can be interpreted as blocking of deletion of the vowel in *CVhR* sequence in order to avoid a **ChR* sequence. That is, if Vowel Deletion was applied to (5.78), it would result in a **khn* sequence. See §3.5 for more detail on this.

Another process that is blocked by this constraint is a synchronic merger process *tlh* → *hl*. First, as noted in Feeling (1975: xviii), in some Oklahoma dialects the sequence *tlh* has been merging with *hl*:

- (5.79) Deaffrication
tlh [tʃ] → *hl* [l]

Thus, words such as *tlhawòðthu* [tʃawò:tʰu] ‘mud’ or *tlha* [tʃa] ‘no’ can also be pronounced as *hlawòðthu* [lawò:thu] or *hla* [la] (Feeling 1975: xviii, Feeling 1975: 130).⁸³ However, when this phonological change would result in a sequence **ChR*, this process is blocked; in (5.80), *tlh* is adjacent to a stop consonant, and application of deaffrication (5.79) would result in a **ChR* sequence and is thus blocked:

⁸³ The other examples in Feeling (1975), where [tʃ] has survived, in a free variation with [l] in some cases, are: *tlhvvtaci* ~ *hlvvtaci* ‘lion’, *tlha* ~ *hla* ‘not’, *skwààtlheěsti* ~ *skwààhleěsti*, and *tlhvvtéékwa* ~ *hlvvtéékwa* ‘eel’.

(5.80)

a. dà:ktlǐha [dà:k^htlǐha]
tààk^htlǐha (*tààkhlǐha)
t-a-k(a)htlh-ih-a⁸⁴
DIST-3SG.A-shell.corn-PRS-IND
'He is shelling corn' (Feeling 1975: 72)

b. à:tli [à:tli]
ààt^hli⁸⁵ (*ààhli)
a-t(i)htlh-i
3SG.A-run-MOT
'He is running' (Feeling 1975: 59)

5.3.3.4. *STST (S = h or s)

Oklahoma Cherokee has a constraint against a sequence *STST, where *S* = *s* or *h* and *T* = plosives, whether or not this cluster occurs across syllable boundaries. Oklahoma Cherokee deletes the first *s* or *h* when this cluster occurs as a result of morpheme concatenation and Vowel Deletion. The following examples illustrate cases where the first *s* is deleted; the (b) forms justify the underlying forms of the morphemes in question, with initial *s* (the clusters in question are underlined):⁸⁶

(5.81) a. hiksgǔ:
hikskoó (*hiskskoó)
hisk-skoó(hi)
five-ten 'fifty' (JRS, Aug 2012)

b. hisgi
hiski
'five' (Feeling 1975: 129)

(5.82) a. yiksdâ:wdé:ga
yikstáawtééka (*yiskstáawtééka)
yi-sk(i)-sta(?)watée(?)k-a
IRR-2SG>1SG-follow:PRS-IND
'You are not following me.' (EJ, July 2011)

b. yisgigó:whti:ha
yiskikóówhthiiha
yi-ski-koohw(a)hth-iih-a
IRR-2SG>1SG-see-PRS-IND
'You are not seeing me.' (ibid.)

⁸⁴ The underlying stem form *-kahtlh-* is supported by the 1SG form *teecíkààtlhíha* (Feeling 1975: 72).

⁸⁵ The expected form is *ààthtli*, with *th* before *tl*, but this *th* does not realize for an unknown reason. The underlying stem form *-tihtlh-* is supported by the 1SG form *katiitli* (Feeling 1975: 59).

⁸⁶ Note that *TSTS* sequences are attested (cf. TABLE 5-3), such as *khthóó?a* 'it (long object) is hanging.' (Feeling 1975: 145) or *tùùksthánvú?i* 'he vomited' (Feeling 1975: 87). *TsTs* sequence is not found in my database.

- (5.83) a. ahnekstanv⁸⁷
 ahneksthanv
 Ø-aahnee(?)sk-st-ahn-vv(?)
 3SG.A-build-INST-PFT-ASR
 ‘built using..’ (Feeling 1975: 149)
- b. à:hné:sgeha
 ààhnééskeha
 Ø-aahnée(?)sk-eh-a
 3SG.A-build-PRS-IND
 ‘He is building a house.’ (Feeling 1975: 25)

This process is informally stated as follows:

- (5.84) s-deletion
 $s \rightarrow \emptyset / _TST$ ($S = s, h; T = \text{plosives}$)

A similar process applies to an *h* before a *TsT* sequence:

- (5.85) a. nvksgǒ:
 nvkskoó (*nvhkskoó)
 nvhk-skoó(hi)
 four-ten ‘forty’ (JRS, Aug 2012)
- b. nvhgi
 nvhki
 ‘four’ (Feeling 1975: 149)

This process is informally stated as follows:

- (5.86) h-deletion
 $h \rightarrow \emptyset / _TST$ ($S = s, h; T = \text{plosives}$)

These processes look like a classic case of Stray Erasure, commonly observed in many languages (Steriade 1982, Blevins 1995: 223). However, some other forms suggest that what is in effect here is Metathesis, rather than Stray Erasure. In (5.87) and (5.88), the 2SG>1SG pronominal prefix *sk(i)-*, the form of which is already justified by (5.82b), combines with stem initial *VhT* sequences, which are expected to result in **skhT*, by application of Vowel Deletion. However, instead what we get is *ksT* sequences: *sk* of the pronominal prefix metathesizes to *ks* before *hT* sequences. The fact that *s* does not belong to the stem is justified by (b) forms:

- (5.87) a. dé:ksgi:ló:ʔe
 tééskkiilóóʔe (*tééskhkiilóóʔe)
 tee-sk-(v)hkiiloo-ʔ-e(h-a)
 DIST-2SG>1SG-wash.FL-PFT-DAT:PRS-IND
 ‘You are doing laundry for me.’
 (DJM, Aug 2012)
- b. dé:dvhgi:ló
 téétvhkiiló
 tee-(ii)t-vhkiiloo-(ʔ-a)
 DIST-1PL.IN.A-wash.FL-PRS-IND
 ‘We are doing laundry.’
 (ibid.)

⁸⁷ Tone and vowel length are not marked in the source.

- (5.88) a. kslv:ʔe
kslv:ʔe⁸⁸
sk-(v)htl-vv-ʔe(h-a)
2SG>1SG-sharpen-PFT-DAT:PRS-IND
'You are sharpening it for me'
(JRS, Aug 2012)
- b. sdvhdli
stvhli
st-vhtl-i(h-a)
2DU-sharpen-PRS-IND
'You two are sharpening it'
(ibid.)

In North Carolina Cherokee, at least in some cases, this sequence is avoided by not applying Vowel Deletion, which would delete the vowel:

- | | | |
|--------|--|--|
| | NC | OK |
| (5.89) | a. sgisde:la
skisteela
ski-steel-a
2SG>1SG-help:IMP-IND
'Help me!' (Walker Calhoun, June 2006) | b. ksdē:la
ksteēla
sk(i)-steél-a
2SG>1SG-help:IMP-IND
'Help me!' (JRS, Aug 2012) |

5.3.3.5. Sources of *ts*⁸⁹

In §2.2.7.1 it was briefly mentioned that a *t+s* cluster is realized as a voiceless alveolar affricate [ts] (Munro 1996a: 5, footnote 6). The cluster status of this sound is evident from the cases such as (5.90), where the morpheme boundary comes between *t* and *s*. Here, the form varies freely between a form where the vowel is deleted (due to Vowel Deletion) and a form with the vowel:

- (5.90) a. ì:tsǵö:sk ~ ì:dasǵö:sk
ìitskoósk ìitaskoósk
ìit-(a)skoó-sk-(a)
1PL.IN.A-dig-PRS-IND
'We are digging' (JRS, Aug 2012) (ibid.)

(5.91) illustrates that [ts] also results from a combination of *c* and *s* (recall from §2.2.2 that *c* is realized as a voiced alveolar or alveo-palatal affricate, [dʒ] or [dʒ]); (b) justifies the stem initial *s*, and (c) shows the 2PL pronominal prefix has the form *ìic(ii)-* elsewhere (the vowel between *c* and *s* is deleted due to Vowel Deletion (§3.1)):

⁸⁸ *tl* → *l* _*s*, at least for JRS.

⁸⁹ I owe much to Chris Koops for an insightful discussion for this section.

- (5.91) a. ì:tsgǔ:sk
 ìitskoósk
 ìic-(a)skoó-sk-(a)
 2PL-dig-PRS-IND
 ‘Y’all are digging it.’ (JRS, Aug 2012)
- b. à:sgǔ:sk
 ààskoósk
 Ø-askoó-sk-(a)
 3SG.A-dig-PRS-IND
 ‘He is digging it.’ (ibid.)
- c. ì:jv:hníha
 ìicvvhníha
 ìic-vvn-híh-a
 2PL-hit-PRS-IND
 ‘Y’all are hitting it.’ (Feeling 1975: 267)

(5.92) shows that [ts] can also result from a sequence of *c* and *h* before a consonant (Scancarelli 1987: 281, Munro 1996b: 54). The stem form *-htlvv-*, with the initial *h*, is justified by (b). In (b), the vowel *i* of 1SG.B *aki-* is deleted due to Vowel Deletion, which deletes the vowel from a *CVhT* sequence (*T* = plosive). The vowel *i* would not be deleted unless it is followed by *h*:

- (5.92) a. tsdlǔ:gi
 tstlǔvǔki
 c(a)-htlǔvǔ(?)k-i
 2SG.B-be.sick:PCT-IND
 ‘Be sick!’ (= 2.34b)
- b. à:kdlǔ:ga
 ààkhtlǔvǔka
 ak(i)-htlǔvǔ(?)k-a (< *-htlvǔk-)
 1SG.B-be.sick:PRS-IND
 ‘I am sick’ (ibid.)

Recall from §2.2.2 that *c+h* cluster is realized as *ch* (a voiceless aspirated alveo-palatal affricate [tʃ] or postalveolar [tʃ̠]) before a vowel (in (5.93) the vowel and *h* metathesize due to *h*-Metathesis):

- (5.93) chawahi
 chawahi
 ca-hwa-h-i
 2SG.B-buy-PCT-IND
 ‘Buy it!’ (Feeling 1975: 168)

(5.94) informally states the realization of a *c+h* sequence, depending on the phonological environment.

- (5.94) a. $c+h \rightarrow [tʃ]/_C$
 b. $c+h \rightarrow [tʃ̠]/_V$

In some cases (especially in underived nouns), when *ts* occurs within a morpheme, *ts* does not break up in the glottal grade, but rather a lowfall tone is assigned to the vowel preceding *ts*:

	<i>h</i> -grade	glottal grade
(5.95)	a. tsgili tskili tskili ghost '(it is) a ghost' (Feeling 1975: 157)	b. jì:tsgili cìtskili (*ciCV̀̀skili) ci-tskili 1SG.A-ghost 'I am a ghost.' (JRS, Aug 2012)
(5.96)	a. tsgǒ:ya tskoóya tskoóya bug 'bug' (Feeling 1975: 157)	b. jì:tsgǒ:y cìtskoóy ci-tskoóy(a) 1SG.A-bug 'I am a bug' (JRS, Aug 2012)

It could be argued that this sequence has been fossilized in these cases without the underlying vowel, and that such instances of *ts* are on the way of phonemicization.

5.3.4. On the epenthetic status of prefix vowels and glides

Short vowels and glides of certain pronominal and pre-pronominal prefixes have been analyzed as being epenthetic in previous studies. In this section, I will reexamine the epenthetic status of these elements, and argue in all cases that these morphemes have two (or more) 'weakly suppletive' allomorphs and none of the allomorphs is derived from the other, and that such elements are not epenthetic. §5.3.4.1 discusses the short vowels of certain pre-pronominal prefixes, and §5.3.4.2 discusses the short vowels of certain pronominal prefixes. §5.3.4.3 concerns the pronominal prefixes ending in *ii*, which is absent before vowel-initial stems. Lastly in §5.3.4.4 I will argue that the final glides *y* and *w* which show up in certain pre-pronominal and pronominal prefixes are not epenthetic either.

5.3.4.1. Short vowels of PPP

Certain pre-pronominal prefixes have short vowels: IRR *y(i)*-, REL *c(i)*-, TRNSL *w(i)*-, PART *n(i)*-, DIST (ii) *t(i)*-, CISL (i) *t(i)*-. These short vowels drop before a vowel initial pronominal prefix, as in (b):

- | | | |
|--------|---|--|
| (5.97) | <p>a. <i>yi-</i>
 yiginí:gowhtĩ:ha
 yikiníkwowhthiíha
 yi-kinii-kohw(a)hth-ííh-a
 IRR-1DU.IN.B-see-PRS-IND
 ‘He is not seeing you and me.’
 (EJ, July 2011)</p> | <p>b. <i>y-</i>
 yagwá:nhta
 yakwáánhtha
 y-akw-aanhth-a
 IRR-1SG.B-know:PRS-IND
 ‘I don’t know.’
 (Pulte & Feeling 1975: 242)</p> |
|--------|---|--|

I analyze such pre-pronominal prefixes with short vowels as having two ‘weakly suppletive’ allomorphs (Haspelmath & Sims 2010: 25);⁹⁰ that is, IRR above, for example, has two allomorphs, *yi-* (/ _C) and *y-* (/ _V).

Both Cook (1979: Ch. 3) and Scancarelli (1987: 91-92) analyze such short vowels of pre-pronominal prefixes as epenthetic. For example, Scancarelli (ibid.) cites the following example:

- (5.98) yuwagó:whtiha
yuwakóówhthiha
yi-w-a-koohw(a)hth-ih-a
IRR-TRNSL-3SG.A-see-PRS-IND
‘He doesn’t see it (with his back turned).’ (Pulte & Feeling 1975: 242)

She argues that the fact that *i* of IRR *yi* assimilates to the backness of *w*-TRNSL to yield *yu-* is because *i* in IRR is an epenthetic vowel:

- (5.99) High Vowel Assimilation
 $\emptyset \rightarrow i \rightarrow u / w_$
(an epenthetic *i* becomes *u* after *w*)

Such an analysis is apparently further supported by the fact that these short vowels of pre-pronominal prefixes cannot bear the high variant of the superhigh accent (Ch.14), and that these short vowels are ‘invisible’ for the assignment of the floating high tone from pre-pronominal prefixes (H3; Ch.13).

⁹⁰ According to Haspelmath & Sims (2010: 25), ‘weak suppletive allomorphy’ is a type of allomorphy where “[a]llomorphs exhibit some similarity, but this cannot be described by phonological rules” (as in English *buy/bough-*), in contrast to ‘phonological allomorphy’ where “[a]lternation could be described by a rule of pronunciation” (as in English plural), or ‘strong suppletive allomorphy’, where “[a]llomorphs exhibit no similarity at all (such as English *good/bett-*).

However, the epenthetic analysis of these vowels should be rejected for the following reasons. First, the quality of this short vowel is not always predictable: some pre-pronominal prefixes have the vowel *i* (IRR *y(i)-*, REL *c(i)-*, TRNSL *w(i)-*, PART *n(i)-*, DIST (ii) *t(i)-*, CISL(i) *t(i)-*), while others have the vowel *a* (CISL(ii) *ta(y)-*, NEG *ka(y)-*). Note that the vowel *a* of CILS (ii) is ‘invisible’ for H3 assignment, just like other pre-pronominal prefixes with the vowel *i* (§13.2.1), and thus one cannot argue that only the vowel *i* of pre-pronominal prefixes is epenthetic. Second, when CISL(ii) *ta-* (5.68a) and NEG *ka-* (b) are followed by a vowel-initial pronominal prefix, a glide *y* is inserted, which is quite unexpected if the vowel *a* was epenthetic:

(5.100)

- a. dayo:sdí:wò:ni:si
 tayoostiiwòðnisi
 tay-oostii-wòð(?)n-iis-i
 CISL-1DU.EX-speak-PFT-MOT
 ‘He and I will speak.’ (EJ, July 2011)
- b. gayo:gini:go:hǎ:ʔi
 kayookiniikoohvǎʔi
 kay-ookinii-kooh-vvʔi
 NEG-1DU.EX.B-see:PFT-ASR/SH
 ‘Since he and I saw it.’ (Feeling 1975: 255)

5.3.4.2. Short vowels of PP

Certain pronominal prefixes end in a short vowel, which is absent before vowel-initial stems.

(5.101) illustrates this alternation with the 2SG.A pronominal prefix:

- | | | | |
|---------|------------------------------|--|-----------------------------|
| | <i>hi-</i> | | <i>h-</i> |
| (5.101) | a. higa | | b. hajaʔi |
| | hika | | hacaʔi |
| | hi-k-Ø-a | | h-acaʔ-Ø-i |
| | 2SG.A-eat-PCT-IND | | 2SG.A-hatch-PCT-IND |
| | ‘Eat it!’ (Feeling 1975: 16) | | ‘Hatch!’ (Feeling 1975: 30) |

The status of these short vowels is more controversial, but again, I analyze such pronominal prefixes as having two (or more) ‘weakly suppletive’ allomorphs; that is, the 2SG.A pronominal prefix

above is analyzed as having two allomorphs, *hi-* (/ _C) and *h-* (/ _V), neither of which is derived from the other.

Huff (1977: 4.2) and Cook (1979: 28) analyze these short vowels as being epenthetic, based on their observations that these vowels are perceptually “extra-short”, and on historical reasons. However, these vowels cannot be analyzed as being epenthetic, for the following reasons.

There are several arguments against the epenthesis analysis. First, as Scancarelli (1987: 91-92, 208) argues, the quality of the short vowel of a pronominal prefix is not always predictable; some of them have a vowel *i* (2SG.A *hi-*, 1SG.A *ci-*, etc.), while others have *a* (2SG.B *ca-*).⁹¹ Secondly, alternations of some of the pronominal prefixes cannot simply be accounted for by epenthesis. For instance, see the alternations of the pronominal prefixes in the following according to whether the following base starts with a consonant (a) or with a vowel (b):

	_C		_V
1SG.A (5.102)	<p>a. <i>ci-</i> <i>jigò:whthíha</i> <i>cikòòwhthíha</i> <i>ci-koohw(a)hthíh-a</i> 1SG.A-see:PRS-IND ‘I see it.’ (Pulte & Feeling 1975: 268)</p>		<p>b. <i>k-</i> <i>g̀v̀:níha</i> <i>k̀v̀v̀níha</i> <i>k-vvhníh-a</i> 1SG.A-hit:PRS-IND ‘I am hitting it.’ (Pulte & Feeling 1975: 265)</p>
1SG.B (5.103)	<p>a. <i>aki-</i> <i>̀̀gigo:whthíha</i> <i>̀̀̀̀kikoowhthíha</i> <i>aki-koohw(a)hthíh-a</i> 1SG.B-see:PRS-IND ‘He sees me.’ (Pulte & Feeling 1975: 268)</p>		<p>b. <i>akw-</i> <i>̀̀gıv:hníha</i> <i>̀̀̀̀kwvvníha</i> <i>akw-vvhníh-a</i> 1SG.B-hit:PRS-IND ‘He is hitting me.’ (Pulte & Feeling 1975: 265)</p>

⁹¹ Huff (1977: 42) analyzes this *a* to be underlying.

2SG>1SG (5.104)	<i>ski-</i> a. sgigo:whthíha skikoowhthíh-a ski-koochw(a)hthíh-a 2SG>1SG-see:PRS-IND ‘You see me.’ (Pulte & Feeling 1975: 268)	<i>skw-</i> b. sgwv:hníha skwvvhníha skw-vvhníh-a 2SG>1SG-hit:PRS-IND ‘You are hitting me.’ (Pulte & Feeling 1975: 265)
--------------------	--	---

If the vowel *i* in these prefixes were an epenthetic vowel, we would expect the allomorphs before a consonant initial base to be *ki-*, *akwi-* and *skwi-*, which is not the case. These sequences are allowed elsewhere in the grammar, and thus more than epenthesis is necessary to account for these alternations (such as the process to change *k* to *c* before *i* only for a pronominal prefix).

Finally, Scancarelli (1987: 91-92) argues that High Vowel Assimilation (5.99), which assimilates an ‘epenthetic’ *i* to the backness of the following *w*, does not apply to the vowel *i* of a pronominal prefix, and thus this *i* of the pronominal prefix is not epenthetic:

(5.105)	hiwò:ní:hi hiwòðnífi (*huwòðnífi) hi-wòð(?)n-íh-i 2SG.A-speak-PCT-IND ‘Speak!’ (Feeling 1975: 117)
---------	--

The alternative approach to epenthesis is to analyze these vowels as being part of the lexical representations of these prefixes (i.e. underlyingly present), as Scancarelli (1987: 91-92) argues. Thus, in (5.106), when the 2SG.A pronominal prefix is affixed to a vowel-initial stem, such an analysis would postulate an underlying *i*, which is deleted before a stem-initial vowel:

(5.106)	hajaʔi hacaʔi h(i)-acaʔ-Ø-i 2SG.A-hatch-PCT-IND ‘Hatch!’ (Feeling 1975: 30)
---------	---

However, the facts from assignment the floating high tone from a pre-pronominal prefix (H3; Ch.13) refute such an analysis. As will be shown in Ch.13, H3 is shifted to the preceding syllable when the underlying vowel is deleted due to Vowel Deletion (§3.1):

- (5.107) dé:kgi:ló:ʔa
 téékhkiilóóʔa
 tee-k-(v)hkiiloo-ʔ-a
 Ⓜ
 DIST-3SG.A-wash.FL-PRS-IND
 ‘He is doing laundry.’ (Feeling 1975: 79)

If a short vowel of the pronominal prefix were underlying, we would expect this high tone shift to be observed with such vowels, too, but in fact this is not the case. Thus, in (5.108), if the short vowel *i* of the pronominal prefix *hi-* were underlyingly present, we would expect H3 to be assigned to this vowel, which subsequently would shift to the preceding syllable after deletion of this *i*, as in (a). However, the attested form is as in (b), which cannot be accounted for with an analysis which postulates an underlying *i*:

- | | | | |
|---------|---|--|--|
| | Expected | | Attested |
| (5.108) | a. *dé:halyê:su:lúsga
*tééhalyéesuulúska
tee-h(i)-alyée(?)suulúsk-a
Ⓜ
DIST-2SG.A-put.on.glove-PRS-IND
‘You are putting on gloves.’ | | b. de:hályê:su:lúsga
teehályéesuulúska
tee-h-alyée(?)suulúsk-a (<*-aliyeʔsuulúsk-)
Ⓜ
DIST-2SG.A-put.on.glove-PRS-IND
‘You are putting on gloves.’ (EJ, July 2011) |

In sum, the short vowels of pronominal prefixes are neither epenthetic nor underlying, and I analyze these pronominal prefixes to have two weakly suppletive allomorphs, neither of which is derived from the other.

5.3.4.3. Long *ii* of PP which is deleted

Certain pronominal prefixes (1DU.IN.A *iinii-*, 1PL.IN.A *iitii-*, 1PL.IN.B *ikii-*, and 2PL *icii-*) end in a long *-ii*, which is absent before vowel initial stems (b):

	/_C		/_V
(5.109)	a.		b.
	ì:ni:go:whtíha		ì:nv:hníha
	ìniikoowhtíha		ìinvvhníha
	ìinii-koohw(a)hthíh-a		ìin-vvhníh-a
	1DU.IN.A-see:PRS-IND		1DU.IN.A-hit:PRS-IND
	‘You and I see it.’		‘You and I are hitting it.’
	(Pulte & Feeling 1975: 269)		(Pulte & Feeling 1975: 266)

Again, I analyze such pronominal prefixes to have two ‘weakly suppletive’ allomorphs, *iinii-* and *iin-*. This long *ii* cannot be epenthetic, since the length is not predictable (Huff 1977: 42), and it is somewhat counterintuitive for an epenthetic vowel to be long. This long vowel is not underlying, either; this can again be shown from the facts of H3 (floating high tone from a pre-pronominal prefix). With the pronominal prefixes in question, H3 is assigned to the third syllable of the ‘modal stem’, when a pre-pronominal prefix has a short vowel or no vowel (§12.2.4), as shown in (5.110). The pre-pronominal prefix is separated by a hyphen in the second line:

(5.110)	yì:di:gówhti:ha
	y-ìitiikówhthiih-a
	Ⓜ
	y-ìitii-kohw(a)hth-iih-a
	IRR-1PL.IN.A-see-PRS-IND
	‘You all and I see it.’ (EJ, July 2011)

If long *ii* of the pronominal prefixes in question were underlyingly present and deleted before a vowel-initial stem, H3 would be expected to occur on the syllable *ja* in (5.111), as in (a), but the actual attested form is (b), with H3 on the syllable *laa*. This fact suggests that *ii* is not underlyingly present in forms such as in (5.111):⁹²

⁹² For the same reason, however, verb stems beginning with *a* would also have two ‘weakly suppletive’

	Expected	Attested
(5.111)	a. *yì:jàlà:sdáʔe:ha *yìcálààstáʔeeha y-ìc(ii)-alàà(?)stáʔeeh-a ⓘ IRR-2PL-tromp.on:PRS-IND ‘Y’ all are tromping on it.’	b. yì:jàlà:sdáʔe:ha yìcálàastáʔeeha y-ìc-alaa(?)stáʔeeh-a (< *-alaʔstaʔeeh-) ⓘ IRR-2PL-tromp.on:PRS-IND ‘Y’ all are tromping on it.’ (EJ, Aug 2011)

5.3.4.4. Glides of PPP and PP

5.3.4.4.1. -y

Certain pronominal prefixes (1SG>3SG.AN *cii(y)-*, 2SG>3SG.AN *hii(y)-*, 1SG>2SG *kvv(y)-*, etc.) and pre-pronominal prefixes (CISL *ta(y)-* and NEG *ka(y)-*) have a final glide *y* (a), which is absent with consonant-initial stems or pronominal prefixes (b); this *y* is not part of the following morpheme either (c):

(5.112)	/_V a. jì:yu:dalé:ʔa ciiyuutalééʔa ciiy-uutaleéʔ-a 1SG>3SG.AN-unhitch:PRS-IND ‘I’m unhitching him.’ (Feeling 1975: 123)	/_C b. jì:nv:galí:ʔa ciinvvkalíʔa cii-nvkal-íh-a 1SG>3SG.AN-clean-PRS-IND ‘I’m cleaning him.’ (Feeling 1975: 112)
	c. gu:dalé:ʔa kuutalééʔa k-uutaleéʔ-a 1SG.A- unhitch:PRS-IND ‘I’m unhitching it.’ (ibid.)	
(5.113)	/_V a. dayo:sdí:wò:ni:si tayooostíwòðniisi tay-oostii-wòð(?)n-iis-i CISL-1DU.EX-speak-PFT-MOT ‘He and I will speak.’ (EJ, July 2011)	/_C b. dagawô:ni:si takawóniisi ta-ka-woo(?)n-iis-i 3SG.A- speak-PFT-MOT ‘He will speak.’ (Pulte & Feeling 1975: 250)
	c. ò:sdi:wó:niha òðstiiwóóniha oostii-wóo(?)n-ih-a 1DU.EX-speak-PRS-IND ‘He and I are speaking.’ (Pulte & Feeling 1975: 275)	

allomorphs, since this *a* deletes after certain pronominal prefixes (such as 3SG.B *uu-*). But I do not analyze such cases as being ‘weakly suppletive’.

I argue that the glides in these cases are not epenthetic (contra Huff 1977: Ch,3), at least synchronically, and again, that these morphemes have ‘weakly’ suppletive morphemes, one with and the other without -y. First, as we saw above in §5.3.4.3, there are other pronominal prefixes ending in *ii* which simply delete this final *ii*- before vowel initial stems, rather than inserting a glide (such as 1DU.IN.A *iinii*- 1PL.IN.A *iitii*-, 1PL.IN.B *ikii*-, etc.). Secondly, CISL *ta(y)*- and NEG *ka(y)*- do not require a glide before a stem beginning with *a*, but rather fuses with this vowel to become *v*, as we saw in §5.3.1.3 ((b) shows 3SG.A is *a*-)

- | | | |
|---------|--|--|
| (5.114) | a. dv:gó:whti:sgǔ:ʔi
tvvkóówhthiiskvǔʔi
ta-a-koohw(a)hth-iisk-vǔʔi
CISL-3SG.A-see-IMPF-ASR
‘He was seeing it (facing the speaker).’
(Pulte & Feeling 1975: 253) | b. à:go:whtǐ:sgǔ:ʔi
ààkoowhthiískǔʔi
a-koohw(a)hth-iísk-vǔʔi
3SG.A-see-IMPF-ASR
‘He was seeing it.’
(ibid.) |
|---------|--|--|

5.3.4.4.2. -w

Certain other pronominal prefixes (3SG.B *uu*-~*uw*-, 3PL.INV *kvv(w)*-) end in a glide *w* before vowel-initial stems (a), which is absent before consonant initial stems (b); (c) shows this *w* is not part of the stem:

- | | | |
|---------|---|---|
| (5.115) | a. /_V
uwo:hohisdi
uwoohohisti
uw-ooho-hist-i
3SG.B-fall-INF-IND
‘for it to fall’
(Feeling 1975: 121) | b. /_C
u:yv:hwi:tdi
uuyvvhwiithti
uu-yvvhwiit-(v)ht-i
3SG.B-carry.LG-NOM-NOM
‘for him to take it (LG) somewhere’
(Feeling 1975: 66) |
| | c. go:hosga
koohoska
k-ooho-sk-a
3SG.A-fall-PRS-IND
‘It is falling.’ (ibid.) | |

Again, I simply assume that 3SG.B pronominal prefix has two weakly suppletive allomorphs, *uu*- and *uw*-, the selection of which depends on the phonological environment, and I do not derive one from

the other. It might have been the case that this *w* was historically an epenthetic consonant to break up the vowel sequences (especially since *w* is ‘homorganic’ with *u*), but there is no synchronic evidence that it still is. On the other hand, one might argue that *w* is in the lexical representation of 3SG.B pronominal prefix. However, such an analysis is implausible, since *w* does not show up before a stem beginning with *a*; in (5.116), (b) shows the underlying stem-initial *a*:

- | | | | | |
|---------|----|--|----|---|
| (5.116) | a. | ù:dlo:hyilṽ:ʔi
ùùtloohyilṽʔi
uu-(a)tlooy-ihl-ṽʔi
3SG.B-cry-PFT-ASR | b. | hadlo:yhga
hatlooyhka
h-atlooy-(i)hk-a
2SG.A-cry-PCT-IND |
|---------|----|--|----|---|

5.4. Relevance of the mora and the syllable

In this section, I will examine the relevance of the syllable (§5.4.1) and the mora (§5.4.2) in Oklahoma Cherokee, looking at various phonological processes that refer to each level.

5.4.1. Relevance of the syllable

5.4.1.1. Superhigh assignment

As will be discussed in detail in Ch.14, a superhigh accent is assigned to the rightmost non-final syllable with a long vowel; in (5.117), (a) has the superhigh accent on the penultimate syllable, while (b) has it on the pre-antepenultimate syllable:

- (5.117)
- | | |
|----|---|
| a. | adṽ:ně:lí:sgi
atṽṽneéííski
‘(he is an) actor’ (Feeling 1975: 14) |
| b. | adayṽ:latvsgi
atayṽṽlathvski
‘TV’ (Feeling 1975: 8) |

Here, the counting unit is clearly the syllable.

5.4.1.2. H3 assignment

As we will see in detail in Ch.13, a floating high tone from a pre-pronominal prefix (H3) is assigned to the first or the second syllable of the ‘modal stem’ (= pronominal prefix + base + aspectual suffix + modal suffix), depending on vowel length (as well as the presence/absence of the vowel) of the pre-pronominal prefix. In (5.118), H3 is assigned to the second syllable of the modal stem, regardless of the vowel length of the first syllable of the modal stem (the pre-pronominal prefixes are separated by a hyphen):

(5.118)

a. yiji:yó:lì:che:ha
yi-ciiyóólìcheeha
Ⓜ
‘I am not understanding you.’ (EJ, July 2011)

b. yigají:yo:lì:che:ha
yi-kacíyoolìcheeha
Ⓜ
‘I am not understanding them.’ (EJ, July 2011)

Furthermore, the tone bearing unit (TBU) of H3 is also the syllable; in (5.119a), H3 is assigned to a short vowel, while in (5.119b) it is on a long vowel. The generalization is that H3 is assigned to the first or the second *syllable* of the modal stem, irrespective of its length:

(5.119)

a. yigo:gíno:lhche:ha
yi-kookínoolhcheeha
Ⓜ
‘They are not understanding him and me.’ (EJ, July 2011)

b. yiji:yó:lì:che:ha
yi-ciiyóólìcheeha
Ⓜ
‘I am not understanding you.’ (EJ, July 2011)

5.4.1.3. Closed Syllable Shortening

Vowels are shortened in closed syllables in specific morphological environments, as we saw in §5.3.2.1. For example, in (5.120a), the final vowel of the pronominal prefix *kinii-* is shortened in a closed syllable. Compare this with (b), where the pronominal prefix has a long vowel in the open syllable:

	V shortened	V not shortened
(5.120)	a. gini-hdi ki.nih.ti 'for you and I to set it (CMP) down' (Feeling et al. 2003: 201)	b. gini:-nṽ:di ki.nii.nṽṽ.ti 'for you and I to set it (FL) down' (Feeling et al. 2003: 198)

See §5.3 above for more on segmental processes which refer to the syllable.

5.4.1.4. Speakers' intuition

It appears that the syllable is more prominent than the mora for speakers. First, the Cherokee Syllabary invented by Sequoya in the early 19th century is based on syllables, rather than moras, and vowel length is not marked (§1.5.3). Vowel length is not usually marked in the Romanized transcriptions of Cherokee, either. In general, most speakers of Cherokee have a hard time recognizing vowel length without training. This is in a sharp contrast to the writing system of a language like Japanese, where all the moraic distinctions (vowel length and consonant gemination) are explicitly marked in the orthographic system.

5.4.2. Relevance of mora

Vowel length is contrastive in Cherokee (§2.1.2) and thus the mora is also crucial, although some speakers have a hard time recognizing the vowel length contrast. In Cherokee, only vowels are moraic, and not coda consonants: coda consonants cannot carry a tone, and in assigning a superhigh accent, which is quantity-sensitive (Ch.14), only syllables with long vowels count as 'heavy', and not a closed syllable with a short vowel. This section looks at two phonological phenomena that refer to the level of mora.

5.4.2.1. TBU of H1 and H2

As we will see in Part II (Ch.6 - Ch.14), there are several sources of a high tone. Among them, the tone bearing unit of a high tone from a glottal stop (H1 in Ch.8 - Ch.11; (5.121a)) and a high tone on the final mora of the stem (H2 in Ch.12; (b)) is the mora. (5.121) shows that the high tone is associated with the mora, not the syllable:

(5.121)

a. H1 à:kě:hê:ga
 ààkhechéeka
 ↓
 H₁
 ‘He is chasing him.’ (Feeling 1975: 33)

b. H2 à:sgǒ:sk
 ààskoósk
 |
 H₂
 ‘He is embarrassed.’ (JRS, Aug 2012)

5.4.2.2. *TROUGH

As we will see in Ch.11, Oklahoma Cherokee has a constraint against a tonal dip of just one mora (§8.5.2.3):

(5.122) *TROUGH (cf. Yip 2000: 137)
 No tonal dip of one mora (*CVC₀VV).

Oklahoma Cherokee prefers a high tone to extend for two moras across syllable boundaries, but if spreading would result in such a tonal dip, this constraint blocks a high tone from spreading to the left.

5.4.3. Summary

In this section, we have seen that both syllable and mora are relevant in Oklahoma Cherokee. A similar case is reported in Tokyo Japanese, where both mora and syllable are relevant phonological units (Kubozono 1999). However, in Tokyo Japanese it has been reported that the mora is more prominent than the syllable, while in Oklahoma Cherokee it appears that the syllable is more prominent. Whether this is

due to the orthography, influence from the contact language (English), or due to certain fundamental differences in their phonological systems, is yet to be understood.

5.5. Conclusion

In this chapter, I outlined the phonotactics and syllable structure of Oklahoma Cherokee. Oklahoma Cherokee can have up to four consonants in a consonant cluster, subject to certain restrictions (§5.1). The syllable structure can be quite complex, and especially the onset can have a complex cluster (§5.2). Various segmental processes remedy illicit sequences which result from other phonological and morphophonological processes (especially from Vowel Deletion (§3.1)): processes which apply to avoid vowel sequences (§5.3.1), processes which avoid a long vowel followed by a tautosyllabic coda consonant (§5.3.2), and various processes which remedy illicit consonant clusters. Both the levels of mora and syllable are relevant in Cherokee, and some phonological phenomena refer to the mora, while others to the syllable (§5.4). The syllable appear to be a more prominent phonological unit than the mora.

Appendix to Chapter 5. Morpheme glossing for examples

This appendix provides the morpheme glosses for some of the examples in this chapter. Only glosses for words consisting of multiple morphemes are given.

(5.1)

a. *sl* à:sladí⁹³
ààslatí
a-slat-í(?-a)
3SG.A-rope-PRS-IND
'He is roping him.' (JRS, Aug 2012)

b. *stl* dà:sdlû:sga
tààstlúuska
t-a-stlúu(?)-sk-a (< *-stlu?-)
DIST-3SG.A-split-PRS-IND
'He is splitting it.' (Feeling 1975: 75)

c. *stl* sdladí
stlatí
st-(v)htlat-i(h-a)
2DU.A-put.out.fire-PRS-IND
'You two are putting out fire.' (JRS, Aug 2012)

(5.6)

a. *ks* à:ksósga
ààksóska
a-k(a)só-sk-a
3SG.A-go.down.hill-PRS-IND
'He is going down hill.' (Feeling 1975: 34)

(5.9)

a. *ksk* ksgo:lí:yê:
kskoolíyée
sk-(a)skooliiy-é(?-a)
2SG>1SG-rub-PRS-IND
'You are rubbing me.' (JRS, Aug 2012)

⁹³ In JRS's or DJM's speech, the final syllable is generally omitted (§1.3).

- b. *kst* ksdě:la
 ksteéla
 sk(i)-steé1-Ø-a
 2SG>1SG-help-PCT-IND
 ‘Help me!’ (JRS, Aug 2012)
- c. *kwsk* à:ljí:kwsга
 ààlcífkwska
 Ø-alcíi(?)kw-sk-a
 3SG.A-spit-PRS-IND
 ‘He is spitting’ (Feeling 1975: 40)
- e. *tsk* tsgǒ:sǎ
 tskoósǎ
 c-skoó-s-vǎ(?)
 2SG.B-dig-PFT-ASR
 ‘You dug it.’ (JRS, Aug 2012)
- g. *tst* tsdǎ:nǎ:
 tstǎǎnǎǎ
 c-(v)htǎǎ(?)n-ǎǎ(?)
 2SG.B-put.FL.into.fire:PFT-ASR
 ‘You have put it (FL) in to fire’ (JRS, Aug 2012)
- h. *khk* dé:kgi:ló
 téékhkiiló
 tee-k-(v)hkiiloó-(?-a)
 DIST-3SG.A-wash.FL-PRS-IND
 ‘He is doing laundry.’ (DJM; JRS, Aug 2012)
- i. *kht* kdi:yá
 khtiiyá
 k-(v)ht-iiy-a
 3SG.A-use-PRS-IND
 ‘He is using it.’ (JRS, Aug 2012)
- j. *khtl* kdlíha
 khtlíha
 k-(v)htl-íh-a
 3SG.A-sharpen-PRS-IND
 ‘He is sharpening it.’ (Feeling 1975: 143)

- k. *kwht* ù:lǎ:kwdi
 ùùlvǎkwhti
 uu-lvǎkw(o)ht-i
 3SG.B-like:PRS-IND
 ‘He likes him, it.’ (Feeling 1975: 175)
- l. *thk* ù:hyvhjinv:tga
 ùùhyvhcinvvthka
 uu-hyvhcinvt-hk-a
 3SG.B-choke.on-PRS-IND
 ‘He is choking on it.’ (Feeling 1975: 169)
- m. *tht* ì:tdí
 ììthtí
 ììt-(v)ht-í(h-a)
 1PL.IN.A-use-PRS-IND
 ‘We are using it.’ (JRS, Aug 2012)
- n. *thtl* ì:ttlí
 ììthtlí
 ììt-(v)htl-í(h-a)
 1PL.IN.A-sharpen-PRS-IND
 ‘We are sharpening it.’ (JRS, Aug 2012)
- (5.10)
- a. *ksl* ksladí
 kslatí
 sk(i)-slat-í(?-a)
 2SG>1SG-rope-PRS-IND
 ‘You are roping me.’ (JRS, Aug 2012)
- b. *tsl* tslv:hǎ
 tslvvhǎ
 c-(v)htl-vvh-ǎǎ(ǎi)
 2SG.B-sharpen-PFT-ASR
 ‘You sharpened it.’ (JRS, Aug 2012)
- c. *nh.tl* à:nhdladí
 àànhtlatí
 an-(v)htlat-í(?-a)
 3PL.A-put.out.fire-PRS-IND
 ‘They are putting out fire.’ (JRS, Aug 2012)

- d. *wh.k* dù:whgi:ló:ʔv
 tùùwhkiilóóʔv
 t-uw-(v)hkiiloo-ʔ-vv(ʔi)
 DIST-3SG.B-wash.FL-PFT-ASR
 ‘He did laundry.’ (JRS, Aug 2012)
- e. *wh.tl* ù:whdládʋ
 ùùwhtlátʋ
 uw-(v)htlat-(ʔ)-vʋ(ʔi)
 3SG.B-put.out.fire-PFT-ASR
 ‘He put out fire.’ (JRS, Aug 2012)
- (5.11)
- a. *ksth* dù:kstanʋ:ʔi
 tùùksthánʋʔi
 t-uu-kst-ahn-vʋʔi
 DIST-3SG.B-vomit-PFT-ASR
 ‘He vomited.’ (Feeling 1975: 87)
- b. *khth* któ:ʔa
 khthóóʔa
 k-(a)hthoo-ʔ-a
 3G.A-LG.hangs-PRS-IND
 ‘it (long object) is hanging.’ (Feeling 1975: 145)
- c. *thtl* dv:ttli
 tvvthtlhi
 ta-Ø-(a)t(i)htlh-i
 CISL-3SG.A-run:PRS-MOT
 ‘He is running toward here.’ (DJM, Aug 2012)
- d. *l.sth* ù:to:lstanʋ:ʔi
 ùùthoolsthánʋʔi
 uu-(a)thoolst-ahn-vʋʔi
 3SG.B-loan-PFT-ASR
 ‘He loaned it to him.’ (Feeling 1975: 60)
- e. *sthk* à:liyê:su:stgí:ʔa
 ààliyéesuusthkíʔa
 Ø-aliyé(ʔ)suusth-kiʔ-a (< *-aliyeʔsuusth-)
 3SG.A-put.on.ring-REV:PRS-IND
 ‘He is taking off a ring.’ (Feeling 1975: 40)

- (5.18b) à:hlíʔilí:dô:ha
 ààhlíʔilíítóoha
 Ø-ahtlhíʔilíítóo(?)h-a
 3SG.A-take.time.PRS-IND
 ‘It is taking time.’ (Feeling 1975: 22)
- (5.22)
- a. à:go:whtíha
 ààkoowhthíha
 a-koohw(a)hth-íh-a
 3SG.A-see-PRS-IND
 ‘He sees it.’ (DF, July 2011)
- b. digina:lhtawò:sdi
 tikinaalhthawòðsti
 ti-kin-aal(i)hthawòð(?)st-i
 DIST-1DU.IN.B-comb.hair:INF-NOM
 ‘for you and I to comb our hair.’ (Feeling et. al. 2003: 108)
- (5.23)
- a. u:ní:yht
 ùùnííyht
 uunii-y-(v)ht(-i)
 3PL.B-receive.LG-INF-NOM/SH
 ‘They have to receive it (something long).’ (JRS, Aug 2011)
- b. alsdé:lhdohdi
 alsteélhtohti
 Ø-al(i)-steel-(v)ht-oht-i
 3SG.A-MID-help-INST-INF-NOM/SH
 ‘aid, assistance’ (Feeling 1975: 4)

PART II. TONE AND ACCENT

Chapter 6. Overview of the Tones and Accents

6.0. Introduction

This chapter provides an overview of the tones and accent in Oklahoma Cherokee, which will be discussed in detail in Ch.7 - Ch.14. §6.1 reviews the tonal and accentual inventory of Oklahoma Cherokee. §6.2 provides the distribution of each tone (‘tonotactics’) discussed in §6.1.

6.1. The tonal and accentual inventory of Oklahoma Cherokee

Oklahoma Cherokee has been described as having the following six pitch patterns on *syllables* (Lindsey 1985, 1987; Wright 1996). Each pitch pattern is given with the orthographic representations in the second column (modified community orthography first, and then ‘phonological’ system after the slash; cf. §1.5.2), along with Feeling’s (1975) numerical notation in the last column:

(6.1)	Six tones and accent of Oklahoma Cherokee		
	Pitch patterns	Representations	Pitch level in Feeling (1975)
	(1) High (H)	á	[3]
	(2) Low (L)	a (no marking)	[2]
	(3) High-low (HL)	â:/ áa	[32]
	(4) Low-high (LH)	ǎ:/ aá	[23]
	(5) Lowfall (LF)	à:/ àà	[1] ([21]) ⁹⁴
	(6) Superhigh (SH)	ǎ:/ aǎ	[4] ([34])

Among these, low-high and high-low will be argued to be combinations of high and low tones (§6.1.3), and superhigh will be argued to be an ‘accent’, rather than a tone, following previous studies (§6.1.5, Ch.14). Every mora of a word has either a high tone or a low tone, and a bimoraic long vowel can carry high-low, low-high, lowfall or superhigh in addition to high and low tones. FIGURE 6-1 gives the schematic representations of the realizations of the six pitch patterns found within a syllable in Oklahoma Cherokee. The numbers correspond to the notations in Feeling (1975).

⁹⁴ Lowfall tone is a contour tone falling from level [2] to level [1], and thus [21] is a more precise notation, but since [21] is not contrastive with [1], Feeling (1975) represents a lowfall tone as [1]. This is also the case with superhigh, which is in fact a [34] contour.

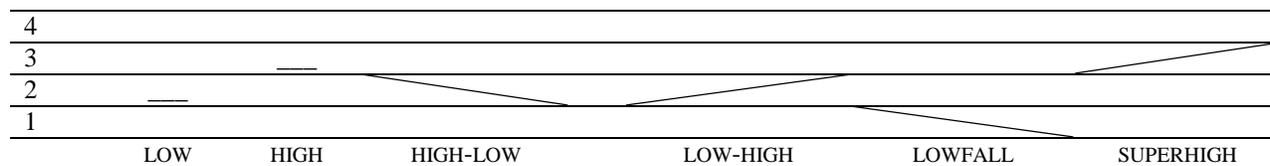


FIGURE 6-1. SCHEMATIC REPRESENTATION OF PITCH PATTERNS IN OKLAHOMA CHEROKEE

FIGURE 6-2 show the spectra and the F0 pitch traces of six Cherokee words, each representing the pitch patterns in FIGURE 6-1, taken from recordings of a male speaker. Note that all words except for the last have a word-final boundary HL% tone, which is not represented in the orthography ([32]; §2.3.2):

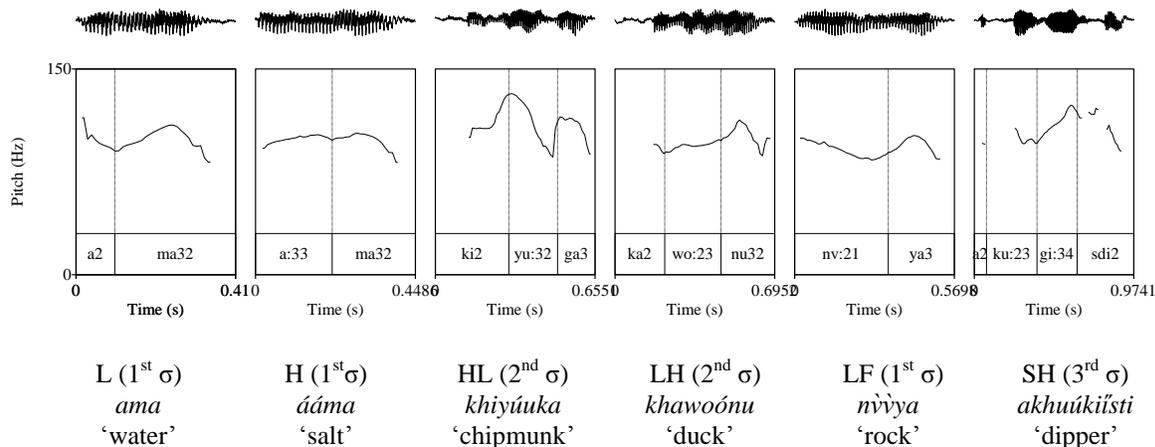


FIGURE 6-2. PITCH PATTERNS OF OKLAHOMA CHEROKEE (DF, male, 2001)

Minimal pairs contrasting only in tones are hard to come by, due to the polysynthetic nature of Cherokee, but there are still instances such as (6.2) - (6.6); (6.2) and (6.3) illustrate contrasts between low and high, (6.4) between high-low and lowfall, and (6.6) between superhigh and low:

- (6.2) a. *gaʔdvsga*
kaʔtvska
 ‘I am growing.’ (Feeling 1975: 62)
- b. *gaʔdǎvsga*
kaʔtǎvska
 ‘I am hanging it up.’ (Feeling 1975: 116)
- (6.3) a. *dò:sdasu:lé:sgó*
tòðstasuulééskó
 ‘We are washing hands.’ (EJ, July 2011)
- b. *dò:sdá:su:lé:sgó*
tòðstáasuulééskó
 ‘We are taking off pants.’ (ibid.)

- | | | |
|-------|--|--|
| (6.4) | a. ho:hwe:l̂v:ga
hoohweel̂vka
'You just wrote it.' (EJ, July 2011) | b. ho:hwe:l̄v:ga
hoohweel̄vka
'Write it!' (ibid.) |
| (6.5) | a. e:d̂v:n̄i:ga
eet̂vniika
'Let's us all hit him.' (EJ, July 2011) | b. è:dv:nî:ga
èèt̄vniika
'Y'all and I just hit him.' (ibid.) |
| (6.6) | a. adawě:lagi:sgi
ataweel̄lak̄iiki
'flame' (Feeling 1975: 7) | b. adawe:lagi:sgi
ataweelak̄iiki
'gunpowder' (ibid.) |

As can be seen above from inspecting some of the examples, tones can be used to encode morphosyntactic information in Cherokee as well as for lexical contrast. Below, I will discuss each of the tones in (6.1) in detail. §6.1.1 discusses the low tone, and §6.1.2 discusses high tone. §6.1.3 argues that high-low/low-high contour tones are combinations of high tone and low tone. Lowfall tone is discussed in §6.1.4, and §6.1.5 looks at superhigh.

6.1.1. Low tone

Low tone is found anywhere in the word, both on short and long vowels:

- (6.7)
- | | |
|----|--|
| a. | ama
ama
'water' (Feeling 1975: 43) |
| b. | ganv:no:wa
kanvvnoowa
'pipe' (Feeling 1975: 114) |

FIGURE 6-3 shows a pitch trace of (6.7b) of a male speaker:

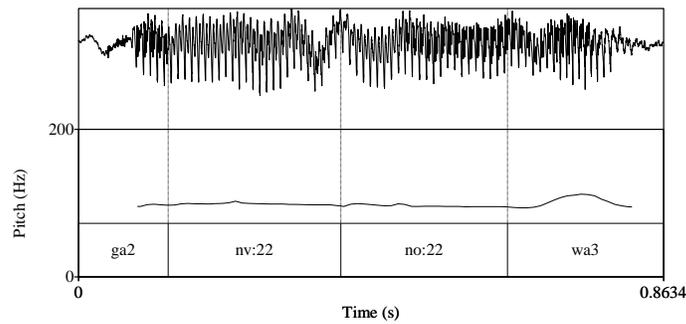


FIGURE 6-3. LOW TONE: *kanvnoowa* ‘pipe’ (DF, male, 2001)

Low tone is the default tone, based on the criteria in Maddieson (1976: 350), Hyman (2000), and Yip (2002: 25): low tone is not phonologically active (for instance, it does not spread), and is more frequent than other tones (§6.2.3).

6.1.2. High tone

High tone (level [3], [33]) is realized at a higher pitch than a low tone. It is found anywhere in the word, and is found both on short (6.8a) and long vowels (b), (c):

- (6.8) High tone
- a. áʔni
áʔni
‘strawberry’ (Feeling 1975: 45)
- b. á:ma
ááma
‘salt’ (Feeling 1975: 43)
- c. gawó:ʔa
kawóóʔa
‘He is bathing him.’ (Feeling 1975: 117)

FIGURE 6-4 shows the spectrum and the pitch trace of (6.8c); here, the pitch on *wóó* is significantly higher than that on the previous syllable:

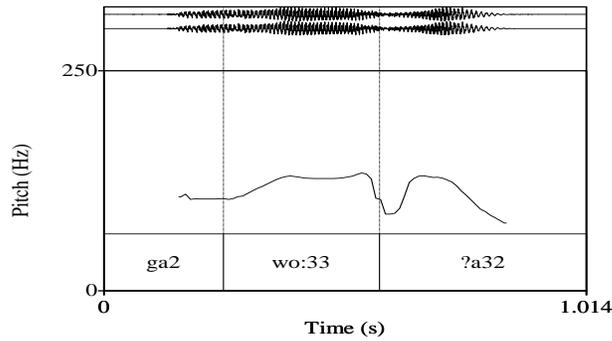


FIGURE 6-4. HIGH TONE: *kawóɔʔa* ‘he is bathing’ (EJ, male, 2010)

High tone is the ‘marked’ tone as opposed to the low tone; high tone is phonologically active (some phonological rules target high tone, and high tone spreads; Ch.8, Ch.9), and is less frequent than the low tone.

High tone is the most complex tone in terms of its phonological properties. A high tone exhibits complex tonal alternations, as exemplified in (6.9); here, the high tone on the second syllable in the tonic form (a) alternates with a lowfall tone in the atonic form (b).

- | | | |
|-------|--|---|
| | tonic: H | atonic: LF |
| (6.9) | a. <i>gawó:niha</i>
<i>kawóóniha</i>
‘He is speaking.’ (Feeling 1975: 117) | b. <i>hiwò:ní:hi</i>
<i>hiwò̀nìíhi</i>
‘Speak!’ (ibid.) |

Ch.8 - Ch.13 will look in detail at various sources of high tones. At this point it suffices to mention that there are four types of high tones, H1 (Ch.8 - Ch.11), H2 (Ch.12), H3 (Ch.13) and H4 (Ch.14), whose sources are different.

6.1.3. High-low and low-high tones

High-low [32] and low-high [23] contour tones occur only on bimoraic (long) vowels. High-low tone can occur anywhere in the word but it is mainly found on verbs, while low-high tone is found only on a penultimate syllable unless it is followed by a high tone (§6.2; Lindsey 1985: 127):

- (6.10) High-low tone

- a. kiyû:ga
 khiyúuka
 ‘chipmunk’ (Feeling 1975: 144)
- b. ga:kâ:neha
 kaakháneha
 ‘He is giving him a living thing.’ (Feeling 1975: 98)

(6.11) Low-high tone

- a. kawǒ:nu
 khawóonu
 ‘duck’ (Feeling 1975: 143)
- b. gale:yǎ:sga
 kaleeyvíska
 ‘A long object is falling from an upright position.’ (Feeling 1975:100)

FIGURES 6-5 and 6-6 show the spectra and the pitch traces of a high-low tone in (6.10a) and a low-high tone in (6.11a):

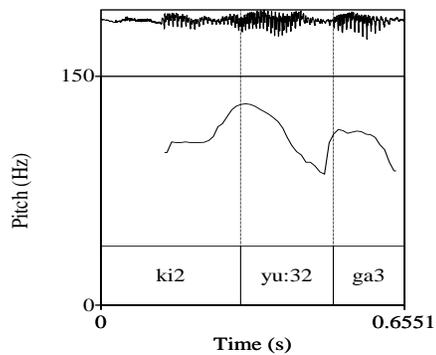


FIGURE 6-5. HIGH-LOW TONE:
khiyúuka ‘chipmunk’ (DF, male, 2001)

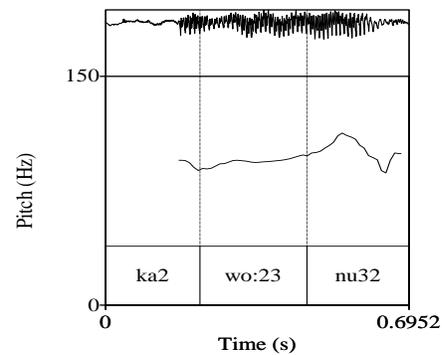


FIGURE 6-6. LOW-HIGH TONE:
khawóonu ‘duck’ (DF, male, 2001)

While the high-low contour tone is always clearly present, the tonal transition of low-high contour tone is somewhat subtler (as seen in FIGURE 6-6) and instances of low-high tone in Feeling (1975) are not always present for all the speakers.

Low-high and high-low contour tones are analyzed as combinations of low and high tones, rather than units (see also Lindsey 1987: 1 and Wright 1996: 12). The first kind of evidence is distributional:

low-high and high-low contour tones are found only on long vowels; if they were units, we would expect them to occur on short vowels as well.

Behavioral facts also support the combination analysis for the low-high and high-low contour tones. Thus, in some cases a low-high tone can be shown to derive from spreading of a high tone from the following syllable leftward. In (6.12), the DIST morpheme *tee-* varies freely between low *tee-* (a) and low-high *teé-* (b), which results from spreading of the high tone of the next syllable to this syllable. In (6.13), the verb base *-(áá)siin-* has a low tone when followed by the morpheme *-éék-* ‘AND:PRS’ (a), while the same verb base has a low-high tone when followed by a morpheme with a high-low tone, *-ývst-* ‘AND:INF’ (b). The high tone resulting from spreading is underlined:

- | | | | |
|--------|---|--|---|
| | LL | | LH |
| (6.12) | a. de:jígò:whtíha
tee-cíkòòwhthíha | | b. dē:jígò:whtíha
teé-cíkòòwhthíha |
| |
H | |
H |
| | ‘I see them.’ (Pulte & Feeling 1975: 247) | | ‘I see them.’ (Pulte & Feeling 1975: 307) |
| (6.13) | a. á:si:né:ga
áásiin-ééka | | b. ù:sí:nv̄:sdi
ùúsiín-ývsti |
| |
H | |
H |
| | ‘He is backing up.’ (Feeling 1975: 53) | | ‘for him to back up’ (ibid.) |

Lastly, the high component of these contour tones shows exactly the same phonological behavior as a high level tone; for instance, both high-low and high tones block Laryngeal Alternation (§9.1.3).

The analysis in this section, that low-high and high-low tones are combinations of low and high tones, reduces the tonal and accentual inventory in (6.1) to the following four tones:

- (6.14) The tonal and accentual inventory of Oklahoma Cherokee (revised)
- (1) Low
 - (2) High
 - (3) Lowfall
 - (4) Superhigh

shows the spectrogram of (6.15b); here, the distance between the voicing pulses is stable, which shows that the vowel is modal:

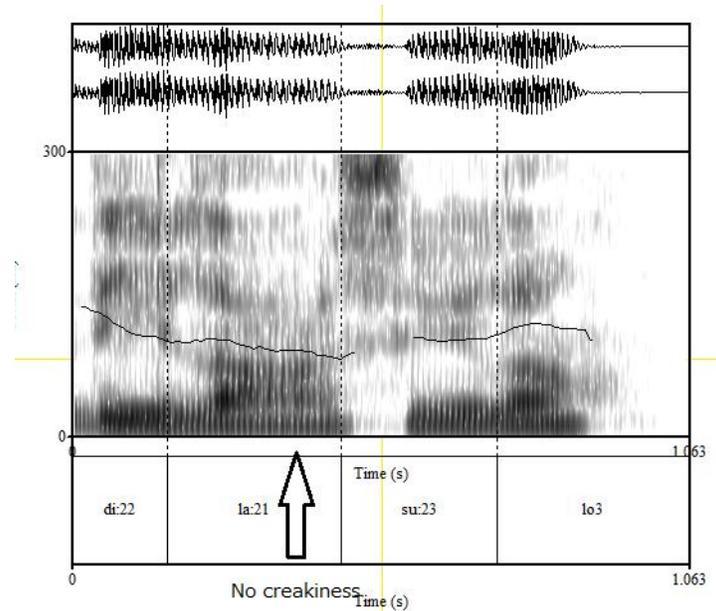


FIGURE 6-8. NO CREAKINESS ON THE VOWEL WITH A LOWFALL TONE:
tiilàsuúlo ‘shoes’ (DF, male, 2010)

A lowfall tone is usually restricted to a long vowel (Lindsey 1987: 1), but Feeling et al. (2003), which distinguishes vowel length even in closed syllables, lists some instances of a lowfall tone on a short vowel:

(6.16)

- a. sdi:nàwhta
stiinàwhtha
‘Find it, you two!’ (Feeling et al. 2003: 122)
- b. hì?nʷ:sv:ʔi
hì?nʷsvvʔi
‘Carry him there later!’ (Feeling et al. 2003: 107)
- c. e:sdi:nèʔvsi
eestiinèʔvsi
‘Give it to him, you two!’ (Feeling et al. 2003: 128)

Unlike a high-low or a low-high tone, there is no evidence that the lowfall tone is composed of a sequence of level tones. The most convincing argument for the unit analysis is the fact that a level [1] level tone does not exist by itself in Oklahoma Cherokee.

Just like a high tone, lowfall tone has various sources. These sources will be discussed in Ch.7.

6.1.5. Superhigh

Superhigh is found on a long vowel and is characterized by a gradual rise in pitch that rises to a point above the normal high tone register (Wright 1996: 21; Johnson 2005: 10). Superhigh is found anywhere in the word but is most frequently found on the penultimate syllable. There can be only one superhigh per word:

(6.17)

- a. akǔ:gǐ:sdohdi
akhuúkiĩstohti
'dipper' (CED-EJ, 2010)
- b. achú:ja
achuúca
'boy' (Feeling 1975: 1)

FIGURE 6-9 shows the spectrum and the pitch trace of (6.17a):

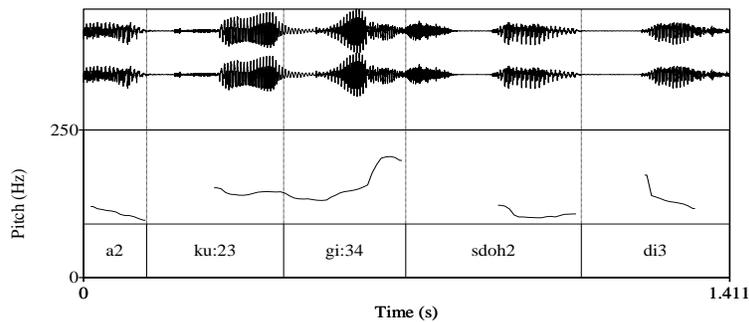


FIGURE 6-9. SUPERHIGH. *akhuúkiĩsiohii* 'dipper' (EJ, male, 2010)

Perceptually and acoustically, superhigh is a rising tone, which rises from the level of a high tone (level [3]) to an even higher level (Lindsey 1985, Wright 1996, Johnson 2005: 10, 12), rather than a

falling tone as implied in some previous studies (Haag 2001: 414, Montgomery-Anderson 2008: 51-52); this is evident from FIGURE 6-9.

Superhigh is acoustically correlated with (i) the pitch rising on the syllable with the superhigh accent, and (ii) the dramatic pitch fall on the following vowel (see FIGURE 6-9; Feeling 1975: xi; Johnson 2005: 10, 12). As Johnson (2005: 10, 12) shows, the more reliable correlate of a superhigh accent is the pitch rising on the accented syllable, rather than the pitch fall on the following syllable, since this pitch fall disappears when a clitic is attached.

Although superhigh is mainly found on long vowels, Lindsey (1985: 128) states that on rare occasions it is also found on a short vowel:

(6.18)

- a. *sóʔi*
 sóʔi
 ‘another’ (Lindsey 1985: 128)

- b. *gǔhdi*
 kǔhti
 ‘with, by means of’ (Feeling 1975: 126)

Perceptually, such vowels do sound short and the pitch on such vowels does sound higher than the pitch level of a high tone. A pitch trace in FIGURE 6-10 confirms this perception: the pitch on *kǔhti* is higher than the high boundary tone on [ʧuhgá]:

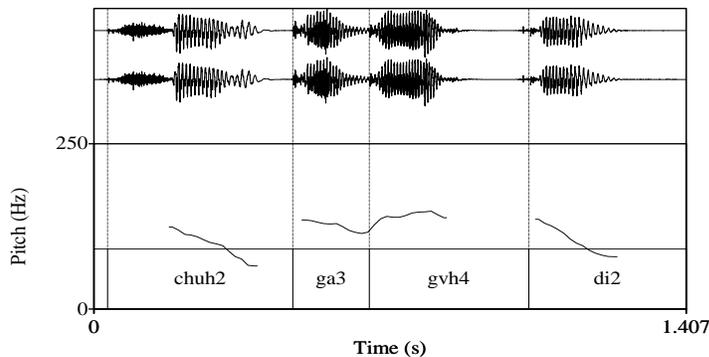


FIGURE 6-10. SUPERHIGH ON A SHORT VOWEL.
chuhka kǔhti [ʧuhgá gǔhdi] (EJ, male, 2010)

Again, like a lowfall tone, but unlike a high-low or a low-high tone, there is no evidence that superhigh is composed of a sequence of level tones; there is no level [4] level tone in Oklahoma Cherokee by itself, and thus a superhigh cannot be considered to be a sequence of level tones, [3] and [4].

Superhigh exhibits some ‘accentual’ properties and it has been referred to as superhigh ‘accent’ in the literature:⁹⁵ superhigh is culminative (only one per word), and as we will see in Ch.14, its assignment can be characterized by a familiar ‘default-to-opposite’ accent. Superhigh is henceforth referred to as a superhigh ‘accent’ in this study.

Feeling (1975: xi) states that the final syllables of Cherokee words exhibit a pitch beginning at level [4] and falling to a lower point. However, Lindsey (1985: 125, 168) shows that final pitch is only optionally higher than preceding [3], and nor is the downslur always present (see also Haag 2001). See §2.3.2 for a more detail on the tone on the word-final vowel.

6.1.6. Summary

To summarize this section, it was shown that low-high and high-low contour tones are best analyzed as combinations of a low tone and a high tone, and not primitive tones (§6.1.3), while lowfall tone (§6.1.4) and the superhigh accent (§6.1.5) are shown to be units, rather than sequences of level tones. The tonal and accentual inventory of Oklahoma Cherokee can therefore be restated as follows:

- (6.19) The tonal and accentual inventory of Oklahoma Cherokee (=6.14)
- (1) Low
 - (2) High
 - (3) Lowfall
 - (4) Superhigh

The following chapters will discuss lowfall tone (Ch.7), high tone (Ch.8 - Ch.13), and superhigh accent (Ch.14).

⁹⁵ For a detailed definition of the term ‘accent’, see §15.1.2.

6.2. Distribution of tones (tonotactics)

In this section, I will look at the distribution of each of the tones discussed in §6.1 as they occur across syllable boundaries ('tonotactics'): which tones occur next to each other more commonly and which tonal sequences are rare. TABLE 6-1 shows the numbers of each of the tonal sequences found in the entries of Feeling (1975) (1788 entries in total). Cells with no attested instance are shaded with the 50% darkness. Cells with 1-15 instances are shaded with the 25% darkness. Cells with 16-100 instances are shaded with the 10% darkness. Cells with more than 101 examples are not shaded. I follow Lindsey (1985: 127, 1987:2) and Johnson (2005: 9-10) in principle in assuming that a non-penultimate [23] tone that is not followed by another level [3] tone (such as a [23]-[2] sequence) as a mistranscription of a superhigh [34] accent (Ch.14), and count them as such.⁹⁶ The rows represent the tone of the first syllable, and the columns represent the tone of the next syllable.

TABLE 6-1. DISTRIBUTION OF TONES.

$\begin{matrix} 2^{\text{nd}} \sigma \\ \backslash \\ 1^{\text{st}} \sigma \end{matrix}$	L [2]	H [3]	LL [22]	HH [33]	LH [23]	HL [32]	LF [21]	SH [34]
L [2]	160	155	215	125	159	36	70	154
H [3]	67	12	31	7	5	4	18	41
LL [22]	211	145	100	77	111	16	39	143
HH [33]	131	5	55	(0)	2	0	9	19
LH [23]	2	126	1	37	2 (?)	54	0	22
HL [32]	50	7	16	0	0	0	3	11
LF [21]	212	51	153	60	83	44	0	54
SH [34]	53	0	0	0	0	0	8	0

6.2.1 Gaps

In TABLE 6-1, the following sequences are not attested (0 instance): HH-HL, HL-HH, HL-LH, HL-HL, LF-LF, SH-H, SH-LL⁹⁷, SH-HH, SH-LH, SH-HL, and SH-SH.⁹⁸

⁹⁶ This is confirmed with my consultants, too. There *are* a couple of instances where [23] not followed by [3] in Feeling (1975) do appear to be true [23], rather than [34], as we will see below

⁹⁷ In Feeling (1975), there is one instance of SH-LL, namely *uustààyv̄hv̄vski* 'his wife' (p. 178). However, this appears to be a mistranscription of SH-L.

⁹⁸ HH-HH sequence is not found in the entries in Feeling (1975), but in the inflected forms this sequence does occur, when a verb stem has a final HH tone and is followed by a habitual modal suffix with HH tone: e.g. *tààkhthinvtéskóó?i* 'he habitually takes off glasses' (Feeling 1975: 71).

As will be discussed in Ch.14, the superhigh accent is assigned to the last long vowel of the word. Thus, SH cannot be followed by a long vowel. This explains the gaps SH-LL, SH-HH, SH-LH, and SH-HL. Since the superhigh accent is culminative (Ch.14), only one superhigh accent is allowed per word. This explains the lack of SH-SH sequence.

Most of the other gaps can be explained by the Obligatory Contour Principle (OCP), which disallows sequences of a high tone from different sources in a two-syllable window (§8.2), or by *TROUGH, which bans a tonal dip of one mora (§8.5.2.3): (HH-HH), HH-HL, HL-HH, and HL-HL.⁹⁹ The non-existence of the HL-LH sequence is not explained.

6.2.2. Rare sequences (1-15 instances)

The following sequences are rare (1-15 instances in Feeling 1975): H-H, H-HH, H-LH, H-HL, HH-H, HH-LH, HH-LF, LH-L, LH-LL, LH-LH, HL-LF, HL-SH, and SH-LF. Motivations for the rarity of some of such sequences can be explained as follows.

First, as Lindsey (1985: 127) shows, LH has to be followed by a high tone, since the H part of the LH tone results from a H tone in the following syllable that has spread leftward (§8.1, §9.3), or when LH is a lexical property, it obligatorily spreads rightward to the following syllable (§12.1.1). This explains the rarity of LH-L, LH-LL, and LH-LH. In fact, such sequences are expected to be absent if Lindsey's claim is correct, but such sequences are in fact attested in Feeling (1975):

- (6.20) LH-L¹⁰⁰
 ga:dě:ysdiha
 kaateéystiha
 ‘He is turning it.’ (Feeling 1975: 92)

⁹⁹ As will be seen in §8.2, the OCP in Oklahoma Cherokee is syllable-based.

¹⁰⁰ LH in this form cannot be SH, since this is an indicative forms of a verb, which does not require a superhigh accent. This form appears to involve the verb root *-:teéyást-* ‘turn’, and the LH-L sequence appears to result from Vowel Deletion (§3.1), which carries a high tone from the LH-H sequence

- (6.21) LH-LL¹⁰¹
 adě:lju:niyhdiʔi
 ateélcuuniyhtiʔi
 ‘bank’ (Feeling 1975: 9)
- (6.22) LH-LH¹⁰²
 a. adě:lju:hlvʔi
 ateélcuúhvlvʔi
 ‘California’ (Feeling 1975: 9)
- b. gǒ:lě:hi
 koóleéhi
 ‘pneumonia’ (Feeling 1975: 122)

Second, Oklahoma Cherokee has several combinatory constraints on the high tone that will be discussed in Ch.8. First, Oklahoma Cherokee has a tendency to avoid a high tone on a short syllable, whether it is followed or preceded by another high tone in the adjacent syllable (§8.5.2.1). This explains the rarity of H-H, H-HH, H-LH, H-HL, and HH-H. Secondly, Cherokee has a constraint against a tonal dip of just one mora of the shape HLH (*TROUGH, §8.5.2.3), which explains the rarity of H-LH and HH-LH. Thirdly, Cherokee also prefers a high tone to be bimoraic, whether within or across syllables (§8.5.1), which explains the rarity of LL-HL, LH-L, LH-LL, and LH-LH. Fourth, high tone is subject to the OCP, which bans a sequence of high tone from different sources. This explains the rarity of H-H, H-HH, H-HL, and HH-H. Lastly, Cherokee avoids a high tone extending for three moras, which again explains the rarity of H-HH and HH-H. These constraints will be discussed in detail in Ch.8.

Lastly, any combination where the second member is LF tends to be rare, since LF itself only occurs under restricted environments (Ch.7). This explains the rarity of HH-LF, HL-LF, and SH-LF sequences. The rarity of HL-SH might be due to the fact that a superhigh accent is generally assigned to an atonic form (but not always; cf. §A.1.2), in which the glottal stop, which is always the source of HL tone, has induced a lowfall tone.

¹⁰¹ This is a compound of two words, *ateél-* ‘money + *c-uuni-yht-iiʔi* ‘place to store (?)’, which might be the cause of the anomaly.

¹⁰² Both of the examples also appear to be compounds. The latter could be a compound of *koóla* ‘winter + *eéhi* ‘resident’, in which case this might be the only instance where a word has two SHs.

6.2.3. Common sequences (more than 101 instances)

The following sequences are common in Feeling (1975) (more than 101 instances): L-L, L-H, L-LL, L-HH, L-LH, L-SH, LL-L, LL-H, LL-LH, LL-SH, HH-L, LH-H, LF-L, and LF-LL.

First, when one of the members is L or LL, the combinations tend to be common (L-L, L-H, L-LL, L-HH, L-LH, L-SH, LL-L, LL-H, LL-LH, LL-LL, LL-SH, HH-L, LF-L, and LF-LL). This is because L tone is the default tone in Oklahoma Cherokee.

The commonality of the LH-H sequence appears to be because this sequence does not violate any of the constraints against a high tone discussed above (except for the constraint against a high tone on a short vowel). The first H of an LH-H sequence in most cases results from spreading of H from the following syllable (§8.5), and thus such a sequence does not incur violation of the OCP.

Many of the sequences where the first member is LF result from Pronominal Tonic Lowering (§7.2), which assigns a lowfall tone to the vowel-initial pronominal prefixes. Feeling's (1975) verb entries are listed with the forms with the 3SG agent forms, which in many cases begin with a vowel (3SG.A *a-* and 3SG.B *uu-*), and thus sequences where the first tone is LF is common.

6.3. Conclusion

In this chapter, I laid out the inventory of tones and accent in Oklahoma Cherokee (§6.1). Six pitch patterns are found on a vowel: low, high, high-low, low-high, lowfall and superhigh. High-low and low-high are analyzed to be combinations of a high tone and a low tone (§6.1.3), and thus the inventory of tones is reduced to low, high, lowfall and superhigh. §6.2 discussed tonotactics; some sequences of tones are common, while others are rare or non-existent. These distributional facts can in most cases be accounted for by the analysis to be provided in the following chapters.

Chapter 7. Lowfall Tone

7.0. Introduction

As we saw in §6.1.4, a lowfall tone is characterized by a fall from the low pitch level to an even lower level. This chapter looks at the various sources of lowfall tone: lowfall tone results from: (i) a glottal stop and Laryngeal Alternation, (ii) Pronominal Tonic Lowering (“Tonic Glottal Insertion” in Lindsey 1985), and (iii) pronominal prefixes beginning with *ii-*.

7.1. From a glottal stop

First, Lindsey (1985: 135-138) and Wright (1996: 15-18) claim that all instances of a lowfall tone come from a glottal stop. An argument for such a claim is the fact that the glottal stop is in complementary distribution with a lowfall tone. This is most obvious in the glottal grade forms of Laryngeal Alternation (§1.7.4.1). In the glottal grade, when the first *h* of the stem is between vowels in the *h*-grade (7.1a), this *h* alternates with a glottal stop in the glottal grade (7.1b), but when *h* is before a consonant in the *h*-grade (7.2a), this *h* is absent in the glottal grade and a lowfall tone is assigned to the preceding syllable (7.2b):

	<i>h</i> -grade	glottal grade
(7.1)	a. à:de:loho:sga	b. gade:loʔo:sga
/V_V	ààteelo <u>h</u> ooska	kateeloʔooska
	∅-ateelohoo-sk-a	k-ateelohoo-sk-a
	3SG.A-find.out-PRS-IND	1SG.A-find.out-PRS-IND
	‘He is finding it out.’ (ibid.)	‘I am finding it out.’ (Feeling 1975: 9)
(7.2)	a. à:de:hlohgwáʔa	b. gadè:lohgwáʔa
/_C	ààteeh <u>h</u> lohkwáʔa	katèèlohkwáʔa
	∅-ateehlohkw-áʔ-a	k-ateehlohkw-áʔ-a
	3SG.A-learn-PRS-IND	1SG.A-learn-PRS-IND
	‘He is learning it.’ (Feeling 1975: 8)	‘I am learning it.’ (ibid.)

Moreover, some morphemes have two allomorphs, one with a vowel-glottal stop sequence (*Vʔ*) and one with a lowfall tone (*ṼṼ*). For instance, the verbs in (7.3) share the classificatory light verb *-naʔ-* ‘set

FL’ (Uchihara 2014); in (a), this morpheme has a lowfall tone (before a consonant), while (b) has a glottal stop (before a vowel):

- | | | |
|-------|---|---|
| (7.3) | <p>a. hinà:wí:da
hinààwiíta
hi-nà(?)-wiít-a
2SG.A-set.FL-take:PCT-IND
‘Take it (flexible) somewhere!’
(Feeling 1975: 104)</p> | <p>b. à:gináʔa
ààkináʔa
aki-náʔ-a
1SG.B-set.FL:PRS-IND
‘I have it (flexible).’
(Feeling et al. 2003: 141)</p> |
|-------|---|---|

Another piece of evidence that a lowfall tone is from a glottal stop is dialectal variation (Lindsey 1985: 137); thus, North Carolina Cherokee has a pre-consonantal glottal stop where Oklahoma Cherokee has a lowfall tone:¹⁰³

- | | | | |
|-------|---|---|-------------------------|
| | Oklahoma Cherokee | | North Carolina Cherokee |
| (7.4) | <p>a. sv:gi
sv̀ki
‘onion’ (Feeling 1975: 155)</p> | <p>b. svʔgi
svʔki
‘onion’ (King 1975: 204)</p> | |
| (7.5) | <p>a. di:da:sdù:dí:ʔi
tiitaastùtùtíʔi
‘jail’ (Feeling 1975: 81)</p> | <p>b. didasduʔdiyu
titastuʔtiyu
‘jail’ (King 1975: 211)</p> | |

Based on these observations, Lindsey (1985: 135) formulates the following rule:

- (7.6) Glottal Lowering, informal (Lindsey 1985: 135)
Preconsonantal ʔ is realized as falling pitch on the preceding vowel, which is lengthened if short.

The synchronic status of this process is not without dispute, since a lowfall tone (almost) never alternates with a glottal stop (except for rare cases such as (7.3)).¹⁰⁴ In this study, I assume that the lowfall tone is already phonologized as a tone, and I do not assume that the lowfall tone is synchronically derived from a glottal stop. At the same time, however, the glottal stop has not been completely lost from the

¹⁰³ Huff (1977: 5) notes that a pre-consonantal glottal stop in North Carolina Cherokee also accompanies a fall in pitch.

¹⁰⁴ Moreover, since creakiness is not usually found with a lowfall tone (FIGURE 6-7), the connection between glottal stop and lowfall tone is synchronically quite remote.

lexical representations (cf. Ch.9). Reflecting such an analysis, I provide both the lowfall tone and the glottal stop in parentheses in the segmentation lines, as in (7.3a).

7.2. Pronominal Tonic Lowering

A lowfall tone is also found in the tonic forms of verbs on pronominal prefixes beginning with a vowel.¹⁰⁵ Compare the following pairs: the tonic forms in (a) have a lowfall tone on the initial syllable, while their corresponding atonic forms in (b) do not (pronominal prefixes are separated by a hyphen):

	LF in tonic	L in atonic
(7.7)	a. ù:sv:híha ùù-svvhíha 'He is going to bed.' (Feeling 1975: 180)	b. u:sv:sdi uu-svsvsti 'for him to go to bed'(ibid.)
(7.8)	a. è:ni:gò:wáhta èèni-kòòwáhtha 'You and me just saw him.' (EJ; DF, July 2011)	b. e:ní:gò:wahta eení-kòòwahtha 'Let's you and me see him.' (ibid.)

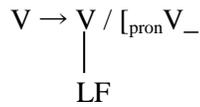
Based on this observation, Lindsey (1985: 136) formulates the following Tonic Glottal Insertion rule:

(7.9)	Tonic Glottal Insertion (Lindsey 1985: 136)
	$\emptyset \rightarrow ʔ / [_{\text{pron}} V _]$

According to Lindsey (1985), the lowfall tone on the vowel-initial pronominal prefixes in (7.7) and (7.8) is accounted for by this rule in combination with the Glottal Lowering rule (7.6), which then assigns a lowfall tone on the vowel. There is, however, no convincing synchronic evidence that a glottal stop is indeed first inserted in the vowel-initial pronominal prefixes. In this study, I simply assume that a lowfall tone is directly assigned to the vowel-initial pronominal prefixes in tonic forms, and I reformulate this rule as Pronominal Tonic Lowering:

¹⁰⁵ As was introduced in §1.7.4.2, finite verbs in the main clause are in the tonic form, while verbs in the subordinate clause, imperative, or infinitive are in the atonic form (see also Appendix A).

(7.10) Pronominal Tonic Lowering



7.3. Pronominal prefix beginning with *ii-*

The last source of a lowfall tone is found with the pronominal prefixes beginning with *ii-* (1/2PL *iicvvy-*, 1DU.IN.A *iinii-*, 1PL.IN.A *iitii-*, 1PL.IN.B *iikii-*, and 2PL *iicii-*, and *(ii)skiiy-* 2/1PL). These pronominal prefixes have a lowfall tone on their initial syllables even in atonic forms where a lowfall tone is not expected (Scancarelli 1987: 64); (7.11a) is an imperative form and (7.11b) has an irrealis pre-pronominal prefix, both of which require the verb to be in the atonic form (cf. Appendix A), but still a lowfall tone is found on the initial syllable:

(7.11)

- a. *ì:jalì:go:hv̀:ga*
 ìic-aliikoohv̀v̀ka
 ‘Get together!’ (Feeling 1975: 44)
- b. (tla) *ỳì:di:gówh̀ti:ha*
 (tlha) *ỳìitii-kówh̀thiiha*
 ‘You all and I don’t see it.’ (EJ, July 2011)

Here I claim that these pronominal prefixes historically had a glottal stop: 1DU.IN.A **iiʔnii-*, 1PL.IN.A **iiʔtii-*, 1PL.IN.B **iiʔkii-*, etc. Support for such a historical analysis comes from the corresponding forms in North Carolina Cherokee: Cook (1979: 74) states that a glottal stop in fact surfaces with these pronominal prefixes when CISL is attached in North Carolina Cherokee. I do not analyze this glottal stop to be underlying synchronically in Oklahoma Cherokee, though.¹⁰⁶

7.4. Conclusion

¹⁰⁶ This is because the lowfall tone on these pronominal prefixes does not block Laryngeal Alternation, which is blocked by a lowfall tone from a glottal stop (§7.4).

In this chapter, we saw three sources of lowfall tone in Oklahoma Cherokee: from a glottal stop, due to Pronominal Tonic Lowering, and with certain pronominal prefixes beginning with *ii-*. These three types of lowfall tone manifest different phonological and morphophonological properties.

The first difference concerns tonal alternation. A lowfall tone from a glottal stop alternates with a high tone, but a lowfall tone from other sources does not. In (7.12), the lowfall tone in the second syllable in (a) from a glottal stop, alternates with a high tone in (b) (the alternation is due to tonicity; cf. §1.7.4.2, Appendix A):

	LF		H
(7.12)	a. hiwò:nĩ:hi		b. gawó:niha
	hiwò̀̀nĩ̀̀hi		kawó̀̀niha
	hi-wò̀̀(?)nĩ̀̀h-i		ka-wó̀̀(?)nih-a
	2SG.A-speak:PCT-IND		3SG.A-speak:PRS-IND
	‘Speak!’ (Feeling 1975: 117)		‘He is speaking.’ (ibid.)

On the other hand, a lowfall tone due to Pronominal Tonic Lowering never alternates with a high tone.

The second difference concerns Laryngeal Alternation: a lowfall tone from a glottal stop blocks Laryngeal Alternation, while other lowfall tones do not. As was first introduced in §1.7.4.1, Laryngeal Alternation is triggered by certain pronominal prefixes, where the first *h* of the verb stem alternates with a glottal stop. When *h* is pre-consonantal, *h* is lost, leaving a lowfall tone on the preceding vowel in the glottal grade, as (7.13) shows (the *h* in question is underlined):

	<i>h</i> -grade		glottal grade
(7.13)	a. à:de:hlohgwá?a		b. gadè:lohgwá?a
	ààteehlohkwá?a		katèèlohkwá?a
	Ø-ateehlohkw-á?-a		k-ateehlohkw-á?-a
	3SG.A-learn-PRS-IND		1SG.A-learn-PRS-IND
	‘He is learning it.’ (Feeling 1975: 8)		‘I am learning it.’ (ibid.)

A lowfall tone from a glottal stop blocks Laryngeal Alternation, as (7.14) shows. Here, the first *h* of the stem in the *h*-grade (underlined) is retained in the glottal grade (b):

- | | | | |
|--------|------------------------------------|----|------------------------------------|
| | <i>h</i> -grade | | glottal grade |
| (7.14) | a. hiǹv̀:hl̥õ:ga | b. | hi:ǹv̀:hl̥õ:ga |
| | hiǹv̀v̥hl̥oóka | | hiiǹv̀v̥hl̥oóga (*hiiǹv̀v̥loóga) |
| | hi-ǹv̀v̥(?)hloó-k-a | | hii-ǹv̀v̥(?)hloó-k-a |
| | 2SG.A-apply.brake-PCT-IND | | 2SG>3SG.AN-tie.up.leg-PCT-IND |
| | ‘Apply brake!’ (Feeling 1975: 113) | | ‘Tie up his leg!’ (ibid.) |

On the other hand, a lowfall tone from other sources does not block Laryngeal Alternation. In

(7.15) the lowfall tone is due to Pronominal Tonic Lowering; the first *h* of the *h*-grade form in (a) is lost in the glottal grade form in (b) and a lowfall tone is assigned despite the presence of a lowfall tone on the first syllable:

- | | | | |
|--------|------------------------------|----|-------------------------------|
| (7.15) | a. ò:jv:hn̥íha | b. | ò:jv̀:níha |
| | òðcv̥v̥hn̥íha | | òðcv̥v̥níha |
| | ooc-v̥v̥hn̥íh-a | | ooc-v̥v̥hn̥íh-a |
| | 1PL.EX.A-hit:PRS-IND | | 1PL.EX.A-hit:PRS-IND |
| | ‘They and I are hitting it.’ | | ‘They and I are hitting him.’ |
| | (Pulte & Feeling 1975:266) | | (ibid.) |

The last difference among various types of lowfall tone concerns the ability to carry a superhigh accent (Ch.14): a lowfall tone due to Laryngeal Alternation can be replaced by a superhigh accent, while a lowfall tone due to Pronominal Tonic Lowering cannot. See §14.1.2.3 for a more detail.

To summarize this chapter, lowfall tone in Oklahoma Cherokee is most likely historically derived from a glottal stop, but there is insufficient evidence to analyze all instances of a lowfall tone to be synchronically derived from an underlying glottal stop; rather, I assume that the lowfall tone from a glottal stop or the lowfall tone with pronominal prefixes beginning with *ii-* are phonologized as tones, but that the assignment of the lowfall tone due to Pronominal Tonic Lowering is a synchronic phonological process.

Chapter 8. Tonal Phonology of H1

8.0. Introduction

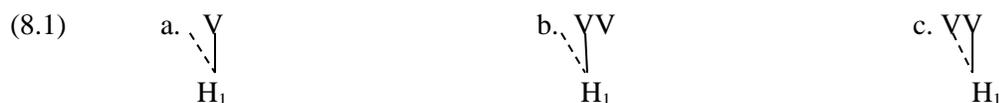
In this chapter, I will look at the tonal phonology of one type of high tone, H1. I will first look at the general basic properties of H1 in §8.1. In the subsequent sections I will discuss the tonal properties of H1, which are common in tonal systems in general, including the Obligatory Contour Principle (§8.2), floating H1 (§8.4), and H1 Spreading (§8.5).

The subsequent three chapters also concern various aspects of H1. Ch.9 argues that the source of H1 is a glottal stop. Ch.10 looks at the reflexes of a glottal stop, focusing on the phonological and morphological environments where a glottal stop is retained. Ch.11 provides the historical source of various types of H1 alignment.

8.1. General properties of H1

H1 is one type of high tone (level [3]) which comes from a glottal stop. H1 is defined by a type of high tone which blocks Laryngeal Alternation (§1.7.4.1), as opposed to H2 (Ch.12) and H3 (Ch.13). H1 may or may not occur with a surface glottal stop; in the latter case, a glottal stop is placed in parenthesis in the segmentation lines. These points will be discussed in Ch.9 in detail, but the the source of H1 is orthogonal to the discussion in this chapter.

H1 occurs anywhere in a word, and more than one H1 can occur in a word. The tone-bearing unit of H1 is the mora. H1 can be linked to the only mora of a short vowel (8.1a), or either to the left (b) or to the right mora of a bimoraic long vowel (c). H1 spreads leftward by one mora; in (a) and (b) H1 spreads leftward across the syllable boundary, while in (c) H1 spreads within a syllable.



The forms in (8.2) exemplify each type of H1 alignment in (8.1). Syllable boundaries are indicated

8.2.1. H1 Deletion

Sometimes, H1 does not occur where it is expected (before a glottal stop). One such case is when the vowel lexically associated with H1 is immediately preceded by a vowel that also carries H1. Compare the following forms. The same morphemes - the present aspectual suffix (class 2) *-iʔ-* (8.4), the reversive derivational suffix *-kiʔ-* (8.5), and the andative suffix *-ée(?)k-* (8.6) - have H1 in (a), but not in (b); these morphemes are preceded by a syllable with another H1 in (b):

- | | | | |
|-------|--|----|--|
| | H1 | | no H1 |
| (8.4) | a. à:teladíʔa
ààtheladíʔa

H ₁
a-thelat-iʔ-a
3SG.A-join-PRS-IND
'He is joining.' (Feeling 1975: 59) | b. | à:jáʔiʔa
ààcáʔiʔa
 ʔ
H ₁ H ₁
Ø-acáʔ-iʔ-a
3SG.A-hatch-PRS-IND
'It's hatching' (Feeling 1975: 30) |
| (8.5) | a. gv:ɡí:ʔa
kvvkííʔa

H ₁
k-vv-kiʔ-a
1SG.A-weave-REV:PRS-IND
'I'm unweaving it.'
(Pulte & Feeling 1975: 282) | b. | dà:lí:yó:ɡiʔa ¹⁰⁸
tààlííyóókiʔa
 ʔ
H H ₁
t-Ø-aalííyóó-kiʔ-a
DIST-3SG.A-put.on.socks-REV:PRS-IND
'He is taking off his socks.'
(Feeling 1975: 73) |
| (8.6) | a. gadadé:ga
katatééka

H ₁
k-atat-ée(?)k-a ¹¹⁰
1SG.A-REFL-AND:PRS-IND
'I am bouncing.' (Feeling 1975: 1) | b. | ɡáʔlè:ga ¹⁰⁹
káʔlèèka
 ʔ
H ₁ H ₁
ka-ʔ-ée(?)k-a
3SG.A-climb-AND:PRS-IND
'He is climbing.' (Feeling 1975: 99) |

This effect is due to a typologically common principle, the Obligatory Contour Principle (OCP):

¹⁰⁸ A long low-toned vowel is shortened before a glottal stop due to a general phonological constraint in Oklahoma Cherokee (§5.3.2.3). The source of the first high tone is unknown.

¹⁰⁹ Again, H1 linked to the left mora of a long vowel alternates with a lowfall tone when H1 is deleted.

¹¹⁰ H1 linked to the left mora of a long syllable spreads rightward within the syllable in certain cases, when this H1 cannot spread to the preceding syllable due to factors discussed in §8.5; see Ch.11 for a more detail.

- (8.7) Obligatory Contour Principle (Leben 1973, Myers 1997, etc.)
Adjacent identical elements are prohibited

In Oklahoma Cherokee, the OCP prohibits a sequence of H1 associated to different nodes in a two-syllable window, whether the H1 tones are associated with a single mora of short syllables or one of the moras of bimoraic syllables:

- (8.8) OCP in Oklahoma Cherokee
- $$\begin{array}{c} *V(V) \quad C_0(V)V \\ | \qquad \qquad | \\ H_1 \qquad \qquad H_1 \end{array}$$

In the case of Oklahoma Cherokee, the OCP has a blocking effect rather than a rule trigger (Yip 1988), such that the second H1 is not realized even though the vowel is lexically associated with H1.

The OCP is restricted to a two-syllable window. It applies when H1 is associated with the single mora of the preceding short syllable as in (8.4) or (8.6), and when H1 is associated with the right mora of the preceding long syllable ($V\acute{V}C_{0_}$), as shown in (8.5) above. It also applies when H1 is associated with the left mora of the preceding long syllable ($\acute{V}VC_{0_}$). The following examples illustrate this last case. One and the same morphemes, *-stoo-ʔ-* ‘crush’ (8.9) and the reversive suffix *-eéʔ-* (8.10), have H1 (before a glottal stop) in (a), while forms in (b), which are preceded by a HL tone, do not:

- | | | | |
|-------|---|--|--|
| | H1 | | no H1 |
| (8.9) | a. à:sdó:ʔa | | b. à:gî:sdoʔa |
| | ààstóóʔa | | ààkíistoʔa (*ààkíistóʔa) |
| | | | |
| | H ₁ | | H ₁ H ₁ |
| | a-stoo-ʔ-a | | a-[kíi(?) + stoo]-ʔ-a |
| | 3SG.A-crush-PRS-IND | | 3SG.A-[eat+crush]-PRS-IND |
| | ‘He is crushing it.’ (Feeling 1975: 48) | | ‘He is chewing it.’ (Feeling 1975: 17) |

- (8.10) a. gu:da^lé:ʔa
kuuta^lééʔa
 | |
 H₁ H₁
k-uuta^l-eéʔ-a
3SG.A-hitch-REV:PRS-IND
‘He is unhitching him.’
(Feeling 1975: 123)
- b. à:sgwâ:hleʔa
àaskwáahleʔ-a
 | |
 H₁ H₁
a-skwáa(?)hl-eéʔ-a (< *-skwaʔhl-)
3SG.A-catch.falling.person-REV:PRS-IND
‘He is catching a falling person’
(Feeling 1975: 52)

The OCP is limited to a two-syllable window; if two H₁’s are interrupted by another syllable, the second H₁ is realized, as shown in (8.11) and (8.12). In (8.12), the andative (AND) suffix *-ée(?)k-* loses H₁ (and alternates with a lowfall tone) when immediately preceded by another H₁ (a), but H₁ is realized when the other H₁ is two syllables away (b). Syllable boundaries are indicated in the second lines:

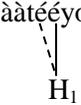
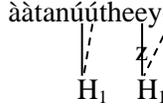
- (8.11) a. à:hna.wá.ʔi.yýv.ʔa
àà.hna.wá.ʔi.yýv.ʔa (*ààhnawáʔiyvʔa)
 | |
 H₁ H₁
Ø-ahnawáʔiyvʔ-a
3SG.A-change.shirt:PRS-IND
‘He is changing his shirt.’ (Feeling 1975: 23)

- b. à:lsgwé:tuhgí:ʔa
àà.lskwéé,thuh.kíí.ʔa
 | |
 H₁ H₁
Ø-al(i)skwée(?)thuhkííʔ-a
3SG.A-take.off.hat:PRS-IND
‘He is taking off his hat.’ (Feeling 1975: 43)

- (8.12) a. no H₁
a. gáʔlè:ga
káʔ.lèè.ka
 | |
 H₁ H₁
ka-ʔl-éé(?)k-a
3SG.A-climb-AND:PRS-IND
‘He is climbing.’ (= 10.4c)
- b. H₁
b. à:hyúʔi:né:ga
àà.hyú.ʔii.néé.ka
 | |
 H₁ H₁
a-hyúʔiin-éé(?)k-a
3SG.A-swim-AND:PRS-IND
‘He is swimming’ (Feeling 1975: 29)

8.2.2. H1 Displacement

In the section above, we observed that the OCP in Oklahoma Cherokee (8.8) is achieved by deleting the second H1. The OCP can also be satisfied by displacing the second H1 to the following syllable, as (8.13) illustrates. In (8.13), both forms have the aspectual suffix $\acute{-(?)oh-}$ in common, which assigns H1 to the vowel before this suffix (indicated by a high tone diacritic above the hyphen), as (a) shows. In (b), however, the second H1 is found on the vowel *after* where it is expected (on the vowel of the aspectual suffix, *o*), since the syllable *thee* is preceded by another H1:

	H1 in the original position		H1 displaced (2 nd H)
(8.13)	a. à:dé:yoha ààtééyoha		b. à:danú:te:yóha ààtanúútheeyóha (*ààtanúútééyoha)
			
	Ø-ateey-(?)oh-a		Ø-atanúú(?)theey-(?)oh-a
	3SG.A-go.around.curve-PRS-IND		3SG.A-twist-PRS-IND
	‘He is going around the curve.’		‘It’s twisting.’
	(Feeling 1975:9)		(Feeling 1975:6)

In §8.2.1. we observed that the second H1 is deleted to satisfy the OCP. The OCP is achieved by H1 Deletion when the syllable following the second H1 is the final syllable or when the following syllable already has a marked tone (i.e. high, lowfall or superhigh), as (8.4) - (8.6) and (8.9) - (8.10) illustrate. When the syllable following the second H1 is not word-final and does not already have a marked tone, as in (8.13b), H1 is displaced to this following vowel.¹¹¹

8.2.3. Summary

In this section, we observed that H1 in Oklahoma Cherokee is subject to a cross-linguistically common principle, the OCP, which bans a sequence of H1’s in adjacent syllables. The OCP in Oklahoma Cherokee has two effects, H1 Deletion (§8.2.1) and H1 Displacement (§8.2.2). H1 Deletion is employed when H1 cannot be displaced to the following syllable either because the following syllable is the final syllable or because it already has a marked tone; otherwise, H1 Displacement is employed.

¹¹¹ H1 Deletion is commoner than H1 Displacement to satisfy the OCP. In my database, there are 33 tokens of H1 Deletion, while there is one instance of H1 Displacement.

Only H1 blocks another H1. The other types of high tone do not block H1. For example, the floating high tone due to a pre-pronominal prefix (H3; Ch.13) does not block H1 of the following syllable to be realized. In (8.14), H3 is placed in a circle:

- (8.14) ÿ:gáwó:niha
 iíkáwóóniha
 Ⓜ H₁
 ii-ka-wóo(?)n-ih-a
 ITER-3SG.A-speak-PRS-IND
 ‘He is speaking again.’ (Pulte & Feeling: 254)

This could be due to the ‘accentual’ nature of H3 (§13.4).

8.3. When H1 is overridden by another tone

In the previous section, we saw that the OCP is the motivation for H1 Deletion and H1 Displacement. H1 Deletion or H1 Displacement are also observed when H1 is overridden by another marked tone (i.e. lowfall (Ch.7) or superhigh (Ch.14)).

8.3.1. H1 Deletion

In §8.2.1, we saw that the second H1 is deleted from a sequence of H1’s in adjacent syllables to satisfy the OCP. H1 is also deleted when another marked tone is imposed on the syllable where H1 is expected. In (8.15), the PFT suffix ^ˈ-ʔ- assigns H1 to the preceding vowel (as indicated by a high tone diacritic above the hyphen). However, in (a) the vowel preceding this morpheme (*uu*) is assigned a lowfall tone due to Pronominal Tonic Lowering (§7.2), and thus this H1 is deleted (or not realized). The (b) form illustrates that the PFT ^ˈ-ʔ- regularly assigns H1 to the last vowel of the preceding morpheme, *ookii-*, since *ii* does not carry a marked tone:

- | | |
|---|---|
| <p>(8.15) a. no H1
 ù:gǔ:ʔi
 ùùkvǔʔi

 H₁
 uu-k-(?)-vǔʔi
 3SG.B-eat-PFT-ASR
 ‘He ate it.’ (Feeling 1975: 16)</p> | <p>H1
 b. ò:gííʔgǔ:ʔi
 òòkííʔkvǔʔi

 H₁
 ookii-k-ʔ-vǔʔi
 1PL.EX.B-eat-PFT-ASR
 ‘They and I ate it.’ (Feeling et al. 2003: 113)</p> |
|---|---|

8.3.2. H1 Displacement

In the previous section, we saw that H1 is deleted when the vowel lexically associated with H1 is assigned another marked tone; this is when H1 cannot be displaced to the following syllable, because the following syllable is the last syllable or because it already has a marked tone. Otherwise, H1 is displaced to the following syllable.¹¹²

Compare the (a) and (b) forms in (8.16) - (8.17). In (a), H1 is found where expected (before the glottal stop), while in (b) H1 is found on the second syllable; this is because in (b) the first syllable is, again, assigned a lowfall tone due to Pronominal Tonic Lowering (or TGI; §7.2). In (8.16), the stem assigns H1 to the vowel of the pronominal prefix, which is indicated by a high tone diacritic above the hyphen in the segmentation line.

- | | |
|---|---|
| <p>(8.16) a. H1 in original place
 jíʔyohisdíha
 cíʔyohistíha

 H₁
 ci-yʔohist-íh-a
 1SG.A-take.break-PRS-IND
 ‘I am taking a break.’ (Feeling 1975: 64)</p> | <p>H1 displaced
 b. à:yóhisdíha
 ààyóhistíha

 H₁
 a-y(?)ohist-íh-a
 3SG.A-take.break-PRS-IND
 ‘He is taking a break.’ (ibid.)</p> |
|---|---|

¹¹² In contrast to the case with the OCP, H1 Displacement is much commoner than H1 Deletion when H1 is overridden by another marked tone.

- (8.17) a. gá:góhvsga
kákohvska
|
H₁
k-ák(?)ohvsk-a
1SG.A-burn:PRS-IND
‘I am burning it.’ (Feeling 1975: 17)
- b. à:góhvsga
ààkóhvsga
|
H₁
Ø-ák(?)ohvsk-a
3SG.A-burn:PRS-IND
‘He is burning it.’ (ibid.)

H1 Displacement is also employed to achieve the OCP, as was discussed in §8.2.2.

8.3.3. Summary

Both H1 Deletion and H1 Displacement are employed when H1 is overridden by another tone, as in the case of the OCP (§8.2). H1 Deletion is employed when H1 cannot be displaced to the following syllable (i.e, the following syllable is the final syllable or it already has a marked tone); otherwise, H1 Displacement is employed.

8.4. Floating H1

A floating tone is a tonal segment which is not associated with any vowel (Goldsmith 1990: 20ff.). In Oklahoma Cherokee, some morphemes assign H1 to the vowel of the preceding morpheme. For instance, the verb stem ^ˈ:(?)tloo- ‘strap’ assigns H1 to the vowel of the preceding morpheme, as (8.18) - (8.19) illustrate; as has been the convention so far, the high tone diacritic above the hyphen in the segmentation line indicates that this morpheme is associated with a floating H1 (the floating H1 is circled, and is linked to the vowel with a dotted line). The (b) forms show that the morphemes which precede this verb stem (1SG.A *ci-* and REFL *ata-*, the vowels of which are lengthened because the stems are ‘long’ stems (§2.1.2)) do not have H1:

- (8.18) a. jí:dlo:híha
1SG.A cítloohíha
|
Ⓜ
ci-ˈ:(?)tloo-híh-a
1SG.A-strap-PRS-IND
‘I am strapping it.’ (Feeling 1975: 92)
- b. ji:jagalíʔa
ciicayoo híʔa
|
ci-:cakal-íh-a
1SG.A-rip-PRS-IND
‘I am ripping it.’ (Feeling 1975: 97)

- (8.19) a. à:dá:dlo:híha
REFL ààtáátloo-híha


 Ø-ata-:(?)tloo-híh-a
 3SG.A-REFL-strap-PRS-IND
 ‘He is putting on a belt.’ (Feeling 1975: 2)
- b. à:da:jagalíha
ààtaacakalíha
 Ø-ata-:cakal-íh-a
 3SG.A-REFL-PRS-IND
 ‘It is ripping.’ (Feeling 1975: 4)

Floating H1 is not restricted to stems; some aspectual suffixes also assign H1 to the vowel of the preceding morpheme, as seen in §8.2 and §8.3 above. In the (a) forms, the aspectual suffixes assign H1 to the last vowel of the base. The (b) forms, inflected forms with another aspectual suffix, show that H1 is not associated with the base.

- (8.20) a. ù:teládǎ:ʔi
ùùthelátvǎ:ʔi


 uu-athelat-(?)-vǎ:ʔi
 3SG.B-join-PFT-ASR
 ‘He joined.’ (Feeling 1975: 59)
- b. à:teladíʔa
ààtheladíʔa


 Ø-athelat-íʔ-a
 3SG.A-join-PRS-IND
 ‘He is joining.’ (ibid.)

- (8.21) a. à:sgwalǎ:niha
ààskwalǎvíniha


 a-skwalvvn-(?)ih-a
 3SG.A-hit.in.head-PRS-IND
 ‘He is hitting him in the head.’
 (Feeling 1975: 52)
- b. ù:sgwalǎ:ní:lǎ:ʔi
ùùskwalǎnílǎ:ʔi


 uu-skwalvvn-íi(?)lǎ-vǎ:ʔi
 3SG.B-hit.in.head-PFT-ASR
 ‘He hit him in the head.’
 (ibid.)

8.5. H1 Spreading

8.5.1. Introduction

In §8.1, we saw that H1 is linked to a short vowel (8.22a), or to the left (b) or the right (c) mora of a long vowel. H1 linked to the right mora of a long vowel obligatorily spreads to the left mora within the syllable (c), and we do not need to discuss this case any further. On the other hand, H1 linked to a short

(8.26)

a. gadáʔnvʔa
 katáʔnvʔa (*kátáʔnvʔa)
 | |
 H₁ H₁
 ‘I am moving from one place to another.’ (Feeling 1975: 6)

b. kanawô:ga
 khanawóoka (*khanáwóoka)
 | |
 H₁ H₁
 ‘He is cold.’ (Feeling 1975: 139)

In the next section, I will show that the spreading of H1 across the a syllable boundary is conditioned by complex factors. H1 cannot spread to:

- (i) Syllables with a short vowel (§8.5.2.1); e.g. *khanawóoka* ‘He is cold’ (**khanáwóoka*).
- (ii) Syllables which already have a marked tone (i.e. high or lowfall) (§8.5.2.2); e.g. *èètóóha* ‘He is walking around’.
- (iii) Syllables which are preceded by another H1 (§8.5.2.3); e.g. *káácvvwaástiha* ‘He is wringing it out.’ (**káácvvwaástiha*).
- (iv) Syllables which belong to a pronominal prefix or the reflexive prefix (§8.5.2.4); e.g. *àtaastáayvvhvska* ‘He is cooking meal’ (**àtaástáayvvhvska*).

8.5.2. Blocking of H1 Spreading

H1 Spreading is blocked by four conditioning factors. I will describe each of them in this section. When H1 fails to spread to the preceding syllable, the resulting configuration in most cases is H1 extending for one mora, whether H1 is linked to a short vowel (8.27a) or to the left mora of a long vowel

(b).

(8.27)

a. à:hnikíʔa
 ààhnikíʔa
 |
 H₁
 Ø-aahnik-íʔ-a
 3SG.A-leave-PRS-IND
 ‘He is leaving.’ (Feeling 1975: 25)

- b. galô:sga
kalóoska
|
H₁
ka-lóo(?)sk-a (< *-loʔsk-)
3SG.A-AN.fall:PRS-IND
'He is falling.' (Feeling 1975: 102)

However, in some cases, H1 linked to the left mora of a long vowel (VV) results in H1 spreading rightward *within a syllable*, as (8.28a) shows. The (b) form justifies that the H1 is lexically linked to the left mora in the andative suffix *-ée(?)k-*:

- | | | | |
|--------|--|----|--|
| | No spread to the preceding σ | | Spread to the preceding σ |
| (8.28) | a. dâ:lhtadé:ga
tààlhthatééka

H ₁ | b. | à:hnohlî:nê:ga
ààhnohliínéeka

H ₁ |
| | Ø-aahnohliin-ée(?)k-a
3SG.A-carry.LG.on.shoulder-AND:PRS-IND
'He is carrying a long object on his shoulder.'
(Feeling 1975: 25) | | t-Ø-al(i)hthat-ée(?)k-a
DIST-3SG.A-jump-AND:PRS-IND
'He is jumping.'
(Feeling 1975: 69) |

This difference between cases like (8.27b) and (8.28) stems from the historical length of the vowel immediately preceding the glottal stop; see Ch.11 for a more detail. However, what is crucial for the discussions below is whether H1 spreads to the *preceding syllable*, and not whether it *extends for two moras*.

8.5.2.1. Preceding syllable is short

H1 cannot spread to a preceding short syllable. First, compare the (a) and (b) forms in (8.29) - (8.30); all the forms in (8.29) - (8.30) share the andative (AND) derivational suffix *-ée(?)k-*, which designates that “the subject is going to a known location to perform the action of the verb” (Cook 1979: 140-141). However, the tonal configurations are different, depending on whether this suffix is preceded by a short vowel (a) or a long vowel (b). In the (a) forms, H1 of the AND does not spread to the preceding syllable (and spreads rightward by one mora *within* the syllable instead), while in the (b) forms, H1 spreads across the syllable boundary:

- | | | | |
|---------|--|----|--|
| | No spread to the preceding σ | | Spread to the preceding σ |
| (8.29) | a. d̀a:lhtadé:ga | b. | ̀a:hnohlí:nê:ga |
| (=8.28) | t̀àlhthatééka | | ̀àhnohlinééka |
| | $\begin{array}{c} \downarrow \\ H_1 \end{array}$ | | $\begin{array}{c} \downarrow \\ H_1 \end{array}$ |
| | Ø-aahnohliin-ée(?)k-a | | t-Ø-al(i)hthat-ée(?)k-a |
| | 3SG.A-carry.LG.on.shoulder-AND:PRS-IND | | DIST-3SG.A-jump-AND:PRS-IND |
| | ‘He is carrying a long object on his shoulder.’ | | ‘He is jumping.’ |
| | (Feeling 1975: 25) | | (Feeling 1975: 69) |
| | | | |
| (8.30) | a. ̀a:gwadé:ga | b. | gansiínéeka |
| | ̀àkwatééka | | kansiínéeka |
| | $\begin{array}{c} \downarrow \\ H_1 \end{array}$ | | $\begin{array}{c} \downarrow \\ H_1 \end{array}$ |
| | akw-at-ée(?)k-a | | ka-n(a)siin-ée(?)k-a |
| | 1SG.B-REFL?-AND:PRS-IND | | 3SG.A-drag-AND:PRS-IND |
| | ‘I am throwing it.’ (Feeling 1975: 159) | | ‘He is dragging it.’ (Feeling 1975: 111) |

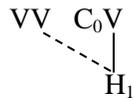
The following examples also support the claim that H1 cannot spread to a preceding short syllable:

- (8.31)
- a. kanawô:ga
khanawóoka (*khanáwóoka)
- $\begin{array}{c} \downarrow \\ H_1 \end{array}$
- ‘He is cold.’ (Feeling 1975: 139)
- b. ̀ù:liyêsu:stga
̀ù̀liyéesuustga
- $\begin{array}{c} \downarrow \\ H_1 \end{array}$
- ‘He is wearing a ring.’ (Feeling 1975: 173)
- c. ̀a:sganv̂:ga
̀àskanývka
- $\begin{array}{c} \downarrow \\ H_1 \end{array}$
- ‘He is committing a crime (Feeling 1975: 50)

This explains the majority of cases where H1 is blocked from spreading to a preceding syllable.

This factor could be seen as being driven by the perceptual salience of a contour tone (in this case, a low-high tone) over a level tone. H1 Spreading can now be revised as follows:

(8.32) H1 Spreading (revised)



(H1 spreads leftwards by one mora across syllable boundaries, *if the preceding syllable has a long vowel*)

8.5.2.2. Preceding syllable already has a marked tone (MAX-T)

H1 cannot spread to a preceding syllable which already has a marked tone (i.e. lowfall, high or superhigh). Compare the forms in (8.33), which are the inflectionally related forms of the same verb. In the 1SG form (a), H1 spreads across a syllable boundary, while in the 3SG form (b), H1 fails to spread to the preceding syllable and instead stays within the syllable. The only phonological difference between the two forms (besides the pronominal prefixes) is the existence of the lowfall tone on the preceding syllable in the 3SG form (in this case, due to Pronominal Tonic Lowering (or TGI), which assigns a lowfall tone to vowel-initial pronominal prefixes; §7.2), and thus we can hypothesize that this lowfall tone blocks H1 from spreading to the preceding syllable.

	Spread to the preceding σ		No spread to the preceding σ
(8.33)	a. gě:dô:ha		b. è:dô:ha
	keétóoha		èètóoha
	k-eetóo(?)h-a		Ø-eetóoh-a
	1SG.A-walk.around:PRS-IND		3SG.A-walk.around:PRS-IND
	‘I am walking around.’ (Feeling 1975: 89)		‘He is walking around.’ (ibid.)

(8.34) shows that spreading to the preceding syllable is also blocked by a high tone (in this case, the high tone is due to the pre-pronominal prefix (H3); cf. Ch.13):

(8.34)	tla yidagé:dó:li
	tlha yitakéétóóli
	tlha yi-ta-k-eetóo(?)l-i
	not IRR-CISL-1SG.A-walk.around:PFT-MOT
	‘I will not go.’ (EJ, July 2011)

This blocking factor, that H1 cannot spread to a preceding syllable which already has a marked tone (i.e., high or lowfall), can be seen as the reflection of a faithfulness constraint, MAX-T (Yip 2002: 83), which requires all the input tones to be realized and thus bans deletion of tones:

(8.35) MAX-T (Yip 2002: 83)
No deletion of tone

Incorporating this observation, H1 Spreading can now be restated as follows:

(8.36) H1 Spreading (revised)

$$\begin{array}{c}
 \text{VV} \quad \text{C}_0\text{V} \\
 | \quad \quad \quad | \\
 \text{[-Tone]} \quad \quad \quad \text{H}_1
 \end{array}$$

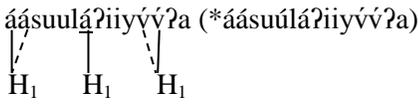
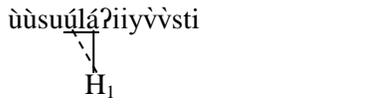
(H1 spreads leftwards by one mora across syllable boundaries, if the preceding syllable has a long vowel and *does not carry a marked tone*)

8.5.2.3. Preceding syllable is preceded by another H1 (*TROUGH)

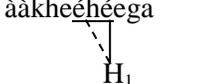
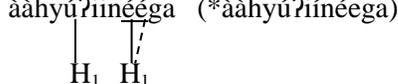
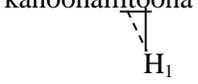
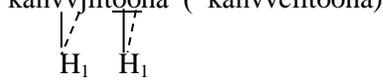
H1 fails to spread to a preceding syllable, if this H1 is preceded by another H1 two syllables away. This is illustrated by the following examples. In (a), the present forms, the second H1 (underlined) fails to spread to the preceding syllable, while in (b), the infinitive forms, the second H1 spreads to the preceding syllable. The difference between the present forms and infinitive forms in (8.37) is that the second H1 in the present forms are preceded by another H1, which is two syllables away, while this is not the case in the infinitive forms.¹¹⁴

<p>(8.37) a. Spread to the preceding σ (PRS)</p> <p>gá:jv:wâ:sdiha <u>káácvvwáastiha</u> (*káácvvwáastiha)</p> $ \begin{array}{c} \swarrow \quad \downarrow \\ \text{H}_1 \quad \text{H}_1 \end{array} $ <p>ka':(?cɔvwáa(?)st-ih-a (< *-: ?cɔvwáa?st-) 3SG.A-wring.out-PRS-IND 'He is wringing it out.' (Feeling 1975: 98)</p>	<p>b. No spread to the preceding σ (INF)</p> <p>uwà:jṿ:wâ:sdohdi uwààcvv<u>wá</u>astohti</p> $ \begin{array}{c} \swarrow \quad \downarrow \\ \text{H}_1 \end{array} $ <p>uwa':(?cɔvwáa(?)st-oht-i (< *-: ?cɔvwáa?st-) 3SG.B-wring.out-INF-NOM 'for him to wring it out' (ibid.)</p>
---	---

¹¹⁴ As we will see in §9.2, in infinitive forms, a glottal stop has induced H1 if this H1 can spread across syllable boundaries, but otherwise it failed to induce H1 and the tone of the preceding vowel is either low or lowfall.

- (8.38) a. á:su:lá?i:yv:ʔa
 áásuulá?iiyvʔa (*áásuúlá?iiyvʔa)

 Ø-áa(?)suulá?iiyvʔ-a
 3SG.A-change.pants:PRS-IND
 ‘He is changing his pants.’
 (Feeling 1975: 55)
- b. ù:sũ:lá?i:yṽ:sdi
 ùùsuúlá?iiyṽsti

 uu-(àà)(?)suulá?iiyṽst-i
 3SG.B-change.pants:INF-NOM
 ‘for him to change pants’
 (ibid.)

Forms such as (8.39) - (8.40) further support the observation that another H1 two syllables away blocks H1 Spreading. The (a) and (b) forms have the same suffixes, *-ée(?)k-* (AND) and *-iitóo(?)h-* (AMB), but the tonal configurations of these suffixes are different. This is because in the (b) forms these morphemes are preceded by another H1 two syllables away and thus H1 of these morphemes cannot spread to the preceding syllable, while in the (a) forms there is no such restriction:

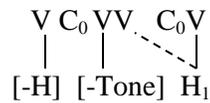
- (8.39) a. Spread to the preceding σ
 à:kě:hê:ga
 ààkheéhéega

 a-kheeh-ée(?)k-a
 3SG.A-follow-AND:PRS-IND
 ‘He is following him.’ (Feeling 1975: 33)
- b. No spread to the preceding σ (2nd H)
 à:hyú?i:né:ga
 ààhyú?iinééga (*ààhyú?iinéega)

 Ø-aahyú?iin-ée(?)k-a
 3SG.A-swim-AND:PRS-IND
 ‘He is swimming.’ (Feeling 1975: 29)
- (8.40) a. gano:halĩ:dô:ha
 kanoohaliítóoha

 ka-noohal-iitóo(?)h-a
 3SG.A-hunt-AMB:PRS-IND
 ‘He is hunting.’ (Feeling 1975: 110)
- b. ganṽ:ji:dô:ha
 kanṽjiiitóoha (*kanṽciitóoha)

 ka-nṽ(?)c-iitóo(?)h-a
 3SG.A-toss-AMB:PRS-IND
 ‘He is tossing about.’ (Feeling 1975: 113)

This fact, that H1 is blocked from spreading by another H1 two syllables away, could be a reflection of a cross-linguistic tendency to avoid a tonal dip (Yip 2002: 137, Hyman 2009: 229); in the case of Oklahoma Cherokee, it avoids a tonal dip (low tone) of one mora surrounded by H1. This could be expressed by a markedness constraint, *TROUGH:

- (8.41) *TROUGH (cf. Yip 2002: 137)
 No tonal dip of one mora (*CṼṼC₀VṼ).

H1 Spreading can now be revised as follows:

(8.42) H1 Spreading (revised)



(H1 spreads leftwards by one mora across syllable boundaries, if the preceding syllable has a long vowel and does not carry a marked tone, *and is not preceded by another H1*)

If the preceding H1 is more than two syllables away, H1 Spreading is not blocked:

(8.43) gá:sañě:nádvsga

káásaneéénátvaska



‘He is attaching it (flexible) behind.’ (Feeling 1975: 114)

Not all the types of high tones block spreading; another type of high tone, the high tone from a pre-pronominal prefix (H3; Ch.13), does not block spreading:

(8.44) de:gʷ:dĩ:yéʔa

teekʷvtiíyéʔa (?deegʷvdiíyéʔa)



tee-k-vvtiiyéʔ-a

DIST-3SG.A-wash.dish:PRS-IND

‘He is washing dishes.’ (Feeling 1975: 78)

Again, this could be due to the ‘accentual’ nature of H3 (§13.4).

8.5.2.4. Domain effect

The three factors above are all phonological. The last factor discussed in this section is morphological; H1 lexically linked to the stem cannot spread to a syllable which belongs to the pronominal prefix or the reflexive prefix. The simplified template of Cherokee verbs is as follows, with the optional position classes in parentheses (cf. §1.7.1):

(8.45) Template of Cherokee verbs

(PPP-)PP-(REFL/MID-)[BASE-(DERIV-)ASP]_{STEM}-MOD

The following examples illustrate that H1 in the verb stem cannot spread to a syllable that belongs either to a pronominal prefix (8.46) or the reflexive/middle prefix (8.47), even if the other conditions for spreading are met (i.e. the preceding syllable is long and does not carry a marked tone, is not preceded by another H1):

(8.46) Pronominal prefix

a. ji:nâ:wi:díha
 ciináawiiťha (*ciináawiiťha)
 |
 H₁
 cii-náa(?)wiit-íh-a (< *-na?wiit-)
 1SG>3SG.AN-carry.FL-PRS-IND
 ‘I am taking him somewhere.’ (Feeling 1975: 104)

b. hi:nâ:wi:dv:hv:ʔi
 hiináawiiťvvhvʔi (*hiináawiiťvvhvʔi)
 |
 H₁
 hii-náa(?)wiit-vvh-vvʔi (< *-na?wiit)
 2SG>3SG.AN-carry.FL-PFT-ASR
 ‘Carry him somewhere later!’ (Feeling et al. 2003: 106)

(8.47) Reflexive

a. à:da:sdâ:yv:hv́sga
 ààtaastáayvvhv́ska (*ààtaastáayvvhv́ska)
 |
 H₁
 Ø-ataa-stáa(?)yvvhv́sk-a (< *-sta?yvvhv́sk-)
 3SG.A-cook.meal:PRS-IND
 ‘He is cooking a meal.’ (Feeling 1975: 7)

b. à:da:hyâ:sdiha
 ààtaahyáastiha
 |
 H₁
 Ø-ataa-hyáa(?)stih-a (< *-hya?stih-)
 3SG.A-REFL-stretch:PRS-IND
 ‘He is stretching.’ (Feeling 1975: 3)

Thus, while spreading is optional within the verb stem (BASE+ASP), spreading is impossible to a pronominal prefix or to a reflexive/middle prefix.

If the morpheme boundary in fact is the conditioning factor, one would expect that the same morpheme with H1 (with a historical glottal stop) would show different realizations depending on whether the preceding morpheme is a pronominal prefix/ reflexive prefix. This is in fact the case. Compare the form *-kíʔ-* ‘eat:PRS’ with a pronominal prefix *oostii-* ‘1DU.EX.A’ in (8.48a) and *-stiikíʔ-* ‘eat.LG:PRS’ in (b), both of which clearly have in common the morpheme *-kíʔ-* ‘eat:PRS’. Both in (a) and (b), the preceding syllables are long and thus the phonological environment is the same. However, in (a), the element *-kíʔ-* is preceded by a pronominal prefix *oostii-* to which H1 cannot spread. In (b), on the other hand, the element *-kíʔ-* is preceded by a stem-internal long vowel *ii* to which H1 can spread.

(8.48)	<p>No spreading</p> <p>a. ò:sdí:gíʔa òòstiikíʔa</p> <p style="text-align: center;"> H₁</p> <p>oostii-kíʔ-a 1DU.EX.A-eat:PRS-IND ‘He and I are eating it (CMP).’ (DF, July 2013)</p>	<p>Spreading</p> <p>b. à:sdí:gíʔa ààstiikíʔa¹¹⁵</p> <p style="text-align: center;"> H₁</p> <p>aa-stiikíʔ-a 3SG.A-eat.LG:PRS-IND ‘He is eating it.’ (Feeling 1975: 47)</p>
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This factor may be seen as a manifestation of the domain effect:¹¹⁶

- (8.49) Domain effect
H1 does not spread across a domain boundary.

Incorporating domain effect (8.49), H1 Spreading can be finalized as follows:

- (8.50) H1 Spreading (final)
- | | | | |
|------|------|-------------------|------------------|
| STEM | [..V | C ₀ VV | C ₀ V |
| | | | --- |
| | [-H] | [-Tone] | H ₁ |

¹¹⁵ The element *-stii-* could historically be an incorporated noun or verb root (to which we can attribute the meaning ‘LG’). Such incorporation or compounding processes are synchronically not productive (Uchihara 2014).

¹¹⁶ One might speculate if this is instead due to the Paradigm Uniformity effect (Steriade 2000, Downing et al. 2005). That is, one could argue that H1 does not spread to the preceding syllable which belongs to the pronominal or reflexive affix in order to maintain the tonal configuration constant throughout the inflection. However, such an account would fail to explain the alternation as in (8.33) above, which has different tonal configurations across inflection.

(H1 spreads leftwards by one mora across syllable boundaries, if the preceding syllable has a long vowel and does not carry a marked tone, and is not preceded by another H1, *as long as it belongs to the same morphological domain*).

8.5.2.5. Exceptions

There are still some examples where H1 fails to spread to the preceding syllable, even though they do not manifest any of the blocking factors discussed in this section. (8.51) are some of such examples:

- (8.51) Exceptions
- a. à:tvvdâ:sdiha
 ààthvvtáastiha
 |
 H₁
 ‘He is listening to him.’ (Feeling 1975: 61)
- b. galo:nâ:sdiha
 galoonáastiha
 |
 H₁
 ‘He is deceiving him.’ (Feeling 1975: 101)

These forms were checked with Durbin Feeling in 2013, and he remarked that H1 Spreading *is* impossible for these cases. The reason why H1 fails to spread is still not clear to me at this point.

Secondly, there are some cases where a high tone extends for three moras, violating DOM BIN (8.25); again, these cases are not explained.

- (8.52)
- a. à:daně:dlí:yvʔa
 ààtaneétlíiyvʔa
 |
 H
 ‘He is changing.’ (Feeling 1975: 5)
- b. à:hyǎ:sdé:lu:hvsga
 ààhyvístééluluhvaska
 |
 H
 ‘He is hitting him on the nose.’ (Feeling 1975: 30)

There are some cases in Feeling (1975) where H1 spreads to the preceding short syllable, thereby apparently violating the constraint discussed in §8.5.2.1, such as (8.53):

(8.53)

a. à:hyvhgwid̥v̥:sga
 ààhyvhkwítv̥vska
 ↓
 H₁
 ‘He is bending it.’ (Feeling 1975: 29)

b. à:gv:hálû:ysga
 ààkvvhálûuyska
 ↓
 H₁
 ‘He is chopping it up.’ (Feeling 1975: 19)

However, these forms were checked with Durbin Feeling in 2013, and he judged forms without H1 Spreading to be more accurate.

8.5.3. Summary

This section examined the conditioning factors that concern H1 Spreading. Whether H1 spreads to the preceding syllable is shown to be determined by various phonological and morphological factors that block H1 from spreading to the preceding syllable: vowel length of the preceding syllable (§8.5.2.1), the tone on the preceding syllable (§8.5.2.2), the tone on the syllable before the preceding syllable (§8.5.2.3), and the morphological boundary (§8.5.2.4).

8.6. Conclusion

This chapter looked at the tonal properties of H1: H1 in Oklahoma Cherokee exhibits properties common in tonal systems in other languages, such as the OCP, floating tone, or spreading. This fact suggests that H1 is already phonologized as a tone, despite its close connection to its source segment, glottal stop. In the next chapter we will look at this connection between H1 and a glottal stop.

Chapter 9. The source of H1¹¹⁷

9.0. Introduction

A glottal stop is the source of one type of high tone, H1. This glottal stop has been given in parentheses as (*ʔ*) when it is not realized. §9.1 discusses evidence for the analysis that H1 comes from a glottal stop, and argues that although the synchronic reflexes of the glottal stop are complex, there is sufficient phonological evidence to posit the glottal stop. It is not the case that a glottal stop is always accompanied by H1, which complicates the analysis, but such cases can be accounted for by the OCP (§8.2) and by morphological factors, discussed in §9.2. That H1 comes from a glottal stop further supports my claim that H1 spreading is *leftward* (§9.3). Since in some cases positing a glottal stop, along with the tones it has induced, is admittedly abstract, I do consider alternatives. In §9.4 I give language internal and external evidence and argue that the lexical representations should include a glottal stop, as well as the tone it has induced. §9.5 concludes.

9.1. Glottal stop as the source of H1

The facts which support the claim that H1 is due to a glottal stop are the following:

- (9.1) Evidence for H1 < *ʔ*
- (i) Co-occurrence of glottal stop and H1
 - (ii) Alternation of H1 with a lowfall tone
 - (iii) Blocking of Laryngeal Alternation
 - (iv) Blocking of Vowel Deletion/*h*-Metathesis
 - (v) Attraction of H3
 - (vi) Comparative evidence

I will discuss each of these phenomena in this section (§9.1.1-§9.1.6). §9.1.7 summarizes the section, with a phonetic explanation of the development of H1 from a glottal stop, and with some

¹¹⁷ This chapter is a heavily revised version of a paper published in 2009 as High Tone in Oklahoma Cherokee in *International Journal of American Linguistics*.

speculations on the plausible historical development of both the lowfall tone and H1 from a glottal stop in Oklahoma Cherokee.

9.1.1. Co-occurrence of a glottal stop and H1

In general, a glottal stop is preceded by H1 in Oklahoma Cherokee. For instance, when pronominal prefixes are attached to stems beginning with a glottal stop, H1 is assigned to the pronominal prefix:

(9.2)

- a. gáʔluhga
 káʔluhka
 ka-ʔluhk-a (< -lʔuhk-)
 3SG.A-arrive:PRS-IND
 ‘He is arriving.’ (Feeling 1975: 102)
- b. gáʔni:síha
 káʔniisíha
 ka-ʔniisíh-a (< -nʔiisíh-)
 3SG.A-bury:PRS-IND
 ‘He is burying him.’ (Feeling 1975: 109)

Otherwise, pronominal prefixes on verbs do not carry a high tone, as in (9.3):

(9.3)

- a. gahlvsga
 kahlvska
 ka-hlvsk-a
 3SG.A-be.sleepy:PRS-IND
 ‘He is sleepy.’ (Feeling 1975: 96)
- b. ganv:galíha
 kanvkalíha
 ka-nvkalíh-a
 3SG.A-clean:PRS:IND
 ‘He is cleaning it.’ (Feeling 1975: 112)

FIGURE 9-1 is a pitch trace (a male speaker) of a verb with a stem-initial glottal stop; here, the pitch on the pronominal prefix *ká(ʔ)*- 3SG.A is higher than the next syllable, *luh* (level 2), and as high as the third syllable, *kéé* (level 3):

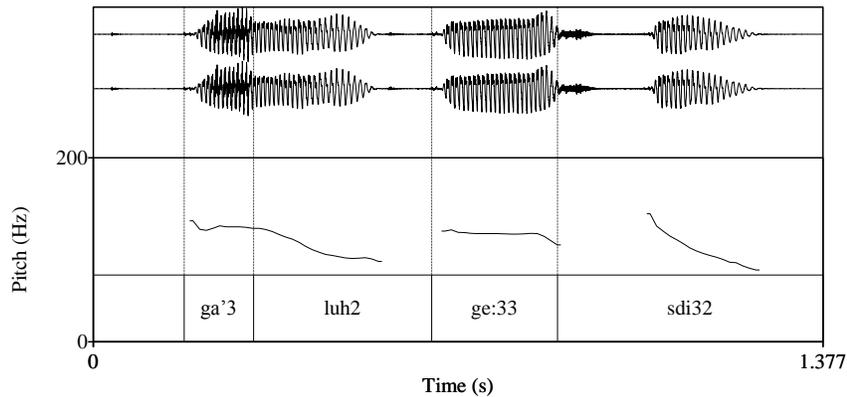


FIGURE 9-1: *káʔluhkéesti* ‘he will be arriving’ (EJ, male, 2010)

Co-occurrence of a glottal stop and H1 is not limited to stem-initial position. Thus, in (9.4), the stem-internal glottal stop is preceded by H1:

- (9.4) à:dawó:ʔa
 ààtawóóʔa
 Ø-atawoóʔ-a
 3SG.A-bathe:PRS-IND
 ‘He is bathing’ (Feeling 1975: 8)

A glottal stop is not always preceded by H1, but all such cases can be accounted for by various phonological and morphological factors. The major phonological factor is the OCP, already discussed in §8.2. The morphological conditions will be discussed in §9.2, but one such case is atonic forms. For instance, (9.5) does not have H1 before the glottal stop because it is in the atonic form (tonicity is determined by morphosyntactic categories, pre-pronominal prefixes and modal suffixes; see Appendix A at the end of this dissertation for more on tonicity).

- (9.5) hiʔluhgi
 hiʔluhki
 hi-ʔluhk-i (< -!ʔuhk-)
 2SG.A-arrive:PCT-IND
 ‘Arrive!’ (Feeling 1975: 102)

9.1.2. Alternation of H1 with lowfall tone

As was briefly mentioned in Ch.8, H1 in tonic forms alternates with a lowfall tone in atonic forms. Moreover, as was seen in Ch.7, the lowfall tone has been analyzed as coming from, at least diachronically, a glottal stop (Lindsey 1985: 135-138). Arguments for this analysis were the alternation of a glottal stop with lowfall tone, as well as comparison with North Carolina Cherokee.

A lowfall tone is mainly found in atonic forms, as in the (a) forms in (9.6) - (9.7); the corresponding tonic forms, (b), have H1 on the syllable which bears a lowfall tone in the atonic forms (a).

The relevant vowels are underlined:

	atonic (LF)	tonic (H1)
(9.6)	a. hadà:dlǒ:ga hatààtloóka h-atàà(?)tloó-k-a 2SG.A-put.on.belt-PCT-IND 'Put on a belt!' (Feeling 1975: 2)	b. à:dá:dlo:híha àà <u>á</u> tloohíha Ø-atáa(?)tloo-híh-a 3SG.A-put.on.belt-PRS-IND 'He is putting on a belt.' (ibid.)
(9.7)	a. jayò:sí:sa cayòòsiísa ca-yòò(?)s-ífs-a 2SG.B-be.hungry-PCT-IND 'Be hungry!' (Feeling 1975: 186)	b. à:giyó:siha ààkiyóósiha aki-yóo(?)s-ih-a 1SG.B-be.hungry-PRS-IND 'I am hungry.' (ibid.)

This alternation points to the underlying (or historical at least) presence of the glottal stop in the syllables with H1 in the (b) forms. FIGUREs 9-2 and 9-3 illustrate pitch traces (male speaker) of a verb stem in (9.7b), -yoo(?)s- 'be hungry'. FIGURE 9-2 is in the tonic form (present tense), with H1, while FIGURE 9-3 is in the atonic form (imperative), with a lowfall tone:

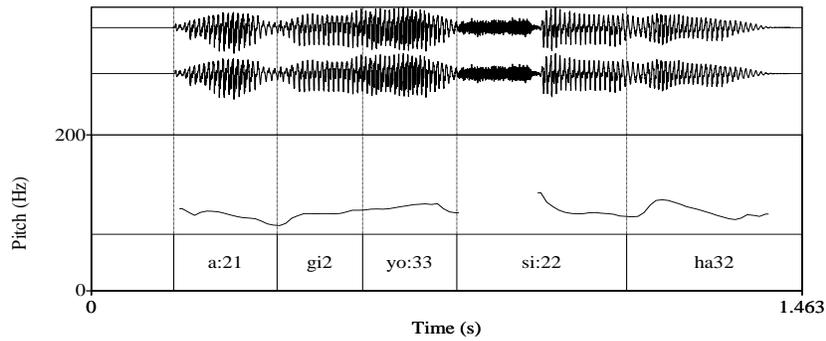


FIGURE 9-2. *ààkiyóósiha* ‘I am hungry (EJ, male, 2010)

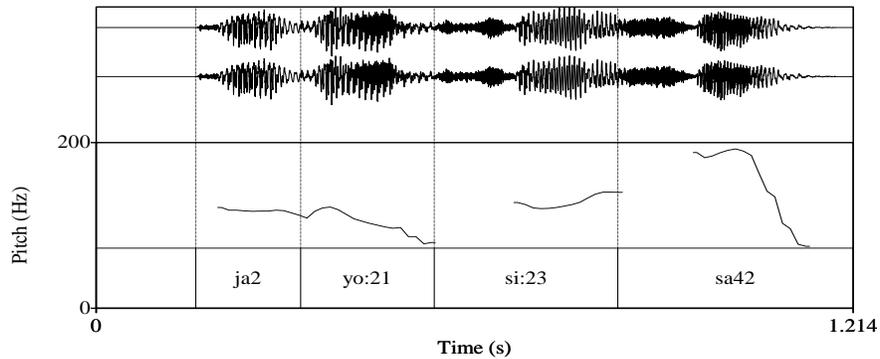


FIGURE 9-3. *cayòòsísa* ‘Be hungry!’ (EJ, male, 2010)

H1, under certain conditions, also alternates with a low tone; these conditions are explained in Ch.10 and Ch.11.¹¹⁸ The other types of high tone, H2 and H3, *never* alternate with a lowfall tone (cf. §12.1.2, §13.1.3).

9.1.3. Blocking of Laryngeal Alternation

As was first introduced in §1.7.4.1, Laryngeal Alternation, where the first *h* of the verb stem alternates with a glottal stop, is triggered by certain pronominal prefixes. Examples are given in (9.8) -

¹¹⁸ When H1 is linked to a short vowel or to the right mora of a long vowel, this H1 alternates with a low tone. For example, tonic: *hákohvstí* ‘you are burning it’ (JRS, Aug 2012) and atonic: *hakohvsta* (Feeling 1975: 17), or see (9.5). In §10.1 I will claim that the historical explanation is the relative order of the glottal stop and its adjacent consonant.

(9.9). The *h* alternates with a glottal stop when *h* is between vowels or after a consonant (9.8). The *h* is lost, leaving a lowfall tone on the preceding vowel, when *h* is pre-consonantal (9.9).

	<i>h</i> -grade	glottal grade
(9.8)	a. go:hosga koo <u>h</u> oska k-oo <u>h</u> o-sk-a 3SG.A-fall-PRS-IND 'It (round, long) is falling.' (Feeling 1975: 121)	b. goʔosga koʔoska ¹¹⁹ k-oo <u>h</u> o-sk-a 1SG.A-fall-PRS-IND 'I am falling.' (ibid.)
(9.9)	a. à:de:hlohgwáʔa ààte <u>h</u> lohkwáʔa Ø-ate <u>h</u> lohkw-áʔ-a 3SG.A-learn-PRS-IND 'He is learning it.' (Feeling 1975: 8)	b. gadè:lohgwáʔa katèèlohkwáʔa k-ate <u>h</u> lohkw-áʔ-a 1SG.A-learn-PRS-IND 'I am learning it.' (ibid.)

There are very limited exceptions to Laryngeal Alternation. One such case is when the first *h* of the stem is preceded somewhere in the stem by a glottal stop; thus in (9.10), the first *h* of the stem does not alternate with a glottal stop or result in a lowfall tone on the preceding vowel:¹²⁰

	<i>h</i> -grade	glottal grade
(9.10)	a. galí:ʔv:hníha kalííʔv <u>h</u> níha ka-liíʔv <u>h</u> níh-a 3SG.A-spank:PRS-IND 'He is spanking him.' (Feeling 1975: 100)	b. ji:lí:ʔv:hníha ciilííʔv <u>h</u> níha (*ciilííʔv̀níha) cii-liíʔv <u>h</u> níh-a 1SG>3SG.AN-spank:PRS-IND 'I am spanking him.' (ibid.)

The only other environment where Laryngeal Alternation is blocked is when the first *h* of the stem is preceded somewhere in the word by H1 (or by a lowfall or low tone when H1 alternates with these), even when H1 is not accompanied by a glottal stop (Lindsey 1987: 5, Munro 1996b: 56). In (9.11) - (9.12), the glottal grade forms preserve the *h* because the vowel in the antepenultimate syllable bears H1.

¹¹⁹ *oo* is shortened before a glottal stop due to a general constraint against a long low-toned vowel before a glottal stop, *VVʔ (§5.3.2.3).

¹²⁰ The fact that it is not the high tone itself, but the glottal stop, that is blocking Laryngeal Alternation, is clear with examples such as *hiiliʔvnhka* 'Spank him!' (Feeling 1975: 100), which does not have a high tone before the glottal stop due to its atonicity (§1.7.4.2, Appendix A), yet Laryngeal Alternation is still blocked.

- | | <i>h</i> -grade | glottal grade |
|--------|--|--|
| (9.11) | a. gawó:niha
kawóóniḥa
ka-wóoʔni-h-a
3SG.A-speak-PRS-IND
'He is speaking.' (Feeling 1975: 117) | b. jiwó:niha
ciwóóniḥa
ci-wóoʔni-h-a
1SG.A-speak-PRS-IND
'I am speaking.' (ibid.) |
| (9.12) | a. à:dađi:nv̄:diha
ààtatiínv̄tiḥa
Ø-atatiínv̄(?)t-ih-a
3SG.A-bounce-PRS-IND
'He is bouncing it.' (Feeling 1975: 1) | b. gadadı:nv̄:diha
katatiínv̄tiḥa (*katatiínv̄tiʔa)
k-atatiínv̄(?)t-ih-a
1SG>3SG.AN-bounce-PRS-IND
'I am bouncing it.' (ibid.) |

Only H1 blocks Laryngeal Alternation; other types of high tone, H2 and H3, do not block Laryngeal Alternation. In the forms below, *h* alternates with a glottal stop in the glottal grade, even though this *h* is preceded by a high tone (H2 in (9.13), H3 in (9.14)):

- | | <i>h</i> -grade | glottal grade |
|--------------|---|---|
| (9.13)
H2 | a. ù:ge:yúha
ùùkeeyúḥa
uu-keeyú-h-a
3SG.B-love-PRS-IND
'He loves her.' (Feeling 1975: 164) | b. ji:ge:yú:ʔa ¹²¹
ciikeeyúúʔa
cii-keeyú-h-a
1SG>3SG.AN-love-PRS-IND
'I love him.' (ibid.) |
| (9.14)
H3 | a. de:gáno:jahlv̄sga
teekánoocahlv̄ska
tee-ka-noocalhv̄sk-a
DIST-3SG.A-advertise:PRS-IND
'He is advertising it.' (Feeling 1975: 79) | b. de:jíno:jaʔlv̄sga
teecínoocaʔlv̄ska
tee-ci-noocalhv̄sk-a
DIST-1SG.A-advertise:PRS-IND
'I am advertising it.' (ibid.) |

If the glottal stop is the source of H1, as in the verbs in (9.11) - (9.12), but not in (9.13) - (9.14), the blocking of Laryngeal Alternation is expected. Furthermore, a high tone (H1) which alternates with a lowfall tone (§9.1.2) *always* blocks Laryngeal Alternation as will be shown in §9.1.7 with illustrative examples.

¹²¹ The vowel lengthening is not explained.

9.1.4. Blocking of Vowel Deletion/*h*-Metathesis

Vowel Deletion/*h*-Metathesis was discussed in Ch.3; Vowel Deletion is a processes whereby a *CVhT* sequence loses its vowel to become *ChT* (9.15) and a *TVhV* sequence optionally loses its first vowel to become *ThV* (9.16). *h*-Metathesis is a process where a *CVhR* sequence metathesizes to *ChVR* (9.17). The (b) forms illustrate the original positions of *h*:

	Vowel Deletion/ <i>h</i> -Metathesis		No Vowel Deletion/ <i>h</i> -Metathesis
(9.15)	a. kdíha		b. hvhda
<i>CVhT</i>	<u>k</u> htíha		<u>h</u> vhta
	k-(v)ht-íh-a		h-vhd-Ø-a
	3SG.A-use-PRS-IND		2SG.A-use-PCT-IND
	‘He is using it.’ (Feeling 1975: 142)		‘Use it!’ (ibid.)
(9.16)	a. à:kawó:sdiha ~		b. à:gíhawó:sdiha
<i>CVhV</i>	akhawóostíha		akíhawóostíha
	ak(i)-hawóo(?)st-ih-a		aki-hawóo(?)st-ih-a
	1SG.B-smother-PRS-IND		
	‘I am smothering.’ (Feeling 1996: 166)		(ibid.)
(9.17)	a. kanalu:sga		b. hihnalũ:hi
<i>CVhR</i>	<u>k</u> hanaluuska		<u>h</u> ihnaluuíhi
	ka-hnaluu-sk-a		hi-hnaluuí-h-i
	3SG.A-ascend-PRS-IND		2SG.A-ascend-PCT-IND
	‘He is ascending.’ (Feeling 1975: 138)		‘Ascend!’ (ibid.)

There are several phonological factors which block Vowel Deletion/*h*-Metathesis (§3.3), among which is that a glottal stop blocks Vowel Deletion/*h*-Metathesis (Flemming 1996: 39); thus, in (9.18), the vowel does not delete, due to the presence of the glottal stop before that vowel:

- (9.18)
- a. aktoʔvhísdi
 akhthoʔv~~h~~ísti (*akhthoʔhísti)¹²²
 a-k(a)hthoʔv-híst-i
 3SG.A-become.wise-INF-NOM
 ‘wisdom’ (Feeling 1975: 36)

¹²² H1 is not found before the glottal stop, since the word is atonic (infinitive).

- b. gáʔluhga
 káʔluhka (*káʔlhka)
 ka-1ʔu-hk-a¹²³
 3SG.A-arrive-PRS-IND
 ‘He is arriving.’ (Feeling 1975: 102)

Vowel Deletion/*h*-Metathesis is also blocked by H1 that precedes the consonant to which an *h* is expected to transfer:

(9.19)

- a. dǒ:dágwohnǎ:ʔi
 toótákwohnǎvǎʔi (*toótákwhonǎvǎʔi)¹²⁴
 (uun-a)tootakw-(ʔ)-ohnǎ-vǎʔi
 3PL.B-be.dayʔ-PFT-COMP-ASR
 ‘Monday’ (Feeling 1975: 86)
- b. gágohǎsga
 kákohǎska (*kákhvstíha, *kákoʔǎska)
 k-ák(ʔ)ohǎsk-a
 1SG.A-burn:PRS-IND
 ‘I am burning.’ (Feeling 1975: 17)

Such a high tone (H1) also always blocks Laryngeal Alternation (§9.1.3); the form in (9.19b) is in the glottal grade but the first *h* does not alternate with a glottal stop. Here again, by postulating an underlying glottal stop in forms such as in (9.19), one can account for not only the presence of H1 (§9.1.1), blocking of Laryngeal Alternation (§9.1.3), but also blocking of Vowel Deletion/*h*-Metathesis.¹²⁵

9.1.5. Attraction of H3

A glottal stop attracts the floating high tone from a pre-pronominal prefix (H3), as will be discussed in Ch.13 below. Certain pre-pronominal prefixes are lexically associated with the H3, and H3 is assigned to the second syllable of the ‘modal stem’ (= full form minus the pre-pronominal prefix) when the pre-

¹²³ A post-consonantal glottal stop metathesize with the consonant to avoid *Cʔ (§5.3.3.2). For the justification on the relative order of the glottal stop and its adjacent consonant, see §10.1.

¹²⁴ Flemming (1996: 36) analyzes the failure to undergo *h*-Metathesis in this example is due to the complex internal structure of *kw*. For an argument against such an analysis, see §3.1.8.

¹²⁵ In §3.2.3, I argued that it is not the high tone itself that is blocking Vowel Deletion/*h*-Metathesis, as previous studies had claimed (Cook 1979: 7, Flemming 1996: 38), since H2 (Ch.12) or H3 (Ch.13) do not block Vowel Deletion/*h*-Metathesis.

pronominal prefix has a short vowel or no vowel (§13.2.1). In (9.20), *yi-*, the irrealis pre-pronominal prefix, assigns H3 to the second syllable of the modal stem (after the hyphen), *nii* (H3 is circled and linked to the vowel with a dotted line):

- (9.20) *yiginí:gowhtí:ha*
 yi-kinífkowhthííha
 
 ‘He is not seeing you and me.’ (EJ, July 2011)

A glottal stop occurring in the *first* syllable of the ‘modal stem’ attracts this H3, so that H3 in this case does not occur on the second syllable (discussed in detail in §13.2.3):

- (9.21)
 a. *wijíʔluhgó:ʔi*
 wi-ciʔluhkóóʔi (**wi-ciʔlúhkóóʔi*)
 
 wi-ci-ʔlu-hk-óóʔi (< -lʔu-)
 TRNSL-1SG.A-arrive-PRS-HAB
 ‘I arrive habitually there.’ (Pulte & Feeling 1975: 246)
- b. *yisgíʔniiyiíha*
 yi-skiʔniiyiíha
 
 yi-ski-ʔniiy-iíh-a (< -nʔiiy-)
 IRR-2SG>1SG-catch-PRS-IND
 ‘You are not catching me.’ (DF, July 2011)

H3 is displaced to the preceding (first) syllable by a couple of other factors (see §12.2), but the only systematic “exceptional” ones are when a verb has H1 in the first syllable of the ‘modal’ stem in the corresponding tonic forms (i.e. forms without a pre-pronominal prefix) as in the (b) forms below. Note that (9.23) has the same verb stem as (9.21b), which has a surface glottal stop (the glottal stop is deleted after a long vowel, due to a general phonotactics constraint against *VVʔ]σ (§5.3.2.3)).

- | | With a PPP (atonic) | Without a PPP (tonic) |
|--------|--|--|
| (9.22) | a. yhá:su:lvsgé
y-háásuulvské (*y-haasúulvské)
H ₃
y-h-aa(?)suulvsk-éʔi
IRR-2SG.A-put.on.pants:IMPF-EVID
‘You were not putting on pants.’
(EJ, July 2011) | b. há:su:lvsgé
háásuulvské
H ₁
h-áa(?)suulvsk-éʔi
2SG.A-put.on.pants:IMPF-EVID
‘You were putting on pants.’
(ibid.) |
| (9.23) | a. yjí:ni:yí:ha
yi-cííniiyíha (*yi-jiinííyíha)
H ₃
yi-cii-(?)niiy-íh-a (< -nʔiiy-)
IRR-1SG>3SG.AN-catch-PRS-IND
‘I am not catching him.’ (EJ, July 2011) | b. jí:ni:yí:ha
cííniiyíha
H ₁
cii-(?)niiy-íh-a (< -nʔi:y-)
1SG>3SG.AN-catch-PRS-IND
‘I am catching him.’ (Feeling 1975: 109) |

The high tone in the forms with a PPP in (a) cannot be H1 from a glottal stop, since these are atonic forms. Thus, the high tone in the (a) forms in (9.22) - (9.23) is H3 associated with a pre-pronominal prefix that is displaced by an underlying glottal stop, while the high tone in the (b) forms is H1.

Such a syllable which attracts H3 always blocks Laryngeal Alternation, so that (9.23) is in the glottal grade, yet the *h* does not alternate with a glottal stop.

9.1.6. Comparative evidence

Finally, comparative evidence also supports the claim that H1 in Oklahoma Cherokee is from a glottal stop. In Oklahoma Cherokee, a glottal stop has induced H1 and the glottal stop itself is deleted in many cases (see Ch.10 for more on the conditioning factors which determine whether or not the glottal stop is retained). In North Carolina Cherokee, on the other hand, a glottal stop remains, both before a consonant (9.24b) and after a consonant (9.25b).

	OK		NC
(9.24)	a. $\dot{u}:wa:ws\acute{v}:ga$		b. $ga:hwsv:\?ga$
$\?C$	$\dot{u}\dot{u}waaws\acute{v}ka$		$kaaws\acute{v}\?ka$
	$uwa:-ws\acute{v}(\?)k-a$		$ka:-ws\acute{v}\?k-a$
	3SG.B-smell:PRS-IND		3SG.A-smell:PRS-IND
	‘He smells it.’ (Feeling 1975: 182)		‘He smells it.’ (Cook 1979: 45)
(9.25)	a. $g\acute{a}gohvsd\acute{f}ha$		b. $-ag\?ohvsd-$
$C\?$	$k\acute{a}kohvst\acute{f}ha$		$-ak\?ohvst-$
	$k-\acute{a}k(\?)ohvst-\acute{f}h-a$		
	1SG.A-burn-PRS-IND		burn
	‘I am burning it.’ (Feeling 1975: 17)		(King 1975: 174)

9.1.7. Summary

Based on the evidence presented above, I have argued that H1 in Oklahoma Cherokee is likely to be from a glottal stop. Tentatively, I claim here that H1 is a lexical tone that still maintains a strong association with its source segment, i.e. glottal stop. In other words, H1 is no longer synchronically derived from a glottal stop, but glottal stop has not been completely lost. We could call such a tone *incipient* tone as opposed to a tone which has lost all connection to its source segment and where the source segment is never realized synchronically (cf. Svantesson & House 2006, Silva 2006). Reflecting such an analysis, *both* tones and a glottal stop are represented in the segmentation line, assuming that both are in the lexical representations.

The various phenomena which can be accounted for by postulation of a glottal stop are not idiosyncratic exceptions; rather, they manifest convergence. For instance, a high tone which alternates with a lowfall tone (i.e. H1) always blocks Laryngeal Alternation, and attracts H3 when it is in the stem initial syllable, as opposed to H2 (Ch.12) or H3 (Ch.13), which are realized at the same pitch level (level [3]) but show none of these properties.

The following examples illustrate this convergence of phenomena. H1 in the verb stem in (9.26) blocks Laryngeal Alternation, and thus the first *h* (underlined) in the verb stem does not alternate with a glottal stop in the glottal grade (b):

- | | | | |
|--------|--|----|--|
| | <i>h</i> -grade | | glottal grade |
| (9.26) | a. à:dá:dlo:híha
ààtáátloohíha
Ø-ata':(?)tloo-híh-a
3SG.A-MID-strap-PRS-IND
'He is putting on a belt.' (Feeling 1975: 2) | b. | gadá:dlo:híha
katáátloohíha (*katáátlooʔíha)
k-ata':(?)tloo-híh-a
1SG.A- MID-strap-PRS-IND
'I am putting on a belt.' (ibid.) |

H1 of the verb stem in (9.26) alternates with a lowfall tone in the atonic form (b):

- | | | | |
|--------|---|----|--|
| | tonic (H1) | | atonic (LF) |
| (9.27) | a. à:dá:dlo:híha
ààtáátloohíha
Ø-atáa(?)tloo-híh-a
3SG.A-put.on.belt-PRS-IND
'He is putting on a belt.' (Feeling 1975: 2) | b. | hadà:dlõ:ga
hatààtloóka
h-atàà(?)tloó-k-a
2SG.A-put.on.belt-PCT-IND
'Put on a belt!' (ibid.) |

(9.28) is another verb stem which illustrates the convergence of phenomena. H1 in the verb in

(9.28) alternates with a lowfall tone (b):

- | | | | |
|--------|---|----|---|
| | Tonic (H1) | | Atonic (LF) |
| (9.28) | a. há:su:lvsgé
háásuulvskéʔi
h-áa(?)suul-vsk-éʔi
2SG.A-put.on.pants-IMPF-EVID
'You were putting on pants.'
(EJ, July 2011) | b. | hà:su:lǎ:ga
hààsuulǎvǎka
h-àà(?)suul-ǎvǎ(?)k-a (<*-vʔk-)
2SG.A-put.on.pants-PCT-IND
'Put on pants!'
(Feeling 1975: 55) |

The syllable with H1 in (9.28a) attracts H3, as shown in (9.29):

- (9.29) yhá:su:lvsgé
y-háásuulvské (*yhaasúulvské)
- Ⓜ
- y-h-aa(?)suulvsk-é(ʔi)
IRR-2SG.A-put.on.pants:IMPF-EVID
'You were not putting on pants.' (EJ, July 2011)

Development of a high tone due to a glottal stop is phonetically natural; crosslinguistically, a glottal stop raises the tone of a preceding vowel (Hombert et al. 1979: 49-51), when both the thyroarytenoid and the cricothyroid muscles are contracted at the same time, which makes the adjacent

vowel tense (Kingston 2011: 2313). A raising effect of a (historical) glottal stop has been reported in various languages all over the world, such as Vietnamese, Burmese, and some Athabaskan languages, among others (Hombert et al. 1979: 49, Krauss 2005).

However, recall that a glottal stop has also induced lowfall tone in Oklahoma Cherokee (Ch.7). In fact, the lowering effect itself due to a glottal stop is also phonetically natural and is attested in some languages, such as some Northern Iroquoian languages (Michelson 1988) and some Athabaskan languages (Krauss 2005). Hombert et al. (1979: 51) suggest that the lowering effect may be attributed not to the glottal stop per se, but to creaky voice, or the laryngeal constriction on vowels induced by a glottal stop, while Kingston states that the vowel before a glottal stop would have a low F₀ if the glottal constriction is achieved by only contracting the thyroarytenoid muscle (and not the cricothyroid muscle), which makes the adjacent vowel creaky (Kingston 2007: 425, Kingston 2011: 2313).

Thus, what is truly exceptional about the tonal effect of a glottal stop in Oklahoma Cherokee is the fact that a glottal stop has induced *both* a higher tone and a lower tone. Athabaskan language family is well-known for its complex development of a historical glottal stop; some of its daughter languages developed a high tone from a historical glottal stop, while others a lower tone, and in some cases even a closely related dialects have developed opposite tones (Krauss 2005: 70; Kingston 2011: 2313). However, none of the Athabaskan languages have been reported to have developed both the higher and lower tones from a historical glottal stop. I am aware of only one other language which has developed both the higher and lower tones from a glottal stop: Upriver Halkomelem Salish (Brown 2004). The details of the development of these tones in this language are not much discussed, as far as I know.

Here, I speculate that the glottal stop first developed a high tone in pre-Cherokee. This hypothesis is supported by the fact that North Carolina Cherokee lacks lowfall tone and still maintains the glottal stop where Oklahoma Cherokee has a lowfall tone¹²⁶ (Ch.7; Lindsey 1985: 137), while it appears to have a high tone before a glottal stop. Such a hypothesis is also supported by the fact that lowfall tone does not

¹²⁶ But also see Huff's (1977: 5) description of North Carolina Cherokee that a glottal stop is often realized as a rapid fall in pitch on the preceding vowel.

manifest tonal properties (such as the OCP, displacement or spreading discussed in Ch.8) as H1 does, which may point to its newer emergence. After the development of H1 from a glottal stop, a pre-consonantal glottal stop which did not induce a higher pitch on the preceding vowel, either due to the OCP (§8.2) or various morphological factors (§9.2) was articulated with less tension (without the constriction in the cricothyroid muscle) in Oklahoma Cherokee, which led to a lowfall tone and the original glottal stop itself has been lost.¹²⁷

9.2. Cases where a glottal stop failed to induce H1

A glottal stop has induced H1 on the preceding vowel as we have seen above. However, in some cases we observe that a glottal stop does not accompany H1, as was briefly mentioned in §9.1.1. Such cases are accounted for by various phonological and morphological factors. The major phonological factor, the OCP, was already discussed in §8.2. This section looks at the morphological factors. A glottal stop does not accompany H1 on the preceding vowel when the glottal stop results from Laryngeal Alternation (§9.2.1), and in some cases when a glottal stop occurs in atonic forms and in nouns and adjectives (§9.2.2).

9.2.1. Glottal grade of Laryngeal Alternation

Underlying glottal stop has induced H1 on the preceding vowel in the tonic forms of verbs if it would not violate the OCP. However, if a glottal stop results from Laryngeal Alternation (§1.7.4.1), there is no H1 on the preceding vowel even in tonic forms. When the *h*-grade form has a post-consonantal *h* as in (9.30a) or an *h* flanked by vowels (9.31a), the glottal stop in the corresponding glottal grade (b) does

¹²⁷ Crosslinguistically, there are different types of “glottal stops” (Ladefoged & Maddieson 1996: 74-77, Kavitskaya 2001: 84ff.); a glottal stop in some languages behave more like a stop, while in other languages it behaves as an approximant (Kavitskaya 2001: 84). There have even been reported some languages which have two types of “glottal stops”, such as Gimi (Ladefoged & Maddieson 1996: 76). It could have been the case that pre-Cherokee had two phonetic realizations of a glottal stop (one more like a stop, which has induced H1, and the other more like an approximant, which has induced the lowfall tone). However, it is unlikely that Cherokee had two types of contrasting phonemic “glottal stops” in its consonantal inventory, since a glottal stop in the same morpheme has induced two opposite tones in Oklahoma Cherokee, depending on the phonological and morphological conditions.

not have any tonal effect. When the *h*-grade form has a pre-consonantal *h* (9.32a), the glottal grade form (b) has a lowfall tone:

	<i>h</i> -grade	glottal grade
(9.30)	a. à:kũ:gíʔa	b. jiʔgũ:gíʔa
<i>Ch</i>	ààk <u>h</u> uúkiʔa	ciʔkuúkiʔa (*cíʔkuúkiʔa)
	a-khuuk-íʔ-a	ci-khuuk-íʔ-a
	3SG.A-dip-PRS-IND	1SG.A-dip-PRS-IND
	‘He is dipping liquid.’ (Feeling 1975:)	‘I am dipping liquid.’ (ibid.)
(9.31)	a. à:de:loho:sga	b. gade:loʔo:sga
<i>VhV</i>	ààteelo <u>h</u> ooska	kateeloʔooska
	Ø-ateelohoo-sk-a	k-ateelohoo-sk-a
	3SG.A-find.out-PRS-IND	1SG.A-find.out-PRS-IND
	‘He is finding it out.’ (ibid.)	‘I am finding it out.’ (Feeling 1975: 9)
(9.32)	a. hvhda	b. g̀v̀:df̀ha
<i>hC</i>	hv <u>h</u> ta	k̀v̀v̀tíha
	h-vht-a	k-vhtíh-a
	2SG.A-use:PCT-IND	1SG.A-use:PRS-IND
	‘Use it!’ (Feeling 1975: 143)	‘I am using it.’ (ibid.)

9.2.2. Tonicity and lexical category

Whether or not a glottal stop has induced H1 depends also on tonicity and the lexical category. In the case of verbs, a glottal stop has induced H1 in tonic forms in all cases, while it did not in atonic forms, such as imperative or infinitive (§9.2.2.2). In the case of other parts of speech (§9.2.2.3), whether or not a glottal stop has induced H1 is less predictable.

9.2.2.1. Tonicity of verbs

As we have seen, a glottal stop has induced H1 on the preceding vowel in tonic forms of verbs in all cases (i.e. main verbs in indicative sentences, verbs with assertive modal suffix, and verbs with certain pre-pronominal prefixes; cf. §1.7.4.2, Appendix A), unless it is preceded by another H1 (§8.2) or unless the glottal stop results from Laryngeal Alternation (§9.2.1). (9.33) shows examples of tonic forms of verbs in which a glottal stop has regularly induced H1:

(9.33)

- a. à:dv:nv:ʔisdíha
ààtvvnvʔistíha
Ø-atvvnvʔist-íh-a
3SG.A-prepare-PRS-IND
'He is preparing it.' (Feeling 1975: 14)
- b. gáʔni:yíha
káʔniiyíha
ka-nʔiiy-íh-a
3SG.A-catch-PRS-IND
'He is catching him.' (Feeling 1975: 109)
- c. gadv:ne:líha¹²⁸
katvʔneelíha
k-atvʔ(?)neel-íh-a
1SG.A-act.silly-PRS-IND
'I am acting silly.' (Feeling 1975: 14)

The only exceptions to this generalization in Feeling (1975) are the verbs in (9.34); they are in tonic forms, but somehow the glottal stop failed to induce H1 on the preceding vowel:¹²⁹

- (9.34) Exceptions
- a. nigaweʔa¹³⁰
nikaweʔa
ni-ka-we-ʔ-a
PART-3SG.A-say-PRS-IND
'He is saying it.' (Feeling 1975: 147)
- b. gò:séha
kòòséha
k-òò(?)s-éh-a
3SG.A-say-PRS-IND
'He is saying to him.' (Feeling 1975: 123)

¹²⁸ The presence of an underlying glottal stop is justified by the fact that it blocks Laryngeal Alternation (§8.1.3; *h* does not alternate with a glottal stop)

¹²⁹ Feeling (1975) has two other forms where H1 is not found in the tonic forms where expected: *dù:do:ʔa* 'he is called' (Feeling 1975: 86) and *gawõ:híli:yvʔa* 'he is replying' (Feeling 1975: 117). However, these forms were checked with Durbin Feeling in 2013 and he has H1 before a glottal stop in these forms.

¹³⁰ Some partitive pre-pronominal prefix requires the verb to be in the tonic form, while others require it to be in the atonic form, especially when partitive is lexically required by the verb base (cf. Appendix A). The absence of H1 before the glottal stop in this case may be because partitive requires the atonic form for this stem.

When a verb is in the atonic form (i.e., imperative, infinitive agentive nominalization, with some pre-pronominal prefixes), a glottal stop did not induce H1 on the preceding vowel. Instead, the vowel carries a low tone if the glottal stop is between vowels, as in (9.35) and (9.38), or (underlyingly) post-consonantal as in (9.36) or (9.39). The vowel preceding the glottal stop carries a lowfall tone if the glottal stop is (underlyingly) pre-consonantal, as in (9.37) or (9.40). Compare the imperative (9.35a) - (9.37a) and infinitive forms (9.38a) - (9.40a) with their corresponding tonic forms (b):

	IMP (Atonic)	Tonic
(9.35) V_V	a. hadv:nvʔisda hadvvnvʔista h-advvnvʔist-Ø-a 2SG.A-prepare-PCT-IND 'Prepare!' (Feeling 1975: 123)	b. à:dv:nv:ʔisdíha ààtvvnvʔistíha Ø-atvvnvʔist-íh-a 3SG.A-prepare-PRS-IND 'He is preparing it.' (ibid.)
(9.36) C_	a. hiʔní:ya hiʔnífya hi-nʔíy-Ø-a 2SG.A-catch-PCT-IND 'Catch it!' (Feeling 1975: 109)	b. gáʔni:yíha káʔniiyíha ka-nʔiy-íh-a 3SG.A-catch-PRS-IND 'He is catching him.' (ibid.)
(9.37) _C	a. hadv:ně:la hatv̀neéla h-atv̀v(ʔ)neél-Ø-a 2SG.A-act.silly-PCT-IND 'Act silly!' (Feeling 1975: 14)	b. à:dv:ne:líha ààtv̀vneelíha Ø-atv̀v(ʔ)neel-íh-a 3SG.A-act.silly-PRS-IND 'He is acting silly.' (ibid.)
(9.38) V_V	a. u:dv:nvʔisdóhdi uutvvnvʔistóhti uu-(a)tvvnvʔist-óht-i 3SG.B-prepare-INF-NOM 'for him to prepare' (Feeling 1975: 123)	b. à:dv:nv:ʔisdíha ààtvvnvʔistíha Ø-atvvnvʔist-íh-a 3SG.A-prepare-PRS-IND 'He is preparing it.' (ibid.)
(9.39) C_	a. u:ní:yhdi uunífyhti uu-n(ʔ)íy-(v)ht-i 3SG.B-catch-INF-NOM 'for him to catch' (Feeling 1975: 109)	b. gáʔni:yíha káʔniiyíha ka-nʔiy-íh-a 3SG.A-catch-PRS-IND 'He is catching him.' (ibid.)

- b. joʔi
coʔi
'three' (Feeling 1975: 135)
- c. goʔi
koʔi
'grease, oil' (Feeling 1975: 122)

A glottal stop between vowels is sometimes accompanied by a high tone on the preceding vowel, as in (9.43):

- (9.43) VʔV H
- a. wané:ʔi
wanééʔi
'hickory tree' (Feeling 1975: 188)
 - b. sóʔi
sóʔi
'another' (Feeling 1975: 154)
 - c. kanè:sáʔi
khanèèsáʔi
'box' (Feeling 1975: 140)

Among the forms in (9.43), Lindsey (1985: 128) states that the form in (b) has a superhigh accent, rather than a high tone. The form in (c) may be a deverbal noun.

When a glottal stop is before a consonant, which I argue to derive from a historical *Cʔ sequence (§10.1), the glottal stop is always accompanied by a high tone:

- (9.44) *VCʔ, H
- a. áʔni
áʔni
'strawberry' (Feeling 1975: 45)
 - b. gáʔni
káʔni
'bullet' (Feeling 1975: 108)
 - c. táʔli
tháʔli
'two' (Feeling 1975: 156)

- d. u:wáʔni
uuwáʔni
'wool' (Feeling 1975: 182)

For root noun/adjective/particles, Feeling (1975) does not have any example of a surface glottal stop followed by a consonant after a low-toned vowel ($VʔC$).

When a long high tone is found on a noun, its historical source is most likely a long vowel followed by a $*Cʔ$ sequence ($*VVCʔ$). A glottal stop is deleted due to a general constraint against a coda glottal stop after a long vowel, $*VVʔ]σ$ (§5.3.2.3):

(9.45)

- a. á:ma (< $*a:mʔaʔ$)
ááma
'salt' (Feeling 1975: 43)
- b. gǎ:na
kǎǎna
'turkey' (Feeling 1975: 127)
- c. wá:le:la
wááleela
'hummingbird' (Feeling 1975: 187)
- d. dawó:li
tawóóli
'mushroom' (Feeling 1975: 77)

When a noun has a lowfall tone or a high-low tone, I assume that these forms had a historical pre-consonant glottal stop $*ʔC$, by analogy to the cases in verbs. In such cases, nouns/adjectives/particles generally have a lowfall tone:

(9.46)

- a. gù:gu (< $*gu(u)ʔgu$?)
kùùku
'bottle' (Feeling 1975: 124)
- b. nǎ:ya
nǎǎya
'stone' (Feeling 1975: 149)

c. galò:gwe
kalòòkwe
'gun'(Feeling 1975: 101)

d. hlawò:tu
hlawòòthu
'mud'(Feeling 1975: 130)

In a very few cases, one finds root nouns with high-low tone:

(9.47)

a. kiyû:ga
khiyúuka
'chipmunk'(Feeling 1975: 144)

b. nv:wô:ti
nvvwóothi
'medicine'(Feeling 1975: 149)

9.2.3. Summary

In this section, we have seen that whether or not a glottal stop has induced H1 is the result of complex factors; a glottal stop resulting from Laryngeal Alternation does not accompany H1 (§9.2.1), and lexical categories also play a role (§9.2.2).

The tones from a glottal stop are in most of the cases predictable from such factors, especially in the case of verbs (§9.2.2.1). The unpredictability (in some cases) of the tones from a glottal stop in other parts of speech (§9.2.2.3) indicates that the tone has been phonologized.

9.3. A consequence of the analysis: Direction of tone spreading

As we saw briefly in §8.1, H1 in many cases spreads leftwards to the preceding mora, whether that mora is within the same syllable (9.48a) or in the preceding syllable (9.48b).

(9.48)

a. à:dawó:ʔa
àà.ta.wóó.ʔa
 ↓
 H₁
'He is bathing' (Feeling 1975: 8)

- b. à:tawě:dóʔvsga
 àà.tha.weé.tó.ʔv.ska
 ↓
 H₁
 ‘He is kissing her.’ (Feeling 1975: 58)

The fact that H1 is from a glottal stop further supports my claim that H1 spreading is leftward. It has been claimed that Cherokee tones spread from left to right (Lindsey 1985: 130-134, Wright 1996: 13-15). But this cannot always be true with H1; as has been shown immediately above, a glottal stop has induced H1 on the preceding vowel. When this H1 occurs on more than one mora, it must be assumed that the vowel immediately preceding the glottal stop is associated with H1, and then this H1 spreads right to left:

- (9.49)
- | | |
|---------------------------|---|
| 1: Lexical representation | 'lick:PRS'
-kanaatíʔ-

H ₁ |
| 2: H1 spreading | -kanaáííʔ-

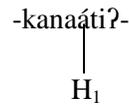
H ₁ |

In (1) in (9.49), H1 is lexically associated with the vowel immediately preceding a glottal stop, *i*. Next in (2) H1 on *i* spreads leftwards to the vowel *a*. It is somewhat unnatural, if not impossible, to assume that the second vowel from the glottal stop (the vowel *a* in (9.50)) is lexically associated with H1 and then this H1 spreads rightwards to the vowel *i*, if a glottal stop is the source of H1, as argued above:¹³¹

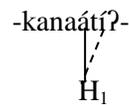
¹³¹ One of the anonymous reviewers of IJAL suggested that if the *i* is some sort of epenthetic vowel, not counted in regards to step 2, rightward spread could be allowed (cf. discussions on Northern Iroquoian languages in Michelson (1988: chapters 5 and 6)). However, there is no rule that would insert an epenthetic vowel between a consonant and a glottal stop in this environment; in fact, in the perfective stem, the glottal stop immediately follows the final consonant of the stem (-kanaat-(ʔ)- (>-kanaáát-)), without any epenthetic vowel.

(9.50) ‘lick:PRS’

1: Lexical representation



2: H1 spreading



Based on this evidence I claim that H1 spreads from *right to left*, as opposed to claims in previous studies.¹³² This is in line with the acoustic facts and speaker intuition. Durbin Feeling states that the left portion of H1 extending for two moras across syllable boundaries is optional, especially in a careful speech (Durbin Feeling p.c., July 2011, July 2013). The left portion of H1 is sometimes hardly audible when H1 spreads across syllable boundaries, in contrast to the right portion of H1, which is always clear.

Whether or not H1 spreads to the preceding syllable depends on complex phonological and morphological factors discussed in detail in §8.5.

9.4. Synchronic status of the glottal stop

The discussion in this chapter so far has shown sufficient evidence to argue that H1 is due historically to a glottal stop. A natural question is the synchronic status of the glottal stop: is glottal stop still in the lexical representation, along with the tones it has induced, even in the cases where the glottal stop is not realized? In this section, I will first argue that an analysis which does not postulate an underlying glottal stop (at the same time as positing H1) would fail to capture the fact that the cluster of rules targets only morphemes that have a high tone that we have been calling H1, and not H2 or H3 (§9.4.1). Next, §9.4.2 provides some external evidence. §9.4.3 summarizes this section.

¹³² Hyman & Schuh (1974) claims that rightward spreading of tones is phonetically more natural, and tones spreading leftward should have an external explanation (1974: 103). In the case of Cherokee, it could be assumed that the glottal stop prevents the tone to spread to the right.

9.4.1. Against a rule feature approach

One alternative analysis to the analysis presented in this chapter is to mark morphemes with H1 with rule features and treat them as ‘exceptional’ to those rules (‘rule feature’ approach of Kiparsky 1968, Hyman 1970, etc.). The relevant rule features would be [+ LA blocking], [+ H3 attraction], [+ VD/h-M blocking], and [+ ~LF] (alternates with a lowfall tone), as in (a). Compare this with the approach in (b), adopted in this study; here, the tones are assumed to be a part of the lexical representation, as well as the glottal stop.

- | | | | |
|--------|--|--|--|
| | Rule feature approach | | ‘incipient tone’ approach |
| (9.51) | a. á:su:líʔa
áásuulíʔa
Ø-áásuul-íʔ-a | | b. á:su:líʔa
áásuulíʔa
Ø-áa(?)suul-íʔ-a |
| | | | |
| | [+ LA blocking] [+ H3 attraction] [+ ~LF]
3SG.A-pu.on.pants-PRS-IND
‘He is putting on pants’ | | |
| (9.52) | a. gágohvsdíha
kákohvstíha
k-ákohvst-íh-a | | b. gágohvsdíha
kákohvstíha
k-ák(?)ohvst-íh-a |
| | | | |
| | [+LA blocking] [+ H3 attraction] [+ VD blocking]
1SG.A-burn-PRS-IND
‘I am burning it.’ | | |

As opposed to the analysis in (b), which includes both a lexical representation of the tone as well as a glottal stop, a rule feature analysis in (a) would result in a failure to explain the convergence of the four phonological and morphophonological behaviors that H1 shows, as opposed to H2 or H3, which we saw in §9.1.7. A rule feature approach would need to assume that these are just idiosyncratic, arbitrary processes that refer to specific morphemes with a high tone (H1). It is not the case that some high tones block Laryngeal Alternation, while others alternate with lowfall tone, and yet others attracts H3; all of the high tones that alternate with a lowfall tone block Laryngeal Alternation and attract H3 (if it is in the first

syllable of the ‘modal’ stem), and those that do not block Laryngeal Alternation never alternate with a lowfall tone, neither do they attract H3.

This is a case where underlying contrast is relevant for the statement of a number of separate rules or constraints, and under such a situation, according to some, a somewhat abstract analysis is preferable to a morpheme alternant analysis (Hyman 1970, Kiparsky 1971, Kenstowicz & Kisseberth 1979: Ch. 6). Finally, a rule feature analysis would predict that at least some of the high tones historically derived from a glottal stop should lose some of the exceptional behaviors and be reanalyzed, but this has not happened (cf. Kiparsky’s (1968) “stability”).

My analysis, which postulates an underlying glottal stop, along with the tones which it has induced, is not completely abstract, since a glottal stop *does* surface in some cases. A glottal stop always surfaces intervocalically (9.53a), and post-consonantly in certain cases (b) (see Ch.10 for a more detail):

(9.53)

- a. à:yóʔi:sdĩ:sgóʔi
 ààyóʔiistiískóʔi
 a-yóʔiist-iísk-óʔi
 3SG.A-break.up-IMPF-HAB
 ‘He habitually breaks it up.’ (Feeling 1975: 65)
- b. gáʔluhga
 káʔluhka
 ka-1ʔu-hk-a
 3SG.A-arrive-PRS-IND
 ‘He is arriving.’ (Feeling 1975: 102)

This surface glottal stop *always* accompanies H1 when complex phonological (i.e. the OCP; §8.2) and morphological conditions (§9.2) are met. The crucial point here is the fact that the high tone which always occurs before a surface glottal stop shows exactly the same phonological and morphophonological behaviors as these “exceptional” high tones (H1), as opposed to other types of high tones (H2, H3): they both block Laryngeal Alternation and Vowel Deletion/*h*-Metathesis and attract H3. Analyzing high tone accompanying a surface glottal stop differently from that which never surfaces with a glottal stop would

fail to capture this fact (cf. Kenstowicz & Kisseberth 1979: 216ff. on similar examples from Lithuanian nasals and Kinyarwanda *h*).

9.4.2. External evidence

Moreover, the surface realization of the glottal stop is also subject to intra- and inter-speaker free variation (see also Scancarelli 1987: 27-28), in which case even the most radical “concrete” approaches such as Natural Generative Phonology (Hooper 1976: 111-116) would permit postulating an underlying segment.

An underlying post-consonantal glottal stop sometimes does surface, at least for some speakers ($VCʔ \rightarrow [ṾC] \sim [ṾʔC]$). Feeling (1975) is consistent, at least for verbs, in not writing a glottal stop where it is predicted to be in my analysis, but another speaker, JRS, consistently pronounces a glottal stop:

- | | | |
|--------|---|--|
| | JRS (Aug, 2012) | Feeling (1975) |
| (9.54) | a. wijáʔdǎv
wicáʔtǎv
wi-ca-t-ʔ-vǎv(ʔi)
TRNSL-2SG.B-set.LG-PFT-ASR
‘You have set it (LG) there (on the ground).’ | b. ù:dǎv:ʔi
ùùtvǎvʔi
uu-t-(ʔ)-vǎvʔi
3SG.B-set.LG-PFT-ASR
‘He has set it (LG)’ (Feeling 1975: 10) |
| (9.55) | a. jáʔgǎv:ʔi
cáʔkvǎvʔi
ca-k-ʔ-vǎvʔi
2SG.B-eat-PFT-ASR
‘You ate it.’ | b. ù:gǎv:ʔi
ùùkvǎvʔi
uu-k-(ʔ)-vǎvʔi
3SG.B-eat-PFT-ASR
‘He ate it.’ (Feeling 1975: 16) |
| (9.56) | wù:hǎvʔdǎv
wùùhǎvʔtǎv
w-uu-hlat-ʔ-vǎvʔi
TRNSL-3SG.B-put.up.LG-PFT-ASR
‘He put it (long) on a raised surface.’ | |
| (8.57) | a. tíʔdli
thíʔtli
t-hi-tl-ʔ-i
CISL-2SG.A-pour-PFT-MOT
‘You will pour it.’ | b. ù:dǎv:ʔi
ùùtlvǎvʔi
uu-tl-(ʔ)-vǎvʔi
3SG.B-pour-PFT-ASR
‘He poured it.’ (Feeling 1975: 12) |

FIGURE 9-4 shows the spectrogram and the pitch trace (a male speaker) of (9.54a). Here, the creakiness is clearly visible on the vowel before the glottal stop:

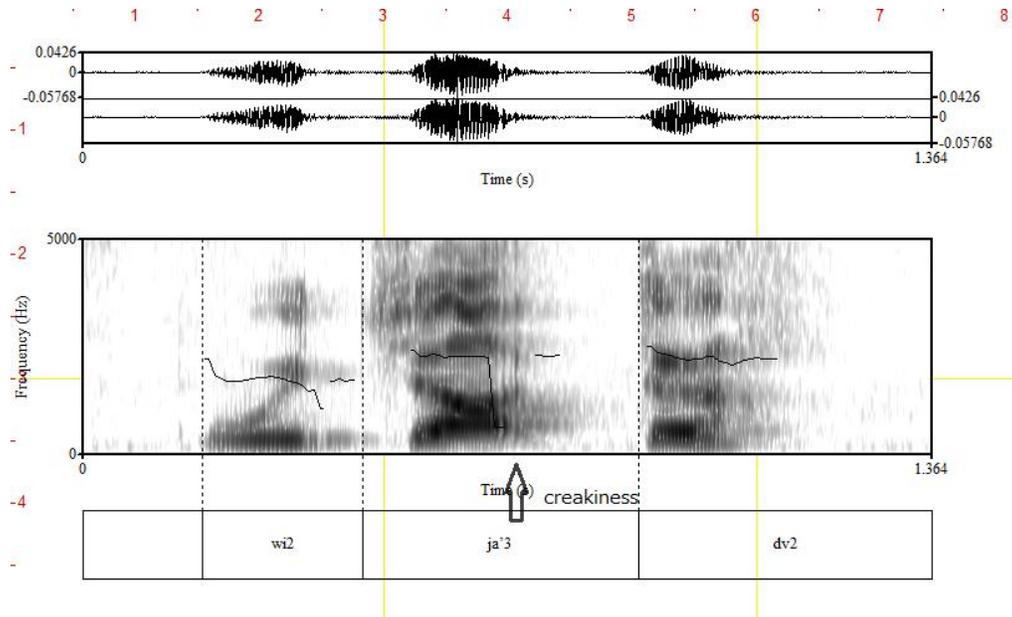


FIGURE 9-4. *wicá?tv* ‘you have put it (long) there’ (JRS, male, 2012)

The surface presence of a pre-plosive glottal stop is subject even to an intra-speaker variation; Durbin Feeling himself writes glottal stops in some cases in his 2003 dictionary, where he does not have one in his 1975 dictionary:

- | | | |
|--------|---|---|
| | Feeling et al. (2003) | Feeling (1975) |
| (9.58) | a. ò:gv:sgalá?dǎ:ʔi
òðkvskalá?tvǎ:ʔi
ook-vvskalat-ʔ-vǎ:ʔi
1PL.EX.B-hide.LG-PFT-ASR
‘They and I hid it.’ (p.148) | b. ù:wa:sgaláǎ:ʔi
ùùwaaskalátǎ:ʔi
uw-vvskalat-(ʔ)-vǎ:ʔi
3SG.B-hide.LG-PFT-ASR
‘He hid it (long).’ (p.128) |
| (9.59) | a. ò:gi:lá?dǎ:ʔi
òðkiilá?tvǎ:ʔi
ookii-lat-ʔ-vǎ:ʔi
1PL.EX.B-set.LG-PFT-ASR
‘They and I put it in it.’ (p.195) | b. ù:láǎ:ʔi
ùùlátǎ:ʔi
uu-lat-(ʔ)-vǎ:ʔi
3SG.B-set.LG-PFT-ASR
‘He put it (LG) in a container.’ (p.99) |

Only an underlying post-consonantal glottal stop has the option of surfacing in Oklahoma Cherokee. An underlying pre-consonantal glottal stop /VʔC/ never surfaces, and its existence is only inferred from its pitch effect on the preceding vowel and other reflexes (although it surfaces in North Carolina Cherokee). In this sense, an underlying pre-consonantal glottal stop is abstract. However, there is no indication that reflexes of glottal stop are anything but stable.

9.4.3. Summary

This section examined the synchronic status of an underlying glottal stop, and argued for an ‘incipient tone’ analysis, which assumes that *both* tones and their source segment (glottal stop) are in the lexical representations. Such an analysis achieves a broader generalization and simpler synchronic grammar than a more ‘concrete’ analysis.

To summarize, the purely synchronic status of the presence of a glottal stop is hard to discern. In the remainder of this study, I adopt an ‘incipient tone’ analysis, which assumes both the tones and their source segment (glottal stop) are in the lexical representations. Adopting a ‘concrete’ analysis (such as a ‘rule feature’ approach) as the synchronic analysis and marking each morpheme with H1 with diacritic features would not allow to express the convergence of the phonological factors that are sensitive to the glottal stop. Having the glottal stop in the lexical representation also enables us to distinguish H1 from H2 or H3 in the representation, and it also has the advantage of covering various dialectal and inter- and intra-speaker variations, depending on which the glottal stop is realized.

9.5. Conclusion

In this chapter, we have seen that the source of H1 is glottal stop. H1, along with the lowfall tone, is best viewed as a tone which still has not completely lost the connection to its segmental source. In the analysis adopted in this study, *both* the lexical tones and their source segment, glottal stop, are assumed to be present in lexical representations.

Chapter 10. Reflexes of Glottal Stop

10.0. Introduction

As was seen in Ch.9, a glottal stop has had a tonal effect on the preceding vowel, and in many cases this glottal stop is deleted. However, glottal stop is still found in some cases in Oklahoma Cherokee. In this chapter, I will show that this depends on complex phonological and morphological conditioning factors, such as the properties of the adjacent consonant, length of the preceding vowel, and lexical category.

§10.1 first provides the justification for postulating both the pre-consonantal and post-consonantal glottal stop, and shows that only historical (or underlying) post-consonantal glottal stop has the option of surfacing in Oklahoma Cherokee. §10.2 lays out the distribution of glottal stop, focusing on the nature of its phonological and morphological environments.

10.1. Relative order of glottal stop and its adjacent consonant

In Oklahoma Cherokee, a glottal stop is only found (on surface) between vowels or rarer before a consonant, and never immediately after a consonant. Compare this with the situation in North Carolina Cherokee, which allows a glottal stop in post-consonantal position (b):

- | | | | |
|--------|---|--|-------------------------------------|
| | OK | | NC |
| (10.1) | a. ò:gí:ʔgǔ:ʔi | | b. u:gʔe:ʔi |
| Cʔ | òòkííʔkvʔi | | uukʔeeʔi |
| | ookii-k-ʔ-vʔi | | uu-k-ʔ-eeʔi |
| | 1PL.EX.B-eat-PFT-ASR | | 3SG.B-eat-PFT-EVID |
| | ‘They and I ate it.’ (Feeling et al. 2003: 113) | | ‘He has eaten it.’ (Cook 1979: 133) |
| (10.2) | a. ù:wa:wsʔga | | b. ga:hwsv:ʔga |
| Cʔ | ùùwaawsʔvk-a | | kaawsvʔka |
| | uwa-:wsʔv(?)k-a | | ka-:wsvʔk-a |
| | 3SG.B-smell:PRS-IND | | 3SG.A-smell:PRS-IND |
| | ‘He smells it.’ (Feeling 1975: 182) | | ‘He smells it.’ (Cook 1979: 45) |

One thing one notices from (10.1) and (10.2) is that the post-consonantal glottal stop of North Carolina Cherokee corresponds to a pre-consonantal glottal stop in Oklahoma Cherokee (10.1), while the pre-consonantal glottal stop of North Carolina Cherokee does not have any reflex in Oklahoma Cherokee besides a tonal effect (10.2). In this section, I give some phenomena which can be better explained by assuming that the underlying positions of the glottal stop in Oklahoma Cherokee are still the same as North Carolina Cherokee.

The relative order of ʔ and C can be inferred in the synchronic grammar of Oklahoma Cherokee from (i) morphology, (ii) tonal alternation, and (iii) Laryngeal Alternation. First, in many cases a morpheme boundary comes between the glottal stop and its adjacent consonant, which is a good place to look for the original position of the glottal stop. Morphological evidence for a post-consonantal glottal stop is not hard to come by. For example, in (10.3), the relative order of $k\text{ʔ}$ is justified by the fact that the morpheme boundary comes between the two segments (k is part of the root, and ʔ is an aspectual suffix); the (b) form is given for comparison to show that the root for ‘eat’ is $-k-$ (and not $-k\text{ʔ}-$ or $-\text{ʔ}k-$):

- | | | | | |
|--------|----|--|----|--|
| (10.3) | a. | ò:gí:ʔgǔ:ʔi
òòkííʔkvǔʔi
ookii-k'-ʔ-vǔʔi
1PL.EX.B-eat-PFT-ASR
‘They and I ate it.’ (Feeling et al. 2003: 113) | b. | jigíʔa
cikíʔa
ci-k-íʔ-a
1SG.A-eat-PRS-IND
‘I am eating it.’ (Feeling et al. 2003: 113) |
|--------|----|--|----|--|

On the other hand, evidence for a pre-consonantal glottal stops is harder to find, but there are some instances such as in (10.4) or (10.5). (10.4) is a compound verb made up of the verb stem in (10.3), $-k-i\text{ʔ}-$ ‘eat-PRS’, followed by another verb base, $-stoo-$ ‘crush’; the $-i\text{ʔ}-$ sequence in (10.3b) is replaced by a long \ddot{u} with a high-low tone in (10.4). The (a) and (b) forms in (10.5) share the classificatory light verb, $-na\text{ʔ}-$ (cf. Uchihara 2014):

- (10.4) à:gî:sdoʔa
 ààkíistoʔa¹³³
 a-k-íi(ʔ)-stoo-ʔ-a (< *-k-i(ʔ)-)
 3SG.A-eat-PRS-crush-PRS-IND
 ‘He is chewing it.’ (Feeling 1975: 17)
- (10.5) a. ganâ:wh̄t̄i:sgóʔi
 kanáawh̄thiískóʔi
 ka-náa(ʔ)-w(a)h̄th-iísk-óʔi (< *-na(ʔ)-)
 3SG.A-set.FL-find-PRS-HAB
 ‘He always finds it (flexible).’
 (Feeling et al. 2003: 122)
- b. à:gináʔa
 ààkináʔa
 aki-náʔ-a
 1SG.B-set.FL:PRS-IND
 ‘I have it (flexible).’
 (Feeling et al. 2003: 141)

Whenever morphology shows that the glottal stop is post-consonantal, H1 instead alternates with the default low tone in atonic forms. Whenever the morphology shows that the glottal stop is pre-consonantal, H1 alternates with a lowfall tone in atonic forms. For example, in (10.6) the glottal stop is post-consonantal and H1 alternates with a lowfall tone in atonic forms, while in (10.7) the glottal stop is pre-consonantal and H1 alternates with a lowfall tone in the atonic form.

- | | Tonic | Atonic |
|--------|---|---|
| (10.6) | a. ò:gv:skaláʔd̄v̄:ʔi
<i>Cʔ</i> òògvvsgaláʔd̄v̄:ʔi
ook-vvskalat-ʔ-vvʔi
1PL.EX.B-hide.LG-PFT-ASR
‘They and I hid it (LG).’
(Feeling et al. 2003: 148) | b. d̄v̄:nv̄:sgalaʔdi ¹³⁴
tv̄vn̄v̄skaláʔti
ta-an-vvskalat-ʔ-i
CISL-3PL.A-hide.LG-PFT-MOT
‘They will hide it (long).’
(ibid.) |
| (10.7) | a. à:gî:sdoʔa
<i>ʔC</i> ààkíistoʔa
a-k-íi(ʔ)-stoo-ʔ-a (< *-iʔ-)
3SG.A-eat-PRS-crush-PRS-IND
‘He is chewing it.’ (Feeling 1975: 17) | b. higì:sdõ:ja
hikìistoóca
hi-k-ìi(ʔ)-stoó-c-a (< *-iʔ-)
2SG.A-eat-PRS-crush-PCT-IND
‘Chew it!’ (ibid.) |

Based on examples such as (10.6) and (10.7), I analyze H1 which alternates with a low tone as deriving from *Cʔ*, while I analyze H1 which alternates with a lowfall tone as deriving from *ʔC*.

¹³³ A long vowel without a high tone is shortened before a glottal stop (§5.3.2.3), which explains the alternation of *-stoo-* and *-sto-*.

¹³⁴ The high tone on the second syllable is due to the pre-pronominal prefix (Ch.13).

An analysis postulating both pre-consonantal and post-consonantal glottal stop is also supported by Laryngeal Alternation (§1.7.4.1, Ch.4). Laryngeal Alternation is a process triggered by certain pronominal prefixes, and the first *h* of the stem is replaced by a glottal stop in the glottal grade. When Laryngeal Alternation applies to a *Ch* sequence, which should result in *Cʔ*, the glottal grade form in fact has *ʔC* (10.8), due to the general phonological constraint **Cʔ* in Oklahoma Cherokee (§5.3.3.2). On the other hand, when Laryngeal Alternation applies to an *hC* sequence, *h* is simply lost and a lowfall tone is assigned to the preceding vowel (10.9). This is consistent with the lowfall tone in (10.7b) above.

	<i>h</i> -grade	glottal grade
(10.8)	a. gatv́sga	b. gaʔd́vsga
<i>Ch</i>	kath́v́ska	kaʔtv́ska
	k-athv́sk-a	k-athv́sk-a
	3SG.A-hang.up:PRS-IND	1SG.A-hang.up:PRS-IND
	‘He is hanging it up’ (Feeling 1975: 116)	‘I am hanging it up’ (ibid.)
(10.9)	a. hvhda	b. gv̀:díha
<i>hC</i>	hvhta	k̀v̀tíha
	h-vht-a	k-vhtíh-a
	2SG.A-use:PCT-IND	1SG.A-use:PRS-IND
	‘Use it!’ (Feeling 1975: 143)	‘I am using it.’(ibid.)

If we can assume that the original position of the glottal stop is the same as the position of *h* with respect to its adjacent consonant, we can see that *ʔC* results from underlying *Cʔ* in (10.8b), while the lowfall tone in (10.9b) results from underlying *ʔC*.

10.2. Distribution of ʔ

An underlying pre-consonantal glottal stop is rarely realized. A post-consonantal glottal stop either deletes or metathesizes with the preceding consonant, depending on various phonological and morphological factors. This section looks at such factors.

Distribution of a glottal stop is not fully predictable; there is a great deal of intra-speaker variations (Scancarelli 1987: 27-28), and there is a variation even within a speaker. Compare, for example, the forms listed in Feeling (1975) and Feeling et al. (2003) in (10.10) - (10.11); (a) forms, from Feeling et al. (2003),

have a surface glottal stop for the perfective (PFT) morpheme, while the (b) forms, from his 1975 dictionary, do not:

	Surface ʔ in Feeling et al. (2003)	No surface ʔ in Feeling (1975)
(10.10)	a. ò:gv:sgaláʔdǔ:ʔi òòkvvskaláʔtvǔʔi ook-vvskalat-ʔ-vǔʔi 1PL.EX.B-hide.LG-PFT-ASR ‘They and I hid it (long).’ (Feeling et al. 2003: 148)	b. ù:wa:sgaládǔ:ʔi ùùwaaskalátvǔʔi uw-vvskalat-(ʔ)-vǔʔi 3SG.B-hide.LG-PFT-ASR ‘He hid it (long).’ (Feeling 1975: 128)
(10.11)	a. ò:gi:láʔdǔ:ʔi òòkiiláʔtvǔʔi ookii-lat-ʔ-vǔʔi 1PL.EX.B-put.LG.into.container-PFT-ASR ‘They and I put it (long) into a container.’ (Feeling et al. 2003: 195)	b. ù:ládǔ:ʔi ùùlátvǔʔi uu-lat-(ʔ)-vǔʔi 3SG.B-put.LG.into.container-PFT-ASR ‘He put it (long) into a container.’ (Feeling 1975: 99)

Below, I will first look at various phonological environments where a glottal stop is found (§10.2.1), and then at morphological environments in §10.2.2.

This section is almost entirely based on Feeling’s dictionaries (1975, 2003), and at this point I simply aim to draw generalizations from these sources. Further research on this topic with other speakers is necessary to determine if these tendencies hold for speakers of Oklahoma Cherokee more generally.

10.2.1. Phonological factors

This subsection looks at the nature of the phonological environments where a surface glottal stop is found. A glottal stop is always found between vowels (§10.2.1.1), but almost never after a tautosyllabic long vowel (§10.2.1.2). When a glottal stop occurs adjacent to a consonant, it is more frequently found next to resonants than plosives/affricates (§10.2.1.3), next to [-back] consonants as opposed to [+back] consonants (§10.2.1.4), and next to internally simple consonants versus internally complex consonants (§10.2.1.5).

10.2.1.1. Between vowels

Before discussing the cases of underlying (or historical) post-consonantal glottal stop, I will discuss the case of a glottal stop between vowels. A glottal stop is *never* deleted between vowels:

(10.12)

- a. à:sdó:ʔa
 ààstóóʔa
 a-stoo-ʔ-a
 3SG.A-crush-PRS-IND
 ‘He is crushing it.’ (Feeling 1975: 48)
- b. gu:dalé:ʔa
 kuutalééʔa
 k-uutal-eéʔ-a
 3SG.A-hitch-REV:PRS-IND
 ‘He is unhitching him.’ (Feeling 1975: 123)

This is because deletion of a glottal stop between vowels would result in a vowel sequence of different qualities, which is banned in Oklahoma Cherokee (* V_1V_2 ; §5.3.1.1).

10.2.1.2. Length of the preceding vowel

In §5.3.2.3, we saw a constraint against a glottal stop after a tautosyllabic long vowel:

(10.13) *VVʔ]σ

A glottal stop is either deleted or the vowel is shortened to remedy such a sequence. Deletion of a glottal stop is exemplified by the forms below. The (a) forms below have a glottal stop, while (b) forms, the conjugated form of the same verbs do not; in the (a) forms the glottal stop is preceded by a short vowel, while in (b), the expected glottal stop is preceded by a long vowel:

- | | | | |
|---------|---|--|------------------------------|
| | /V_ | | /VV_ |
| (10.14) | a. jíʔni:yíha | | b. jí:ni:yíha |
| | cíʔniiyíha | | cíniiyíha |
| | ci-nʔiiyíh-a | | cii-nʔiiyíh-a |
| | 1SG.A-catch:PRS-IND | | 1SG>3SG.AN-catch:PRS-IND |
| | ‘I am catching it.’ (Feeling 1975: 109) | | ‘I am catching him.’ (ibid.) |

- (10.15) a. gáʔni:síha
káʔniisíha
ka-nʔiisíh-a
3SG.A-bury:PRS-IND
‘He is burying him.’ (Feeling 1975: 109)
- b. jí:ni:síha
cíniisíha
cii-nʔiisíh-a
1SG>3SG.AN-bury:PRS-IND
‘I am burying him.’ (ibid.)
- (10.16) a. gáʔluhga
káʔluhka
ka-lʔuhk-a
3SG.A-arrive:PRS-IND
‘He is arriving.’ (Feeling 1975: 102)
- b. ù:lúhǰvʔi
ùùlúhcvʔi
uu-lʔuhc-vvʔi
3SG.B-arrive:PFT-ASR
‘He arrived.’ (ibid.)

This constraint is not absolute. Feeling et al. (2003) list some cases where the glottal stop remains even when it is preceded by a long vowel in the same syllable (10.17 a), but not always (b):

- | | with surface ʔ | no surface ʔ |
|------------|---|---|
| (10.17) a. | ì:jí:ʔgé:ʔi
ìicíʔkékéʔi
ìicii-kʔ-ééʔi
2PL-eat-PFT-EVID
‘I heard y’ all ate it.’
(Feeling et al. 2003: 113) | b. ì:ji:sdí:gé:ʔi
ìiciistííkékéʔi
ìicii-stiik-(ʔ)-ééʔi
2PL-eat.LG-PFT-EVID
‘I hear y’ all ate it (long).’
(Feeling et al. 2003: 116) |

10.2.1.3. Manner of articulation of the adjacent consonant

A glottal stop adjacent to a consonant is somewhat rare in Feeling (1975), especially in the tonic forms of the verbs. However, there are still some such cases, and in the majority of such cases the adjacent consonant is a resonant, rather than a plosive/affricate. First, Feeling (1975) lists some verb stems beginning with a glottal stop followed by a resonant, ʔR (again, pronominal prefixes are separated by hyphens):

- (10.18)
- a. gáʔluhga
ká-ʔluhka
‘He is arriving.’ (Feeling 1975: 102)
- b. gáʔni:yáʔa
ká-ʔniiyáʔa
‘He is leaving it (flexible).’ (Feeling 1975: 109)

On the other hand, verb stems beginning with a glottal stop + a plosive/affricate, $\text{ʔ}T$, are not found in Feeling (1975). It could either be the case that this sequence does not occur stem-initially, or that the glottal stop is deleted from the historical $*T\text{ʔ}$ sequence.

A glottal stop adjacent to a resonant is also found in stem-internal positions:

(10.19)

- a. à:dáʔnvʔa
 ààtáʔnvʔa
 ‘It is moving from one place to another.’ (Feeling 1975: 6)
- b. à:híʔli
 ààhíʔli
 ‘He is driving.’ (Feeling 1975: 20)

The relevant constraint can be stated as follows:

- (10.20) $*\text{ʔ}T$ (T = plosive/affricate)
 No plosives/affricates adjacent to a surface glottal stop

This constraint is, again, not absolute; thus, Feeling et al. (2003) has some forms with surface $[\text{ʔ}T]$, as we saw above in (10.10), and even Feeling (1975) has a couple of instances of a surface $[\text{ʔ}T]$ in the tonic forms of verbs:

- (10.21) ù:hnú:yo:láʔdǎʔi
 ùùhnúúyooláʔtvǎʔi
 uu-hnúú(?)yoolat-ʔ-vǎʔi
 3SG.B-mist-PFT-ASR
 ‘It is misting.’ (Feeling 1975: 142)

$\text{ʔ}T$ is somewhat more common with nouns and adjectives (cf. §10.2.2.3):

(10.22)

- a. ajaʔdi
 acaʔti
 ‘fish’ (Feeling 1975: 30)
- b. galhjaʔdi
 kalhcaʔti
 ‘bow’ (Feeling 1975: 95)

In all of the instances above, we could analyze that the $?R$ sequence is a result of metathesis from $R?$ due to the general constraint against $*C?$ sequences in Oklahoma Cherokee (§5.3.3.2). If such an analysis is correct, the constraint in (10.20) can be interpreted as follows: a glottal stop tends to be retained and metathesized after a resonant, while it tends to be deleted after a plosive/affricate:

(10.23)

- a. $R? \rightarrow ?R$ (Metathesis)
- b. $T? \rightarrow T$ (Deletion)

This difference between resonants and plosives/affricates appears to have a phonetic explanation. It is easier for a glottal stop to metathesize with the preceding resonant than with a preceding obstruent. According to Kingston (1985: 330), when the release of an oral closure produces an audible burst, as in the case of an obstruent, glottalization is bound to it, while when no such burst occurs, as in the case of resonants, glottalization is not tightly bound to any part of the oral articulation, because of the failure of the oral articulation to obstruct the passage of air out of the mouth enough to raise supraglottal (intraoral) air pressure. The glottalization can thus “dissociate from the segment which originally bore it and attach itself elsewhere” (ibid.). Possibly for this reason, in languages with the laryngealized series for consonants, it is common for laryngealized plosives to be realized as ejectives, while laryngealized sonorants are realized as preglottalized sonorants (Sapir 1938: 249, Ladefoged & Maddieson 1996: 108-111, McDonough 2003: 75ff. etc.). In the case where the consonant before a glottal stop is a plosive, some languages realize phonological $T?$ sequences as ejectives (Caddo (Melnar 1998: 33); Kashaya (Buckley 1994); Wakashan (Kingston 1985: 327ff.); Dakota (Shaw 1989); etc.), but since Oklahoma Cherokee does not have the ejective series in its consonant inventory, this is not an option and thus a glottal stop is simply deleted.

10.2.1.4. Place of articulation of the adjacent consonant

A closer examination of the glottal stop adjacent to a consonant in Feeling (1975) shows that a surface glottal stop occurs only before a coronal consonant (*t*, *tl*, *n*, and *l*) and *y*, and not before velar (*k*) or labio-velar (*kw*, *w*) consonants:¹³⁵

(10.24)

- a. /_t ajaʔdi
 acaʔti
 ‘fish’ (Feeling 1975: 30)
- b. /_tl ga:hyáʔdlǎ:ʔi
 kaahyáʔtlvǎʔi
 ‘collar’ (Feeling 1975: 96)
- c. /_n áʔni
 áʔni
 ‘strawberry’ (Feeling 1975: 45)
- d. /_l tiyǒ:háʔli
 thiyóháháʔli
 ‘lizzard’ (Feeling 1975: 156)
- e. /_y áʔyosgi
 áʔyoski
 ‘soldier’ (Feeling 1975: 65)

The relevant constraint can be stated as follows:

(10.25) *ʔC
 |
 [+back]

No [+back] consonant (*k*, *kw*, *w*) adjacent to a glottal stop.

This, again, is not an absolute constraint. In the glottal grade of Laryngeal Alternation, velar *k* is found adjacent to a surface glottal stop in Feeling (1975) (§10.2.2.1):

¹³⁵ A glottal stop does not occur next to *m*, either. However, the nonexistence of *ʔ + m* sequence appears to be due to the marginal status of the phoneme *m*, rather than its phonetic properties (§2.2.4).

	<i>h</i> -grade		glottal grade
(10.26)	a. à:kisga		b. jiʔgisga
	àà <u>kh</u> iska		ciʔkiska
	a-khi-sk-a		ci-khi-sk-a
	3SG.A-swallow-PRS-IND		1SG.A-swallow-PRS-IND
	‘He is swallowing it.’ (Feeling 1975: 33)		‘I am swallowing it.’ (ibid.)

Moreover, this condition appears to be subject to inter- and intra-speaker variations. Thus, Feeling et al. (2003) has some pre-*k* glottal stop even when the glottal stop does not result from Laryngeal

Alternation:

(10.27)	hiʔgv:ʔi
	hiʔkvvʔi
	hi-k-ʔ-vvʔi
	2SG.A-eat-PFT-ASR
	‘Eat it later!’ (Feeling et al. 2003: 113)

This could be because the morphological factor, that perfective aspectual suffix -ʔ- (class 2a-c) tends to surface (§10.2.2.2), overrides the phonological constraint in (10.25).

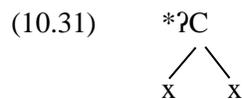
The phonetic motivation for (10.25) appears to be that the places of articulation of velar and labio-velar consonants *k*, *kw*, and *w* are too close to the glottis (Jeri Jaeger, p.c.). In this sense, a sequence of a glottal stop and a consonant in Oklahoma Cherokee behaves more like implosives or voiced laryngealized plosives than ejectives, in that [-back] consonants are commoner (Maddieson 1984: 111ff.).

10.2.1.5. Internally complex segments *kw*, *tl*

In §4.1.4, we saw that internally complex segments *kw* and *tl* behave differently from other plosives/affricates with respect to Laryngeal Alternation (§1.7.4.1). Forms with a plosive/affricate followed by an *h* (*Th*) generally has a *ʔT* sequence in the glottal grade (10.28), but when this consonant is either *kw* or *tl*, the glottal stop is not found (10.29), (10.30). In (10.29a), the *tlh* sequence is realized as *hl* due to Deaffrication (§.2.2.2, §5.3.3.3). The first *h* of the stem is underlined in the segmentation lines.

	<i>h</i> -grade		glottal grade (1SG)
(10.28)	a. gatʋ́sga	b.	gaʔdʋ́sga
<i>t</i>	kathʋ́ska		kaʔtʋ́ska
	k-athʋ́sk-a		k-athʋ́sk-a
	3SG.A-hang.up:PRS-IND		1SG.A-hang.up:PRS-IND
	‘He is hanging it up’ (Feeling 1975: 116)		‘I am hanging it up’ (ibid.)
(10.29)	a. hahlawí:da	b.	gadlawi:díha
<i>tl</i>	hahlawííta		katlawiitíha
	h-atlhawíit-a		k-atlhawíitíh-a
	2SG.A-take.off:PCT-IND		1SG.A-take.off:PRS-IND
	‘Take off flying!’ (Feeling 1975: 21)		‘I am taking off flying’ (ibid.)
(10.30)	a. hakwiya	b.	gagwiyíha
<i>kw</i>	hakwhiya		kakwiyíha
	h-akwhiy-a		k-akwhiyíh-a
	2SG.A-pay:PCT-IND		1SG.A-pay:PRS-IND
	‘Pay it!’ (Feeling 1975: 36)		‘I am paying’ (ibid.)

The different behavior of *kw* and *tl* as opposed to other plosives/affricates may be due to their internally complex nature (Clements & Keyser 1983: 85, Clements & Hume 1995: 254). The constraint can be stated as follows:



No glottal stop adjacent to a branching segment

Again, this is not an absolute condition, since there are some forms with a surface glottal stop adjacent to *tl*, as we saw in (9.24b) above.

10.2.2. Morphological factors

This section looks at three morphological factors that are relevant for the realization of a glottal stop, and these may override the phonological factors discussed in §10.2.1. First, a glottal stop tends to be realized in the glottal grade of Laryngeal Alternation (§10.2.2.1). A glottal stop also tends to be realized when it is the perfective aspectual suffix -ʔ (§10.2.2.2), or when it belongs to a part of speech other than

verbs (§10.2.2.3). In general, a glottal stop appears to be maintained when it would delete without reflex, including a tonal reflex.

10.2.2.1. Glottal grade of *Ch* sequence

I have mentioned above that a glottal stop adjacent to a consonant is somewhat rare in Feeling (1975). One exception is in the glottal grade of stems with *Ch* sequences. When a verb stem has a post-consonantal *h* in the *h*-grade, the corresponding glottal grade form has a pre-consonantal glottal stop, whether its adjacent consonant is a plosive (10.32) or a resonant (10.33), unless *C* is an internally complex segment (§10.2.1.5):

	<i>h</i> -grade	glottal grade
(10.32)	a. à:kũ:gíʔa ak <u>h</u> uúkiʔa a-khuuk-íʔ-a 3SG.A-dip-PRS-IND 'He is dipping liquid.' (ibid.)	b. jiʔgũ:gíʔa ciʔkuúkiʔa ci-khuuk-íʔ-a 1SG.A-dip-PRS-IND 'I am dipping liquid.' (Feeling 1975: 36)
(10.33)	a. à:dahyíha ààta <u>h</u> yíha Ø-atay-híh-a 3SG.A-deny-PRS-IND 'He is denying it.' (ibid.)	b. gadaʔyíha kataʔyíha k-atay-híh-a 1SG.A-deny-PRS-IND 'I am denying it' (Feeling 1975: 3)

This fact could be interpreted as being motivated by avoidance of the loss of of a segment without trace: a glottal stop due to Laryngeal Alternation does not induce H1 even in the tonic forms of verbs (§9.2.1), and thus if the glottal stop itself were deleted, the glottal stop would not have any trace. This can be interpreted as manifestation of a faithfulness constraint MAX-IO, which requires that all the input segments have output correspondences, and thus bans deletion of a segment:

(10.34)	MAX-IO (Kager 1999: 67) Input segments must have output correspondents. ('No deletion')
---------	--

10.2.2.2. PFT -ʔ (class 2a-c)

As was mentioned above, Feeling et al. (2003) has more examples with a glottal stop adjacent to a consonant, where corresponding forms in Feeling (1975) do not have a glottal stop. Most of such examples with a surface glottal stop adjacent to a consonant in Feeling et al. (2003) turn out to be the class 2a-c perfective aspectual suffix -ʔ (and rarely also in Feeling (1975), as in (c)):

- (10.35) PFT -ʔ
- a. hihláʔdv:ʔi
 hihláʔtvvʔi
 hi-htlhátʔ-vvʔi
 2SG.A-put.up.LG-PFT-ASR
 ‘Put it (long) up later!’ (Feeling et al. 2003: 182)
- b. ò:gíʔdlǎ:ʔi
 ookíʔtlvǎʔi
 ookii-tlʔ-vǎʔi
 1PL.EX.B-pour-PFT-ASR
 ‘They and I have poured it in.’ (Feeling et al. 2003: 184)
- c. ù:hnú:yo:láʔdǎ:ʔi
 ùùhnúúyooláʔtvǎʔi
 uu-hnúú(?)yoolatʔ-vǎʔi
 3SG.B-mist-PFT-ASR
 ‘it misted’ (Feeling 1975: 142)

A glottal stop in other aspectual suffixes does not surface, even in Feeling et al. (2003). For instance, the initial glottal stop of class 5a aspectual suffix, -ʔih- (PRS), does not surface; compare this form with that in North Carolina Cherokee, which has a surface glottal stop:

- | | | | |
|---------|----------------------------|--|--------------|
| | OK | | NC |
| (10.36) | a. ji:yó:liha | | b. -yó:ʔlih- |
| | ciiyóóliha | | -yóóʔlih- |
| | cii-yoolʔ(?)ih-a | | -yoolʔih- |
| | 1SG>3SG.AN-greet-PRS-IND | | greet-PRS |
| | ‘I am greeting him.’ | | |
| | (Feeling et al. 2003: 131) | | (King 1975) |

This could be due to the fact that class 2a-c perfective aspectual suffix consists only of a glottal stop. If this glottal stop is deleted, the only exponence of this morpheme would be H1 assigned to the

preceding vowel in the tonic form, and no indication whatsoever in the atonic form, where a glottal stop failed to induce H1 (§9.2.2). This, again, can be interpreted as a manifestation of a faithfulness constraint, MAX-IO (10.34).

10.2.2.3. Lexical category

In Feeling (1975), a glottal stop adjacent to a consonant is rare for tonic forms of verbs (except in the glottal grade forms), but a glottal stop adjacent to a consonant is somewhat more frequent in other parts of speech, namely nouns and adjectives, whether underived (10.37a) or derived (b, c):

(10.37)

- a. ajaʔdi
 acaʔti
 ‘fish’ (Feeling 1975: 30)
- b. galhjaʔdi
 kalhcaʔti
 ‘bow’ (Feeling 1975: 95)
- c. gá:ye:sáʔdǎ:ʔi
 kááyeesáʔtvǎʔi
 ‘his finger’ (Feeling 1975: 117)

(10.37c) arguably has the morpheme *-t-ʔ-* ‘set.LG-PFT’, and these morphemes occur without the glottal stop in the case of finite forms of verbs:

- (10.38) ù:wa:sgaládǎ:ʔi
 ùùwaaskalátvǎʔi
 uw-vvskala-tʔ(-vǎʔi
 3SG.B-hide-set.LG-PFT-ASR
 ‘He hid a long object.’ (Feeling 1975: 128)

This fact may have the same explanation as the morphological factors discussed above: in nouns and adjectives, a glottal stop did not always induce H1 on the preceding vowel (§9.2.2), as can be seen in (10.37a, b), and thus deleting the glottal stop itself would result in obscuring of the presence of the glottal stop, in the sense that the glottal stop would not have any surface reflexes. This, again, can be interpreted as manifestation of a faithfulness constraint, MAX-IO (10.34).

10.2.3. Summary

In this section, I have laid out the distribution of a glottal stop, looking at the nature of the phonological and morphological environments where a glottal stop is found. We have seen five phonological factors and three morphological factors; the morphological factors could be interpreted as manifestations of a faithfulness constraint, MAX-IO (10.34), which requires the input segments to have output correspondences.

The ranking of each constraint mentioned above can be informally stated as in (10.39). * V_1V_2 , which bans a sequence of vowels of different qualities within a syllable (§10.2.1.1), is inviolable, thus it is ranked the highest; the source of the morphological factors (§10.2.2), can override other phonological factors, thus is ranked next.¹³⁶ * $VV\text{?}]σ$, which bans a glottal stop after a long vowel within the same syllable (§10.2.1.3), is the strongest among other phonological factors, thus comes next, but may be overridden by morphological factors. Other phonological factors are stated only in terms of tendencies, thus ranked the lowest:

(10.39) Ranking of constraints
 $*V_1V_2 \gg \text{MAX-IO} \gg *VV\text{?}]σ \gg *?C, \quad *?C, \quad *?T$
|
[+back] / \ x x

This is a case of morphologically conditioned phonological processes (Anttila 2002, 2007, Inkelas & Zoll 2007, Caballero 2011, among others). Surface realization of the glottal stop is subject not only to various phonological conditions, but also to morphological conditions, as well as to lexical conditions (cf. Anttila 2002: 15). Surface realization of a glottal stop cannot be categorically determined by phonological and morphological factors, but only phonological *tendencies* can be stated (cf. Anttila 2002: 14), in the sense that it is also subject to intra- and inter-speaker variations to some degrees.

¹³⁶ Here my intention is not either to support or refute the Cophonology theory by including the morphological factor along with the phonological constraints in a single ranking (Inkelas et al. 1997, Caballero 2011, etc.).

One interesting factor concerning the realization of a surface glottal stop is the lexical category (§10.2.2.3). Smith (2011) argues that this kind of ‘part-of-speech effects’ (or ‘category-specific effects’) can be accounted for by assuming that noun is in a “strong position”, in that nouns are permitted to show more phonological contrasts than words of other categories (Smith 2011). However, as we have seen above, the difference between verbs and other parts of speech in Oklahoma Cherokee can be accounted for by the motivation to avoid merger (MAX-IO, (10.34)), and there does not appear to be a necessity to resort to the ‘strength’ of nouns as opposed to verbs.

As was mentioned earlier, the discussion in this section is almost entirely based on Durbin Feeling’s speech (Feeling 1975, Feeling et al. 2003). A more detailed sociolinguistic and dialectal study would reveal a clearer picture of the phenomenon.

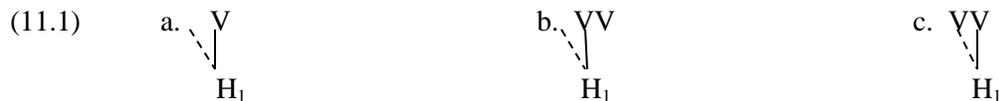
10.3. Conclusion

This chapter looked at the distribution of the glottal stop, focusing on the nature of the phonological and morphological environments where a glottal stop is found in contemporary Oklahoma Cherokee. In Oklahoma Cherokee, only intervocalic or original post-consonantal glottal stop is ever realized (§10.1); the realization of an underlying (or historical) post-consonantal glottal stop is subject to various phonological (§10.2.1) and morphological (§10.2.2) factors. The realization of a glottal stop is also subject to intra- and inter-speaker variations.

Chapter 11. Historical Source of H1 Alignment

11.0. Introduction

In §8.1, we saw that H1 can be aligned to the only mora of a short vowel (11.1a), or either to the left (b) or the right (c) mora of a long vowel:



In Ch.9, I argued that the source of H1 is a glottal stop. If that is the case, a natural question is how a glottal stop has given rise to the three types of alignments of H1 in (11.1). In this final chapter on H1, through internal reconstruction, I will show that the various types of H1 alignment result from a complex interaction of two historical factors, (i) relative order of the glottal stop and its adjacent consonant, and (ii) the historical length of the vowel which preceded the glottal stop, as well as (iii) the synchronic H1 Spreading discussed in §8.5. §11.1 first overviews the historical development of each type of H1 alignment. §11.2 provides the language-internal evidence for the reconstruction of the historical relative order of *C* and *ʔ* and the historical vowel length. §11.3 illustrates my proposal laid out in §11.1 with examples from each type of H1 alignment. §11.4 concludes.

11.1. Historical source of H1 alignment

This section overviews the historical origin of the H1 alignment, according to the two historical factors, (i) relative order of the glottal stop and its adjacent consonant, and (ii) whether a glottal stop was preceded by a historical long vowel or a short vowel, as well as the synchronic factor of (iii) whether H1 can spread to the preceding syllable.

First, a short vowel with H1 has only one source: a short vowel followed by a post-consonantal glottal stop or a glottal stop between vowels, $*V(C)ʔ$. This H1 spreads leftward by one mora to the preceding syllable, unless the spreading is blocked by the conditions mentioned in §8.5.2:

- | | | | |
|--------|--|----|---|
| | *VVC? | | *VV?C |
| (11.5) | a. kanó:yeha
khanóóyeha
∖
∖
H ₁ | b. | gano:halĩ:dô:ha
kanoohaliitóoha
∖
∖
H ₁ |
| | ka-hnoóy(?)eh-a
*ka-hnooy-?eh-a
3SG.A-fan-PRS-IND
'He is fanning it.' (Feeling 1975: 142) | | ka-noohaliitoo(?)h-a
*ka-noohaliitoo?h-a
3SG.A-hunt:PRS-IND
'He is hunting.' (Feeling 1975: 110) |

When H1 is aligned with the left mora of a long vowel (11.4b), the tonal configuration within that syllable is in general high-low (V́V), as in (11.5b). However, there is one case where a long vowel which is lexically aligned with H1 on the left mora (V́V) has the tonal configuration high-high (V́V́), rather than high-low (V́V). This is when spreading to the preceding syllable is blocked by the factors discussed in §8.5.2, *and* the vowel preceding the glottal stop was historically long (*VV?C). This is shown by the examples in (11.6), which share the andative suffix *-ee?k-. In (11.6a), H1 spreads to the preceding syllable, and the configuration of the syllable with the lexical H1 is high-low, as expected; in the form in (b), H1 cannot spread to the preceding syllable because it is short, and thus the tonal configuration is high-high.

- | | | | |
|--------|--|----|--|
| | Spread to the preceding σ | | No spread to the preceding σ |
| (11.6) | a. à:hnohlĩ:nê:ga
ààhnohliínéeka
∖
∖
H ₁ | b. | dà:lhtadé:ga
tààlhthatééka
∖
∖
H ₁ |
| | Ø-aahnohliin-ée(?)k-a
3SG.A-carry.LG.on.shoulder-AND:PRS-IND
'He is carrying a long object on his shoulder.'
(Feeling 1975: 25) | | t-Ø-al(i)hthat-ée(?)k-a
DIST-3SG.A-jump-AND:PRS-IND
'He is jumping.'
(Feeling 1975: 69) |

When the vowel preceding the glottal stop is historically short, the tonal configuration is regularly high-low, whether H1 spreads to the preceding syllable or not. The forms in (11.7) illustrate this. In (a), H1 spreads to the preceding syllable. In (b), H1 Spreading is blocked due to *TROUGH (§8.5.2.3). In both cases the H1 configuration is high-low.

	Spread to the preceding σ		No spread to the preceding σ (2 nd H1)
(11.7)	a. uwà:jǎ:wâ:sdohdi uwààcvǎwáastohti	b.	gá:jǎ:wâ:sdiha káácvǎwáastiha (*káácvǎwáastiha)
	uwa-:(?)cvǎwáa(?)st-oh-t-i		ka-:(?)cvǎwáa(?)st-ih-a
	*uwa -:?cvǎwá?st-oh-t-i		*ka -:?cvǎwá?st-ih-a
	3SG.B-wring.out-INF-NOM		3SG.A-wring.out-PRS-IND
	‘for him to wring it out’ (ibid.)		‘He is wringing it out.’ (Feeling 1975: 98)

Table 11-1 summarizes the discussion so far. Types (i) and (ii) represent cases where H1 was aligned with a short vowel. Type (i) represents cases where H1 spreads, and Type (ii) where H1 does not spread because spreading is blocked. Types (iii) and (iv) represents cases where H1 is aligned to the right mora of a long vowel, and thus H1 obligatorily spreads leftward within the syllable. In Types (i) - (iv) the glottal stop is post-consonantal. A glottal stop between vowels (*V?V) yielded exactly the same H1 configuration as a post-consonantal glottal stop, and thus *C* is in parentheses. Types (v) and (vi) represent cases where H1 was aligned to a historical short vowel and the glottal stop was post-consonantal. Lastly, in Types (vii) and (viii) H1 was aligned with the left mora of a historically long vowel, and the glottal stop was also post-consonantal. The label ‘spreading’ in TABLE 11-1 indicates that H1 spreads to the *preceding syllable*; in Type (iv), this is irrelevant, since H1 spreads *within* the syllable.

TABLE 11-1: HISTORICAL SOURCE OF H1 ALIGNMENT

	*V_		*VV_	
	SPREADING	SPREADING BLOCKED	SPREADING	SPREADING BLOCKED
*C?)	(i) CV̄C 	(ii) CV̄C 	(iii) CV̄VC 	(iv) CV̄VC
*?C	(v) CV̄VC 	(vi) CV̄VC 	(vii) CV̄VC 	(viii) CV̄VC

Each type of H1 alignment in TABLE 11-1 will be exemplified in §11.3 with illustrative examples. However, before doing so, I will provide evidence for reconstructing the relative order of *C* and ? and the historical vowel length.

11.2. Justification for the internally reconstructed forms

In the previous section, I proposed the historical sources of H1 alignment : relative order of *ʔ* and *C*, and vowel length. These have reflexes in Oklahoma Cherokee independently from H1 alignment. The historical relative order of *ʔ* and *C* is inferred from tonal alternations (§11.1.1), and historical vowel length is inferred from the ability to carry a superhigh accent (§11.1.2).

11.2.1. Relative order of a glottal stop and its adjacent consonant

Justification for the relative order of the glottal stop and its adjacent consonant was discussed in §10.1: (i) morphology, (ii) tonal alternation, and (iii) Laryngeal Alternation. Here I briefly review the tonal alternation.

In §10.1, I showed that, whenever the morphology shows that the glottal stop is pre-consonantal, as in (11.8), H1 alternates with a lowfall tone in the atonic form (b). When the morphology indicates that the glottal stop is post-consonantal, as in (11.9), H1 is replaced by the default low tone (b). The relevant vowels are underlined.

	Tonic	Atonic
(11.8)	a. à:gî:sdóʔa	b. hígì:sdó:ja
<i>ʔC</i>	ààkí̄stoʔa	híkí̄stoóca
	a-kí̄(ʔ)-stoo-ʔ-a (< *-kiʔ-)	hi-kí̄(ʔ)-stoó-c-a (< *-kiʔ-)
	3SG.A-eat:PRS-crush-PRS-IND	2SG.A-eat:PRS-crush-PCT-IND
	‘He is chewing it.’ (Feeling 1975: 17)	‘Chew it!’ (ibid.)
(11.9)	a. ò:gv:sgaláʔdǔ:ʔi	b. dǔ:nǔ:sgalaʔdi
<i>Cʔ</i>	òòkvvskaláʔtvǔʔi	tvǔnǔvskalaʔti ¹³⁷
	ook-vvskalat-ʔ-vǔʔi	ta-an-vvskalat-ʔ-i
	1PL.EX.B-hide.LG-PFT-ASR	CISL-3PL.A-hide.LG-PFT-MOT
	‘They and I hid it (LG).’	‘They will hide it (LG).’
	(Feeling et al. 2003: 148)	(ibid.)

¹³⁷ The high tone on the second syllable is due to the pre-pronominal prefix (Ch.13).

Based on cases such as in (11.8) and (11.9), I claim that H1 which alternates with a lowfall tone, as in (11.8), results from a historical *ʔC sequence, while H1 which alternates with a low tone, as in (11.9), results from a historical *Cʔ sequence.

11.2.2. Historical vowel length

In Oklahoma Cherokee, a short vowel before a pre-consonantal glottal stop was lengthened and the glottal stop was deleted (11.10a). A historical long vowel before a pre-consonantal glottal stop remained long but the glottal stop was also deleted (b). Thus the vowel length contrast was neutralized in this environment:

(11.10) Vowel Length Neutralization

- a. *VʔC > VVC (Compensatory Lengthening)
- b. *VVʔC > VVC

Compare the following forms in Oklahoma Cherokee with the corresponding forms in North Carolina Cherokee. North Carolina Cherokee preserves the pre-consonantal glottal stop, and appears to preserve the original vowel length contrast in this environment.¹³⁸

- | OK | NC |
|--|--|
| (11.11) a. ù:nv̄:ne:lǎ:ʔi
ùùnǎv̄:neelǎv̄:ʔi
uu-nǎv̄(?)neel-vǎv̄:ʔi
3SG.B-give.FL:PFT-ASR
'He has given FL to her.'
(Feeling 1975: 113) | b. u:nv:ʔne:lv:gi
uunvvʔneelvvki
uu-nvvʔneel-vvki
3SG.B-give.FL:PFT-ASR
'He has given it to her.'
(Cook 1979: 94) |
| (11.12) a. go:hwě:lî:sgó:ʔi
koohweélîiskóóʔi
k-oohweel-îi(?)sk-óóʔi (< *-iʔsk-)
3SG.A-write-IMPF-HAB
'He habitually writes it.'
(Feeling 1975: 122) | b. go:hwe:liʔsgoʔi
koohweeliʔskoʔi
k-oohweel-iʔsk-oʔi
3SG.A-write-IMPF-HAB
'He writes.'
(Cook 1979: 139) |

¹³⁸ King's (1975) and Cook's (1979) transcriptions of vowel length before a pre-consonantal glottal stop are not consistent, but at least they show that the vowel length is contrastive before a pre-consonantal glottal stop in North Carolina Cherokee.

The historical vowel length in this environment (before a pre-consonantal glottal stop) can be inferred synchronically within Oklahoma Cherokee from whether or not the vowel in question can carry a superhigh accent, which is assigned to the last non-final long vowel of the word (Ch.14). Only historical long vowels can carry a superhigh accent, while long vowels which resulted from Compensatory Lengthening of a historical short vowel cannot. In (11.13), the second syllable (underlined) can carry a superhigh accent as (b) shows, while in (11.14), the second syllable, which is phonetically long, cannot carry a superhigh accent and thus the superhigh accent is assigned to the antepenultimate syllable in (b):

- | | | | |
|---------|---|--|---|
| | without SH | | with SH |
| (11.13) | a. à:jó:task
ààc <u>ó</u> óthask
Ø-acoó(?)tha-sk-(a)
3SG.A-blow-PRS-IND
'He is blowing it' (JRS, Aug 2012) | | b. aj ^ó :task
aco <u>ó</u> thask
Ø-acoo(?)tha-sk-(i)
3SG.A-blow-IMPF-NOM/SH
'(He is a) blower' (JRS, Aug 2012) |
| (11.14) | a. à:yâ:tohí
ààyáathohí
a-yáa(?)tho-hí(h-a)
*a-yaʔtho-híh-a
3SG.A-distribute-PRS-IND
'He is distributing it' (JRS, Aug 2012) | | b. ú:yà:tost
uúyààthost
uu-yàà(?)tho-st-(i)
*uu-yaʔtho-st-i
3SG.B-distribute-INF-NOM/SH
'He has to distribute it.' (JRS, Aug 2012) |

11.3. Illustrative examples

This section illustrates each type of H1 alignment in Table 11-1, providing forms which justify the relative order of *ʔ* and *C* (atonic forms) and the historical vowel length (superhigh accent). In this section, examples are first given in the tonic form in (a), with H1. Atonic forms are given in (b) where available, to justify the relative order of *ʔ* and *C*. The (c) forms, with a superhigh accent, are given where available, to justify the historical vowel length.

11.3.1. Types (i), (ii) (*V(C)ʔ)

As we saw in §11.1, historical *V(C)ʔ sequence yielded a short vowel aligned with H1:

(11.15) $*V(C)? > \acute{V}C$

When H1 spreads to the preceding syllable, the tonal configuration is constantly $\acute{V}C$. whether or not H1 spreads to the preceding syllable:

TABLE 11-2: $*V(C)?$

	$*V_$		$*VV_$	
	SPREADING	SPREADING BLOCKED	SPREADING	SPREADING BLOCKED
$*(C)?$	(i) $\acute{C}VC$ 	(ii) $\acute{C}VC$ 	(iii) $\acute{C}\acute{V}C$ 	(iv) $\acute{C}\acute{V}C$
$*?C$	(v) $\acute{C}\acute{V}VC$ 	(vi) $\acute{C}\acute{V}VC$ 	(vii) $\acute{C}\acute{V}VC$ 	(viii) $\acute{C}\acute{V}VC$

The forms in (11.16) - (11.19) exemplify this type. The forms in (11.16) and (11.17) show examples where H1 spreads to the preceding syllable (Type (i)); as was mentioned above, a glottal stop between vowels (11.17) has exactly the same tonal reflex as a historical post-consonantal glottal stop (11.16). In both cases, H1 in (a) alternates with a low tone in (b), justifying the historical $C?$ order. The forms with a superhigh accent are not available, but synchronic short vowels always come from a historical short vowel and thus reconstructing a short vowel is justified. The vowels in question are underlined.

(11.16) $*VC?$, spread (2nd H1)

a. $g\acute{a}:san\grave{e}:n\acute{a}dvsga$ (tonic)
 $k\acute{a}\acute{a}sane\acute{e}n\acute{a}tvska$

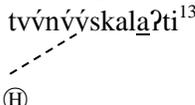
$ka\acute{:}:(?)saneen\acute{a}t(?)vsk-a$
 $*ka\acute{:}:(?)saneen\acute{a}t(?)vsk-a$
 3SG.A-attach.FL.behind:PRS-IND
 ‘He is attaching it (flexible) behind.’
 (Feeling 1975: 114)

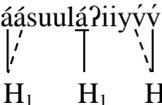
b. $h\grave{i}:sane:nad\grave{v}:ga$ (atonic)
 $h\grave{i}saneen\grave{a}tv\grave{v}ka$

$hi\grave{:}:(?)saneen\grave{a}t(?)v\grave{v}k-a$
 $*hi\grave{:}:(?)saneen\grave{a}t(?)v\grave{v}k-a$
 2SG.A-attach.FL.behind:PCT-IND
 ‘Attach it behind!’
 (Feeling 1975: 115)

- (11.17) *V?V, spread
- | | |
|---|--|
| <p>a. à:tawě:dó?vsga (tonic)
 ààthaweeétó?vska (tonic)</p> <p style="text-align: center;"> 
 H₁</p> <p>a-thaweeetó?vsk-a
 *a-thaweeto?vsk-a
 3SG.A-kiss:PRS-IND
 ‘He is kissing her.’ (Feeling 1975: 58)</p> | <p>b. hi:dawe:do?v:ga (atonic)
 hiitaweeto?v̀vka</p> <p>hii-thaweeto?v(?)k-a
 *hii-thaweeto?v(?)k-a
 2SG>3SG.AN-kiss:PCT-IND
 ‘Kiss her!’ (ibid.)</p> |
|---|--|

The forms in (11.18) - (11.19) illustrate cases where H1 does not spread to the preceding syllable (Type (ii)); in (11.18) H1 does not spread because the preceding syllable is short; no spreading in (11.19) is due to *TROUGH). Again, alternation of H1 with a low tone in the atonic forms (b) justifies the post-consonantal glottal stop.

- (11.18) *VC?, no spread
- | | |
|--|---|
| <p>a. hv:sgalá?dv:ʔi (tonic)
 hvvska^á?tvvʔi (tonic)</p> <p style="text-align: center;"> 
 H₁</p> <p>h-vvskalat-ʔ-vvʔi
 *h-vvskalat-ʔ-vvʔi
 2SG.A-hide.LG-PFT-ASR
 ‘Hide it (long) later!’</p> | <p>b. dǔ:nv:sgala?di (atonic)
 tv́nv́v́ska^á?ti¹³⁹</p> <p style="text-align: center;"> 
 ⊕</p> <p>da-an-vvskalat-ʔ-i
 *da-an-vvskalat-ʔ-i
 CISL-3PL.A-hide.LG-PFT-IND
 ‘They will hide it.’ (Feeling et al. 2003: 148)</p> |
|--|---|

- (11.19) *V?V, no spread (2nd H1)
- | | |
|---|--|
| <p>a. á:su:lá?i:yv:ʔa (tonic)
 áásuulá?iiyývʔa</p> <p style="text-align: center;"> 
 H₁ H₁ H₁</p> <p>Ø-áa(?)suulá?iiyvvʔ-a
 *Ø-aa?suula?iiyvvʔ-a
 3SG.A-change.pants:PRS-IND
 ‘He is changing pants.’ (Feeling 1975: 55)</p> | <p>b. hà:su:la?i:yv̀:na (atonic)
 hàasuula?iiyv̀na</p> <p>h-àà(?)suula?iiyvv̀n-a
 h-aa?suula?iiyvv̀n-a
 2SG.A-change.pants:PCT-IND
 ‘Change pants!’ (Feeling 1975: 55)</p> |
|---|--|

11.3.2. Types (iii), (iv) (*VV(C)?)

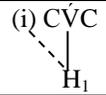
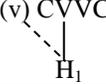
A historical *VV(C)? sequence yielded a long vowel with H1 aligned to its right mora; this H1 obligatorily spreads leftward within the syllable:

¹³⁹ The high tone is due to the pre-pronominal prefix (Ch.13).

(11.20) *VV(C)? > VVC


The tonal configuration of this type is constantly CVVC, whether or not H1 can spread to the preceding syllable:

TABLE 11-3: *VVC?

	*V_		*VV_	
	SPREADING	SPREADING BLOCKED	SPREADING	SPREADING BLOCKED
*(C)?	(i) CVVC 	(ii) CVVC 	(iii) CVVC 	(iv) CVVC 
*?C	(v) CVVC 	(vi) CVVC 	(vii) CVVC 	(viii) CVVC 

The forms in (11.21) - (11.22) illustrate cases where the spreading to the preceding syllable would not be blocked (Type (iii)). Alternation of H1 with a low tone in the atonic forms in (b) justifies the historical post-consonantal glottal stop. In (11.22), the vowel in question is shortened before a glottal stop in the atonic form (b), due to the general constraint against a *VV? sequence unless the vowel carries a high tone (§5.3.2.3).

(11.21) *VVC?, spreadable (2nd H)

a. à:dí:gwalv:dé:yoha (tonic)

ààtííkwálvvtééyoha



Ø-atíí(?)kwálvvtéey-(?)oh-a

*Ø-atíí?kwálvvtéey-?oh-a

3SG.A-spin-PRS-IND

‘He is spinning.’ (Feeling 1975: 10)

b. hadì:gwalv:de:yaga (atonic)

hatììkwálvvtéeyaka

h-atìì(?)kwálvvtéey-(?)ak-a

*h-atìì?kwálvvtéey-?ak-a

2SG.A-spin-PCT-IND

‘Spin!’ (Feeling 1975: 10)

- (11.22) *VV?V, spreadable
- | | |
|---|---|
| <p>a. à:dv:nv:ʔisdíha (tonic)</p> <p>ààtvvnv^vʔistíha</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">H₁</p> <p>∅-atvvnvʔistíh-a</p> <p>*∅-atvvnvʔistíh-a</p> <p>3SG.A-prepare:PRS-IND</p> <p>‘He is preparing it.’ (Feeling 1975: 14)</p> | <p>b. hadv:nvʔisda (atonic)</p> <p>hatvvnvʔista</p> <p>h-atvvnvʔist-a</p> <p>*h-atvvnvʔist-a</p> <p>2SG.A-prepare:PCT-IND</p> <p>‘Prepare it!’ (Feeling 1975: 14)</p> |
|---|---|

The forms in (11.23) - (11.24) illustrate cases where spreading to the preceding syllable is blocked

(Type (iv)).

- (11.23) *VVC?, unspreadable
- | | |
|--|--|
| <p>a. kanó:yeha (tonic)</p> <p>khanóóyeha (tonic)</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">H₁</p> <p>ka-hnooy-(?)eh-a</p> <p>*ka-hnooy-?eh-a</p> <p>3SG.A-fan-PRS-IND</p> <p>‘He is fanning it.’ (Feeling 1975: 142)</p> | <p>b. hihno:yǎ:la (atonic)</p> <p>hihnooyvǎla</p> <p>hi-hnooyvǎl-a</p> <p>*hi-hnooyvǎl-a</p> <p>2SG.A-fan:PCT-IND</p> <p>‘Fan it!’ (Feeling 1975: 142)</p> |
|--|--|
- (11.24) *VV?V, unspreadable
- | |
|--|
| <p>a. à:dawó:ʔa (tonic)</p> <p>ààtawóóʔa</p> <p style="text-align: center;">↓</p> <p style="text-align: center;">H₁</p> <p>∅-atawoóʔ-a</p> <p>*∅-atawooʔ-a</p> <p>3SG.A-bathe:PRS-IND</p> <p>‘He is bathing.’ (Feeling 1975: 8)</p> <p>c. adawó:sk (SH)</p> <p>atawoósk</p> <p>∅-atawoo(?)sk-(i)</p> <p>*∅-atawooʔsk-i</p> <p>3SG.A-bathe:IMPF-NOM/SH</p> <p>‘(he is a) bather’ (JRS Aug, 2012)</p> |
|--|

11.3.3. Types (v), (vi) (*V?C)

A historical *V?C sequence yielded a long vowel with H₁ aligned to its left mora (via

Comepensatory Lengthening); this H1 spreads to the mora of the preceding syllable unless blocked. The tonal configuration within the syllable is constantly high-low whether H1 spreads to the preceding syllable or not.

(11.25) *V?C > VVC


TABLE 11-4: *V?C

	*V_		*VV_	
	SPREADING	SPREADING BLOCKED	SPREADING	SPREADING BLOCKED
*C)?	(i) CVVC 	(ii) CVVC 	(iii) CVVC 	(iv) CVVC 
*?C	(v) CVVC 	(vi) CVVC 	(vii) CVVC 	(viii) CVVC 

(11.26a) gives a form where H1 spreads to the preceding syllable (Type (v)). As (c) shows, the relevant synchronic long vowel fails to carry a superhigh accent even though it is the last long vowel of the word, which justifies reconstruction of a historical short vowel ((c) also shows that the vowel in question alternates with a lowfall tone, justifying the pre-consonantal glottal stop):

(11.26) *V?C, spread

a. à:li:hě:lî:ga (tonic)
 ààliiheélîka

 Ø-aliiheelî(?)k-a
 *Ø-aliiheeli?k-a
 3SG.A-be.happy:PRS-IND
 ‘He is happy.’ (Feeling 1975: 39)

c. jà:li:hě:lî:ga (SH)
 cààliiheélîka
 c-Ø-aliiheelî(?)k-a
 *c-Ø-aliiheeli?k-a
 REL-3SG.A-be.happy:PRS-IND/SH
 ‘the one who is happy’ (JRS, Aug 2012)

(11.27a) exemplifies Type (vi); here, H1 fails to spread to the preceding syllable since the

preceding syllable already has a lowfall tone (*MAX-T; §8.5.2.3), due to Pronominal Tonic Lowering (§7.2). H1 in (a) alternates with a lowfall tone (b), justifying the *?C order. The (c) form, with a superhigh accent, shows that the synchronic long vowel in question fails to carry a superhigh accent, which justifies reconstruction of a historical short vowel:

- (11.27) *V?C, no spread
- | | |
|---|---|
| <p>a. à:yâ:tohí (tonic)
 àà<u>yá</u>athohí

 H₁
 a-yáa(?)tho-hí(h-a)
 *a-ya?tho-híh-a
 3SG.A-distribute-PRS-IND
 ‘He is distributing it’ (JRS, Aug 2012)</p> | <p>b. hiyààtohi (atonic)
 hiyà:thohi

 hi-yàà(?)tho-h-i
 *hi-ya?tho-h-i
 2SG.A-distribute-PCT-IND
 ‘Distribute it!’ (Feeling 1975: 62)</p> |
| <p>c. ú:yà:tost (SH)
 uúyààthost
 uu-yàà(?)tho-st-(i)
 *uu-ya?tho-st-i
 3SG.B-distribute-INF-NOM/SH
 ‘He has to distribute it.’ (JRS, Aug 2012)</p> | |

11.3.4. Types (vii), (viii) (*VV?C)

A historical *VV?C sequence yielded a long vowel with H1 aligned to its left mora. This H1 spreads to the preceding syllable unless blocked.

- (11.28) *VV?C > VVC
 |
 H₁

When this H1 does not spread to the preceding syllable, H1 instead spreads rightwards; this can be interpreted as displacement of the spread H1 to the following mora, due to Max-T, which bans deletion of tones (§8.5):

- (11.29) *VV?C > VVC
 |
 H₁

This is in contrast to Type (vi), where H1 does not spread rightward when it fails to spread to the

preceding syllable. See §11.4 for more on this difference.

TABLE 11-5: *VV?C

	*V_		*VV_	
	SPREADING	SPREADING BLOCKED	SPREADING	SPREADING BLOCKED
*C)?	(i) CVC H ₁	(ii) CVC H ₁	(iii) CVVC H ₁	(iv) CVVC H ₁
*?C	(v) CVVC H ₁	(vi) CVVC H ₁	(vii) CVVC H ₁	(viii) CVVC H ₁

H₁ in (11.30a) spreads to the preceding syllable (Type (vii)). The (b) form has the same suffix as (a), ambulative (AMB) *-iitoo?h-; here, the penultimate syllable has a lowfall tone, justifying the *?C order (the high tone on the preceding syllable is unexplained). The relevant syllable can carry a superhigh accent, as (c) shows, thus justifying reconstruction of a historical long vowel:

(11.30) *VV?C, spread

a. gano:hali:dô:ha (tonic)
kanoohaliitôoha

|
H₁

ka-noohal-iitoo(?)h-a

*ka-noohal-iitoo?h-a

3SG.A-hunt-AMB:PRS-IND

‘He is hunting.’ (Feeling 1975: 110)

b. keládf:dô:ha
khelátíitòoha

k-ehlát-ítòò(?)ha

*k-ehlát-íitoo?ha

3SG.A-mingle-AMB-IND

c. gano:hali:dô:hi (SH)
kanoohaliitôo^hhi

ka-noohaliitoo(?)h-i

*ka-noohaliitoo?h-i

3SG.A-hunt:IMPF-NOM

‘(he is a) hunter.’ (Feeling 1975: 110)

In (11.31a), H₁ does not spread to the preceding syllable (Type (viii)), due to the lowfall tone on this syllable (from Pronominal Tonic Lowering). This H₁ alternates with a lowfall tone in (b), justifying the historical *?C order. The relevant vowel can carry a superhigh accent, as (c) shows, thus justifying reconstruction of a historical long vowel.

- (11.31) *VV?C, no spread
- | | |
|--|---|
| <p>a. à:hné:sgeha (tonic)
 ààhnééskeha
 ↓
 H₁
 Ø-aahnée(?)skeh-a
 *Ø-aahnee?skeh-a
 3SG.A-build.house:PRS-IND
 ‘He is building a house.’ (Feeling 1975: 25)</p> | <p>b. ha:hnè:sgv̌:la (atonic)
 haahnèèskv̌la
 h-aahnèè(?)skv̌l-a
 *h-aahnee?skv̌l-a
 2SG.A-build.house:PCT-IND
 ‘Build a house!’ (Feeling 1975: 25)</p> |
|--|---|
- c. u:hné:sgeht (SH)
uuhneéskeht
uu-(aa)hnee(?)skeht-(i)
uu-aahnee?skeht-i
3SG.B-build.house:INF-NOM/SH
‘He has to build a house.’ (JRS, Aug 2012)

11.4. Conclusion

In this chapter, I have proposed the historical sources of the various types of H1 alignment through internal reconstruction. Various types of H1 alignment resulted from complex interaction of the relative order of the glottal stop and its adjacent consonant, and the historical vowel length before this sequence. The forms obtained from internal reconstruction as we have seen in this chapter differ from the synchronic representations in the following respects. First, tones (H1 and lowfall) are phonologized and are associated with a mora in Oklahoma Cherokee, while these tones are not reconstructed for pre-Cherokee. Second, the vowel length contrast before a pre-consonantal glottal stop is analyzed to be neutralized in synchronic Oklahoma Cherokee, while it is contrastive in the reconstructed forms.

Here, I would like to conclude this chapter by taking a look at one complication concerning a synchronic situation of H1 alignment, which resulted from the neutralization of vowel length before a pre-consonantal glottal stop. We have seen that a historical *VV?C sequence resulted in a long vowel with H1 aligned to its left mora (V̌V), but that the tonal configuration of that syllable alternates between high-low (V̌V) and high-high (V̌V̌) depending on whether H1 spreads to the preceding syllable or not (Types (vii) and (viii); §11.3.4). For instance, the andative suffix (AND) has a tonal configuration -éek- when H1

spreads to the preceding syllable (11.32a), while it has a tonal configuration *-éék-* when H1 does not spread to the preceding syllable (b):

- | | |
|--|--|
| <p>(11.32) a. Spread to the preceding σ
 à:hnohlí:nê:ga
 ààhnohliínéeka
 \swarrow
 \downarrow
 H₁
 Ø-aahnohliin-ée(?)k-a
 3SG.A-carry.LG.on.shoulder-AND:PRS-IND
 ‘He is carrying a long object on his shoulder.’
 (Feeling 1975: 25)</p> | <p>b. No spread to the preceding σ
 dà:lhtadé:ga
 tààlhthatééka
 \swarrow
 \downarrow
 H₁
 t-Ø-al(i)hthat-ée(?)k-a
 DIST-3SG.A-jump-AND:PRS-IND
 ‘He is jumping.’
 (Feeling 1975: 69)</p> |
|--|--|

As we saw above, not all the long vowels with H1 aligned to their left mora manifest this alternation. A historical **V?C* sequence has also yielded a long vowel with H1 aligned to its left mora, $\acute{V}V$ (§11.3.3; Types (iii) and (iv)), but the H1 configuration of this type is constantly high-low ($\acute{V}V$), whether H1 spreads to the preceding vowel (11.33a) or not (b):

- | | |
|---|---|
| <p>(11.33) a. Spread to the preceding σ
 uwà:jv:wâ:sdohdi
 uwààcvv\acute{w}áastoh\acute{t}i
 \swarrow
 \downarrow
 H₁
 uwa-:(?)cvvwáa(?)st-oh\acute{t}-i
 *<i>uwa</i> -:?cvvwáa?st-oh\acute{t}-i
 3SG.B-wring.out-INF-NOM
 ‘for him to wring it out’ (ibid.)</p> | <p>b. No spread to the preceding σ
 gá:jv:wâ:sdiha
 káácvvwáastiha (*káácvvwáastiha)
 \swarrow \downarrow
 H₁ H₁
 ka-:(?)cvvwáa(?)st-ih-a
 *<i>ka</i> -:?cvvwáa?st-ih-a
 3SG.A-wring.out-PRS-IND
 ‘He is wringing it out.’ (Feeling 1975: 98)</p> |
|---|---|

In a synchronic analysis, one has to be able to express the difference between the two types of H1 linked to the left mora of a long vowel; i.e. ones which show alternation of tonal configuration (Types (vii), (viii)), exemplified by (11.32), and those which do not show this alternation (Types (v), (vi)), as exemplified by (11.33). In a purely synchronic analysis, we can propose that Types (v) and (vi), which resulted from a **V?C* sequence, is marked with a rule feature [-H1 Displacement]. Since such vowels also fail to carry a superhigh accent (§11.2.2), these vowels are marked with a rule feature [-SH] as well. I tentatively assume that [-H1 Displacement] is dependent on the feature [-SH].

Chapter 12. High Tone on the Final Mora of the Stem (H2)

12.0. Introduction

Some verbs and nouns have a high tone (level [3]) on the final mora of the stem (henceforth H2), which in most cases is in the penultimate syllable of the word.¹⁴⁰ When this penultimate syllable is short, this syllable has a high tone, as in (12.1a). When this syllable is long, this syllable has a low-high rising tone, as (12.1b) and (12.2) illustrate:

- (12.1) Verb
- a. à:da:jagalíha
ààtaacakalíha
Ø-ata-:cakalíh-a
3sg.A-REFL-rip:PRS-IND
'It is ripping.' (Feeling 1975: 4)
- b. à:sgǒ:sk
ààskoósk
Ø-askoósk(-a)
3sg.A-be.embarrassed:PRS-IND
'He is embarrassed.' (JRS, Aug 2012)
- (12.2) Noun
- a. yǒ:na
yoóna
'bear' (Feeling 1975: 189)
- b. wě:sa
weésa
'cat' (Feeling 1975: 188)
- c. sě:lu
seélu
'corn (Feeling 1975: 152)

¹⁴⁰ The 'stem' in this case consists of the pronominal prefix + base + aspectual suffix in the case of a verb (i.e. minus the modal suffix, such as IND). For monomorphemic root nouns the 'stem' is coextensive with the root in many cases.

- d. sgǔ:hi
 skoóhi
 ‘ten’ (Feeling 1975: 152)

The position of H2 is always fixed and predictable: it is always found on the final mora of the stem. However, whether or not a word carries H2 is not predictable, and thus, each stem is specified with the feature [\pm H2], although some phonological and morphological tendencies can be stated (§12.2). This is reminiscent of a word-tone (Hyman 2006: 230), word-accent, or word melody system, where the tone is contrastive not at the level of the mora or the syllable but at the level of the word, as observed in Mende (Leben 1973: Ch.2; Goldsmith 1976: 35), Tongan (Goldsmith 1976: 142ff.), or the pitch accent system of Kagoshima Japanese (Hayata 1999: 18-35, etc.) or in the verbal pitch accent system in Tokyo Japanese.

In this chapter, I will first look at the phonological properties of H2 (§12.1), and then discuss the lexical and morphosyntactic conditioning factors that determine the occurrence of H2 (§12.2).

12.1. Phonological properties of H2

H2 is realized at the same pitch level as H1, and just like H1, the tone bearing unit of H2 is the mora (Wright 1996: 12). However, otherwise H2 shows different behaviors and properties from H1: direction of spreading (§12.1.1), tonal alternation (§12.1.2), and (non-)blocking of Laryngeal Alternation (§12.1.3).

12.1.1. Direction of spreading

H2 spreads from left to right, as has been shown in previous studies (Lindsey 1985, Wright 1996), in contrast to H1 and H3. This is evident from the following pairs, cited from Lindsey (1985: 132-133). The verb stem in (12.3) is specified with the feature [+H2] and thus has H2 on the last mora of the stem (realized as a rising tone on the penultimate syllable). H2 spreads rightward to the next mora when the next syllable is not the last syllable of the word, as in (a). H2 does not spread to the last syllable of the word, as (b) shows. (12.4), which has a [-H2] stem, illustrates that the lexical tone of the first syllable of the assertive modal suffix (ASR) is low-high in (a), thus confirming that long high level tone in (12.3a) is

due to the rightward spreading of H2 of the preceding vowel (the origin of a high tone on ASR is unknown).

- | | | | |
|--------|--|--|---------------------------------|
| | ASR | | IND |
| (12.3) | a. ù:sgǝ:sǎ:ʔi | | b. à:sgǝ:sga |
| [+H2] | ùùskoósǎǎʔi | | ààskoóska |
| | | | |
| | uu-(a)skoó-s-vǎʔi | | Ø-askoó-sk-a |
| | 3SG.B-dig-PFT-ASR | | 3SG.A-dig-PRS-IND |
| | ‘He dug it.’ (Feeling 1975: 51) | | ‘He is digging it.’ (ibid.) |
| | | | |
| (12.4) | a. ù:hlo:sǎ:ʔi | | b. à:hlo:sga |
| [-H2] | ùùhloosǎǎʔi | | ààhlooska |
| | | | |
| | uu-htlhoo-s-vǎʔi | | a-htlhoo-sk-a |
| | 3SG.B-surpass-PFT-ASR | | 3SG.A-surpass-PRS-IND |
| | ‘He surpassed him.’ (Feeling 1975: 23) | | ‘He is surpassing him.’ (ibid.) |

Recall from Ch.8 and Ch.9 that H1 spreads leftward. It might seem somewhat counterintuitive that both rightward and leftward spreading coexist synchronically in a single language, but there *are* languages that are reported to have both, such as San Esteban Mixtec (Maddieson 1976: 350), or Navajo, where high tone spreads rightward, but low tone spreads leftward (Leer 2001: 80-82).

Alternatively, one could analyze H2 spreading as tone plateauing (Goldsmith 1990: 36), motivated by the avoidance of a tonal dip of one mora; such a constraint (*TROUGH) is already independently motivated to account for the blocking of H1 Spreading (§8.5.2.3). In such an analysis, the high tone on the first mora of the assertive -ǎǎʔi is simply the result of tonal leveling, rather than spreading from either direction.¹⁴¹

¹⁴¹ To see if this is the case, we need to see cases where H2 is not followed by a low-high tone in the next syllable; if H2 spreads leftward without the presence of a low-high tone on the next syllable, cases as in (12.3) should be analyzed as spreading; on the other hand, if spreading is not observed in the absence of a low-high tone in the next syllable, cases as in (12.3) should be analyzed tone plateauing. However, H2 occurs at the stem final position, which is almost always followed either by an utterance-final HL% or H% boundary tone (§2.3.2), or a modal suffix with a high tone (ASR -ǎǎʔi, HAB -ó(ó)ʔi or EVID -é(é)ʔi),

12.1.2. Atonic forms

In Ch.9, we saw that H1 alternates with a lowfall tone in the atonic forms (again, tonicity in Oklahoma Cherokee is determined by complex morphophonological factors; cf. §1.7.4.2, Appendix A). In contrast, H2 either remains high (12.5b) or alternates with the unmarked low tone (12.6b) in the atonic forms (Lindsey 1987: 5). (b) are examples of imperative forms, which are atonic. Relevant vowels are underlined.

- | | | | |
|--------|---|--|---|
| | Tonic (PRS): | | Atonic (IMP): |
| (12.5) | a. <u>à</u> :hyahkě:tsga
ààhyahkheétska
a-hyahkheéc-sk-a
3SG.A-peel-PRS-IND
'He is peeling it.' (Feeling 1975: 27) | | b. hi <u>h</u> yahkě:tsa
hihyahkheétsa
hi-hyahkheéc-s-a
2SG.A-peel-PCT-IND
'Peel it!' (ibid.) |
| (12.6) | a. <u>ù</u> :lǎ:kwdi
uul <u>v</u> ýkwhti
uu- l <u>v</u> kw(o)ht-i
3SG.B-like-IND
'He likes it.' (Feeling 1975: 175) | | b. hi <u>l</u> v:kwda
hi <u>l</u> vykwhta
hi-l <u>v</u> kw(o)ht-a
2SG.A-like-IND
'Like it!' (ibid.) |

The factor determining whether or not H2 remains H in the atonic form is yet to be understood.

12.1.3. Blocking of Laryngeal Alternation

As opposed to H1 (§9.1.3), H2 does not block Laryngeal Alternation (Lindsey 1987: 6). Thus, in (12.7) and (12.8), *h* is preceded by H2 but the first *h* of the stem (underlined) alternates with a glottal stop in the glottal grade:

- | | | | |
|--------|---|--|---|
| | <i>h</i> -grade | | glottal grade |
| (12.7) | a. <u>à</u> :da:jagalíha
ààtaacakalí <u>h</u> a
Ø-ata-:cakalíh-a
3SG.A-rip:PRS-IND
'He is ripping.' (Feeling 1975: 4) | | b. gada:jagalí:ʔa
kataacakalíʔa ¹⁴²
k-ata-:cakalíh-a
1SG.A-rip:PRS-IND
'I am ripping.' (ibid.) |

and it is difficult to determine which analysis best accounts for the facts.

¹⁴² The vowel is lengthened before the glottal stop resulting from Laryngeal Alternation, for an unknown reason (cf. Appendix B).

- (12.8) a. u:ge:yúha
 uukeyyúha
 uu-keeyúh-a
 3SG.B-love:PRS-IND
 ‘He loves her.’ (Feeling 1975: 164)
- b. ji:ge:yú:ʔa
 ciikeeyúúʔa
 cii-keeyúh-a
 1SG>3SG.AN-love:PRS-IND
 ‘I love him.’ (ibid.)

12.2. Lexical and morphosyntactic conditions determining the presence of H2

As was mentioned in §12.0, each stem is listed in the lexicon with the feature [\pm H2], and this feature is realized as H2 on the final mora of the stem. Whether or not a stem is specified with the feature [+H2] or [-H2] is not entirely predictable, but some tendencies can be stated. §12.2.1 looks at such tendencies. H2 also has a morphosyntactic function, which will be discussed in §12.2.2.

12.2.1. Lexical conditions

12.2.1.1. Verbs

Some verbs carry H2 on the final mora of the stem:

- (12.9)
- a. à:dlo:hyíha
 ààtloohyíha
 Ø-atlooy-híh-a
 3SG.A-cry-PRS-IND
 ‘He is crying.’ (Feeling 1975: 13)
- b. à:de:hǒ:sga
 ààteehoóska
 Ø-ateehoó-sk-a
 3SG.A-be.embarrassed-PRS-IND
 ‘He is embarrassed.’ (Feeling 1975: 8)
- c. gv:no:sásga
 kvvnoosáska
 k-vvnoosá-sk-a
 3SG.A-sweep-PRS-IND
 ‘He is sweeping.’ (Feeling 1975: 128)

H2 tends to occur with verb stems which take Classes 1a, 1b, 3, 4, or 5 aspectual suffixes (cf. §1.7.1.2). None of these aspectual suffixes contains a glottal stop, which would have given rise to H1. Still, the occurrence of H2 is not fully predictable; some verbs with the same aspectual suffix and with similar phonological conditions may or may not have H2, as can be seen in (12.10) (class 3a) and (12.11) (class 3b), and thus the feature [\pm H2] has to be considered a lexical property of the stem:¹⁴³

	[+H2]	[-H2]
(12.10)	a. à:de:hǒ:sga ààteehoóska Ø-ateehoó-sk-a 3SG.A-be.embarrassed-PRS-IND 'He is embarrassed.' (= 12.9b)	b. à:ga:nawo:sga ààkaanawooska a-kaanawoo-sk-a 3SG.A-be.warm-PRS-IND 'It's warm' (Feeling 1975: 15)
(12.11)	a. gv:gǔ:sga kvvkuúska k-vvkuú-sk-a 3SG.A-leak-PRS-IND 'It's leaking.' (Feeling 1975: 126)	b. à:to:lsga ààthoolska Ø-a(h)thool-sk-a 3SG.A-borrow-PRS-IND 'He is borrowing it.' (Feeling 1975: 60)

H2 is not usually found when the stem final vowel is immediately preceded by another high tone, whether it is H1 (Ch.8 - Ch.11) or H3 (Ch.13), even when the verb takes one of the aspectual suffixes mentioned above.¹⁴⁴ In (12.12), H2 on the stem final vowel *i* in (a) is deleted when H3 is assigned to the preceding vowel (*oo*) due to the irrealis pre-pronominal prefix *y-* (IRR) in (b):

¹⁴³ Among 143 verbs listed in Feeling (1975) which take either of Classes 1a, 1b, 3, 4, or 5 aspectual suffixes, 72 verbs are [+H2], while 71 verbs are [-H2]. Among such [-H2] verbs, 37 verbs have phonological explanation for the absence of H2 (such as the presence of another high tone on the preceding syllable), while the other 34 [-H2] verbs do not.

¹⁴⁴ In this sense, Oklahoma Cherokee has a tendency to have a high tone on the final vowel of the verb stem, regardless of its source.

- | | | | |
|---------|---|--|---|
| | not preceded by H | | preceded by H |
| (12.12) | a. higo:whtíha
hikoowhthíha

H ₂ | | b. hyigó:whtiha
hyikóówhthiha
Ⓢ |
| | hi-koohw(a)hth-íh-a
2SG.A-see-PRS-IND
'You are seeing it.'
(Pulte & Feeling 1975: 242) | | y-hi-koohw(a)hth-ih-a
IRR-2SG.A-see-PRS-IND
'You are not seeing it.'
(ibid.) |

This appears to be due to the OCP discussed in §8.2, which bans the sequence of high tones associated with different nodes.

When derivational suffixes are attached to the stem, H₂ appears to remain in the original place, but it is not clear yet if this is the case for all the derivational suffixes. (12.13) illustrates the forms with and without a venitive (VEN) derivational suffix, *-iihl-*, and (12.14) with and without a causative suffix *-hist-*:

- | | | | |
|---------|---|--|---|
| | without VEN | | with VEN |
| (12.13) | a. à:sũ:hwísk
ààsuúhwísk
a-suúhwí-sk(-a)
3SG.A-paint-PRS-IND
'He is painting it.' (JRS, Aug 2012) | | b. ù:sũ:hwísi:hlv́
ùùsuúhwísiihlv́
uu-suúhwí-s-iihl-ív(ʔi)
3SG.B-paint-PFT-VEN:PFT-ASR
'He came to paint it.' (JRS, Aug 2012) |
| | without CAUS | | with CAUS |
| (12.14) | a. à:de:hõ:sga
ààteehoóska
Ø-ateehoó-sk-a
3SG.A-be.embarrassed-PRS-IND
'He is embarrassed.' (Feeling 1975: 8) | | b. à:de:hõ:hísdiha
ààteehoóhistiha
Ø-ateehoó-hist-ih-a
3SG.A-be.embarrassed-CAUS-PRS-IND
'He is embarrassing him.' (ibid.) |

12.2.1.2. Nouns

H₂ is sometimes also found on root nouns when the penultimate syllable is long; the tonal pattern is always low-high:

- (12.15) Nouns with LH
a. gǎ:da
kaáta
'soil' (Feeling 1975: 91)

- b. kǒ:la
kxoóla
'bone' (Feeling 1975: 145)
- c. tǔ:ya
thuúya
'beans' (Feeling 1975: 157)

Not all the nouns with a long penultimate syllable have H2:

- (12.16) No LH
- a. a:li
aali
'sweat' (Feeling 1975: 39)
 - b. lo:lo
lolo
'locust' (Feeling 1975: 146)

Lindsey (1987: 8) reports that loanwords from English with a penultimate stress pattern tends to have a LH tone in Cherokee:

- (12.17) Loans with LH
- a. kǎ:hwi
khaáhwí
'coffee' (Feeling 1975: 138)
 - b. wǎ:ji
waáci
'watch' (Feeling 1975: 187)

The low-high pitch rising on some nouns transcribed with [23] in Feeling (1975) is not always clear with all the speakers (even in DF's speech itself). Thus, JRS has a clear pitch rising in a word in (12.15c) (FIGURE 12-1), but DF does not have a clear rising (FIGURE 12-2). Compare these pitch traces with that of *lolo* 'locust' (FIGURE 12-3), which is a word without a low-high pitch rising:

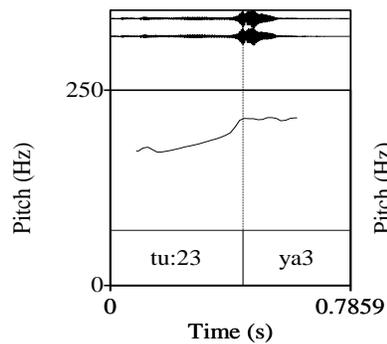


FIGURE 12-1. *thuíya* ‘beans’
(JRS, male, 2012)

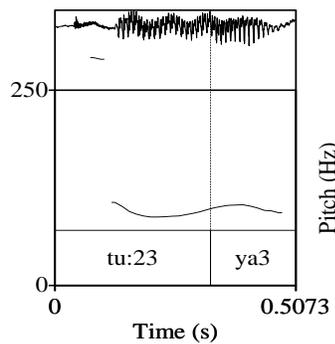


FIGURE 12-2. *thuíya* ‘beans’
(DF, male, 2001)

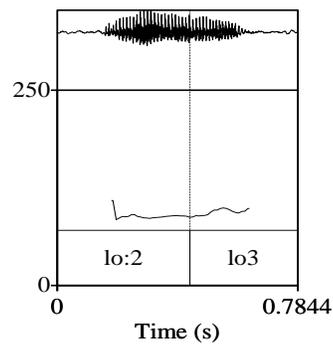


FIGURE 12-3. *lolo* ‘locust’
(DF, male, 2001)

12.2.2. Morphosyntactic function: punctual forms of verbs

H2 is generally a lexical property of stems. However, H2 is also employed to distinguish imperative (IMP) forms from punctual (PCT) forms of verbs in certain cases, which are otherwise segmentally identical. H2 is assigned to the stem-final mora in the punctual forms when this penultimate syllable is short (a), while their corresponding imperative forms (b) lack this H2. This is irrespective of whether the stem is lexically specified with [+H2] or [-H2]:

- | | | |
|---------|--|---|
| | PCT [+H2] | IMP [-H2] |
| (12.18) | a. higo:hwáhta
hikoohwáhtha
hi-koochwahth-a
2SG.A-see:PCT-IND
‘You just saw it.’ (EJ, July 2011) | b. higo:hwahta
hikoohwahtha
hi-koochwahth-a
2SG.A-see-PCT-IND
‘See it!’ (ibid.) |
| (12.19) | a. híga
híka
hi-k-Ø-a
2SG.A-eat-PCT-IND
‘You just ate it’ (EJ, July 2011) | b. higa
hika
hi-k-Ø-a
2SG.A-eat-PCT-IND
‘Eat it!’ (ibid.) |

- | | | | |
|------------|--|----|---|
| (12.20) a. | hinv:gála
hinvvkála
hi-nvokal-Ø-a
2SG.A-clean-PCT-IND
'You just cleaned it.' (EJ, July 2011) | b. | hinv:gala
hinvvkala
hi-nvokal-Ø-a
2SG.A-clean-PCT-IND
'Clean it!' (ibid.) |
|------------|--|----|---|

This tonal contrast (i.e. whether or not PCT has H2) is not found when the penultimate syllable is long, as (12.21) and (12.22) show (again, this is regardless of whether the stem is lexically specified with [+H2] or [-H2]):

- | | | | |
|------------|---|----|---|
| | PCT | | IMP |
| (12.21) a. | hì:sde:la
hìsteela
hii-steel-Ø-a
2SG>3SG.AN-help-PCT-IND
'You just helped him.' (EJ, July 2011) | b. | hì:sde:la ¹⁴⁵
hìsteela
hii-steel-Ø-a
2SG>3SG.AN-help-PCT-IND
'Help him!' (ibid.) |
| (12.22) a. | higo:li:ya
hikooliia
hi-kooliia-Ø-a
2SG.A-read-PCT-IND
'You just read it.' (EJ, July 2011) | b. | higo:li:ya ¹⁴⁶
hikooliia
hi-kooliia-Ø-a
2SG.A-read-PCT-IND
'Read it!' (ibid.) |

Tonal contrast of punctual and imperative (in terms of the presence of H2) is found when the verb has a glottal stop, either underlyingly (12.23a) - (12.25a) or as the result of Laryngeal Alternation (12.26a) - (12.27a), even when the stem final vowel is long. Their corresponding imperative forms (b) lack this H2:

- | | | | |
|------------|--|----|---|
| | PCT | | IMP |
| (12.23) a. | hisdúʔi
histúʔi
hi-stuʔ-Ø-i
2SG.A-open-PCT-IND
'You just opened it.' (EJ, July 2011) | b. | hisduʔi
histuʔi
hi-stuʔ-Ø-i
2SG.A-open-PCT-IND
'Open it!' (ibid.) |

¹⁴⁵ Feeling (1975: 47) has *hìsteéla*, but both EJ and Durbin Feeling state that the pronunciation of PCT and IMP are exactly the same.

¹⁴⁶ Feeling (1975: 18) has *higooliíya*, but both EJ and Durbin Feeling state that the pronunciation of PCT and IMP are exactly the same.

- (12.24) a. ho:hwe:l̥v̥:ga
 hoohweel̥v̥vka
 h-oohweel-*v̥v*(?)k-a (< *-v?k-)
 2SG.A-write-PCT-IND
 ‘You just wrote it.’ (EJ, July 2011)
- b. ho:hwe:l̥v̥:ga
 hoohweel̥v̥vka
 h-oohweel-*v̥v̥*(?)k-a (< *-v?k-)
 2SG.A-write-PCT-IND
 ‘Write it!’ (ibid.)
- (12.25) a. hi:yó:sda
 hiiyóósta
 hii-yoo(?)st-Ø-a
 2SG>3SG.AN-spoil-PCT-IND
 ‘You just spoiled him.’ (EJ, July 2011)
- b. hi:yò:sda
 hiiyòòsta
 hii-yòò(?)st-Ø-a
 2SG>3SG.AN-spoil-PCT-IND
 ‘Spoil him!’ (Feeling 1975: 65)
- (12.26) a. hi:yó:ʔa
 hiiyóóʔa
 hii-yoo-h-a
 2SG>3SG.AN-shoot-PCT-IND
 ‘You just shot him.’ (EJ, July 2011)
- b. hi:yoʔa¹⁴⁷
 hiiyoʔa
 hii-yoo-h-a
 2SG>3SG.AN-shoot-PCT-IND
 ‘Shoot him!’ (ibid.)
- (12.27) a. hi:l̥u:ga
 hiilúuka
 hii-luhk-a
 2SG>3SG.AN-kill:PCT-IND
 ‘You just killed him.’ (EJ, July 2011)
- b. hi:l̥u:ga
 hiilùùka
 hii-luhk-a
 2SG>3SG.AN-kill:PCT-IND
 ‘Kill him!’ (ibid.)

H2 on the penultimate syllable is not found in the punctual forms even if that syllable has a glottal stop, when this syllable is preceded by a syllable with another high tone (in the cases below, H1); this appears to be due to the OCP that bans a sequence of high tones associated with different nodes (§8.2):

- | | PCT | IMP |
|------------|---|--|
| (12.28) a. | hí:dlvʔa
húútlvʔa (*húúdlvʔa)
h-úu(?)tlv-ʔ-a
2SG.A-cover-PCT-IND
‘You just covered it.’ (EJ, July 2011) | hù:dlvʔa
hùùtlvʔa
h-ùù(?)tlv-ʔ-a
2SG.A-cover-PCT-IND
‘Cover it!’ (ibid.) |
| (12.29) a. | hisdû:hv̥:ga (*hisdû:h̥v̥:ga)
histúuhv̥v̥ka
hi-stúu(?)hv̥v̥(?)k-a (< *-stuʔhv̥?k-)
2SG.A-close-set.CMPT:PCT-IND
‘You just closed it.’ (EJ, July 2011) | hisdù:hv̥:ga
histùùhv̥v̥k-a
hi-stùù(?)-hv̥v̥(?)k-a (< *-stuʔhv̥?k-)
2SG.A-close-set.CMPT:PCT-IND
‘Close it!’ (ibid.) |

¹⁴⁷ The vowel before a glottal stop is shortened due to the constraint against a long low toned vowel before a glottal stop (*VVʔ; §5.3.2.3).

12.3. Conclusion

In this chapter, I have shown that a high tone which is found on the final mora of the stem (H2) is different from a high tone from a glottal stop (H1), based on the difference in their phonological properties (§12.1). I have also shown that whether or not a word has H2 is a lexical property of the stem, and that this phenomenon typologically resembles a word-accent system (§12.2.1). H2 is also employed to distinguish punctual forms of verbs from imperative forms, which are otherwise segmentally identical (§12.2.2).

Chapter 13. Floating High Tone from Pre-Pronominal Prefixes (H3)

13.0. Introduction

This chapter attempts the first comprehensive description of the floating high tone from pre-pronominal prefixes (henceforth H3). H3 is realized at the same pitch level as H1 (Ch.8-Ch.11) and H2 (Ch.12), but H3 is assigned to the forms which take certain pre-pronominal prefixes. In (13.1), the distributive (DIST) pre-pronominal prefix *tee-* assigns H3 to *hi*; this tone is absent from the form without the pre-pronominal prefix in (b). Pre-pronominal prefixes are separated by a hyphen.

- | | | | |
|--------|--|--|--|
| | with PPP | | without PPP |
| (13.1) | a. de:hígo:whtíha
tee-híkoowhtíha | | b. higo:whtíha
hikoowhtíha |
| | Ⓜ | | |
| | ‘You are seeing them’
(Pulte & Feeling 1975: 248) | | ‘You are seeing it’
(Pulte & Feeling 1975: 268) |

Here, I use the term *floating tone* to refer to tones which, at a given moment in the derivation, are not associated with any segment (Goldsmith 1990: 20).

In previous studies of H3 in Oklahoma Cherokee (Lindsey 1987, Wright 1996), H3 is claimed to be assigned to the syllable following the syllable of the pre-pronominal prefix. However, my database contains many examples where H3 is found on other syllables: there are cases where it is assigned to the syllable to which the single consonant of the pre-pronominal prefix belongs (13.2a), to the second syllable after the pre-pronominal prefix (b), even to the third syllable when the the pre-pronominal prefix consists only of a consonant (c), or not on any syllable (d):

(13.2)

- a. The same syllable as the PPP
yákwtv:gâ:ne¹⁴⁸
y-ákwhthvvkáane (y-: IRR)
Ⓜ
'I didn't hear it' (Pulte & Feeling 1975: 350)
- b. 2nd syllable from PPP
yigini:gowhti:ha
yi-kinífkowhthiíha
Ⓜ
'He is not seeing you and me.' (EJ, July 2011)
- c. 3rd syllable from PPP
yì:di:gówhti:ha
y-ìitiikówhthiíha
Ⓜ
'You all and don't I see it.' (EJ, July 2011)
- d. No H3
wà:jiyò:lv
w-ààciyòòlv (w-: TRNSL)
Ⓜ
'Someone got shot' (CED-EJ, 2010)

In this chapter, I will argue that these variations are due to various phonological and morphological factors: the vowel length of the pre-pronominal prefixes, the presence of an underlying vowel or glottal stop, and morpheme-specific idiosyncrasies.

TABLE 13-1 shows the template for pre-pronominal prefixes in Oklahoma Cherokee, partly repeated from §1.7.1.6. In TABLE 13-1, the feature [±TONIC] indicates whether the pre-pronominal prefix requires the verb to be in the tonic form or in the atonic form (see Appendix A for details). The feature [±H3] indicates whether the pre-pronominal prefix assigns H3 or not; REL and NEG do not assign H3 (§13.3.1), while other prefixes do. Alternations that are morphologically conditioned are placed on separate lines, while alternations conditioned by phonological factors are indicated by a tilde (~). Vowels

¹⁴⁸ In the actual negative forms of the verbs, this form must be accompanied by a negative clitic *hla/ tlha* 'not'. This particle is omitted from the forms in this chapter.

in parentheses appear before a consonant; y in parentheses appears before a vowel. On the (non-epenthetic) status of the short vowels and glides in parentheses, see §5.3.4.

TABLE 13-1: PRE-PRONOMINAL PREFIXES

IRR [-tonic] [+H3]	TRNSL [-tonic] [+H3]	PART [±tonic] [±H3]	DIST [+H3]	CIS [±tonic] [+H3]	ITR [+tonic] [+H3]	NEG [-tonic] [-H3]
<i>y(i)-</i>	<i>w(i)-</i>	<i>n(i)-</i> <i>ii- ~iy-</i>	<i>t(ee)-</i> <i>t(i)-~c-</i> <i>too-</i>	<i>t(i)- ~c-</i> <i>ta(y)-</i>	<i>ii- ~ iʔ- ~ Ṽ</i> <i>vʷ- ~ vʔ- Ṽ</i>	<i>ka(y)- kee-</i>
REL [+tonic] [-H3]						
<i>c(i)-</i>						

The organization of this chapter is as follows. First, §13.1-§13.3 discuss the basic facts of H3. §13.1 briefly discusses the phonological properties of H3 to show that it has different phonological properties from the other two types of high tones, H1 (Ch.9) and H2 (Ch.12), even though they are realized at the same pitch level. §13.2 discusses the principles governing the various positions of H3. §13.3 lists the factors that block assignment of H3. §13.4 situates the Cherokee floating H3 in a broader context and I argue that it is more of an ‘accentual’, rather than tonal, phenomenon, and that it is a quantity insensitive iambic accent. I also argue that the H3 assignment rule is best captured by adopting an extrametrical analysis, as opposed to epenthetic or “weightless” analyses.

13.1 Phonological properties of H3

H3 manifests different phonological properties from H1 (Ch.9) and H2 (Ch.12), even though they all are realized at the same pitch level. In this section, I will first show that the tone-bearing unit of H3 is the syllable, unlike H1 or H2, whose tone-bearing unit is the mora (§13.1.1). Second, I will show that the direction of tone spreading is leftward, like H1, but unlike H2 (§13.1.2). Third, it will be shown that H3 remains high in the atonic form, unlike H1 (§13.1.3). Lastly I show that H3 does not block Laryngeal Alternation, like H2 but unlike H1 (§13.1.4).

13.1.1. Tone-bearing unit

H3 is assigned to the syllable as a whole. If the vowel to which H3 is assigned is short, H3 extends only for one mora:

- (13.3) Short vowel
- a. de:gáno:jahl'vsga
tee-kánoocahl'vska
- Ⓜ
- tee-ka-noocahl'vsk-a
DIST-3SG.A-advertise:PRS-IND
'He is advertising it.' (Feeling 1975: 78)
- b. de:jígv:walò:díha
tee-cíkvvwalòdítíha
- Ⓜ
- tee-ci-kvvwalòd(ʔ)tíh-a (< *-kvvwaloʔtih-)
DIST-1SG.A-set.price:PRS-IND
'I am setting a price.' (Feeling 1975: 68)

If the vowel of the syllable to which H3 is assigned is long, H3 extends for two moras:

- (13.4) Long vowel
- a. de:gé:tvsga
tee-kééthvska
- Ⓜ
- tee-k-eethvsk-a
DIST-3SG.A-endure:PRS-IND
'He is enduring it.' (Feeling 1975: 78)
- b. de:jí:yali:sò:sdíha
tee-cíiyaliisoóstíha
- Ⓜ
- tee-ci-y-alisoóstíh-a
DIST-1SG.>3SG.AN-aim.at:PRS-IND
'I am aiming at him' (Feeling 1975: 74)

These facts suggest that the tone-bearing unit of H3 is the *syllable*, as opposed to H1 or H2, whose tone-bearing units are the *mora*.

13.1.2. Direction of spreading

H3 optionally spreads by one mora to the left, whether the syllable assigned H3 is short or long ((a), (c) vs. (b), (d)), and whether the preceding syllable is short or long ((a), (b) vs. (c), (d)).

(13.5)

- a. deéjígooliíyéʔa
 teé-cíkooliíyéʔa
 ②-----①
 Ⓜ
 tee-ci-kooliíyéʔ-a
 DIST-1SG.A-read:PRS-IND
 ‘I’m reading them.’ (Pulte & Feeling 1975: 328)
- b. deéǵv́noosásga
 teé-kv́noosáska
 ②-----①
 Ⓜ
 tee-k-vvnoosásk-a
 DIST-3SG.A-sweep:PRS-IND
 ‘He is sweeping them.’ (Pulte & Feeling 1975: 307)
- c. dijáyáwèègi
 ti-cáyáwèèki
 ②-----①
 Ⓜ
 ti-ca-yawèè(?)k-i
 DIST-2SG.B-be.tired:PCT-IND
 ‘Be tired!’ (Feeling 1975: 88)
- d. dijádlóóhi
 ti-cátlóóhi
 ②-----①
 Ⓜ
 ti-c-atlooh-i
 DIST-2SG.B-confront:PCT-IND
 ‘Confront with it!’ (Feeling 1975: 86)

That H3 is first assigned to the right syllable, rather than the left one, is clear from the fact that the high tone on the left syllable is optional while that on the right syllable is obligatory. Compare the following pair; each member of the pair is in a free variation. In (a) H3 is assigned to the syllable *ci* without spreading, while in (b) H3 is assigned to the syllable *ci* and then spreads to the preceding mora:

- | | | | |
|--------|--|--|--|
| | No spreading | | Spreading |
| (13.6) | a. deejígòdòwhthíha
tee-cíkòdòwhthíha
⊘
tee-ci-koohw(a)hthíh-a
DIST-1SG.A-see:PRS-IND
'I see them.' (Pulte & Feeling 1975: 247) | | b. deejígòdòwhthíha
teé-cíkòdòwhthíha
② ⊘ ①
⊘
tee-ci-koohw(a)hthíh-a
DIST-1SG.A-see:PRS-IND
'I see them.' (Pulte & Feeling 1975: 307, 332) |

H3 is similar to H1 in that the tone spreading is leftward (§8.1, §9.3), in contrast to H2, whose direction of tone spreading is rightward (§13.1.1).

13.1.3. Atonic forms

H3 remains high even in atonic forms, as (b) forms illustrate:

- | | | | |
|--------|--|--|---|
| | Tonic (PRS) | | Atonic (IMP) |
| (13.7) | a. de:káno:gí?a
tee-khánookí?a
⊘
tee-ka-hnookí?-a
DIST-3SG.A-sing:PRS-IND
'He is singing.' (Feeling 1975: 79) | | b. tíhnó:gi
t-hihnóóki
⊘
t-hi-hnook-i
DIST-2SG.A-sing:PCT-IND
'Sing!' (ibid.) |
| (13.8) | a. de:gánadíwsga
tee-kánatíwsga
⊘
tee-ka-natí(?)w-sk-a
DIST-3SG.A-cross-PRS-IND
'He is crossing it.' (Feeling 1979: 77) | | b. t-inádi:hwi
t-hinátìihwi
⊘
t-hi-natì(?)w-h-i (< *-nati?w-)
DIST-2SG.A-cross-PCT-IND
'Cross it!' (ibid.) |

This is in contrast to H1 which alternates with a lowfall tone (§9.1.2), or H2, which is replaced by a low tone (or remains high, like H3) in atonic forms (§12.1.2).

13.1.4. Blocking of Laryngeal Alternation

Laryngeal Alternation is a stem alternation process triggered by certain pronominal prefixes and according to which the first *h* of the stem alternates with a glottal stop in the glottal grade (§1.7.4.1). H3 does not block Laryngeal Alternation, like H2 (§12.1.3), but unlike H1 (§9.1.3). In (13.9b), the first *h* of

the *h*-grade in (a) (underlined in the segmentation line) is replaced by a glottal stop in the glottal grade, and it is preceded by H3. In (13.10), the first *h* is in the *h*-grade is pre-consonantal (a), and thus in the glottal grade the preceding vowel has a lowfall tone (b).

- | | |
|---|---|
| <p>(13.9) a. <i>h</i>-grade
 de:gáno:jahlv́sga
 tee-kánoocah<u>l</u>v́sk-a
 Ⓜ
 tee-ka-noocalh́v́sk-a
 DIST-3SG.A-advertise:PRS-IND
 ‘He is advertising.’ (Feeling 1975: 78)</p> | <p>b. glottal grade
 de:jíno:jaʔlv́sga
 tee-cínoocaʔlv́sk-a
 Ⓜ
 tee-ci-noocalh́v́sk-a
 DIST-1.sg.A-advertise:PRS-IND
 ‘I am advertising.’ (ibid.)</p> |
| <p>(13.10) a. de:gú:kdíha
 tee-kúúk<u>h</u>tíh-a
 Ⓜ
 tee-k-uuk(o)htíh-a
 DIST-3SG.A-decide:PRS-IND
 ‘He is deciding it.’ (Feeling 1975: 78)</p> | <p>b. de:gú:gò:díha
 te:-kúúkòdòtíha
 Ⓜ
 te:-k-uukohtíh-a
 DIST-1SG.A-decide:PRS-IND
 ‘I am deciding it.’ (ibid.)</p> |

13.2. Position of H3

The position of H3 is determined by various phonological and morphological factors. §13.2.1-§13.2.3 concern the phonological factors. First, in §13.2.1 argue that the vowel length (and presence/absence of the vowel) of the pre-pronominal prefix is the most crucial factor in determining the location of H3. §13.2.2 and §13.2.3 illustrate how positing an underlying vowel and underlying glottal stop accounts for apparent exceptions. §13.2.4 and §13.2.5 look at factors pertaining to specific morphemes. §13.2.4 shows that the peculiar behaviors of pronominal prefixes beginning with *ii-*, and §13.2.5 looks at the anomalous behaviors of two pre-pronominal prefixes, CISL and NEG, when preceded by another pre-pronominal prefix.

13.2.1. Vowel length of the PPP

As we saw in (13.2) above, H3 can be assigned to various positions within a verb. In this section, I show that the relevant factor here is the vowel length (and presence/absence of a vowel) of the pre-

pronominal prefixes. I will first look at the cases where the vowel of the pre-pronominal prefix is long (§13.2.1.1), and then where it is short or non-existent (§13.2.1.2). I will then show that this also holds when a pre-pronominal prefix is preceded by another pre-pronominal prefix (§13.2.1.3). §13.2.1.4 summarizes the discussion in this subsection, rejecting alternative analyses.

13.2.1.1. When the vowel of the PPP is long

The most important factor determining the placement of H3 is the vowel length of the pre-pronominal prefix; if the vowel of the pre-pronominal prefix is long (DIST(i) *tee-*, ITER *ii-/vv-*), H3 is assigned to the first syllable of the ‘modal stem’ (= pronominal prefix + base + aspectual suffix + modal suffix):

(13.11) H3 Association I (long PPP)
 CVV]_{PPP} + MOD[(C₀)V(V)C₀V(V)..


Note that this representation is meant merely to be a descriptive device and I do not necessarily assume it to be a true grammatical object. Alternative analyses for this process will be discussed at the end of this chapter in §13.4. (13.12) is an example; the boundary between the pre-pronominal prefix and the ‘modal stem’ is separated by a hyphen in the second line:

(13.12) de:káno:gí:ʔa
 tee-khánookííʔa

 tee-ka-hnook-ííʔ-a
 DIST-3SG.A-sing-PRS-IND
 ‘He is singing.’ (Feeling 1975: 79)

FIGURE 13-1 shows the pitch trace (a male speaker) of (13.12):

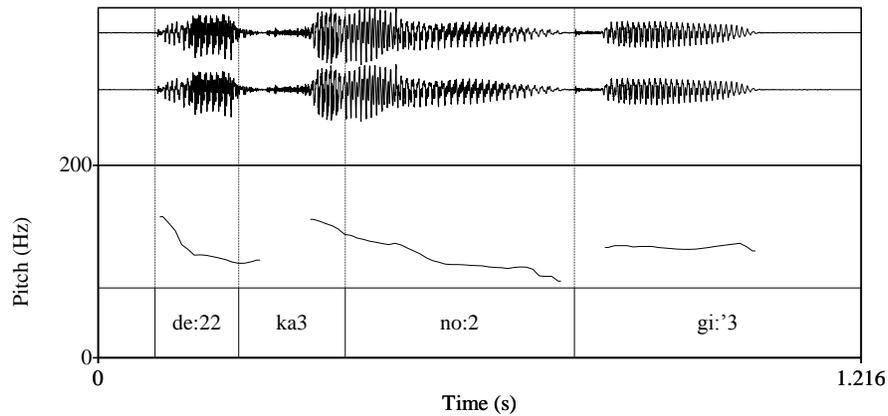


FIGURE 13-1. *teekhánookí?* ‘He is singing’ (EJ, male, 2010)

The examples in (13.13) show additional instances of DIST (i):

- (13.13) DIST (i)
- a. de:hígo:whtíha
tee-híkoowhthíha
Ⓜ
tee-hi-koohw(a)hth-íh-a
DIST-2SG.A-see-PRS-IND
‘You see them’ (Pulte & Feeling 1975: 248)
- b. de:jí:yadani:lú:ga
tee-cíiyataniilúvka
Ⓜ
tee-ciiy-ataniilúv(?)k-a
DIST-1SG>3SG.AN-accept:PRS-IND
‘I am accepting him’ (Feeling 1975: 67)

(13.14) - (13.15) illustrate cases of H3 assigned by the iterative pre-pronominal prefix (ITER).

ITER has two allomorphs: *vv-*, which occurs with the nominal *-i*, motion *-i*, or assertive *-vú?i* modal suffixes, and *ii-*, which occurs elsewhere (Cook 1979: 77, Pulte & Feeling 1975: 254):

(13.14) ITER (i)
 a. v:sgíni:gò:wáhta
 vv-skíniikòòwáhtha
 Ⓜ
 vv-skinii-koochwáhth-a
 ITER-2/1DU-see:PCT-IND
 ‘You two have just seen me.’ (EJ, July 2011)

b. v:hí:gò:wáhta
 vv-híikòòwáhtha
 Ⓜ
 vv-hii-koochwáhth-a
 ITER-2SG>3SG.AN-see:PCT-IND
 ‘You just saw him.’ (EJ, July 2011)

(13.15) ITER (ii)
 i:sdí:wó:ni:ha
 ii-stíjwóóniha
 Ⓜ
 ii-stii-wóo(?)n-iih-a
 ITER-2DU-speak-PRS-IND
 ‘You two are speaking again’ (EJ, July 2011)

With vowel-initial pronominal prefixes (such as *a-* 3SG.A, *oocii-* 1PL.EX.A, etc.), either a glottal stop is inserted after the ITER (13.16a), or the vowel of the pre-pronominal prefix merges with the initial vowel of the pronominal prefix and the H3 is assigned to this initial vowel (b) (Pulte & Feeling 1975: 254):

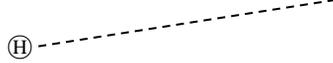
	No merge	~	Merge
(13.16) a.	íʔu:go:hé:ʔi		úgo:hé:ʔi
	íʔ-uukoohééʔi		úkoohééʔi
	Ⓜ		Ⓜ
	íʔ-uu-kooH-ééʔi		íʔ-uu-kooH-ééʔi
	ITER-3SG.B-see:PFT-EVID		ITER-3SG.B-see:PFT-EVID
	‘He reportedly saw it again’ (Pulte & Feeling 1975: 254)		

Note in either case the initial vowel with H3 is shortened.

13.2.1.2. When the vowel of the PPP is short or non-existent

If the vowel of the pre-pronominal prefix is short or non-existent (IRR *y(i)-*, TRNSL *w(i)-*, PART *n(i)-*, DIST(ii) *t(i)-*, CISL *ta-/ti-*, or HORT \emptyset -), H3 is assigned to the second syllable of the ‘modal stem’:

(13.17) H3 Association II (short PPP)
 $C(V)]_{PPP} +_{MOD}[(C_0)V(V)C_0V(V)..$



(13.18) is an example with IRR:

(13.18) *yisgwahtv:dà:sdí:ha*
yi-skwahthvvtààstiíha



yi-skw-ahthvvtàà(?)st-iih-a (< *-ahthvvtààst-)
 IRR-2SG>1SG-listen-PRS-IND/SH
 ‘If you listen to me’ (CED-EJ, 2010)

FIGURE 13-2 is a pitch trace (male speaker) of (13.18):

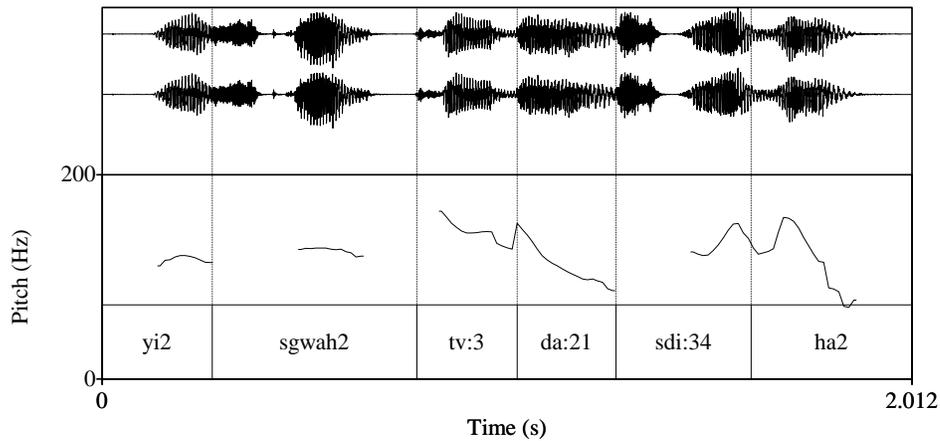


FIGURE 13-2. *yiskwahthvvtààstiíha* ‘if you listen to me’ (EJ, male, 2010)

H3 is assigned to the second syllable of the modal stem, according to H3 Association II (13.17), both when the pre-pronominal prefix has a short vowel or when it has no vowel (when it consists only of a

consonant). In (13.19) - (13.22), the pre-pronominal prefixes of (a) forms have a short vowel, while the (b) forms have no vowel:

- | | V of PPP present | V of PPP absent |
|------------|---|--|
| (13.19) a. | yiginí:gowhtí:ha | yagwá:nhta |
| IRR | yi-kiníjkowhthííha | y-akwáánhtha |
| | Ⓜ | Ⓜ |
| | yi-kinii-kohw(a)hth-iíh-a | y-akw-aanhth-a |
| | IRR-1DU.IN.B-see-PRS-IND | IRR-1SG.B-know:PRS-IND |
| | ‘He is not seeing you and me.’ | ‘I don’t know’ |
| | (EJ, July 2011) | (Pulte & Feeling 1975: 242) |
| (13.20) a. | wigané:hne:ha | waní:ne:hne:ha |
| TRNSL | wi-kanééhneéha | w-anííneehneeha |
| | Ⓜ | Ⓜ |
| | wi-ka-neeheéh-a | w-anii-neeheeh-a |
| | TRNLS-3SG.A-give.LQ:PRS-IND | TRNSL-3PL.A-give.LQ:PRS-IND |
| | ‘He is giving him some liquid.’ | ‘They are giving him some liquid.’ |
| | (EJ, July 2011) | (EJ, July 2011) |
| (13.21) a. | dijádłó:hi ¹⁴⁹ | tahnáwa?i:yǎ:na |
| DIST (ii) | ti-cátlóóhi | t-hahnáwa?iiyvǎna |
| | Ⓜ | Ⓜ |
| | ti-c-atloo-h-i | t-h-ahnawa?iiyvǎ-n-a |
| | DIST-2SG.B-PCT-IND | DIST-2SG.A-change.clothes-PCT-IND |
| | ‘Be confronted with it!’ (Feeling 1975: 86) | ‘Change clothes!’ (Feeling 1975: 69) |
| (13.22) a. | nigv:gígo:hǎ:na ¹⁵⁰ | nu:ní:go:hǎ:na |
| | ni-kvkvíkoohvǎna | n-uunííkoohvǎna |
| | Ⓜ | Ⓜ |
| | ni-kvkvki-koooh-vvna | n-uunii-koooh-vvna |
| | PART-3PL>1SG-see:PFT-NEG/SH | PART-3PL.B-see:PFT-NEG/SH |
| | ‘them without seeing me’(EJ, July 2011) | ‘them without seeing him’(EJ, July 2011) |

(13.23) shows forms with CISL. CISL has a vowel *a* in (a), while in (b) the vowel of CISL is merged with the vowel of the pronominal prefix:

¹⁴⁹ H3 on *tloo* spreads to the preceding syllable, *ca*.

¹⁵⁰ Partitive PPP does not always assign H3. Thus, with the verb bases which lexically take the partitive PPP (e.g. *-atvvʔn-* ‘do’, *-we-* ‘say’, etc.), H3 is not assigned by this PPP (see §13.3).

- | | | | |
|---------|------------------------------------|--|-----------------------------|
| | V of PPP present | | V of PPP merged |
| (13.23) | a. dayo:jé:dò:li
tay-oocéétòdli | | b. dv:gó:hi
t-vvkóóh-i |
| | Ⓜ | | Ⓜ |
| | tay-ooc-eetòd(?)l-i | | ta-a-kooh-i |
| | CISL-1PL.EX.A-walk.around:PFT-MOT | | CISL-3SG.A-see:PFT-MOT |
| | ‘You all and I will come here.’ | | ‘He will see it.’ |
| | (EJ, July 2011) | | (Pulte & Feeling 1975: 249) |

Hortative (HORT) does not have an overt pre-pronominal prefix, but instead is marked solely by H3. Segmentally a hortative form is the same as the punctual form of the verb, but hortative forms have H3 (a). In contrast, their corresponding punctual forms (b) have a lowfall tone on the first syllable (due to Pronominal Tonic Lowering (or TGI; §7.2) and H2 on the penultimate syllable, which is characteristic of a punctual form (§12.2.2):

- | | | | |
|---------|---|--|---|
| | HORT | | PCT |
| (13.24) | a. e:ní:gò:wahta
eeníikòdòwahtha | | b. è:ni:gò:wáhta
èèniikòdòwáhth-a |
| | Ⓜ | | |
| | eenii-koohwahth-a | | eenii-koohwahth-a |
| | 1DU.IN>3SG.AN-see:PCT-IND | | 1DU.IN>3SG.AN-see:PCT-IND |
| | ‘Let’s us two see him’ (EJ, July 2011) | | ‘You and I saw him briefly.’ (EJ, July 2011) |
| (13.25) | a. e:dV:nì:ga
eetVvniika | | b. è:dv:nî:ga
èètvvníika |
| | Ⓜ | | |
| | eet-vvn-ihk-a | | eet-vvn-ihk-a |
| | 1PL.IN>3SG.AN-hit-PCT-IND | | 1PL.IN>3SG.AN-hit-PCT-IND |
| | ‘Let’s us all hit him.’ (EJ, July 2011) | | ‘Y’all and I hit him briefly’ (EJ, July 2011) |

13.2.1.3. When there are more than one PPP

A verb can take up to three pre-pronominal prefixes. When there are more than one pre-pronominal prefix, the placement of H3 is determined by the *last* pre-pronominal prefix (except when CISL or NEG is the last pre-pronominal prefix; see §13.2.5); that is, the counting for the position of H3 begins with the last pre-pronominal prefix, rather than with the beginning of the word. Thus, when the last pre-

pronominal prefix has a long vowel (i.e. DIST (i) or ITER), H3 is assigned to the first syllable of the modal stem, according to H3 Association I (13.11):¹⁵¹

- (13.26) The last PPP long
- a. wide:jígò:whtí:sgv:ʔi
witee-cíkòðwhthíískvʔi
- Ⓜ
- wi-tee-ci-koohw(a)hth-íísk-vʔi
TRNSL-DIST-1SG.A-see-IMPF-ASR
‘I was seeing them (facing away).’ (Pulte & Feeling 1975: 247)
- b. do:hígo:whtíha¹⁵²
too-híkoohw(a)hthíha
- Ⓜ
- tee-vv-hi-koohw(a)hth-íh-a
DIST-ITER-2SG.A-see-PRS-IND
‘You are seeing them again.’ (Pulte & Feeling 1975: 255)

When the last pre-pronominal prefix has a short vowel or no vowel (except for CISL), H3 is assigned to the second syllable of the modal stem, according to H3 Association II (13.17):

- (13.27) The last PPP short
- a. widigö:hwé:là:neha
witikoóhwéélààneha
- Ⓜ
- wi-ti-k-oohweel-àà(?)n-eh-a (< *-aʔn-)
TRNSL-DIST-3SG.A-write-PFT-DAT:PRS-IND
‘He is writing them to him.’ (Pulte & Feeling 1975: 245)

¹⁵¹ Usually, DIST takes the allomorph (ii) with *ti-* after another pre-pronominal prefix (Pulte & Feeling 1975: 247). Here, ASR requires the verb to be in the tonic form, and thus DIST takes the allomorph (i) (cf. Appendix A).

¹⁵² The combination of DIST and ITER results in *too-* (Pulte & Feeling 1975: 254).

b. yidijigô:whthíha
 yiti-cikóowhthíha
 (H)
 yi-ti-ci-koohw(a)hth-íh-a
 IRR-DIST-1SG.A-see-PRS-IND
 ‘I am not seeing them.’ (Pulte & Feeling 1975: 247)

c. yido:jí:nv:tlô:híha
 yit-ooçínv̀̀̀tlhoóhíha
 (H)
 IRR-DIST-1PL.EX.A-tie.up.leg-PRS-IND
 ‘They and I are tying his legs up.’ (EJ, July 2011)

d. yuwagó:whtiha
 yuw-akóówhthiha¹⁵³
 (H)
 yi-w-a-koohw(a)hth-ih-a
 IRR-TRNSL-3SG.A-see-PRS-IND
 ‘He doesn’t see it (with his back turned).’ (Pulte & Feeling 1975: 242)

The same principle holds when a verb has three pre-pronominal prefixes. In (13.28), the last pre-pronominal prefix is iterative *vv-*, with a long vowel (which fuses with DIST *tee-* and becomes *too-*; Pulte & Feeling 1975: 254), hence H3 is assigned to the first syllable of the modal stem, *ca*, and then spreads leftward:

(13.28) jidô:jádé:si
 citoó-cátéési
 (H)
 ci-tee-vv-c-atée(?)s-i
 REL-DIST-ITER-2SG.B-throw:?-IND
 ‘Don’t throw them’ (Pulte & Feeling 1975: 243)

When one of the pre-pronominal prefixes is a non-H3 assigning pre-pronominal prefix (i.e. REL or NEG; see §13.3.1), but when the other pre-pronominal prefix is a H3 assigning prefix, the feature of the H3 assigning pre-pronominal prefix is percolated to the whole sequence and H3 is assigned to the relevant

¹⁵³ The combination of IRR *yi-* and TRNSL *wi-* optionally yields *yuw-* (Pulte & Feeling 1975: 244).

syllable. Thus, when REL, which by itself does not assign H3, is combined with a H3 assigning pre-pronominal prefix, the form has H3:¹⁵⁴

- (13.29) jide:gá:gà:tinv:dé:ʔa
 citee-kákààathinvvtééʔa
 Ⓜ
 ci-tee-k-akahthinvtééʔ-a
 REL-DIST-1SG.A-take.off.glasses:PRS-IND
 ‘(that’s why) I’m taking off glasses.’ (CED-EJ, 2010: 70)

When NEG occurs with another pre-pronominal prefix which assigns H3, NEG always attracts H3. See §13.2.5.2.

13.2.1.4. Summary: vowel length of the pre-pronominal prefix

In this section, I have argued that the relevant factor for determining the position of H3 is the purely phonological factor of *vowel length* (and the presence/absence of the vowel) of the pre-pronominal prefix. In this section, I reject alternatives to such an analysis.

First, the position of H3 is not determined by morpheme-specific rules. This is evident when we compare the two allomorphs of the distributive pre-pronominal prefix. The distributive prefix alternates between an allomorph with a long vowel (13.30 a) and the one with a short vowel or no vowel (b), depending on the tonicity of the verb (see Appendix A; Pulte & Feeling 1975: 247-248, Cook 1979: 67-71). H3 is assigned to the first syllable of the modal stem when the distributive pre-pronominal prefix has a long vowel (a), while it is assigned to the second syllable when it is in the allomorph with no vowel (b):

¹⁵⁴ Since REL is the initial pre-pronominal prefix in the template, it is always the first pre-pronominal prefix.

- | | |
|---|---|
| (13.30) a. DIST (i)
de:gáleʔvsga
tee-káleʔvaska

tee-k-aleehvsk-a
DIST-1SG.A-get.up:PRS-IND
‘I am getting up’ (Feeling 1975: 73) | DIST (ii)
b. talé:hv:ga
th-alééhv̀v̀ka

t-h-aleehv̀v̀(?)k-a (< *-aleehvʔk-)
DIST-2SG.A-get.up:PCT-IND
‘Get up!’ (Feeling 1975: 73) |
|---|---|

The only difference between (a) and (b) is the presence/absence of the vowel of the pre-pronominal prefix.

The relevant factor determining the position of H3 is the vowel length of the *pre-pronominal prefix*, rather than that of the first syllable of the *word*. This is evident from the fact that H3 is always assigned to the second syllable of the modal stem (after the hyphen) when the pre-pronominal prefix has a short vowel or no vowel, regardless of the vowel length of the first syllable of the *word*. In (13.31), the first syllable of (a) is long, while that of (b) is short, but nevertheless H3 is still assigned to the second syllable in both cases, since in both cases the vowel of the pre-pronominal prefix is absent:

- | | |
|--|--|
| (13.31) a. 1st V of the modal stem long
yo:gíno:lhche:ha
y-ookínoolhcheeha

y-ookin-ool(i)-hc-heeh-a
IRR-1DU.EX.B-understand-PFT-DAT:PRS-IND
‘He is not understanding him and me.’
(EJ, July 2011) | 1st V of the modal stem short
b. yagwálà:sdaʔe:ha
y-akwálààstaʔeeha

y-akw-alàà(?)sta-ʔeeh-a (< *-alaʔsta-)
IRR-1SG.B-tromp.on-PRS-IND
‘He is not tromping on me.’
(EJ, July 2011) |
|--|--|

The counting unit for H3 assignment is the *syllable*, rather than the *mora*. In (13.32), H3 is assigned to the second syllable of the modal stem, regardless of the vowel length of the first syllable of the modal stem; that is, if the counting unit were *mora*, H3 would be assigned to the third mora of the modal stem in (13.32a) while it would be assigned to the second mora of the modal stem in (b):

- | | | |
|---------|---|---|
| | H3 on the 3rd mora of the modal stem | H3 on the 2nd mora of the modal stem |
| (13.32) | a. yiji:yó:lì:che:ha
yi-ciyyóólìcheeha | b. yigají:yo:lì:che:ha
yi-kacííyoolìcheeha |
| | Ⓜ | Ⓜ |
| | yi-ciyy-ooli-hc-heeh-a
IRR-1SG>3SG.AN-understand-PFT-DAT:PRS-IND | yi-kaciiy-ooli-hc-heeh-a
IRR-1SG>3PL.AN-understand-PFT-DAT:PRS-IND |
| | ‘I don’t understand you.’ (EJ, July 2011) | ‘I don’t understand them.’ (EJ, July 2011) |

The domain of H3 assignment is *the modal stem*. In other words, bracket erasure (Kiparsky 1982) has to have applied before H3 assignment. Thus, H3 assignment is blind to the internal structure of the modal stem; H3 can occur on the vowel of the pronominal prefix (13.33), the stem (13.34), or the aspectual suffix (13.35), as long as they are either the first or the second syllable of the modal stem:

- (13.33) H3 on the pronominal prefix
yiginí:gowhtí:ha
yi-kinííkwowhthííh-a
Ⓜ
yi-kinii-kowh(a)hth-ííh-a
IRR-1DU.IN.B-see-PRS-IND
‘He is not seeing you and me.’ (EJ, July 2011)
- (13.34) H3 on the stem
yagwá:nhta
y-akwáánhtha
Ⓜ
y-akw-aanhth-a
IRR-1SG.B-know:PRS-IND
‘I don’t know’ (Pulte & Feeling 1975: 242)
- (13.35) H3 on the aspectual suffix
yigv̌:hnhá
yi-kv̌nhíh-a
Ⓜ
yi-k-vvn-hih-a
IRR-3SG.A-hit-PRS-IND
‘He is not hitting him.’ (Pulte & Feeling 1975: 345)

It is not clear whether the modal suffix can carry H3, since the high tone on the modal suffix in (13.36) could be due either to H3 or the boundary H% tone (§2.3.2):

(13.36)

a. yu:há
 y-uuhá
 Ⓜ ?
 y-uu-h-a
 IRR-3SG.B-have.CMP:PRS-IND
 ‘He doesn’t have it.’ (DJM, Aug 2012)

b. yigahlá
 yi-kahlá
 Ⓜ ?
 yi-ka-lh-a
 IRR-3SG.A-CMP.be.in.container:PRS-IND
 ‘It (CMP) is not in the container.’ (DJM, Aug 2012)

13.2.2. Presence of an underlying vowel

The position of H3 is predictable from the vowel length and presence/absence of the vowel of the pre-pronominal prefix in the majority of cases, as we saw above. However, in some cases, H3 is instead found on one syllable before where it is expected to be. The majority of such cases can be accounted for by assuming that the vowels which are assigned H3 are deleted by Vowel Deletion (§3.1). For instance, in (13.37a), H3 is first assigned to the vowel *v*, according to H3 Association I (13.11), but then this *v* is deleted due to Vowel Deletion and H3 then shifts to the preceding syllable, *tee*. The presence of the deleted vowels is justified by (b) forms, which do not go undergo Vowel Deletion due to the factors discussed in §3.3 ((13.37) - (13.39)), or because the form is in the glottal grade (13.40):

- PPP with long V
- (13.37) a. dé:kgi:ló:ʔa
téé-khkiilóóʔa (*tee-khkíílóóʔa)
tee-k-(v)hkiiloo-ʔ-a

DIST-3SG.A-wash.FL-PRS-IND
‘He is doing laundry.’ (Feeling 1975: 79)
- b. tvhgí:lo:ja
t-hvhkíílooca
t-h-vhkiiloo-c-a

DIST-2SG.A-wash.FL-PCT-IND
‘Do the laundry!’ (Feeling 1975: 79)
- (13.38) a. dě:kdladí
teé-khtlatí
tee-k-(v)htlat-í(ʔ-a)

DIST-3SG.A-put.out.fire-PRS-IND
‘He is putting out fire.’ (DJM, Aug 2012)
- b. hvhdlada
hvhtlata
h-vhtlat-Ø-a
2SG.A-put.out.fire-PCT-IND
‘Put out the fire!’ (Feeling 1975: 143)
- PPP with short V
- (13.39) a. yákwtv:gâ:ne (*y-akwtv:gâ:ne)
y-ákwthvkvkáane
y-akw-(a)hthvkv-áa(ʔ)n-e(ʔi) (< *-aʔn-)

IRR-1SG.B-hear-PFT-EVID
‘I didn’t hear it.’
(Pulte & Feeling 1975: 350)
- b. hatv:gǽ:ga
hahthvkvǽka
h-ahthvkv-ǽ(ʔ)k-a (< *-vʔk)
2SG.A-hear-PCT-IND
‘Hear it!’
(Feeling 1975: 61)
- (13.40) a. tíktla
t-híkhtlha
t-hi-k(a)htlh-Ø-a

DIST-2SG.A-shell.corn-PCT-IND
‘Shell corn!’ (Feeling 1975: 72)
- b. de:jígà:tlíha (glottal grade)
teecíkààtlíha
tee-cj-kahtlh-íh-a

DIST-1SG.A-shell.corn-PRS-IND
‘I am shelling corn’ (ibid.)

H3 displacement due to Vowel Deletion can be stated as follows:

- (13.41) H3 Displacement I
PPP-..VC₀(V)

(H3 shifts to the preceding vowel when the vowel associated with it is deleted)

(13.45) H3 Attraction
 PPP-[V?..]_{MOD}

Ⓜ

(H3 is attracted to a syllable with a glottal stop as long as it is in the first syllable of the modal stem)

When the underlying glottal stop is in the second syllable of the modal stem, H3 is regularly assigned to this syllable according to H3 Association II (13.17); in (13.46), some speakers (such as DF) have a surface glottal stop, while others (such as EJ) do not:

(13.46) yigo:gí(?)ni:yĩ:ha
 yi-kookí?niiyĩha

Ⓜ

yi-kooki-n?iiy-iĩh-a

IRR-3PL>1PL.EX-catch-PRS-IND

‘They are not catching them and me.’ (EJ, July 2011)

When the syllable containing the glottal stop is not within the first two syllables of the modal stem, the glottal stop fails to attract H3, and H3 is assigned to the second syllable of the modal stem, according to H3 Association II (13.17):

(13.47)

a. yige:gíni:ni:yĩ:ha
 yi-keekíniiniiyĩha (*yi-keekinííiniiyĩha)

Ⓜ

yi-keekinii-n(?)iiy-iĩh-a

IRR-3PL>1DU.IN-catch-PRS-IND

‘They are not catching you and me.’ (EJ, July 2011)

b. yigo:gín(a)là:sda?e:ha
 yi-kookín(a)lààsta?eeha

Ⓜ

yi-kookin-alaà(?)sta-?eeh-a (< *-ala?sta-)

IRR-3PL>1DU.EX-tromp.on-PRS-IND

‘They are not tromping on him and me.’ (EJ, July 2011)

This could be accounted for by stipulating that H3 in Oklahoma Cherokee has to occur within a first two syllable window (Kager 2012) of the modal stem (except for the cases to be discussed in §13.2.4, where H3 is found on the third syllable of the modal stem).

A glottal stop due to Laryngeal Alternation also attracts H3. In (13.48) and (13.49), the first *h* in the *h*-grade forms (a) is pre-consonantal, thus we would expect this *h* to be deleted and to assign a lowfall tone on the preceding vowel in the glottal grade (cf. §1.7.4.1). However, this syllable attracts H3 according to H3 Attraction (13.45); this H3 is imposed on the syllable with a lowfall tone, and thus result in a high-low tone in the (b) forms.

- | | |
|--|---|
| <p>(13.48) a. <i>h</i>-grade
 t:hlíhgwadù:ga
 t-hihlíhkwatùùka
 Ⓜ
 t-hi-hlihkwatùù(?)k-a
 DIST-2SG.A-turn.over:PCT-IND
 ‘Turn it over!’ (Feeling 1975: 79)</p> | <p>glottal grade
 b. t-î:lihgwadû:ga
 t-hílihkwatúuka
 Ⓜ
 t-hii-hlihkwatúu(?)k-a (< *-hlihkwatúk-)
 DIST-2SG>3SG.AN-turn.over:PCT-IND
 ‘Turn him over!’ (ibid.)</p> |
| <p>(13.49) a. ju:hnu:gõ:sdi
 c-uuhnuukoósti

 c-uu-hnuukoóst-i
 DIST-3SG.B-claw:INF-NOM
 ‘for him to claw him’ (Feeling 1975: 79)</p> | <p>b. tî:nu:gõ:la
 t-híhnuukoóla
 Ⓜ
 t-hii-hnuukoól-a
 DIST-2SG>3SG.AN-claw:PCT-IND
 ‘Claw him!’ (ibid.)</p> |

13.2.4. Peculiar behaviors of pronominal prefixes beginning with *ii*-

Pronominal prefixes beginning with *ii*- (1/2PL *iicvvy*-, 1DU.IN.A *iinii*-, 1PL.IN.A *itii*-, 1PL.IN.B *iikii*-, and 2PL *iicii*-, and (*ii*)*skiiy*- 2/1PL) show peculiar characteristics when they occur with a pre-pronominal prefix. First, when these pronominal prefixes occur with a pre-pronominal prefix with a long vowel (DIST (i), ITER), the vowel of the pre-pronominal prefix merges with that of the pronominal prefix, and attracts H3:

(13.50) DIST
 a. dé:ni:go:whtíha
 téé-niikoowhthíha
 tee-(ii)nii-koochw(a)hth-íh-a

 DIST-1PL.IN.A-see-PRS-IND
 ‘You and I see them.’ (Pulte & Feeling 1975: 247)

b. dé:dahlv:ʔiha
 téé-tahlvʔiha
 tee-(ii)t-ahlvv-ʔih-a

 DIST-1PL.IN.A-tie.up-PRS-IND
 ‘You (pl) and I are tying it up (plural act)’ (Pulte & Feeling 1975: 260)

(13.51) ITER
 a. v̄:di:go:hwáhta
 v̄v̄-tiikoohwáhtha
 vv-(ii)tii-koochwáhth-a

 ITER-1PL.IN.A-see:PCT-IND
 ‘You all and I just saw it again.’ (EJ, July 2011)

b. v̄:ji:go:hwáhta
 v̄v̄-ciikoohwáhtha
 vv-(ii)cii-koochwáhth-a

 ITER-2PL-see:PCT-IND
 ‘You all just saw it again.’ (EJ, July 2011)

This observation can be stated as follows:

(13.52) H3 Displacement II (long PPP)
 $C_1VV_1]_{PPP} + \text{MOD}[iiC_2V(V)_{2..} \rightarrow C_1VV_1C_2V(V)_{2..}$



(When a pre-pronominal prefix with a long vowel is attached to a pronominal prefix beginning with *ii-*, the vowel of the pre-pronominal prefix and that of pronominal prefix merge and H3 is assigned to this vowel)

When these pronominal prefixes occur with a pre-pronominal prefix that has no vowel (IRR, TRNSL, PART, DIST(ii), CISL), a lowfall tone occurs on the syllable with *ii-*; H3 is displaced to the right and is assigned to the *third* syllable of the modal stem, rather than the second. Note that this is the only case where H3 is assigned outside the initial two-syllable window of the modal stem:

(13.53)

- a. wì:jv:nê:ne:ha
 w-ìicvvnéeneeha
 ④
 w-ìicvv-neehneeh-a
 TRNSL-2/1PL-give.LQ:PRS-IND
 ‘I am giving you all some liquid.’ (EJ, July 2011)
- b. yì:di:gówh̄ti:ha
 y-ìitiikóhw(a)h̄thiiha
 ④
 y-ìitii-kohw(a)h̄th-iih-a
 IRR-1PL.IN.A-see-PRS-IND
 ‘You all and don’t I see it.’ (EJ, July 2011)
- c. ðì:jǐ:gó:wh̄tiha
 t-ìiciíkwówh̄thiha
 ④
 tí-ìicii-koohw(a)h̄th-ih-a
 CISL-2PL-see-PRS-IND
 ‘You (pl) see it (facing the speaker).’ (Pulte & Feeling 1975: 253)

- d. nì:sgi:góǎ́:na
 n-ìiskiiǎ́ǎ́vǎ́na¹⁵⁷
 Ⓜ-----
 n-ìiskii-koh-vvna
 PART-2/1PL-see:PFT-NEG/SH
 ‘You all without seeing me’ (EJ; DF, July 2011)

This observation is given in (13.54):

- (13.54) H3 Displacement III (PPP with no V)
 C]PPP + MOD[ìC₁V(V)C₂V(V)..
 Ⓜ-----

(When a pre-pronominal prefix with no vowel is attached to a pronominal prefix beginning with *ii-*, a lowfall tone is assigned to this vowel and H3 is assigned to the third syllable of the modal stem)

Note that the lowfall tone on the first syllable in the forms above is not the result of Pronominal Tonic Lowering (or TGI; §7.2), which assigns a lowfall tone to the vowel-initial pronominal prefix in the tonic forms. First, the pre-pronominal prefixes above require the verb to be in the atonic form (§A.2.2), and thus Pronominal Tonic Lowering should not apply; this is clear from the fact that other vowel-initial pronominal prefixes do not have this lowfall tone with the same pre-pronominal prefixes and conjugations:

- (13.55) yo:gíno:lhche:ha
 y-ookínoohlcheeha (*y-òòkínoohlcheeha)
 Ⓜ-----
 y-ookin-ool(i)-hc-heeh-a
 IRR-1DU.EX.B-understand-PFT-DAT:PRS-IND
 ‘He is not understanding him and me.’ (EJ, July 2011)

¹⁵⁷ In EJ’s speech, this pronominal prefix behaves the same way as other pronominal prefixes beginning with *ii-*. However, this pronominal prefix is different from others in that its initial *ii-* is optional, the conditioning factor of which is not clear (Scancarelli 1987: 105). Furthermore, this optional *ii-* does not attract H3 with the distributive prefix, unlike other pronominal prefixes with initial *ii-*: *teeskíyaǎ́lǎ́ǎ́iha*, not **téeskíyaǎ́lǎ́ǎ́iha* ‘you (pl) are tying me and him, me and them up (plural acts).’ (Pulte & Feeling 1975: 263).

The fact that the lowfall tone is not the result of Pronominal Tonic Lowering is also clear from the fact that this lowfall tone on *ii-* does not block H3 assignment; Pronominal Tonic Lowering blocks H3 assignment (see §13.3.2).

These pronominal prefixes historically had a glottal stop: 1DU.IN.A **iiʔnii-*, 1PL.IN.A **iiʔtii-*, 1PL.IN.B **iiʔkii-*, etc. (§7.3). For North Carolina Cherokee, Cook (1979: 74) states that a glottal stop in fact surfaces with these pronominal prefixes when CISL is attached in North Carolina Cherokee. I do not analyze this glottal stop to be underlying synchronically in Oklahoma Cherokee, since the high tone or lowfall tone on this vowel does not block Laryngeal Alternation rule, which is blocked by a high (and lowfall) tone from a glottal stop (H1, §9.1.3). In (13.53) above, 1/2 PL pronominal prefix *iicvv(y)-* is triggering Laryngeal Alternation and causing the first *h* of the stem to alternate with a glottal stop.

13.2.5. Peculiar behaviors of CISL and NEG

Cislocative and negative pre-pronominal prefixes show idiosyncratic behavior with respect to H3 assignment when they are preceded by another pre-pronominal prefix.

13.2.5.1. Cislocative

When the cislocative pre-pronominal prefix is preceded by another pre-pronominal prefix, H3 is assigned to the syllable before the one we would expect from the generalization obtained above in §13.2.1.3, namely that H3 is assigned to the second syllable of the modal stem with CISL and that the counting begins from the last pre-pronominal prefix. Thus, in the following forms we would expect H3 to be assigned to the second syllable of the modal stem, but in fact H3 is found on the first syllable of the modal stem:

- (13.56) PPP+CISL
- a. nidayú:go:whtv̄hdi
 nitay-úúkoowhthv̄hti (*nitay-uugóowhtv̄hdi)
- Ⓜ
- ni-tay-uu-koohw(a)hth-v̄ht-i
 PART-CISL-3SG.B-see-INF-NOM
 ‘for him to see it (looking this way)’ (Pulte & Feeling 1975: 246, 253)
- b. do:dajígoʔi
 toota-cíkoʔi
- Ⓜ
- too-ta-ci-koh-i
 DIST-CISL-1SG.A-see:PFT-MOT
 ‘I will see them.’ (Pulte & Feeling 1975: 248)
- c. yiwidagé:dó:li
 yiwita-kéétóoli
- Ⓜ
- yi-wi-ta-k-eetóo(?)l-i
 IRR-TRNSL-CISL-1SG.A-walk:PFT-MOT
 ‘I will not go there.’ (DF, July 2011)

We can tentatively stipulate that the sequence of pre-pronominal prefix and CISL behaves as if they constitute a single pre-pronominal prefix with a long vowel:

(13.57) PPP+CISL = CVV]_{PPP}

This odd behavior of CISL is also observed not only with the allomorph *ta(y)-* of CISL, but also with the allomorph *ti-*, as shown in (13.58). Thus, it is not the case that the odd behavior of CISL is due to its vowel quality:

- (13.58) CISL *ti-*
- a. nidigáwó:ni:sí:sǒ:ʔi
 niti-káwóóniisíísóǒʔi
- Ⓜ
- ni-ti-ka-wóo(?)n-iis-íi(?)s-ooʔi
 PART-CISL-3SG.A-speak-PFT-MOT:PFT-HAB/SH
 ‘He was already going to speak’ (Pulte & Feeling 1975: 290)

- b. do:disdí:go:hwáhta
 tooti-stííkoohwáhtha
 ④
 too-ti-stii-koohwáhth-a
 DIST-CISL-2DU-see:PCT-IND
 ‘You (du) see them (facing the speaker)’ (Pulte & Feeling 1975: 256)

It is not the case that the counting begins from the first pre-pronominal prefix (or CISL is treated as part of the modal stem). Such an analysis would predict H3 to be assigned to the second syllable in (13.58b) since the first PPP, DIST *too-*, has a long vowel, which is not the case. See §13.4.2 for a possible explanation for this idiosyncratic behavior of CISL.

13.2.5.2. Negative

Negative pre-pronominal prefix (NEG) is not a H3 assigning prefix and thus does not assign H3 itself (§13.3.1), but when NEG is preceded by a H3 assigning pre-pronominal prefix, the form has H3 (since NEG is the final pre-pronominal prefix in the template, it is always the last pre-pronominal prefix). In such a case, somehow H3 is attracted to NEG:

(13.59)

- a. v:gá:jawò:nǐ:sǎ:ʔi
 vvkáá-cawòòníísvǎʔi
 ④
 vv-kaa-ca-wòò(?)n-íís-vvʔi
 ITER-NEG-2SG.B-speak-PFT-PFT-ASR/SH
 ‘since you have spoken again’ (Pulte & Feeling 1975: 254)
- b. yigáji:lù:ga
 yiká-ciilùùka
 ④
 yi-ka-cii-luhk-a
 IRR-NEG-1SG>3SG.AN-kill:PCT-IND
 ‘I still can’t kill it.’ (CED-EJ, 2010: 96)

- c. yigáyo:wo:lhgi
 yikáy-oowoolhki
 Ⓜ
 yi-kay-oow-ool(i)-hk-i
 IRR-NEG-UNSP-know-PRS-IND
 ‘No one will know.’ (CED-EJ, 2010: 76)

In one case, H3 is assigned to the first syllable of the modal stem. It may be the case that the underlying glottal stop is attracting H3 here.

- (13.60) nidigahá:ko:hvsdĩ:sgo
 nitika-háákoohvstiísko
 Ⓜ
 ni-ti-ka-h-aak(?)oohvst-íisk-o(?i)
 PART-DIST-NEG-2SG.A-burn-IMPF-HAB
 ‘You have been burning.’ (CED-EJ, 2010: 75)

Again, see §13.4.2 for a possible explanation for this idiosyncratic behavior of NEG.

13.3. Blocking of H3 assignment

The phonological and morphological factors discussed in §13.2 account for the placement of H3. However, in some forms H3 is not found, even when the form has a pre-pronominal prefix. This section looks at various environments where H3 is not found.

13.3.1. PPPs which do not assign H3: REL and NEG (and some PART)

Two pre-pronominal prefixes, relative (REL) and negative (NEG) do not assign H3:¹⁵⁸

- (13.61) REL
 a. jigini:go:hv
 ci-kiniikoohv
 ci-kinii-kooh-ív(?i)
 REL-1DU.IN.B-see:PFT-ASR
 ‘(Yesterday) He saw you and me.’ (EJ, July 2011)

¹⁵⁸ However, see Feeling et al. (2010: 7) example (10), which has H3 with REL: *cookíneedòðlví?i* ‘the place another and I were’.

- b. jiji:gò:whí:ha
 ci-ciikòòwhthííha
 ci-cii-koohw(a)hth-iih-a
 REL-1SG>3SG.AN-see-PRS-IND/SH
 ‘the one that I see.’ (Pulte & Feeling 1975: 242)
- (13.62) NEG
- a. gayo:gini:go:hǎ:ʔi
 kay-ookiniikoohvǎʔi
 kay-ookinii-kooh-vvʔi
 NEG-1DU.EX.B-see:PFT-ASR/SH
 ‘Since he and I saw it.’ (Pulte & Feeling 1975: 255)
- b. gasgigo:hǎ:ʔi
 ka-skikoohvǎʔi
 ka-ski-kooh-vǎʔi
 NEG-2SG>1SG-see:PFT-ASR
 ‘You haven’t seen me in a while.’ (EJ, July 2011)

The reason why these pre-pronominal prefixes do not assign H3 is not clear, but it may have something to do with the fact that these are most ‘peripheral’ pre-pronominal prefixes - that is, REL occupies the first slot (but so does IRR, which assigns H3), while NEG the last within the template for the pre-pronominal prefix (see TABLE 13-1).

The partitive pre-pronominal prefix (PART) usually assigns H3 (cf. §13.2.1.2), but some verbs that lexically require PART do not have H3:

- (13.63) PART + -w- ‘say’
- a. nigaweʔa
 ni-kaweʔa
 ni-ka-w-eʔ-a
 PART-3SG.A-say-PRS-IND
 ‘He is saying it.’ (Feeling 1975: 147)
- b. nisdi:weʔa
 ni-stiiweʔa
 ni-stii-w-eʔ-a
 PART-2DU-say-PRS-IND
 ‘You two are saying it.’ (EJ, July 2011)

(13.64) PART + *-alist-* ‘become’
 nigalsdi:sko
 ni-kalstiisko
 ni-k-al(i)st-iisk-o(ʔi)
 PART-3SG.A-become-IMPF-HAB
 ‘It becomes’ (CED-EJ, 2010: 61)

(13.65) PART + *-atvʋʔn-* ‘do’
 nò:sdadʋ:ne:ha
 n-oostatʋʋnee:ha
 n-oost-atʋʋ(?)n-eeh-a
 PART-1DU.EX.A-do-PRS-IND
 ‘He and I are doing it.’ (EJ, July 2011)

It could be the case that the absence of H3 with a lexicalized PART is due to the loss of morphological independence of PART due to lexicalization.

13.3.2. Blocking by Pronominal Tonic Lowering

DIST generally assigns H3 to the first syllable of the modal stem, as we saw above in §13.2.1, but it does not assign H3 when the pronominal prefix carries a lowfall tone due to Pronominal Tonic Lowering (or TGI, §7.2). This is evident by comparing (a) and (b) in (13.66), which are inflectionally related forms of the same verb; in (a), the pronominal prefix *ka-* begins with a consonant and thus Pronominal Tonic Lowering does not apply and H3 is regularly assigned, while in (b) the pronominal prefix *uu-* begins with a vowel and Pronominal Tonic Lowering applies but H3 is not assigned:

<p>(13.66) a. H3 present de:káno:gí:ʔa tee-khánookííʔa (H) tee-ka-hnook-ííʔ-a DIST-3SG.A-sing-PRS-IND ‘He is singing’ (Feeling 1975: 93)</p>	<p>b. H3 absent dù:hno:gí:sǎ:ʔi t-ùùhnookíísǎʔi t-uu-hnook-íí(?)s-vǎʔi DIST-3SG.B-sing-PFT-ASR ‘He sang.’ (ibid.)</p>
--	--

The forms below are additional examples where Pronominal Tonic Lowering blocks H3:

(13.67)

a. dà:ni:ye:li:sga
tàniiyeeliiska
t-anii-yeelii-sk-a
DIST-3PL.A-adjourn-PRS-IND
'They are adjourning.' (Feeling 1975: 75)

b. dù:ktiv:ta
t-ùùkhthinvvtha
t-uu-(a)k(a)hthinvt-h-a
DIST-3SG.B-wear.glass-PRS-IND
'He is wearing glasses.' (Feeling 1975: 87)

Most of the pre-pronominal prefixes do not allow Pronominal Tonic Lowering to apply,¹⁵⁹ but REL and DIST allow Pronominal Tonic Lowering. The following is an example with REL:

(13.68) jù:ni:go:hv
c-ùùniigoohv
c-uunii-gooh-ív(?)i
REL-3PL.B-see:PFT-ASR
'(Yesterday) they saw it.' (EJ, July 2011)

13.3.3. Blocking by superhigh accent

H3 assignment is also blocked by a superhigh accent (Ch.14), if the superhigh accent is assigned to the syllable before the one where H3 is expected. This is the case whether the superhigh accent is realized as superhigh (when there is a long vowel in the word) or as a high tone (when there is no long vowel in the word).

(13.69) Blocking by SH
a. jidv̌:galuhji
citv̌v̌-kaluhci (*citv̌v̌káluhci)
ci-t-vv-ka-l(?)u-hc-i
REL-CISL-ITER-3SG.A-arrive-PFT-MOT
'the one will come back.' (JRS, Aug 2012)

¹⁵⁹ In other words, most of the pre-pronominal prefixes require the verb to be in the atonic form; see Appendix A.

- b. yicháwasa
 yi-cháwasa (*yicháwása)
 yi-ca-hwa-s-a
 IRR-2SG.B-PFT-IND
 ‘if you buy it’ (JRS, Aug 2012)

13.3.4. Morphosyntactic categories

H3 is not found with some inflected and derived verb forms of verbs, even when there is a pre-pronominal prefix. This is the case for DIST (ii) with the infinitive form (13.70) or the agentive nominalization form (13.71) of verbs:

(13.70) Infinitives

- a. ju:sdu:dli:sdi
 c-uustuutlìisti
 c-uu-stuutl-ìi(?)st-i (< *-i?st-)
 DIST-3SG.B-sprinkle-INF-NOM
 ‘for him to sprinkle it.’ (Feeling 1975: 76)

- b. ju:su:hwisdi
 c-uusuuhwisti
 c-uu-(a)suuhw-ist-i
 DIST-3SG.B-bark-INF-NOM
 ‘for it to bark.’ (Feeling 1975: 76)

(13.71) Agentive nominalization

- a. di:da:wó:sgi
 tiitaawoóski
 ti-Ø-(a)taa-woo-(?)sk-i
 DIST-3SG.A-REFL-bathe-IMPF-NOM/SH
 ‘Baptist (= the one who bathes people).’ (Feeling 1975: 81)

- b. digalo:gí:sgi
 ti-kalookiíski
 ti-ka-look-ii(?)sk-i
 DIST-3SG.A-hoe-IMPF-NOM/SH
 ‘farmer (= the one who hoes)’ (Feeling 1975: 82)

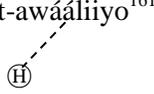
13.4. Cherokee floating H3 in a broader context

In this section, I examine Cherokee floating H3 in a broader context and attempt to situate it within the typology of word-prosody systems. I argue first that H3 in fact should be interpreted as a quantity-

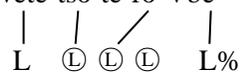
insensitive iambic pitch-accent, rather than a tone (§13.4.1). In §13.4.2, I argue that analyzing the short vowel of a pre-pronominal prefix as extrametrical offers a unified account for the odd behavior of H3.

13.4.1. Quantity-insensitive iambic pitch-accent?

H3 in Oklahoma Cherokee has been analyzed as tonal in previous studies (Lindsey 1987, Wright 1996). However, a closer examination of this phenomenon suggests that it is ‘accentual’ rather than tonal.¹⁶⁰ First, H3 manifests culminativity (Hyman 2006: 231, Hyman 2012: 362), in that the word has only one H3 even when the word has more than one pre-pronominal prefixes. The form in (13.72) has three pre-pronominal prefixes, but it has only one H3:

- (13.72) yudawá:li:yo
 yut-awááaliyo¹⁶¹

 yi-wi-t-akw-aaliyo
 IRR-TRNSL-DIST-1SG.B-put.on.socks:PRS(?)
 ‘When I have (different) socks on’ (CED-EJ, 2010: 339)

A prototypical tonal language does not show this property; rather, when a word has more than one morpheme associated with a floating high tone, each of the floating high tones surfaces. (13.73) is an example from Bora, a Witotoan language spoken in Peru and Columbia (Thiesen and Wieber 2012: 64, Yip 2002: 247-248):

- (13.73) Bora
 íhvèté-tsò-té-rò-obè¹⁶²
 ihvete-tso-te-ro-Vbe

 finish-cause-go.to.do-CE-SG.MASC
 ‘In vain did he go to make it stop.’ (Thiesen and Wieber 2012: 64)

¹⁶⁰ For a detailed definition of the term ‘accent’, see §15.1.2.

¹⁶¹ The combination of IRR *yi-* and TRNSL *wi-* optionally fuses to *yu-* (Pulte & Feeling 1975: 244).

¹⁶² The realization of only two L tones, rather than three, is due to the OCP that blocks a sequence of the same marked tones (Yip 2002: 248).

Accent is known to shift to the syllable within the same foot (Kager 1995: 387, Al-Mozainy et al. 1985, Melinger 2002), and thus the data in (13.75) is consistent with the iambic analysis.

If this analysis is correct, Cherokee H3 turns out to be a typologically rare quantity-insensitive iambic accent (Hayes 1995, Gordon 2002, Altshuler 2009, etc.). Recall also that vowel length is contrastive in Cherokee (§2.1.2); according to Hayes (1995: 268), in the rare instances of quantity-insensitive iambic accents, all the languages do not have vowel length contrast, and thus Cherokee would be an exception to such an observation.

13.4.2. Invisibility of the short vowel of the PPP

In §13.2.1, we saw that what determines the position of H3 is the vowel length and the presence/absence of the vowel of the pre-pronominal prefix. Such a system is somewhat cross-linguistically unheard of, and alternative analyses deserve considering. It would also be ideal if a unified account is available, of cases where the vowel of the pre-pronominal prefixes is long and where it is short. Here I consider the following three alternative analyses:

(13.76) Three possible alternative analyses

- (i) The short vowel of PPP is extrametrical
- (ii) The short vowel of PPP is epenthetic
- (iii) The short vowel of PPP is “weightless”

Each analysis will be evaluated in light of how it can handle the facts outlined in §13.2. All of the analyses attempt to treat the short vowel of the PPP as ‘invisible’ (marked with angle brackets, <>) in some sense when creating a foot structure consisting of the first two syllable of the word:

(13.77) (. x)
 y<i>giní:gowhtí:ha
 y<i>kinífkowhthííha
 yi-kinii-kohw(a)hth-ííh-a
 IRR-1DU.IN.B-see-PRS-IND
 ‘He is not seeing you and me.’ (EJ, July 2011)

In §13.4.2.1, I argue that the facts on H3 are satisfactorily accounted for by analyzing the short vowels of pre-pronominal prefixes as being extrametrical. §13.4.2.2 and §13.4.2.3 look at alternative analyses (epenthetic and “weightless” analyses) and argue that the extrametrical analysis is superior to such analyses.

13.4.2.1. Short vowel of PPP is extrametrical

I argue that the short vowel of the pre-pronominal prefix is extrametrical (Lieberman & Prince 1977, Hayes 1982, etc.). That is, it is excluded from syllable counting for assigning the iambic pitch accent (the extrametrical syllable is marked with angle brackets):

- (13.78) <x>(. x)
 yi gi ní:gowhtĩ:ha
 yi ki níkwowhthifha
 yi-kinii-kohw(a)hth-iĩh-a
 IRR-1DU.IN.B-see-PRS-IND
 ‘He is not seeing you and me.’ (= 13.77a)

One immediate problem arises with such an analysis: when there is more than one pre-pronominal prefix, and they all have short vowels, all of them are still ‘extrametrical’:

- (13.79) <x><x>(. x)
 wi di gǔ:hwé:là:neha
 wi ti koóhwéélààneha
 wi-ti-k-oooweel-àʔn-eh-a
 TRNSL-DIST-3SG.A-write-PFT-DAT:PRS-IND
 ‘He is writing them to him.’ (Pulte & Feeling 1975: 245)

This violates the Peripherality Condition, which prohibits a sequence of more than one extrametrical element (Hayes 1982: 270, Hayes 1995: 57):

- (13.80) Peripherality Condition
 A constituent may be extrametrical only if it is at a designated edge (left or right) of its domain.

An extrametrical element can be any phonological constituent (Hayes 1982: 228) and thus not necessarily a syllable, but also a segment, a foot or an affix. Thus, it is tempting to analyze cases like

(13.79) as involving extrametricality of a bimoraic foot. However, such an analysis is untenable. First, such an analysis would predict that a pre-pronominal prefix with a long vowel, which is bimoraic, would be invisible, but this is not the case. In (13.81), the long vowel of DIST is ‘visible’, and thus H3 is assigned to the second syllable of the word:

- (13.81) (. x)
 de:hígo:whthíha
 teehíkoowhthíha (*teehikóówhthíha)
 tee-hi-koohw(a)hth-íh-a
 DIST-2SG.A-see-PRS-IND
 ‘You see them’ (Pulte & Feeling 1975: 248)

Furthermore, if a bimoraic foot was extrametrical in Cherokee, it would predict a sequence of two short syllables to be ‘invisible’ while one long syllable to be ‘visible’ (i.e., V.V should be less ‘visible’ than VV), since a sequence of two short syllables would constitute a foot but not a long syllable. However, this is not the case, either. The combination of IRR *yi-* and TRNSL *wi-* optionally merges to one long vowel *yu:-*, but this sequence is still not counted for the purpose of H3 assignment:

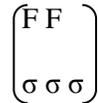
- (13.82) <x>(. x)
 yu:gawô:niha
 yuukawóoniha (*yuukáwòðniha)
 yi-wi-ka-woo(?)n-ih-a
 IRR-TRNSL-3SG.A-speak-PRS-IND
 ‘He isn’t speaking (with his back turned)’ (Pulte & Feeling 1975: 244)

Therefore, any attempt to avoid violation of Peripherality Condition (13.80) fails. However, this condition is in fact merely a stipulation (Selkirk 1984: 88), and as Inkelas (1989: 156ff.) states, this condition “lacks independent motivation in the theory, and follows from no known theoretical principle”. Here I adopt Inkelas’ (1989: Ch.6) ‘domains’ approach to invisibility, as opposed to the more standard ‘diacritic feature’ approach (Hayes 1982, Myers 1987, etc). Inkelas sees the ‘invisibility’ as being marked by exclusion from the prosodic domain. Thus, her model predicts the existence of an invisibility such as (13.83a, b), but not (c), since (c) would have discontinuous ‘visible’ parts. Note that in Inkelas’ model the visible part is in the parentheses, and the invisible part is outside of the parentheses:

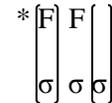
(13.83) a. Invisibility



b. No invisibility



c. Impossible



The Cherokee facts conform to this prediction, and now it appears that the Cherokee grammar conspires to avoid the structure in (13.83c). It turns out that all the pre-pronominal prefixes with a short/no vowel (‘invisible’ ones) occur toward the left edge of the template, while those with a long vowel (‘visible’ ones) toward the right edge, and there is no discontinuity of the ‘visible’ part (except for CISL and NEG, but see below). In TABLE 13-2, the bold line shows the boundary between the ‘visible’ and ‘invisible’ parts:

TABLE 13-2. INVISIBILITY OF CHEROKEE PPPS

IRR	TRNSL	PART	DIST	CISL	ITER	NEG
y(i)-	w(i)-	n(i)-	ti-/c-	ti/ta(y)-	vv-/ii-	ka(y)-
			t(ee)-/too-	PPP+ti/ta(y)-		
INVISIBLE				VISIBLE		

In TABLE 13-2, CISL and NEG are exceptional in that they occur toward the right edge within the template but have short (invisible) vowels. Now recall that these pre-pronominal prefixes are precisely the ones with exceptional behaviors, discussed in §13.2.5. First, recall from §13.2.5.1 that the short vowel of CISL is ‘invisible’ when it stands alone (a), while it is ‘visible’ when preceded by another pre-pronominal prefix (b):

	CISL	IRR+CISL
	<x>(. x)	<x>(. x)
(13.84) a.	da-jigóʔi	b. do:da-jígoʔi
	ta-cikóʔi	toota-cíkoʔi
	ta-ci-koh-i	too-ta-ci-koh-i
	CISL-1SG.A-see:PFT-MOT	DIST-CISL-1SG.A-see:PFT-MOT
	‘I will see it.’ (Pulte & Feeling 1975: 248)	‘I will see them.’ (ibid.)

- | | | | | |
|---------|----------|---|----------|---|
| | <x>(. x) | | <x>(. x) | |
| (13.85) | a. | day-o:sdí:wò:ni:si
tay-oostíwòðniisi
tay-oostii-wòð(?)n-iis-i
CISL-1DU.EX-speak-PFT-MOT
'You two will speak.' (EJ, July 2011) | b. | yiday-ó:sdi:wó:ni:si
yitay-óóstiiwóóniisi
yi-tay-oostii-wóo(?)n-iis-i
IRR-CISL-1DU.EX-speak-PFT-MOT
'You two will not speak.' (ibid.) |

This fact is now explained in the following way: in TABLE 13-2, CISL is preceded by DIST in the template, and if CISL remains invisible even after a visible DIST *too-*, it would result in the impermissible structure (13.83c).¹⁶⁴ This effect might have spread to other invisible pre-pronominal prefixes, IRR, TRNSL, and PART.

Second, recall the fact that NEG *ka(y)-* attracts H3 when preceded by another pre-pronominal prefix (§13.2.5.2):

- (13.86)
- a.
- v:gá:-jawò:ní:s'v'ʔi
vvkáá-cawòðniísv'ʔi
vv-kaa-ca-wòð(?)n-íís-vvʔi
ITER-NEG-2SG.B-speak-PFT-PFT-ASR/SH
'since you have spoken again' (Pulte & Feeling 1975: 254)
- b.
- yigá-ji:lù:ga
yiká-ciilùùka
yi-ka-cii-luhk-a
IRR-NEG-1SG>3SG.AN-kill:PCT-IND
'I still can't kill it.' (CED-EJ, 2010: 96)

This idiosyncrasy can now be seen as its struggle between two conflicting processes: NEG itself does not assign H3, so that it cannot assign H3 to the next syllable; on the other hand, if NEG was invisible and H3 were to be assigned to the second syllable of the modal stem, it would result in the structure in (13.83c), since NEG is preceded by some visible pre-pronominal prefixes such as ITER (13.86a). A compromise is to attract H3 to itself.¹⁶⁵

¹⁶⁴ In fact, (13.84b) shows that the DIST *too-* should be analyzed as being extrametrical when followed by CISL. This fact should be accounted for by interactions of various constraints, but a detailed theoretical analysis of these forms is outside the scope of this study.

¹⁶⁵ The short vowel of a pre-pronominal prefix is 'extrametrical' with respect to another kind of accent,

In contrast to Inkelas' (1989) 'domains' approach to extrametricality, under the 'diacritic features' approach to extrametricality (Hayes 1982, etc.), Cherokee merely exhibits a violation of the Peripherality Condition. It is merely a coincidence that it is only CISL that becomes visible when preceded by another pre-pronominal prefix, not other pre-pronominal prefixes with short vowel, such as IRR, TRNSL, or PART. Also, it is merely an idiosyncratic property of NEG that it attracts H3.

We have seen that the Peripherality Condition is not observed in Cherokee, but since this condition is widely attested cross-linguistically, we still need some kind of explanation as to why more than two elements are allowed to be 'invisible' in Cherokee. The answer may lie in the templatic structure of the pre-pronominal prefixes; most of the languages on which the theories of extrametricality have based on appear to have hierarchical structure. In a hierarchical structure, morphemes are added one by one; however, in a templatic structure, there is no evidence of this sort of ordering of affixation. It could be the case that combinations of pre-pronominal prefixes are counted as one element because the pre-pronominal prefixes are affixed at the same time.

The second minor problem with the extrametricality analysis is the fact that the extrametrical element is at the left edge, rather than the right edge, which is the typologically unmarked position for extrametricality (Hayes 1995: 57). However, this condition is just a typological tendency and extrametricality at the left edge has been proposed in various languages (cf. Hale and White Eagle 1980 on Winnebago), including another Iroquoian language, Seneca (Melinger 2002).

Below, I will consider two alternative analyses, and argue that the extrametrical analysis is superior to such approaches.

13.4.2.2. Against an epenthesis analysis

An alternative analysis to the extrametricality is epenthesis (Cook 1979, Scancarelli 1987: 210; see §5.3.4. on epenthesis). Under such an analysis, the vowel of the short pre-pronominal prefixes is

the superhigh accent (Inkelas' (1989: 127) "across-the-board invisibility"). See §14.1.2.2 for a more detail.

epenthetic and thus is not counted when determining the position of H3. Under this analysis, the vowel *i* of IRR *yi-* does not exist when assigning H3:

(13.87) Epenthesis analysis

(. x)
 y-kinii-kohw(a)hth-íh-a
IRR-1DU.IN.B-see-PRS-IND
 ‘He is not seeing you and me.’
 => yikiníkwowhthíha (= 13.19a)

This way, one could generalize H3 Assignment as “associate H3 to the second syllable of the verb, regardless of the vowel length of the prepronominal prefix”, which both accounts for pre-pronominal prefixes with a long vowel as well as those with a short vowel.

This may well be the historical source of these unusual rules, but this analysis has to be rejected on three grounds. First, as we saw in §5.3.4.1, the vowel quality of this “epenthetic” vowel is not always predictable: most of the pre-pronominal prefixes with a short vowel have the vowel *i-*, but one of the allomorphs of CISL, *ta-*, has the vowel *a*. Furthermore, when the *ta-* allomorph of CISL (or NEG *ka-*) is attached to a pronominal prefix beginning with a vowel other than *a*, this *a* of the prefix does not get deleted, but rather an “epenthetic” *y* is inserted; this is unexpected if *a* of CISL was an epenthetic vowel:¹⁶⁶

(13.88) dayo:sdí:wò:ni:si
 tay-oostíwòðniisi
 tay-oostii-wòð(?)n-iis-i
 CISL-1DU.EX-speak-PFT-MOT
 ‘He and I will speak.’ (EJ, July 2011)

Secondly, if we regard the vowels that are skipped in counting the syllable as epenthetic, it amounts to state that all and only the short vowels of pre-pronominal prefixes are epenthetic, and none of the

¹⁶⁶ When the initial vowel of the pronominal prefix is *a*, this *a* of the pre-pronominal prefix and *a* of the pronominal prefix merge to produce *vv-* (Cook 1979: 74).

vowels of pronominal prefix, stem, or modal suffix; such an analysis clearly misses the generalization that all and only the ‘invisible’ vowels occur at the edge of the word.

Lastly, an epenthetic analysis does not offer any insights into the peculiar behaviors of CISL and NEG when combined with another pre-pronominal prefix.

13.4.2.3. Against a “weightless” analysis

Another possible analysis is to analyze the short vowel of a pre-pronominal prefix to be “weightless” (Lounsbury 1942, Hyman 1985: Ch. 5, Michelson 1989). Such weightless vowels are not epenthetic and are present underlyingly, but simply are not moraic and so do not carry “weight”; thus they are ignored for metrical counting. Under such an analysis, (13.77) would be analyzed as follows: .

(13.89)

	σ	σ	σ	σ	σ
	/	/	/	/	/
c	cv	cvv	cvc	cvv	cv
yí	kí	ní	kówh	thí	há
yí-kinii-kówh(a)hth-ííh-a					
IRR-1DU.IN.B-see-PRS-IND					
‘He is not seeing you and me.’					

=> yikinííkwówhthííhá (EJ, July 2011)

Such an analysis can accommodate the fact that the quality of the ‘invisible’ vowel of the pre-pronominal prefixes is not always predictable, as we saw above. However, such an analysis assumes that each vowel of the pre-pronominal prefix is lexically specified as to whether its vowel is weightless or not. This assumption, again, is problematic, since such an analysis misses the generalization that all and only the ‘invisible’ vowels occur at the edge of the word. Lastly, again, a weightless analysis does not offer any insights into the peculiar behaviors of CISL and NEG.

13.5. Conclusion

In this chapter, I have laid out the various phonological and morphological factors that determine the position of a floating high tone from a pre-pronominal prefix (H3). The position of H3 is determined

by the vowel length (and presence/absence) of a pre-pronominal prefix (§13.2.1), presence of an underlying vowel (§13.2.2), presence of a glottal stop (§13.2.3), as well as various morpheme specific peculiarities (§13.2.4, §13.2.5). H3 is sometimes not found on the verb even when there is a pre-pronominal prefix, due to some morphological factors (§13.3). Lastly, I have shown that typologically speaking, H3 resembles a quantity-sensitive iambic pitch accent with extrametricality at the left edge (§13.4).

Chapter 14. Superhigh Accent

14.0. Introduction

Superhigh accent is carried by a verb in a subordinate clause, by deverbal nouns, and by adjectives (§14.2; Cook 1979: 92, Lindsey 1985: 125). Although its occurrence is morphosyntactically conditioned, it manifests some properties common to ‘accentual’ systems: it is culminative (one per word), and its assignment reminds one of the ‘default-to-opposite’ accent.¹⁶⁷

Superhigh accent is found only on a long vowel, and is characterized by a gradual rise in pitch that rises to a point above the normal high tone register (Wright 1996: 21, Johnson 2005: 10).¹⁶⁸

- (14.1) yigawô:ní:ha
 yi-kawóoniíha
 (H)
 yi-ka-woo(?)n-iih-a
 IRR-3SG.A-speak-PRS-IND/SH¹⁶⁹
 ‘When he is speaking.’ (CED-EJ, 2010)

FIGURE 14-1 is a pitch trace of a male speaker of (14.1); as can be seen, the superhigh accent on *ní* (level 34) has a higher pitch than the high tone (H1; level 3) on *wóó*:

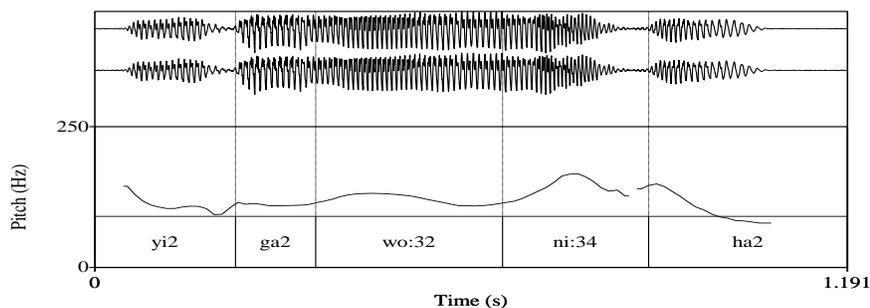


FIGURE 14-1. *yikawóoniíha* ‘if he speaks’ (EJ, male, 2010)

¹⁶⁷ For a detailed definition of the term ‘accent’, see §15.1.2.

¹⁶⁸ Lindsey (1985: 128) claims that some Oklahoma speakers maintain the contrast between [3] (high) and [4] (superhigh) on short vowels (e.g. *sóʔi* ‘another’), but such an instance is rather rare (cf. §7.1.4).

¹⁶⁹ Since the superhigh accent is not associated with particular morphemes, it is indicated after a slash, at the end of the gloss for the word.

As shown in FIGURES 14-1 and 14-3 below, superhigh accent is a rising tone, rather than a falling tone as implied in some previous studies (Haag 2001: 414, Montgomery-Anderson 2008: 51-52).

The Cherokee superhigh accent is correlated with (i) the pitch rising on the syllable with the superhigh accent, and (ii) the dramatic pitch fall on the following vowel (see FIGURE 14-1; Feeling 1975: xi; Johnson 2005: 10, 12). As Johnson (2005: 10, 12) shows, the more reliable correlate of a superhigh accent is the pitch rising on the accented syllable, rather than the pitch fall on the following syllable, since this pitch fall disappears when a clitic is attached.¹⁷⁰

A superhigh accent is sometimes preceded by a preparatory rising [23] (low-high) on the preceding syllable, which appears to be optional:

- (14.2) Preparatory rising before SH
 ad̀v:ně:lí:sgi
 at̀v̀neélííski
 Ø-at̀v̀(?)neel-iisk-i
 3SG.A-act.silly-IMPF-NOM/SH
 ‘(he is an) actor’ (Feeling 1975: 14)

More than one word in an utterance can have a superhigh accent:

- (14.3) More than one SH per utterance
 aj̀i:la gó:tlv̄hdi yijaj̀i:stlana
 acífla koótlhv̄hti yicacií̄stlhana
 acífla k-ootlv̄h-ht-i yi-ca-ciistl-ahn-a
 fire 3SG.A-make-INF-NOM/SH IRR-2SG.B-fire.up-PFT-IND/SH
 ‘When you fire up a match’ (CED-EJ, 2010)

¹⁷⁰ Clitics have various tonal effects on the preceding vowel (Haag 1999, Haag 2001, Johnson 2005, Montgomery-Anderson 2008: 141), but the details of these effects are not yet fully understood.

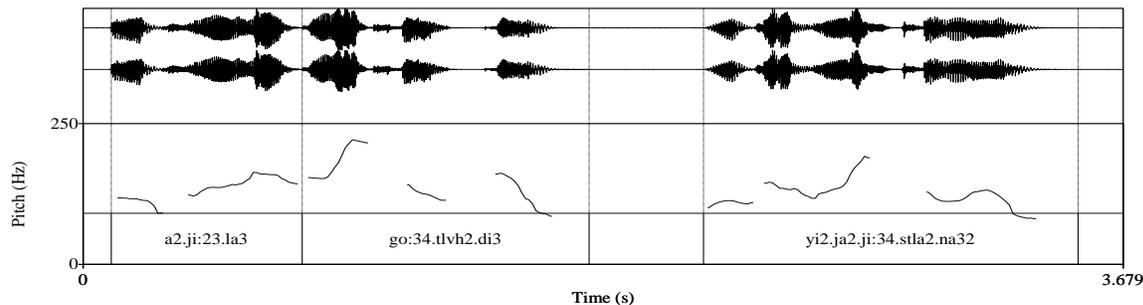


FIGURE 14-3. *aciġla goĩlhvhti yicaciĩstlhana* ‘when you fire up a match’ (EJ, male, 2010)

This chapter first looks at the various factors that determine the position of the superhigh accent (§14.1). §14.2 looks at the distribution of the superhigh accent, laying out the morphosyntactic environments where a superhigh accent is found. §14.3 concludes.

14.1. Position of the superhigh accent: default-to-opposite

In this section, I discuss the position in the word of the superhigh accent. §14.1.1 discusses cases with a long vowel, while §14.1.2 discusses cases with short vowels. §14.1.3 looks at some exceptional long vowels which fail to carry a superhigh accent. §14.1.4 summarizes the section, concluding that Cherokee superhigh accent is a default-to-opposite accent.

14.1.1. Basic principle: on the last long vowel

The most basic principle is that the superhigh accent is assigned to the last long vowel that is not the word final vowel (Cook 1979: 92, Lindsey 1985: 126, Wright 1996: 21):

- (14.4) Superhigh Assignment (initial)
Assign a superhigh accent to the last non-final long vowel of the word.

Most frequently, the superhigh accent is assigned to the penultimate syllable of the word; in Feeling (1975), there are 104 forms where a superhigh accent is found on the penultimate syllable, while there are 61 instances where it is found on other syllables:¹⁷¹

¹⁷¹ This means that most frequently the penultimate syllable is long in Cherokee. It is not clear whether

- (14.5) Penultimate
- a. ahyv̆:ki
 ahyv̆vkhi
 a-hyv̆vkhi
 3SG.A-prisoner/SH
 ‘(he is a) prisoner’ (Feeling 1975: 30)
- b. di:ktin̆:tdi
 tiikhthin̆v̆thti
 ti-Ø-(a)k(a)hthin̆vt-ht-i
 DIST-3SG.A-put.on.eyeglasses-INF-NOM/SH
 ‘eyeglasses’ (Feeling 1975: 84)

The superhigh accent is found on non-penultimate syllables too, as long as it is the last long syllable:

- (14.6) Antipenultimate
- a. agõ:whtvhdi
 akoõwhthvhti
 a-koohw(a)hth-vht-i
 3SG.A-see-INF-NOM/SH
 ‘sight’ (Feeling 1975: 18)
- b. di:de:hyõ:hvsgi
 tiiteehyoõhvski
 ti-Ø-(a)teehyoohvsk-i
 DIST-3SG.A-teach:IMPF-NOM
 ‘teacher’ (Feeling 1975: 81)
- (14.7) Pre-antipenultimate
- a. adayv̆:latvsgi
 atayv̆lathvski
 Ø-atayv̆lathvsk-i
 3SG-be.in.view:IMPF-NOM/SH
 ‘TV’ (Feeling 1975: 8)
- b. ju:dã:tihnaʔi
 cuutaãthihnaʔi
 c-uu-(a)ta-athihn-aʔi
 DIST-3SG.B-MID-lead-ʔ/SH
 ‘chairman, president’ (Feeling 1975: 135)

this is merely a coincidence or if this is the result of some kind of ‘conspiracy’.

Forms in (14.7) are especially of interest, since they appear to violate the constraint that accent systems in general are restricted to a three-syllable window (Kager 2012).¹⁷²

In the original source (Feeling 1975), the words in (14.6, 7) are transcribed with [23] (low-high), rather than superhigh [4]. However, I follow Lindsey (1985: 127, 1987:2) and Johnson (2005: 9-10) in assuming that non-penultimate [23] tone that is not followed by another level [3] tone is a mistranscription of a superhigh [34] accent. This observation is confirmed by recordings (FIGURE 14-4) and consultation with speakers. In FIGURE 14-4, the pitch on *yv:l* is higher than the [32] boundary tone on *ski*.

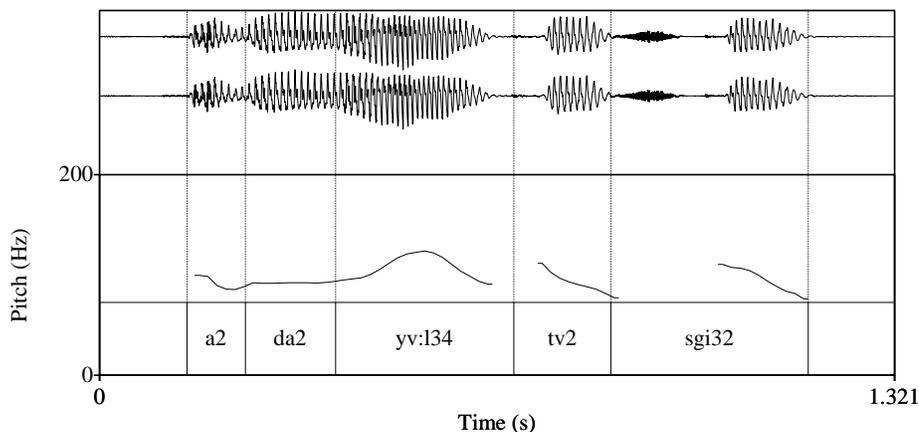


FIGURE 14-4. *atayvvlathvski* ‘television (DF, male, 2010)

Superhigh Assignment (14.4) states that the superhigh accent cannot be assigned to a word-final vowel. Thus, even when the word-final vowel is underlyingly long (which is shortened when not followed by a clitic; §2.3), such a vowel cannot carry a superhigh accent in general. However, Feeling (1975) has some rare cases where a superhigh accent is found on the final vowel (Feeling 1975: xi):

¹⁷² Kager (2012: 1470) cites Cherokee as having either penultimate or ante-penultimate accent, but this is not true, as the examples illustrate.

- (14.8) Ultimate
- a. á:gé:
 áákeě
 ‘over there’ (Feeling 1975: 16)
- b. do:yú:
 tooyuú
 ‘really, very’ (Feeling 1975: 86)
- c. hilǎ:
 hilaǎ
 ‘how, what’ (Feeling 1975: 129)
- d. goʔí:
 koʔíí
 ‘Greasy’ (Feeling 1975: 122)

In all of such cases it is plausible that these forms resulted from deletion of the word-final syllable (§2.3.1, Chris Koops, p.c. 2013). For instance, (14.8b) is also pronounced as *tooyuúhi*.

Since Superhigh Assignment (14.4) is blind to the internal structure of verbs, it can be assigned not only to an aspectual suffix (14.5a) or a verb base (14.6-7a), but also to a modal suffix (14.9), a pronominal (14.10) or a reflexive prefix (14.11), or even to a pre-pronominal prefix (14.12):

- (14.9) SH on a modal suffix
- a. à:yâ:tohlǎ:ʔi
 ààyáathohlvǎʔi
 a-yáa(?)tho-hl-vvʔi (< *-yaʔtho-)
 3SG.A-distribute-PFT-ASR/SH
 ‘chapter’ (Feeling 1975: 63)
- b. winagíʔluhjǎ:ʔi
 ④
 winakíʔluhcoǎʔi
 wi-n-aki-lʔu-hc-ooʔi
 TRNSL-PART-1SG.B-arrive-PFT-HAB/SH
 ‘after I arrived there’ (Pulte & Feeling 1975: 351)

- (14.10) On a pronominal prefix
- a. ú:hwasgi
 uúhwaski
 uu-hwa-sk-i
 3SG.B-buy-IMPF-NOM/SH
 ‘(he is a) buyer’ (JRS, Aug 2012)
- b. u:ní:lhdohdi
 uuniihltohti
 uunii-l[o]ht-oht-i
 3PL.B-put.into.container-INF-NOM/SH
 ‘They have to put it into a container.’ (JRS, Aug 2012)
- (14.11) On a reflexive prefix
- adá:hihi
 ataáhihi
 Ø-ataa-hih-i
 3SG.A-REFL-kill:IMPF-NOM/SH
 ‘thing that kills’ (Feeling 1975: 2)
- (14.12) On a pre-pronominal prefix
- a. DIST jidé:kdladiʔi
 citeékhtlatiʔi
 ci-tee-k-(v)htlat-iʔ-i
 REL-DIST-3SG.A-put.out.fire-PRS-INF/SH
 ‘the one who is putting out fire’ (DJM, Aug 2012)
- b. ITER v̌:jaluhist
 v̌v̌caluhist
 vv-ca-l(?)u-hist-(i)
 ITER-2SG.B-arrive-INF-NOM
 ‘You have to return.’ (JRS, Aug 2012)

14.1.2. When there is no long vowel

When there is no long vowel in the word a superhigh accent cannot be assigned according to Superhigh Assignment (14.4). In such a case, the general principle is that a high (level [3]) tone is assigned to the first vowel of the word (§14.1.2.1). A systematic exception is that the short vowel of a pre-pronominal prefix cannot carry this high tone (§14.1.2.2).

14.1.2.1. General principle: H4 on the initial vowel

If there is no long vowel in the word, a high tone (level [3], H4 henceforth) is assigned to the first vowel of the word instead (Lindsey 1985: 127, Wright 1996: 21):

- (14.13) ákisdi
ákhisti
a-khi-st-i
3SG.A-swallow-INF-NOM/SH
'pill' (< thing to swallow) (Feeling 1975: 33)

This H4 is realized at the same level (level [3]) as the other types of high tone, and is no higher than them (Lindsey 1985: 128): high tone from glottal stop (H1; Ch.8 - Ch.11), high tone assigned to the final mora of the stem (H2; Ch.12), and floating high tone from pre-pronominal prefixes (H3; Ch.13). FIGURE 14-5 shows a pitch trace (a male speaker) of (14.13). Here, the tone on *a* is at the same level as the initial part of the word-final boundary tone on *sti*, which is [32]:

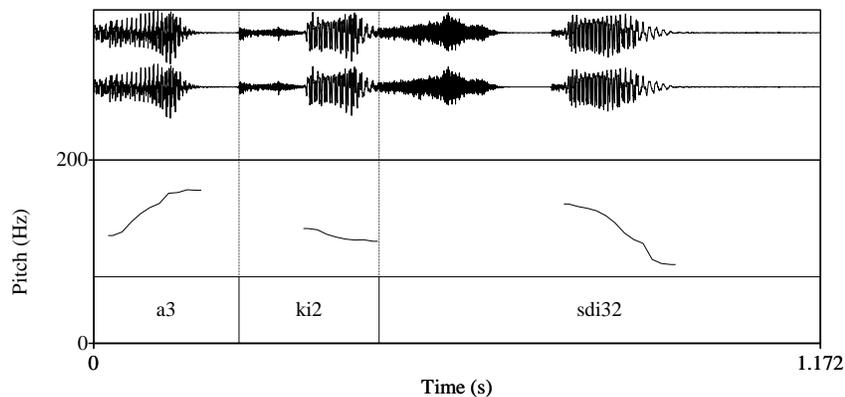


FIGURE 14-5: *ákhisti* [ák^hisdí] 'pill' (EJ, male, 2010)

That this word-initial H4 is a variant of the superhigh accent is evident from the following facts: first, when the same verb is conjugated with pronominal prefixes with a long vowel, H4 in (a) is replaced by a superhigh accent (b):

- | | | | |
|---------|--|----|--|
| | SH realized as a word-initial H | | SH realized as a superhigh |
| (14.14) | a. cháwasgi
cháwaski
ca-hwa-sk-i
2SG.B-buy-IMPF-NOM/SH
'You are a buyer' (JRS, Aug 2012) | b. | ú:hwasgi
uúhwaski
uu-hwa-sk-i
3SG.B-buy-IMPF-NOM/SH
'He is a buyer' (JRS, Aug 2012) |
| (14.15) | a. jálhdohti
cálhtohti
ca-l(o)ht-oht-i
2SG.B-put.into.container-INF-NOM/SH
'You have to put it into a container.'
(JRS, Aug 2012) | b. | u:ní:lhdohdi
uunii'lhtohti
uunii-l(o)ht-oht-i
3PL.B-put.into.container-INF-NOM/SH
'They have to put it into a container.'
(JRS, Aug 2012) |
| (14.16) | a. ákdohdi
ákhtohti
ak-(v)ht-oht-i
1SG.B-use-INF-NOM/SH
'I have to use it.' (JRS, Aug 2012) | b. | jü:nhdohdi
cuünhtohti
c-uun-(v)ht-oht-i
DIST-3PL.B-use-INF-NOM/SH
'They have to use them.' (JRS: Aug 2012) |

Second, this H4 is not found in forms that do not require a superhigh accent, such as the imperative (14.17a) or the infinitive forms of a verb (b), (c) (see §14.2 for the morphosyntactic categories where superhigh is found; the high tone in (b) and (c) are H2):

- (14.17)
- a. chawahi
chawahi
ca-hwa-h-i
2SG.B-buy-PCT-IND
'Buy it!' (Feeling 1975: 168)
- b. ulhdóhdi
ulhtóhti
uu-l(o)ht-óht-i
3SG.B-put.into.container-INF-NOM
'for him to put it into a container' (Feeling 1975: 95)
- c. uwhdóhdi
uwhtóhti
uw-(v)ht-óht-i
3SG.B-use-INF-NOM
'for him to use it' (Feeling 1975: 143)

This H4 assignment can now be added to Superhigh Assignment (14.4):

- (14.18) Superhigh Assignment (continued)
- (i) Assign a superhigh accent to the last non-final long vowel of the word.
 - (ii) *When there is no long vowel in the word, assign a high (level [3]) tone to the first syllable of the word.*

14.1.2.2. PPP with a short vowel

There is a systematic exception to Superhigh Assignment (14.18); that is, the short vowel of a pre-pronominal prefix cannot carry H4. In (14.19a) - (14.21a), H4 is assigned to the second syllable rather than the expected first syllable, which is the vowel of the pre-pronominal prefix.

- (14.19) ditsdóhdi
 titstóhti¹⁷³ (*títstohti)
 ti-c-(v)ht-oht-i
 DIST-2SG.B-use-INF-NOM/SH
 ‘You have to use them.’ (JRS, Aug 2012)
- (14.20) dijáldohdi
 ticáldtohti
 ti-ca-l(o)ht-oht-i
 DIST-2SG.B-put.into.container-IINF-NOM/SH
 ‘You have to put them into a container.’ (JRS, Aug 2012)
- (14.21) dikdládi:sgi¹⁷⁴
 tikhtlátìski
 ti-k-(v)htlat-ì(?)sk-i (< *-i?sk-)
 DIST-3SG.A-put.out.fire-IMPF-NOM/SH
 ‘(He is a) firefighter’ (Feeling 1975: 84; DJM, Aug 2012)

The forms in (14.19) - (14.21) all have the distributive pre-pronominal prefix (DIST). However, the inability to carry H4 is not a peculiarity of the short vowel of DIST; any pre-pronominal prefix with a short vowel cannot carry H4. (14.22a) is an example with the relative pre-pronominal prefix (REL), and (14.22b) an example with the irrealis pre-pronominal prefix (IRR):

¹⁷³ *ch* → *ts* / _C (§5.3.3.5).

¹⁷⁴ The penultimate syllable cannot carry the superhigh accent, since this vowel is historically short (see §14.1.3.3).

(14.22)

a. REL jigáhliha
 cikáhliha (*cíkahliha)
 ci-ka-lh-ih-a
 REL-3SG.A-sleep-PRS-IND/SH
 ‘the one who is sleeping’ (DJM, Aug 2012)

b. IRR yicháwasa
 yicháwasa
 yi-ca-hwa-s-a
 IRR-2SG.B-buy-PFT-IND/SH
 ‘If you buy it’ (JRS, Aug 2012)

As (14.21) illustrates, when the vowel that is expected to carry H4 is deleted due to Vowel Deletion

(§3.1), H4 is instead assigned to the following syllable:¹⁷⁵

(14.23) dikhdládì:sgi
 tikhtlátìski
 ti-k-(v)htlát-ì(?)sk-i (< *-i?sk-)
 ↓
 H₄
 DIST-3SG.A-put.out.fire-IMPF-NOM/SH
 ‘(He is a) firefighter’ (=14.21)

This is in contrast to the case of a floating high tone from a pre-pronominal prefix (H3), which shifts to the left when the vowel carrying this H3 is deleted (§13.2.2); an example that shows this leftward shift is given for comparison in (14.24):

(14.24) tíktla
 thíkhtlha
 t-hì-k(a)htl-h-a
 ↓
 Ⓜ
 DIST-2SG.A-shell.corn.-PCT-IND/SH
 ‘Shell corns!’ (Feeling 1975: 72)

More generally, H4 is not to be confused with H3. First, the position of the high tone is different: H3 is assigned to the second syllable of the ‘modal’ stem (= pronominal prefix + base + aspectual suffix +

¹⁷⁵ When there is no pre-pronominal prefix, H4 is assigned to the first syllable and thus can only be displaced to the following syllable

modal suffix) when the vowel of the pre-pronominal prefix is short or when the pre-pronominal prefix consists just of a consonant, while H4 is found on the first syllable of the ‘modal’ stem in the forms above. This is clear when one compares forms in (14.25):¹⁷⁶

- | | | |
|---------|--|---|
| (14.25) | IRR, with a H4 | IRR, with H3 |
| a. | yicháwasa
yicháwasa | b. tlá yichawásé
tlá yichawásé |
| | yi-ca-hwa-s-a
IRR-2SG.B-buy-PFT-IND/SH
‘If you buy it’ (=14.22b) | 
tlá yi-ca-hwa-s-é(ʔi)
not IRR-2SG-buy-PFT-EVID
‘You didn’t buy it.’ (JRS, Aug 2012) |

The fact that the short vowel of a pre-pronominal prefix cannot carry H4 is consistent with the ‘extrametrical’ analysis given in §13.4; there, I argued that the short vowel of a pre-pronominal prefix are ‘invisible’ to H3 assignment. This ‘invisibility’ also holds for H4 assignment (“across-the-board invisibility” in Inkelas 1989: 127). The fact that the long vowel of a pre-pronominal prefix can carry a superhigh accent (14.12) is also consistent with the extrametrical analysis given in §13.4, which argues that the long vowel of a pre-pronominal prefix is ‘visible’.

Superhigh Assignment, (14.4), (14.18), can now be restated (still informally) as follows, incorporating the facts discussed in this section:

- (14.26) Superhigh Assignment (continued)
- (i) Assign a superhigh accent to the last non-final long vowel of the word.
 - (ii) When there is no long vowel in the word, assign a high (level [3]) tone to the first syllable of the ‘modal stem’.¹⁷⁷

¹⁷⁶ Additional arguments for not analyzing the high tone in the forms above as H3 are as follows. First, a pre-pronominal prefix does not assign H3 to the infinitive or the agentive nominalization form of verbs (§13.3.4), so that the high tone in (14.19) - (14.21) above cannot be H3. Secondly, REL never assigns H3 (§13.3.1), so that the high tone in (14.22a) cannot be H3.

¹⁷⁷ ‘Modal stem’ = the full form minus pre-pronominal prefixes (pronominal prefix + base + aspectual suffix + modal suffix).

14.1.3. Exceptional long vowels

There is a further complication with Superhigh Assignment that has not been discussed in previous studies. My data sources contain some forms with a superhigh accent which is not assigned to the last long vowel of the word: that is, a vowel with a superhigh accent is followed by another long vowel; such a case should be ruled out according to Superhigh Assignment (14.26):

(14.27)

- a. u:ló:nà:sdóht
uuloónààstóht
uu-loonàà(?)st-óht-(i) (< *-loona?st-)
3SG.B-deceive-INF-NOM/SH
'He has to deceive him.' (JRS, Aug 2011)

In other cases, the only long vowel in the word is not assigned the superhigh accent, but instead H4 is found on the following syllable, as in (14.28); again such a case should be excluded according to Superhigh Assignment:

- (14.28) jà:hláhvsk
cààhláhvsk (*caáhlahvk)
c-a-htlha-hvsk-(a)
REL-3SG.A-place.on-set.CMP:PRS-IND/SH
'the one who is placing it on (a shelf)' (JRS, Aug 2012)

In this section, I show that a long vowel with a lowfall tone due to Pronominal Tonic Lowering cannot carry a superhigh accent (§14.1.3.1), while a long vowel with a lowfall tone due to Laryngeal Alternation can carry a superhigh accent, in the absence of a 'true' long vowel (§14.1.3.2). When a long vowel comes from a historical short vowel, such a long vowel fails to carry a superhigh accent (§14.1.3.3).

14.1.3.1. Long vowel due to Pronominal Tonic Lowering

If a long vowel with a lowfall tone is the result of the Pronominal Tonic Lowering (§7.2), which assigns a lowfall tone to the vowel-initial pronominal prefix (and lengthens the vowel if it is short) in the tonic forms, a syllable with such a lowfall tone cannot carry a superhigh accent, and instead H4 is

assigned to the following short syllable. This is the case whether the vowel of the pronominal prefix in question is lexically short (14.29), long (14.30), or there is none (14.31)

(14.29) jà:hláhvsk
 cààhláhvsk (*jǎ:hlahvk)
 c-a-htlhahvsk-(a)
 REL-3SG.A-place.on:PRS-IND/SH
 ‘the one who is placing it on (a shelf)’ (JRS, Aug 2012)

(14.30) jù:síhwask
 cùùsíhwask
 c-uu-sihwa-sk-(a)
 REL-3SG.B-cough-PRS-IND/SH
 ‘the one who is coughing’ (JRS, Aug 2012)

(14.31) jà:lsáldî
 cààlsáltí
 c-Ø-al(i)sal(a)t-í(ʔ-a)
 REL-3SG.A-ascend-PRS-IND/SH
 ‘the one who is ascending’ (JRS, Aug 2012)

14.1.3.2. Long vowel due to Laryngeal Alternation

Laryngeal Alternation is triggered by certain pronominal prefixes and the first *h* of the stem is replaced by a glottal stop in the glottal grade (§1.7.4.1). When *h* is pre-consonantal in *h*-grade (a), the glottal grade form instead has a lowfall tone on the preceding vowel (b):

	<i>h</i> -grade	glottal grade
(14.32)	a. hvhda	b. g̀v̀:díha
	hvhta	k̀v̀v̀tíha
	h-vht-a	k-vhtíh-a
	2SG.A-use:PCT-IND	1SG.A-use:PRS-IND
	‘Use it!’ (Feeling 1975: 143)	‘I am using it.’ (ibid.)

As can be seen in (14.32), a short vowel before a pre-consonantal *h* is lengthened (along with the assignment of a lowfall tone) in the glottal grade. Such a long vowel can carry a superhigh accent if this is the only “long” vowel within the word. The following examples illustrate this. (a) forms show that the vowels lengthened due to Laryngeal Alternation can carry a superhigh accent. (b) is also in the glottal

grade, but without the superhigh accent, due to the morphosyntactic category. (c) forms show that the vowels in question are short in the *h*-grade forms:

- (14.33) a. digv̌:dladi:sg(i)¹⁷⁸ (glottal grade)
tikv̌tlatìski
ti-k-vhtlat-ì(ì?)sk-i (< *-i?sk-)
DIST-1SG-put.out.fire-IMPF-NOM/SH
‘I am a firefighter.’ (DJM; JRS, Aug 2012)
- b. gv̌:dladíʔa (glottal grade)
kv̌tlatíʔa
k-vhtlat-íʔ-a
1SG.A-put.out.fire-PRS-IND
‘I am putting out a fire.’ (Feeling 1975: 143)
- c. hvhdlada (*h*-grade)
hvhtlata
h-vhtlat-Ø-a
2SG.A-put.out.fire-PCT-IND
‘Put out a fire!’ (Feeling 1975: 143)
- (14.34) a. digá:sehi (glottal grade)
tikaásehi
ti-k-ase-hi(h-i)
DIST-1SG.A-count-IMPF-NOM/SH
‘I am a counter’ (JRS, Aug 2012)
- b. de:gâ:sehíha¹⁷⁹ (glottal grade)
teekáasehíha
Ⓜ
tee-k-ase-híh-a
DIST-1SG.A-count-PRS-IND
‘I am counting it’ (Feeling 1975: 76)
- c. taséga (*h*-grade)
thaséka
Ⓜ
t-h-asé-k-a
DIST-2SG.A-count-PCT-IND
‘Count it!’ (Feeling 1975: 76)

If a syllable with a lowfall tone lengthened due to Laryngeal Alternation is preceded by a ‘true’ (underlying) long vowel, a superhigh accent is instead assigned to that ‘true’ long vowel:

- (14.35) jí:yv̌:doht
cííy̌v̌toht (*ciiyv̌toht)
ciiy-vht-oht-(i)
1SG>3SG.AN-use-INF-NOM/SH
‘I have to use him.’ (JRS, Aug 2012)

¹⁷⁸ The penultimate syllable cannot carry a superhigh accent, since it is a historically short vowel (§14.1.3.3).

¹⁷⁹ The high-low tone on the second syllable is because H3 is imposed on the original lowfall tone.

The observations above suggest the existence of the following ‘vowel length’ hierarchy, based on their ability to carry a superhigh accent; a ‘true’ long vowels can always carry a superhigh accent, while a vowel lengthened due to Laryngeal Alternation can carry a superhigh accent in the absence of a ‘true’ superhigh accent:

- (14.36) ‘Vowel length’ hierarchy
 Long V > Long V due to LA > Short V

This fact may indicate that the vowel lengthening accompanying the assignment of a lowfall tone due to Laryngeal Alternation is on the way of becoming phonologized as a long vowel.

14.1.3.3. Historical short vowel

As we have seen in §11.2, certain synchronic long vowels in Oklahoma Cherokee come from historical short vowels, as a result of Compensatory Lengthening with the loss of a pre-consonantal glottal stop (14.37a), and thereby merging with a historical long vowel before a pre-consonantal glottal stop (14.37b):

- (14.37) Vowel Length Neutralization
 a. *V?C > VVC (Compensatory Lengthening)
 b. *VV?C > VVC

A historical long vowel before a pre-consonantal glottal stop can carry a superhigh accent, as in (14.38a) and (14.39a), as expected. (b) forms are in the atonic forms without the superhigh accent, thereby showing that the syllables with a superhigh accent in (a) otherwise have a lowfall tone, thus showing the presence of a historical pre-consonantal glottal stop:

- | | | | |
|---------|------------------------------------|--|------------------------------|
| | with SH | | without SH |
| (14.38) | a. ajó:task | | b. hajò:ta |
| | acoóthask | | hacòðtha |
| | Ø-acoo(?)tha-sk-(i) | | h-acòð(?)th-a |
| | 3SG.A-blow-IMPF-NOM/SH | | 2SG.A-blow:PCT-IND |
| | ‘(He is a) blower’ (JRS, Aug 2012) | | ‘Blow it!’(Feeling 1975: 32) |

- (14.39) a. u:hně:sgeht
 uuhněskeh
 uu-(a)hnee(?)sk-eh-(i)
 3SG.B-build.house-INF-NOM/SH
 ‘He has to build a house.’
 (DJM; JRS, Aug 2012)
- b. u:hnè:sgehdi
 uuhnèskehti
 uu-(a)hnèè(?)sk-eh-(i)
 3SG.B-build.house-INF-NOM/SH
 ‘for him to build a house’
 (Feeling 1975: 25)

A historical short vowel lengthened due to Compensatory Lengthening cannot carry a superhigh accent, and instead the superhigh accent is assigned to the preceding long vowel, as in (14.40) and

(14.41):

- (14.40) u:ló:nà:sdóht
 uuloónààstóht
 uu-loonàà(?)st-óht-(i) (*-loonaʔst-)
 3SG.B-deceive-INF-NOM/SH
 ‘He has to deceive him.’ (JRS, Aug 2011)

- (14.41) di:dǎ:nà:hlvsk
 tiitaǎnààhlvsk
 ti-Ø-(a)taa-nàà(?)hlvsk-(i) (< *-naʔhlvsk-)
 DIST-3SG.A-REFL-hire:IMPF-NOM/SH
 ‘He is a hirer.’ (JRS, Aug 2012)

Synchronically, it appears that these vowels need to be marked either as [+SH] or [-SH], and thus the Cherokee superhigh accent assignment is purely phonological in origin (non-final last long syllable), but is well on the way of becoming a mixed system based on phonological as well as lexical properties (some long syllables are lexically marked with [-SH]).¹⁸⁰

Vowel length was also neutralized when this vowel belongs to a pronominal prefix and is in a closed syllable, where a long vowel is shortened (§5.3.2.1). In such cases, too, Superhigh Assignment is sensitive to the original vowel length:

¹⁸⁰ There is a chance this original vowel length contrast is synchronically phonetically still contrastive (the historical short vowel may be shorter than the historical long vowel), but no systematic measurement was conducted.

	with SH		without SH
(14.42)	a. ú:yhdi		b. uyhdi
	uúyh.ti		uyh.ti
	uu-y-(v)ht-i		uu-y-(v)ht-i
	3SG.B-receive.LG-INF-NOM/SH		3SG.B-receive.LG-INF-NOM
	‘He has to receive a long object’		‘for him to receive a long object’
	(JRS, Aug 2012)		(Feeling 1975: 63)

14.1.3.4. Summary: exceptional long vowels

To summarize this section, a long vowel due to Pronominal Tonic Lowering cannot carry a superhigh accent (§14.1.3.1), but a vowel lengthened due to Laryngeal Alternation can carry a superhigh accent (§14.1.3.2). Lastly, a historical short vowel lengthened due to Compensatory Lengthening cannot carry a superhigh accent (§14.1.3.3). Superhigh Assignment can now be reformulated as follows:

- (14.43) Superhigh Assignment (final)
- (i) Assign a superhigh accent (level [4]) to the last non-final *historical* long vowel of the word (*which does not carry a lowfall tone due to Pronominal Tonic Lowering*).
 - (ii) Assign a superhigh accent to the long syllable with a lowfall tone lengthened due to *Laryngeal Alteration*, if there is no other long vowel in the word.
 - (iii) When there is no long vowel in the word, assign a high (level [3]) tone to the first syllable of the ‘modal stem’, or after the syllable with a lowfall tone due to *Pronominal Tonic Lowering*.

14.1.4. Summary: superhigh accent as a default-to-opposite accent

From the discussion in this section, it was shown that the Cherokee superhigh accent (i) is assigned to the non-final long vowel, and (ii) in the absence of a long vowel, a high tone (H4) is assigned to the first syllable of the word. Thus, it is clear that Cherokee superhigh accent resembles a default-to-opposite accent (Wright 1996: 21; Prince 1983; Hayes 1995: 296-299; Kager 1995: 384; Halle & Idsardi 1995: 412; Kager 2012), which can be formalized as an unbounded trochaic (‘strong-weak’) accent, disregarding complications such as the exceptional long vowels. In (14.44), (a) says that feet are constructed so that a long vowel (‘quantity sensitive’) comes at the left-edge of each foot (‘left-headed’); when the foot does not have a long vowel, as in (ii) or as in the initial foot of (i), the first syllable of the foot is assigned the head of the foot. Foot is unbounded, so that the foot extends up to the next long vowel.

(b) says that the head of the rightmost foot will be the head of the word, and thus assigned the primary accent of the word. (i) illustrates the case where the word has a long vowel, while (ii) where the word does not have a long vowel.

(14.44) Default-to-opposite accent (Hayes 1995: 298)

- a. Foot Construction: Form a left-headed, quantity sensitive unbounded foot.
- b. Word Layer Construction: End Rule Right.



What is interesting about the Cherokee superhigh accent is that while its phonological manifestation is metrical and accentual, its occurrence is not automatic but is instead morphosyntactically motivated (see §14.2). See §15.2.5 for more on the typological implications of this phenomenon.

14.2. Morphosyntactic conditions determining the presence of superhigh

In this section, I outline the environments where a superhigh accent is found. In §14.2.1 I will list the morphosyntactic categories which require a superhigh accent, while §14.2.2 will list morphosyntactic categories where a superhigh accent is not found. These two sections will illustrate that the categories which require a superhigh accent are not apparently coherent. §14.2.3 summarizes this section, attempting at identifying the ‘core function’ of a superhigh accent.

14.2.1. Forms with a superhigh accent

In this section, I will list all the environments where the superhigh accent is found. A superhigh accent is found on subordinate verbs (§14.2.1.1), adjectives (§14.2.1.2), some deverbal nouns (§14.2.1.3), as well as on nominal forms such as diminutive nouns (§14.2.1.4), location nouns (§14.2.1.5), and inalienably possessed nouns (§14.2.1.6).

Montgomery-Anderson 2008: 491-495). Among several criteria for singling out the adjective class (§1.7.3) is the requirement that all adjectives, whether derived (14.47) or not (14.46), have to carry a superhigh accent (Lindsey & Scancarelli 1985: 210):

- (14.46) Root adjectives
- a. ě:gwa
 eěkwa
 Ø-eekwa
 3SG.A-huge/SH
 ‘huge, large’ (Feeling 1975: 89)
- b. uwo:dú:hi
 uwootuúhi
 uw-ootuuhi
 3SG.B-pretty/SH
 ‘pretty’ (Feeling 1975: 184)
- c. ó:sda
 oósta
 Ø-oosta
 3SG.A-good/SH
 ‘good’ (Feeling 1975: 150)
- (14.47) Derived adjectives
- a. u:danv:galǘ:da
 uutanvkalvǘta
 uu-(a)ta-nvkal-vvt-a
 3SG.B-MID-clean-PP-IND/SH
 ‘clean’ (Feeling 1975: 159)
- b. ulsduǘí:da
 ulstuǘíita
 uu-(a)l(i)-stuǘ-iit-a
 3SG.B-MID-open-PP-IND/SH
 ‘open’ (Feeling 1975: 174)

The following minimal pairs illustrate that the part of speech is the crucial factor determining the presence/absence of the superhigh accent:

	with SH (Adjective)	without SH (Noun)	without SH (Verb)
(14.48)	a. u:hyṽ:dla uuhyṽvtla uu-hyvvtl-a 3SG.B-be.cold-IND/SH 'cold' ('cold water') (Feeling 1975: 169)	b. u:hyv:dla uuhyvvtla uu-hyvvtl-a 3SG.B-be.cold-IND 'cold' ('catch a cold') (ibid.)	c. ù:hyv:dla ¹⁸² ùùhyvvtla uu-hyvvtl-a 3SG.B-be.cold-IND 'it (weather) is cold' (ibid.)
(14.49)	a. adã:wé:hi ataáwééhi 'magical' (Feeling 1975: 7)	b. adã:wé:hi ataáwééhi 'magician' (ibid.)	
(14.50)	a. ju:ksṽ:sdi cuuksṽsti c-uu-k(a)svvst-i DIST-3SG.B-smoke-NOM/SH 'smoky' (Feeling 1975: 136)	b. ju:ksṽ:sdi cuuksṽsti c-uu-k(a)svvst-i DIST-3SG.B-smoke-NOM 'smoke' (ibid.)	

Carrying a superhigh accent does not always entail that it is an adjective: a verb carries a superhigh accent in the subordinate clause (§14.2.1.1), and some nouns carry a superhigh accent (§13.2.1.3-§14.2.1.7).

14.2.1.3. Some deverbal nouns

There are several noun derivational processes in Oklahoma Cherokee, the functions of which are not yet fully understood (Pulte & Feeling 1975: 319-322, Montgomery-Anderson 2008: 441-473, Stone 2012). Nouns can be derived from various aspectual forms of verbs, some of which carry a superhigh accent (14.51): agentive nominalization (a, b) and action nominalization with ASR *-vvʔi* (c, d) based on the imperfective stem; objective nominalization with ASR *-vvʔi* (e,f) based on the perfective stem; and instrumental nominalization (g, h) based on the infinitive stem or an infinitive used as a predicate (i):¹⁸³

¹⁸² The lowfall tone on the first syllable is due to Pronominal Tonic Lowering (or TGI), which assigns a lowfall tone to the vowel-initial pronominal prefixes in the tonic forms (§7.2).

¹⁸³ For the definitions of these terms, see Comrie & Thompson (1985).

(14.51)

- a. ahyv:dladi:sđi:sgi
 ahyvvtlatiistiiski
 a-hyvvtl-at-ii(?)st-iisk-i (< *-i?st-)
 3SG.A-cold-set.LG-CAUS-IMPF-NOM/SH
 ‘fridge’ (Feeling 1975: 29)
- b. di:da:nĩ:yĩ:sgi
 tiitaanifyiiski
 ti-Ø-(a)taa-n(?)iiy-iisk-i
 DIST-3SG.A-MID-catch-IMPF-NOM/SH
 ‘policeman’ (Feeling 1975: 80)
- c. à:dlé:sgṽ:ʔi
 ààtlééskṽʔi
 Ø-atléé(?)sk-vvʔi
 3SG.A-turn.off:IMPF-ASR/SH
 ‘turn-off’ (Feeling 1975: 12)
- d. dà:ni:sdayo:hihṽ:ʔi
 tààniistayoohihṽʔi
 t-anii-stayoo-hih-vvʔi
 DIST-3PL.A-shoot.at-IMPF-ASR/SH
 ‘Christmas’ (Feeling 1975: 75)
- e. a:hné:lhtanṽ:ʔi
 aahnéélhtanṽʔi
 Ø-aahnéélht-ahn-vvʔi
 3SG.A-interpret-PFT-ASR/SH
 ‘interpretation, translation’ (Feeling 1975: 24)
- f. à:tale:sṽ:ʔi
 ààthaleesṽʔi
 a-thalee-s-vvʔi
 3SG.A-drill.hole-PFT-ASR/SH
 ‘hole’ (Feeling 1975: 58)
- g. ganv:gwaló:sdi
 kanvkvwaloošti
 ka-nvkvwaloo-(?)st-i
 3SG.A-hammer-INF-NOM/SH
 ‘hammer’ (Feeling 1975: 113)

- h. adá:hnehdi
 ataáhnehti
 Ø-ataa-hneht-i
 3SG.A-MID-give.CMP:INF-NOM/SH
 ‘gift’ (Feeling 1975: 2)
- i. a:sé:dý: dǐ:gigì:sdi
 aaséétv́ tíkikiìsti
 ti-(a)ki-k-ìì(?)st-i (< *-i?st-)
 must DIST-1SG.B-eat-INF-NOM/SH
 ‘I have to eat them.’ (JRS, Aug 2012)

Not all the deverbal nouns carry a superhigh accent; deverbal nouns with ASR *-vv?i* always carry a superhigh accent, while others are found with and without a superhigh accent (for the factors conditioning the occurrence of the superhigh accent, see §14.2.3):

14.2.1.4. Diminutives

A superhigh accent is found when a noun has a diminutive suffix *-(uu)ca* or *-na*. Some diminutive nouns have counterparts without the diminutive suffix (and without a superhigh accent), shown in (b):

- | | with diminutive | | without diminutive |
|---------|--|----|--|
| (14.52) | a. achǔ:ja
achuúca
a-chuuca
3SG.A-boy/SH
‘boy’ (Feeling 1975: 1) | b. | achv:ya
achvvya
‘male animal’ (ibid.) |
| (14.53) | a. age:hyú:ja
akeehyuúca
a-keehy-uuca
3SG.A-woman-DIM/SH
‘girl’ (Feeling 1975: 16) | b. | agě:hya
akeéhya
a-keéhya
3SG.A-woman
‘woman’ (ibid.) |
| (14.54) | awí:na
awiíina
a-wiina
3SG.A-young.man/SH
‘young man’ (Feeling 1975: 62) | | - |

- (14.55) agí:na -
 akiina
 a-kiina
 3SG.A-young.animal/SH
 ‘young animal’ (Feeling 1975: 17)

In some cases the noun does not have an overt diminutive suffix, but a superhigh accent is still assigned:

- (14.56) ǎ:ta
 aǎtha
 Ø-aatha
 3SG.A-young.woman/SH
 ‘young woman’ (Feeling 1975: 56)

14.2.1.5. Location nouns

Cherokee has some derivational processes which derive location nouns from a non-locational noun with one of the locative suffixes, *-ooʔi*, *-oohi*, *-yi*, etc. (the formation, function and productivity of these locative suffixes are not yet well understood; cf. Pulte & Feeling 1975: 308-309, Koops 2011, Montgomery-Anderson 2008: 469-471). When a noun accompanies one of these suffixes, it carries a superhigh accent. (b) forms below are counterparts without the locative suffixes and thus without a superhigh accent:

- | | LOC (with SH) | original (without SH) |
|---------|---|------------------------------|
| (14.57) | a. gu:só:ʔi
kuusoóʔi
kuus-ooʔi
Creek-LOC/SH
‘Muskogee’ (Pulte & Feeling 1975: 308) | b. gu:sa
kuusa
‘Creek’ |
| (14.58) | a. kó:gǎ:ʔi
khóókǎʔi
khóók-vvʔi
crow-LOC?/SH
‘crow place’ (Pulte & Feeling 1975: 309) | b. kó:ga
khóóka
‘crow’ |

- (14.59) a. ganu:lǎ:hi
 kanuulvǎhi
 kanuul-vvhi
 grass-LOC/SH
 ‘in the grass’ (Pulte & Feeling 1975: 309) ‘grass’
- b. ganǎ:lv
 kanuúlv
- (14.60) a. a:mǎ:hi
 aamoǎhi
 aam-oohi
 salt-LOC/SH
 ‘in the salt’ (Pulte & Feeling 1975: 309) ‘salt’
- b. á:ma
 ááma

14.2.1.6. Inalienably possessed body part terms

Body part terms take various lexicalized possession suffixes (*-vvʔi*, *-ooʔi*, *-iiʔi*, *-ooli*, or *-ni*) in the inalienably possessed forms (Pulte & Feeling 1975: 312, Montgomery-Anderson 2008: 427).¹⁸⁴ When a body part term takes one of these suffixes, it carries a superhigh accent, while its alienable counterpart does not (all the following forms are from Feeling & Pulte 1975: 312-313).

The following body part terms take the suffix *-ooli*, which may be related to Proto-Iroquoian **-r-* ‘to be in’ (Rudes 1984: 500):

- | | | |
|---------|---|-------------------------------|
| (14.61) | Inalienable
ahǎ:li
ahoǎli
a-h-ooli
3SG.A-mouth-POSS/SH
‘his mouth’ | Alienable
_ ¹⁸⁵ |
|---------|---|-------------------------------|

¹⁸⁴ In addition, inalienably possessed body part terms take pronominal prefixes indicating the possessor. These pronominal prefixes can be either from set A or set B, and their selection is lexically specified and not predictable (Cook 1979: 146, Montgomery-Anderson 2008: 423-428). The alienable possessive forms also have pronominal prefixes, which may or may not be from the same set as their inalienable counterparts, but they cannot express possession relationship; a periphrastic construction has to be used to express possession in these cases (ibid.). In the case of Cherokee, the inalienably possessed counterparts manifest more marked forms than their alienable counterparts, in that the inalienable forms have a superhigh accent and an additional suffix, which is typologically rare (Dixon 2010: 286ff).

¹⁸⁵ These forms are not attested in the source.

- | | | | |
|------------|--|----|--|
| (14.62) a. | aktó:li
akhthoóli
a-k(a)hth-ooli
3SG.A-eye-POSS/SH
‘his eye’ | b. | akta
akhtha
a-k(a)htha
3SG.A-eye
‘eye’ |
| (14.63) a. | askó:li
askhoóli
a-skh-ooli
3SG.A-head-POSS/SH
‘his head’ | b. | uska
uskha
u-skha
3SG.B-head
‘head’ |
| (14.64) | kayv:só:li
khayvvsoóli
ka-hyvvs-ooli
3SG.A-nose-POSS/SH
‘his nose’ | | - |

The following body part terms take the suffix *-ni* in the inalienable forms; this suffix may be cognate with Seneca external locative suffix **-neh* (Chafe 1996: 570):

- | | Inalienable | Alienable | |
|------------|---|-----------|--|
| (14.65) a. | uwò:yě:ni
uwòðyeěni
uw-òò(ʔ)y-eeeni (< *oʔy-)
3SG.B-hand-POSS/SH
‘his hand’ | b. | uwô:ya
uwóoya
uw-óo(ʔ)ya (< *oʔy-)
3SG.B-hand
‘hand’ |
| (14.66) a. | ahyvhjě:ni
ahyvhceěni
a-hyvhcee-ni
3SG.A-throat-POSS/SH
‘his throat’ | b. | ahyvhje
ahyvhce
a-hyvhce
3SG-throat
‘throat’ |
| (14.67) a. | gaʔlé:ni
kaʔleěni
ka-lʔee-ni
3SG.A-ear-POSS
‘his ear’ | b. | gaʔle
kaʔle
ka-lʔe
3SG.A-ear
‘ear’ |

Other body part terms which take the possessive suffix *-ni* are ‘leg’ (*-nvʔske-*), ‘knee’ (*-hnike-*), ‘arm’ (*-hnooke-*), and ‘foot’ (*-alaʔsihte-*).

(14.68) - (14.70) illustrate body part terms taking suffixes *-vvʔi* and *-ooʔi*, which are the same form as the assertive and habitual modal suffixes on verbs (some forms which take these suffix do appear to have a verbal morphology, such as the aspectual suffix). The following body part terms take the suffix *-vvʔi*, with a superhigh accent:

- (14.68) Inalienable
 ù:tsgwalv:tʷ:ʔi
 uutskwalvvthvʷʔi
 uu-tskwalvvth-vvʔi
 3SG.B-ankle-POSS/SH
 ‘his ankle’
- (14.69) aye:lʷ:ʔi
 ayeelvʷʔi
 a-yeel-vvʔi
 3SG.A-body-POSS/SH
 ‘his body’
- (14.70) ganhdóhgʷ:ʔi
 kanhtóhkʷʔi
 ka-n(v)htóhk-vvʔi
 3SG.A-tooth-POSS/SH
 ‘his tooth’

Other body part terms which take the possessive suffix *-vvʔi* are ‘finger’ (*-:ʔyeesaʔt-*), ‘toe’ (*-hnaʔsaʔt-*), ‘navel’ (*-tiiʔyvvtat-*), ‘lip’ (*-haneeʔkaʔl-*), ‘skin’ (*-neeʔkaʔl-*), ‘hair’ (*-sthihk-*), and ‘claw’ (*-ʔsuhkahl-*). The following body part terms take the suffix *-ooʔi*:

- | | | |
|------------|---|---|
| | Inalienable | Alienable |
| (14.71) a. | gà:nhgõ:ʔi
kàànhkoõʔi
ka-(ʔ)n(v)hk-ooʔi
3SG.A-tongue-POSS/SH
‘his tongue’ | b. gà:nhga
kàànhka
ka-(ʔ)n(v)hk-a
3SG.A-tongue
‘tongue’ |
| (14.72) | ganv:wó:ʔi
kanvwoõʔi
ka-nvww-ooʔi
3SG.A-shoulder-POSS/SH
‘his shoulder’ | - |

The following body part terms take the suffix *-iiʔi*, which is the same suffix as is found on some location nouns (Pulte & Feeling 1975: 308):

	Inalienable	Alienable
(14.73)	gane:ǰí:ʔi kaneeciíʔi ka-neec-iiʔi 3SG.A-chest-POSS/SH 'his chest'	-
(14.74)	ganv:dí:ʔi kanvvtíʔi ka-nvvt-iiʔi 3SG.A-breast-POSS/SH 'his breast'	-
(14.75)	ga:sohí:ʔi kaasohíʔi ka-:soh-iiʔi 3SG.A-back-POSS/SH 'his back'	-
(14.76)	a. u:sgwo:hlí:ʔi uuskwóhliíʔi uu-skwoohl-iiʔi 3SG.B-stomach-POSS/SH 'his stomach'	b. u:sgwǒ:la uuskwóla uu-skwoóla 3SG.B-stomach

The reason inalienably possessed nouns carry a superhigh accent is not yet clear, but it could be the case that the inalienable possession suffixes indeed are locative suffixes (*-iiʔi*, and *-ni*) and modal suffixes of deverbal nominals (*-vvʔi* and *-ooʔi*) in origin, which themselves require a superhigh accent (§14.2.1.3, §14.2.1.5).¹⁸⁶

14.2.1.7. Others

Root nouns generally do not carry a superhigh accent (§14.2.2.5), but there are some root nouns with a superhigh accent which do not conform to any of the categories discussed above:

¹⁸⁶ Northern Iroquoian also employs an external locative suffix **-keh* or **-neh* with external body parts, even when no locative meaning is involved (Chafe 1996: 570, Mithun 1996: 638).

(14.77) Root nouns with a superhigh accent

a. gó:la
koóla
'winter' (Feeling 1975:)

b. gǎ:du
kaátu
'bread' (Feeling 1975:)

14.2.2. Forms without a superhigh accent

This section lists the environment where the superhigh accent is not found. A superhigh accent is not found on a verb in the main clause (§14.2.2.1), imperative forms (§14.2.2.2), infinitive (§14.2.2.3), some agentive nominalization forms (§14.2.2.4) or root nouns (§14.2.2.5).

14.2.2.1. Verbs in main clause

A verb in the main clause does not carry a superhigh accent:

(14.78) anĩ:táʔli ani:sgaya à:ni:no:halĩ:dô:he,
aniítháʔli aniiskaya ààniinoohaliítóohe
anii-thálʔi anii-skaya anii-noohaliítóo(?)h-e(ʔi)
3PL.A-two 3PL.A-man 3PL.A-hunt:IMPF-EVID
'Two men were hunting,' (Pulte & Feeling 1975: 354)

14.2.2.2. Imperatives

Imperative forms of verbs never carry a superhigh accent (contra Cook 1979: 92):

(14.79)

a. hiʔní:ya
hiʔnííya
hi-nʔííy-Ø-a
2SG.A-catch-PCT-IND
'Catch him!' (Feeling 1975: 109)

b. hadagi
hataki
h-at-ak-i
2SG.A-hang-REV:PCT-IND
'Remove it from a hanging position!' (Feeling 1975: 91)

Imperative verbs are ‘atonic’ in that they lack Pronominal Tonic Lowering and in that a glottal stop did not induce H1, but nevertheless they do not carry a superhigh accent.

14.2.2.3. Infinitives

Instrumental nominalization based on the infinitive stem of the verb, or an infinitive used as a predicate carries a superhigh accent (§14.2.1.3). However, when an infinitive is used as an action/state noun as an argument of a verb, infinitive does not carry a superhigh accent:

(14.80)

- a. u:nv:gwalò:sdi
 uunvkvwalòðsti
 uu-nvkvwaloo-(?)st-i
 3SG.B-hammer-INF-NOM
 ‘for him to hammer it’ (Feeling 1975: 113)
- b. u:so:nv:sdi
 uusoonvvti
 uu-soonvv-st-i
 3SG.B-wound-INF-NOM
 ‘for him to wound him’ (Feeling 1975: 55)

Even some argument nouns (even instrumental nominalizations such as in (b, c)) based on an infinitive does not carry a superhigh accent:

(14.81) Argument nouns without SH

- a. ada:geyhdi
 ataakeeyhti
 Ø-ataa-keey(u)-ht-i
 3SG.A-MID-love-INF-NOM
 ‘love’ (Feeling 1975: 2)
- b. galo:gò:di
 kalookòðti
 ka-look-òð(?)t-i (< *-o?t-)
 3SG.A-hoe-INF-IND
 ‘hoe’ (Feeling 1975: 101)

- c. galù:ysdi
kalùùysti
ka-lùù(?)y-st-i (< *-luʔy-)
3SG.A-chop-IMP-IND
'axe' (Feeling 1975: 103)

See §14.2.3 for the (possible) factors conditioning the presence/ absence of the superhigh accent on these forms.

14.2.2.4. Some agentive nominalization

Agentive nominalization based on the imperfective stem of the verb usually has a superhigh accent.

However, in some cases a superhigh accent is not found with such forms:

(14.82)

- a. ahyv:dagwalò:sgi
ahyvvtakwalòòski
a-hyvvtakwaloo-(?)sk-i
3SG.A-thunder-IMP-IND
'thunder' (Feeling 1975: 29)
- b. gaʔlè:gi
kaʔlèèki
ka-lʔee-(?)k-i
3SG.A-climb-IMP-IND
'blacksnake' (Feeling 1975: 99)
- c. sě:lu anhtasgì:sgi
seélu anhtaskìiskì
seélu an-(a)hthask-ìì(?)sk-i
corn 3PL.A-explode-IMP-IND
'popcorn' (Feeling 1975: 152)

See §14.2.3, again, for the factors conditioning the presence/ absence of the superhigh accent on these forms.

14.2.2.5. Root nouns

Undersived root nouns do not carry a superhigh accent (as opposed to derived nouns, which always have a superhigh accent):

(14.83)

- a. asgaya
askaya
a-skaya
3SG.A-man
'man' (Feeling 1975: 50)
- b. ama
ama
'water' (Feeling 1975: 43)
- c. gĩ:ga
kiíka
'blood' (Feeling 1975: 119)

14.2.3. Summary: incoherence of the morphosyntactic category marked by a superhigh accent

The description in this section revealed that the category marked by a superhigh accent is not coherent: a superhigh accent is carried by verbs in a subordinate clause, adjectives, some deverbal nouns (but not all), location nouns, inalienably possessed body part terms, diminutives. It appears to be extremely difficult to pin down the core function of the superhigh accent, if there is ever one.¹⁸⁷

It might as well be the case that the forms *without* the superhigh accent are 'marked'. This is all the more plausible if the Cherokee superhigh accent is the remnant of the Proto-Iroquoian penultimate accent (Michelson 1988), the position of which is similar to the Cherokee superhigh accent.

The most interesting facts concerning the presence/absence of a superhigh accent are the existence of minimal pairs which contrast solely by the presence/absence of the superhigh accent. First, the infinitive stem of a verb may or may not carry a superhigh accent (§14.2.1.3, §14.2.2.3). Second, some agentive nominalization carries a superhigh accent (§14.2.1.3), while others do not (§14.2.2.4). Below, I first argue that whether an infinitive form has a superhigh accent is determined by whether it functions as an argument of a verb or as a predicate (§14.2.3.1). Second, I argue that for argument nouns, the crucial factor for the occurrence of a superhigh accent is whether this nominalization refers to the original argument of the verb (§14.2.3.2).

¹⁸⁷ A similar situation, where the categories marked by a specific morpheme are not coherent, is found in stem-final vowel alternation in Bantu (Jeff Good, p.c.) or Ablaut in Dakota (Shaw 1980: Ch.3).

- (14.87) tlá jáhlvdi yigi.
 tlhá cáhlvti yiki
 ca-lh-vt-i yi-ki
 NEG 2SG.B-sleep-INF-NOM/SH IRR-COPULA
 ‘You must not sleep.’ (DJM, Aug 2012)

14.2.3.2. Argument noun: reference to the original argument of the verb

In the case of the argument nouns (instrumental nominalization based on the infinitive stem or the agentive nominalization based on the imperfective stem), another factor seems to be at stake. First, compare the minimal pairs below. (a) forms have superhigh accent, while (b) forms do not.

- | | With SH | Without SH |
|---------|---|--|
| (14.88) | a. gayhgǒ:gi ¹⁸⁸
kayhkoóki
‘liar’ (Feeling 1975: 118) | b. gayhgò:gi
kayhkòòki
‘lie’ (ibid.) |
| (14.89) | a. digo:hwě:lò:di ¹⁸⁹
tikooheélòòti
ti-k-oohweel-òò(?)t-i (< *-oʔt-)
DIST-3SG.A-write-INF-NOM/SH
‘pencil’ (Feeling 1975: 82) | b. digo:hwě:lô:di
tikooheélóoti
ti-k-oohweel-óo(?)t-i (< *-oʔt-)
DIST-3SG.A-write-INF-NOM
‘desk’ (Robinson 1989) |
| (14.90) | a. ju:gǔ:walhdi
cuukvǔwalhti
c-uu-kvǔwal-(o)ht-i
DIST-3SG.B-be.worth-INF-NOM/SH
‘price’ (Feeling 1975: 136) | b. ju:gv:walhdi
cuukvǔwalhti
c-uu-kvǔwal-(o)ht-i
DIST-3SG.B-be.worth-INF-NOM
‘wealth’ (ibid.) |
| (14.91) | a. adawě:lagì:sgi
ataweélakììski
Ø-ataweelak-ìì(?)sk-i (< *-iʔsk-)
3SG.A-burn-IMPF-NOM/SH
‘flame’ (Feeling 1975: 7) | b. adawe:lagì:sgi
ataweelakììski
Ø-ataweelak-ìì(?)sk-i (< *-iʔsk-)
3SG.A-burn-IMPF-NOM
‘gunpowder’ (ibid.) |

¹⁸⁸ Morphologically, these forms appear to be agentive nominalizations of some kind of verb, but no verb root of the shape *-y(V)hkoo-* is known to me. The verb stem ‘to lie’ is *-aciskooʔvsk-*.

¹⁸⁹ The expected instrumental nominalization here would be the verb base *-oohweel-* ‘write’ with two infinitive/causative suffixes (the first one indicating the instrument, the second one nominalization); however, some instrumental nouns are lexicalized with the form without the expected second infinitive/causative suffix (Pulte & Feeling 1975: 321).

Looking at the pairs above, we find that the (a) forms, which have a superhigh accent, refer to the actor or undergoer arguments of the original verb: (14.88) ‘the one who lies’, (14.89) ‘the thing with which to write’, (14.90) ‘the thing which is worth, and (14.91) ‘the thing which burns’. On the other hand, the (b) forms, without the superhigh accent, do not refer to any of the original arguments, and it appears that they are semantically lexicalized to some extent (i.e. their meanings are not fully predictable from the original verbs). Here I argue that the crucial factor determining the presence/absence of a superhigh accent here is whether the derived nominals refer to the core argument of the verb or not.

In general, forms without a superhigh accent tend to denote an abstract entity (14.92), while the forms with a superhigh accent tends to a concrete entity (14.93):

- (14.92) No SH
- a. ada:geyhdi
 ataakeeyhti
 Ø-ataa-keey(u)-ht-i
 3SG.A-MID-love-INF-NOM
 ‘love’ (Feeling 1975: 2)
- b. ayo:hu:hisdi
 ayoohuhisti
 a-yoohuu-hist-i
 3SG.A-die-INF-NOM
 ‘death’ (Feeling 1975: 64)
- (14.93) with SH
- a. di:ktin̄:thdi
 tiikhthin̄v̄thti
 ti-Ø-(a)k(a)hthin̄v̄t-(v)ht-i
 DIST-3SG.A-put.on.glass-INF-NOM/SH
 ‘eyeglasses’ (Feeling 1975: 84)
- b. di:da:n̄:ȳ:sgi
 tiitaanifȳīski
 ti-Ø-(a)taa-n(?)īiy-iisk-i
 DIST-3SG.A-MID-catch-IMPF-NOM/SH
 ‘policeman’ (Feeling 1975: 80)

However, this is not always the case, since we have examples such as *atuutale'ęsti* ‘freedom’, which is an abstract noun but bears a superhigh accent, or *tikoohweeli* ‘paper’, which is not an abstract noun but does not bear a superhigh accent.

14.3. Conclusion

In this chapter, I have laid out in detail Superhigh Assignment, which resembles a ‘default-to-opposite’ accent (§14.1). In contrast to accentual systems in other languages, Cherokee superhigh accent has a morphosyntactic function and is found on various morphosyntactic categories (§14.2). This morphosyntactic use of an ‘accent’-like system is one of the peculiar characteristics of the Cherokee tonal and accentual system, which will be discussed in §15.2.5.

Chapter 15. Typological Properties of the Cherokee Tonal and Accentual System

15.0. Introduction

This chapter looks at the tonal and accentual system of Oklahoma Cherokee from a typological perspective. First, I examine which word-prosody system Cherokee most fits into (§15.1); that is, whether Cherokee is a tonal, a stress-accent, or a pitch-accent language (Beckman 1986, Hyman 2006, 2009, 2012). This chapter will also explore the typologically outstanding properties of Cherokee tones and accents (§15.2).

15.1. Cherokee tones and accents: what are they?

This section tackles the question of the nature of the Cherokee tonal and accentual system. §15.1.1 summarizes the tonal and accentual system of Oklahoma Cherokee discussed in Ch.6 - Ch.14. §15.1.2 reviews typological studies on the word-prosody systems. With this background, §15.1.3 attempts to situate the Cherokee tonal and accentual system in a typological context.

15.1.1. Summary of the Cherokee tonal and accentual system

In this section, I summarize the discussions in Part II (Ch.6 - Ch.14) on the tonal and accentual system in Oklahoma Cherokee.

In Ch.6, I showed that the six pitch patterns occurring on a syllable (low, high, low-high, high-low, lowfall, superhigh) can be organized into four contrastive tones, low, high, lowfall and superhigh. In subsequent chapters I argued that there are at least four sources of the high tone (level 3): (i) high tone from a glottal stop (H1; Ch.8 - Ch.11); (ii) high tone on the final mora of a stem (H2; Ch.12); (iii) high tone from a pre-pronominal prefix (H3; Ch.4); and (iv) a high variant of the superhigh accent (H4).

TABLE 15-1 summarizes the inventory of tones and accents and their different properties as discussed in Ch.6 - Ch.14: their sources (second column), with which these tones alternate (fourth column), whether or

not they block Laryngeal Alternation (fifth column), tone bearing unit (TBU) (sixth column), and whether or not the tone spreads across the syllable boundary, and if it does, its direction (last column).

TABLE 15-1. SUMMARY OF CHEROKEE TONES AND ACCENTS

TYPE	SOURCE	CHAPTER	ALTERNATION	LA BLOCKING	TBU	SPREADING
LOW	(default)	Ch.6	LOW/HIGH	NO	MORA	NO
LOWFALL	> *ʔC	Ch.7	HIGH	YES	SYLLABLE	NO
H1	> *ʔC	Ch.8 -	LOWFALL	YES	MORA	LEFTWARDS
	> *Cʔ, VʔV	Ch.11	LOW			
H2	On stem final V	Ch.12	LOW/HIGH	NO	MORA	RIGHTWARDS
H3	Due to PPP	Ch.13	HIGH	NO	SYLLABLE	(LEFTWARDS)
H4	A variant of SH	Ch.14	SUPERHIGH	NO	SYLLABLE	NO
SUPERHIGH	Accent	Ch.15	HIGH	NO	SYLLABLE	(LEFTWARDS)

At the beginning of this dissertation, in Ch.1, I gave the following examples to illustrate how each syllable in a Cherokee word is specified with tones and accents:

(15.1) (= (1.1))

- a. à:dé:yohv̌:ʔi
 ààtééyohv̌v̌ʔi
 Ø-ateey-(ʔ)oh-vvʔi
 3SG.A-go.around.curve-PRS-ASR/SH
 ‘curve’ (Feeling 1975: 9)
- b. adv̌:ně:lí:sgi
 atv̌v̌neéliĩski
 Ø-atv̌v̌(ʔ)ne:l-iisk-i
 3SG.A-act.silly-IMPF-NOM/SH
 ‘(he is an) actor’ (Feeling 1975: 14)

- c. yi-sgwahtv:dà:sdí:ha
 yiskwahthývtààstíha
 ①
 yi-skw-ahthvvtà(?)st-iih-a (< *-ahthvvtà?st-)
 IRR-2SG>1SG-listen-PRS-IND/SH
 ‘If you listen to me’ (CED-EJ, 2010)

Now that we have a comprehensive description of the Cherokee tonal and accentual system at hand, we should be able to identify the sources of each tone in (15.1). First, in (15.1a), the lowfall tone on the first syllable is due to Pronominal Tonic Lowering (or TGI; §7.2), which assigns a lowfall tone to the vowel-initial pronominal prefix in tonic forms (as required by the assertive modal suffix; cf. §A.2.3). The high tone on the second syllable is due to a glottal stop in the aspectual suffix (Ch.9). The morphosyntactic category of this form, a nominalized verb, requires a superhigh accent (§14.2.1.3), and the superhigh accent is regularly assigned to the last long vowel of the word.

In (b), the word is in the atonic form and thus Pronominal Tonic Lowering is not found on the first syllable. The lowfall tone on the second syllable is due to a glottal stop (§7.1); recall that a glottal stop failed to induce H1 in atonic forms. The low-high tone on the next syllable is a preparatory raising before a superhigh accent (§14.0). Lastly, the morphosyntactic category of this form, agentive nominalization, requires the superhigh accent and the superhigh accent is regularly assigned to the last long vowel of the word.

Lastly in (c), the high tone on the third syllable is due to the pre-pronominal prefix (Ch.13); since the vowel of the pre-pronominal prefix is short, H3 is assigned to the second syllable of the modal stem (§13.2.1.2). The lowfall tone in the next syllable is due to a glottal stop; a glottal stop failed to induce H1, since the form is atonic as required by the irrealis pre-pronominal prefix (§A.2.2). The form is a subordinate verb, which requires a superhigh accent (§14.2.1.1) and thus a superhigh accent is regularly assigned to the last long vowel of the word.

15.1.2. Typology of the word-prosody systems

In this section, before situating the Cherokee tonal and accentual system in a typological perspective, I review two trends of typological studies on word-prosody systems, namely that represented by Trubetzkoy (1969) and Beckman (1986) on the one hand (§15.1.2.1), and Hyman (2006, 2009, 2012) on the other (§15.1.2.2). The two trends share the fundamental distinction between ‘tonal’ and ‘accentual’ systems.

15.1.2.1. Trubetzkoy (1969), Beckman (1986)

The most widely-accepted typology of word-prosody systems is to divide the various word-prosody phenomena first into two categories (Trubetzkoy 1969, Beckman 1986, Hyman 2006, among others): tonal systems and accentual systems.

In a tonal system, pitch marks a paradigmatic contrast: that is, it functions primarily to distinguish one word from another that could have occurred in the same place (Beckman 1986: 2-3). Accent, on the other hand, is “a system of syntagmatic contrasts used to construct prosodic patterns which divide an utterance into a succession of shorter phrases and to specify relationships among these patterns which organize them into larger phrasal groupings (Trubetzkoy’s (1969) delimitative and culminative functions)” (Beckman 1986: 1). More informally stated, accent is “an ‘abstract’ mark where a culmination of prosodic features occurs, thereby marking that syllable (or accent bearing unit) with greater salience than surrounding syllables (Hyman 1978: 4).”

Accentual systems are further subdivided into stress-accent and pitch-accent systems according to this view, as illustrated in TABLE 15-2. In such a view, the difference between stress accent system and pitch accent system is merely how the ‘accent’ is realized phonetically: in a pitch accent system (e.g. Tokyo Japanese), the primary correlate of the ‘accent’ is F0 (i.e., pitch), while in a stress accent system, it is a combination of F0, length, intensity, or vowel quality.

TABLE 15-2. A CLASSIFICATION OF WORD-PROSODY SYSTEMS
(based on Trubetzkoy 1969, Beckman 1986, and Remijsen 2002: 40)

PHONOLOGY		
Lexical tone: paradigmatic contrast (e.g. Mandarin, Mazatec (Pike 1948))	Lexical accent: culminative and delimitative: if distinctive, the contrast is syntagmatic.	
	Lexical pitch accent (e.g. Tokyo Japanese)	Lexical stress (e.g. English)
Encoding: F0		Encoding: parameters in addition to F0
PHONETICS		

15.1.2.2. Hyman (2006, 2009, 2012)

Hyman's (2006, 2009, 2012) approach to word-prosody diverges somewhat from such views. His classification involves a small set of definitional properties of tonal and stress-accentual systems, along with 'canonical' properties of each system. In canonical typology (Corbett 2006, 2007, Palancar 2012, Brown & Chumakina 2012, etc.), the 'canon' is an ideal category or an ideal process, against which the actual constructs of a language instantiating that particular phenomenon can be evaluated, and the canonical instances, that is the best, clearest and indisputable are unlikely to be frequent (Corbett 2007: 9, Brown & Chumakina 2012). In this sense, the canon is not something good or bad, or a prototype (Palancar 2012: 785).

For the tonal systems, Hyman (2006) gives the following definition:

- (15.2) Definition of Tone (Hyman 2006: 229)
A language with tone is one in which an indication of pitch enters into the lexical realisation of at least some morphemes.

As a defining property of tonal languages, languages which do not conform to this definition do not count as a tonal language. As canonical features of tonal languages, Hyman (2009, 2012) lists the following:

- (15.3) Canonical features of tonal languages (Hyman 2009, Hyman 2012: 357)
- a. Binary
Both H and L are phonologically activated.
 - b. Omniprosodicity
Every tone-bearing unit (TBU) has a H or L.
 - c. Unrestrictedness
All combinations of H and L occur.
 - d. Faithfulness:
Every /H/ or /L/ is realized on its underlying morpheme and TBU.
 - e. Lexical
/H/ and /L/ should contrast on lexical morphemes.
 - f. Contours?
HL and LH contours should be possible on a single TBU.
 - g. Floating tones?
H and L tonal morphemes and lexical floating tones should be possible.

As canonical features, not all the languages manifest these properties; rather, the more features from (15.3) a language exhibits, the closer a language is to a canonical tonal language.

For stress-accent systems, Hyman (2006, 2009, 2012) gives the following definitional properties:

- (15.4) Definition of Stress-accent (Hyman 2006: 231)
- a. Obligatoriness: every lexical word has *at least* one syllable marked for the highest degree of metrical prominence (primary stress).
 - b. Culminativity: every lexical word has *at most* one syllable marked for the highest degree of metrical prominence.

Again, as definitional properties, languages which do not exhibit these two features are not stress-accent language, according to Hyman's view. Thus, Somali, where accent is culminative but not obligatory, Creek, where accent is obligatory but not culminative, or Seneca, where accent is neither obligatory nor culminative, do not count as stress-accent languages (Hyman 2006: 243). He further lists the following canonical features of stress-accent languages (note that (a) and (b) are already listed as the definitional properties of stress-accent languages):

- (15.5) Canonical features of stress-accent languages (Hyman 2009, Hyman 2012: 362):
- a. Obligatory
All words have a primary stress.
 - b. Culminative
No word should have more than one primary stress.
 - c. Predictable
Stress should be predictable by rule.
 - d. Autonomous
Stress should be predictable without grammatical information.
 - e. Demarcative
Stress should be calculated from the word edge.
 - f. Edge-adjacent
Stress should be edge-adjacent (initial, final)
 - g. Non-moraic
Stress should be weight-independent
 - h. Privative
There should be no secondary stress
 - i. Audible
There should be a phonetic cue(s) of the primary stress.

According to Hyman, there is no prototypical or canonical “pitch-accent” system (Hyman 2012: §3.5), and pitch-accent systems “freely pick-and-choose properties from the tone and stress prototypes, producing mixed, ambiguous, and sometimes analytically indeterminate systems which appear to be “intermediate” (Hyman 2009: 213). Pitch-accent systems often exhibit the following properties, but they are neither definitional nor canonical features of pitch-accent systems:

- (15.6) ‘PA-like’ properties (Hyman 2006: 237)
- a. A system whose underlying prosody is abstractly different from surface realizations.
 - b. A system which combines tone and stress.
 - c. A system which has restricted, sparse or privative tone.

15.1.3. Fitting Cherokee tones and accents in typological perspective

With this background on the typology of the word-prosody system, let us attempt to categorize the tonal and accentual system of Oklahoma Cherokee.

In the previous literature, the Cherokee tonal and accentual system has been analyzed as a pitch-accent system (Lindsey 1987, Johnson 2005). However, after looking at the tonal and accentual phenomena in detail in this study, it is clear that the Cherokee tonal and accentual system as a whole

cannot be assigned to one of the word-prosody systems in §15.1.2: it is not a canonical tonal system, nor a stress-accent system. The system as a whole can be best captured as a combinations of several systems.

First, Oklahoma Cherokee has *incipient* tones, which have a segmental source (glottal stop) and are on their way to becoming pure tones, but which still have not lost their connections with the source segment. This is the case with H1 (Ch.8 - Ch.11), possibly along with the lowfall tone (Ch.7). Whether incipient tones are close to a canonical tone is a tricky issue, but we have seen that such an incipient tone (H1) has already developed a complex tonal alignment system (§8.1, Ch.11), and manifest various properties common in purely tonal systems, such as the OCP (§8.2), floating tone (§8.4), or spreading (§8.5). Hyman (2006) also remarks that “[t]one may thus either be present in URs or be introduced by rule. If this latter occurs at the lexical level, rather than postlexically, this would count as tone by the above definition.” (Hyman 2006: 230). In this sense, lowfall and H1 in Oklahoma Cherokee meets the definition in (15.2) as a tonal language, even in the most abstract interpretation that the tone in Oklahoma Cherokee is introduced by a rule from a glottal stop in the lexical level (which this study does not adopt; this study assumes that *both* the glottal stop and the tones it has induced are in the lexical representation).

H1 also satisfies some of the properties of ‘canonical’ tonal systems in terms of Hyman’s criteria (15.3); every TBU is specified with a tone, thus satisfies (b) Omniprosodicity; high and low tones have a rather free distribution (§6.2), thus satisfies (c) Unrestrictedness; purely tonal minimal pairs are hard to come by due to the polysynthetic nature of Cherokee, but still there are such cases as we saw in §6.1, and thus satisfies (e) Lexical.

Secondly, we have seen that Superhigh Assignment (Ch.14) is best captured as a default-to-opposite accent, despite its morphosyntactic function. Cherokee superhigh accent violates Obligatoriness in (15.4), which is the definitional property of the stress-accent system according to Hyman, but it satisfies many of the ‘canonical’ features of stress-accent systems (15.5): the superhigh accent is restricted to one per word, thus satisfying (b) Culminative; the position of the superhigh accent is recoverable by general rule (except for possible lexicalization of historical short vowel before a pre-

consonantal glottal stop as [-SH]; §14.1.3.3), thus satisfying (c) Predictable; superhigh accent assignment is blind to the morphological structure, thus satisfying (d) Autonomous (the inability of the short vowel of a pre-pronominal prefix to carry the high variant of superhigh is accounted for by extrametricality; §14.1.2.2); the superhigh accent assignment is calculated from the word edge (the superhigh accent is an unbounded trochaic system counted from the right edge; §14.1.4), thus satisfying (e) Demarcative; there is no ‘secondary’ superhigh accent, thus satisfying (h) Privative; and lastly, the superhigh accent is realized with a rise in pitch, thus satisfying (i) Audible.

I argued in §13.4.1 that the high tone from pre-pronominal prefixes (H3; Ch.13) is best captured as an iambic accent, rather than a floating tone. Support for such an analysis includes its culminativity, syllable as the TBU, and sensitivity to extrametricality. Again, due to its morphosyntactic nature, H3 does not satisfy Obligatoriness, the definitional property of a stress-accent system (15.4), but satisfies many of the canonical properties of a stress-accent system. Only one H3 is allowed (§13.4.1), thus satisfying (b) Culminative; H3 assignment is predictable from a general rule (§13.2), thus satisfying (c) Predictable; H3 assignment is blind to the internal structure of the ‘modal stem’, thus satisfying (d) Autonomous (assuming extrametricality does not involve grammatical information); H3 assignment is calculated from the word edge (H3 is an iambic pitch-accent counted from the left edge; §13.4.1), thus satisfying (e) Demarcative; H3 is quantity-insensitive (§13.4.1), thus satisfying (g) Non-moraic; there is no ‘secondary’ H3, thus satisfying (h) Private; and lastly, H3 is realized as a high tone, satisfying (i) Audible.

TABLE 15-3 summarizes how ‘canonical’ superhigh accent and H3 are, according to Hyman’s canonical features of stress-accent languages (15.5):

TABLE 15-3. CANONICALITY OF SH AND H3

	SH	H3
A. OBLIGATORY	NO	NO
B. CULMINATIVE	YES	YES
C. PREDICTABLE	YES	YES
D. AUTONOMOUS	YES	YES
E. DEMARCATIVE	YES	YES
F. EDGE-ADJACENT	NO	NO
G. NON-MORAIC	NO	YES
H. PRIVATIVE	YES	YES
I. AUDIBLE	YES	YES

Lastly, I have shown that the high tone found on the last mora of the stem (Ch.12; H2) resembles a word-tone system; word-tone systems diverge from prototypical tonal systems, in that such systems have a syntagmatic dimension (Hyman 2006: 230-231).

In sum, we can conclude that the tonal and accentual system of Oklahoma Cherokee consists of two incipient tones (lowfall, H1), one word-tone (H2), and two types of accents, H3 and superhigh. In a way, Oklahoma Cherokee is ‘non-canonical’ in that it has multiple accentual systems; Hyman does not discuss whether co-existence of multiple accentual systems is non-canonical, but his discussions appear to assume that this is the case. For more on coexistence of multiple metrical systems, see §15.2.4.

15.2. Typologically outstanding properties of Cherokee tones and accents

This section looks at the typologically peculiar properties of the Cherokee tonal and accentual system.

15.2.1. Historical development of both lower and higher tones from a glottal stop

As was shown in Ch.7, lowfall tone has glottal stop as its historical source. At the same time, as was argued in Ch.9, glottal stop has also induced a high tone (H1) in Oklahoma Cherokee. Whether a glottal stop induced H1 or a lowfall tone depends on complex phonological and morphological factors (§8.2, §9.2). This is the most evident when one and the same morpheme alternates between H1 and

lowfall (§9.1.2), as in the second syllable of the forms in (15.7). In these examples, the conditioning factor is morphological (tonicity): (a) is tonic, while (b) is atonic (the relevant vowels are underlined).

	H1		LF	
(15.7)	a.	à:dá:dlo:híha	b.	hadà:dlǒ:ga
		àà <u>táá</u> tloohíha		hatà <u>t</u> loóka
		Ø-atáa(?)tloo-híh-a		h-atàà(?)tloó-k-a
		3SG.A-put.on.belt-PRS-IND		2SG.A-put.on.belt-PCT-IND
		‘He is putting on a belt.’ (Feeling 1975: 2)		‘Put on a belt!’ (ibid.)

It is phonetically natural for a glottal stop to induce higher tones, as in Vietnamese, Burmese, and some Athabaskan languages, among others (Hombert et al. 1979: 49, Krauss 2005). It is also equally phonetically natural for a glottal stop to induce lower tones, as in some Northern Iroquoian languages (Michelson 1988) and some Athabaskan languages (Krauss 2005). See §9.1.7 for a more detailed phonetic explanation. However, it is extremely rare for a language to develop *both* higher and lower tones from a glottal stop. Athabaskan language family is well-known for its complex development of a historical glottal stop; some of its daughter languages developed a high tone from a historical glottal stop, while others a lower tone, and in some cases even a closely related dialects have developed opposite tones (Krauss 2005: 70; Kingston 2011: 2313). However, none of the Athabaskan languages have been reported to have developed both the higher and lower tones from a historical glottal stop. The only other language which has been reported to have developed both higher and lower tones from a glottal stop is Upriver Halkomelem Salish (Brown 2004), but the details of the development of these tones in this language are not much discussed, as far as I know.

15.2.2. Coexistence of both rightward and leftward spreading

In §8.1 and §9.3, we saw that H1 (high tone from a glottal stop) spreads leftward (15.8), and so do H3 (high tone from a pre-pronominal prefix; §13.1.2) (15.9):

(15.8) à:tawě:dóʔvsga
 ààthawééʔóʔvaska
 ↓
 H₁
 a-thaweeéʔvsk-a
 3SG.A-kiss:PRS-IND
 ‘He is kissing her.’ (Feeling 1975: 58)

(15.9) dě:jígo:lí:yéʔa
 teé-cíkooliíyéʔa
 ② ↗ ①
 ④
 tee-ci-kooliiyéʔ-a
 DIST-1SG.A-read:PRS-IND
 ‘I’m reading them.’ (Pulte & Feeling 1975: 328)

Note also that superhigh accent optionally accompanies a preparatory raising on the preceding syllable (§14.0).

On the other hand, we saw in §12.1.1 that H2 spreads rightward.

(15.10) ù:skó:svʔi
 ùùskoósʔvʔi
 ↓ ↓
 H₂ H
 uu-(a)skoó-s-vʔi
 3SG.B-dig-PFT-ASR
 ‘He dug it.’ (Feeling 1975: 51)

As was mentioned in Ch.12, an alternative to rightward spreading H2 is to see it as tonal plateauing, but crucial evidence for determining the right analysis is lacking.

Co-existence of both rightward and leftward spreading appears somewhat counterintuitive. However, there *are* languages that are reported to have both, such as San Esteban Mixtec (Maddieson 1976: 350), or Navajo, where high tone spreads rightward, but low tone spreads leftward (Leer 2001: 80-82).

15.2.3. Hybrid tone + accent system: non-contact-induced stratification?

The third typologically outstanding property of the Cherokee tonal and accentual system is the co-existence of the tonal and accentual systems. As we saw in §15.1.3, Cherokee tones and accents are best viewed as a combination of two incipient tones (lowfall, H1), one word-tone (H2) and two accents, H3 and superhigh.

Co-existence of both tonal and accentual phenomena in a single language is not particularly uncommon. Such systems are attested in geographically and genetically as diverse as in Mesoamerica (Oto-Manguean (Picket 1951, Nellis & Hollenbach 1980, Hollenbach 1977, etc.), Uto-Aztecan (Caballero 2010, Guion et al. 2010 etc.)), South America (Everett 1998, Zariquiey Biondi 2011, etc.), Europe (Southern Slavic (Inkelas & Zec 1988, etc.), Scandinavia (Riad 2012, etc.)), and Austronesia (Remijsen 2002, etc.). Such a system is also found in some creole languages (Saramaccan (Good 2004), Papiamentu (Rivera-Castillo 2009, Remijsen & van Heuven 2005)).

In the languages mentioned above, it is the norm for every word to have obligatory accent as well as lexical tones, and in many cases accent and tone interact in a complex manner (cf. Van der Hulst & Smith 1988, Van der Hulst et al. 2010, de Lacy 2002, etc.). For instance, in some languages accent is manifested mostly as lengthening of the vowel or the consonant (Zapotec (Picket 1951, Nellis & Hollenbach 1980), Kashibo-Kakataibo (Zariquiey Biondi 2011), etc.), as well as certain effects on the pitch levels of the lexical tones, while in others tonal contrast is only available for stressed syllables (Scandinavian (Riad 2012)) yet in others stress placement is dependent on the tones (South Slavic (Inkelas & Zec 1988), Ayutla Mixtec (Pankratz & Pike 1967)).

In contrast, in Oklahoma Cherokee the lexicon in the language appears to be split into words with ‘tones’ (= verbs in the main clause, root nouns; §14.2.2) and words with ‘(superhigh) accent’ (=

subordinate verbs, deverbal nouns, location nouns, diminutives, adjectives, etc.; §14.2.1), although they can be derivationally related.¹⁹⁰

- (15.11) ‘Tonal’ words
- a. à:ni:no:halĩ:dô:he
 aniinoohaliítóohe
 anii-noohaliitóo(?)h-e(?i)
 3PL.A-hunt:IMPF-EVID
 ‘they were hunting,’ (Pulte & Feeling 1975: 354)
- b. kó:ga
 khóóka
 ‘crow’ (Feeling 1975: 145)
- (15.12) ‘Accentual’ words
- a. uwo:dú:hi
 uwootuúhi
 uw-ootuuhi
 3SG.B-pretty/SH
 ‘pretty’ (Feeling 1975: 184)
- b. ahyv:dladi:sdĩ:sgi
 ahyvvtlatiĩstíĩski
 a-hyvvtl-at-ii(?)st-iisk-i (< *-i?st-)
 3SG.A-cold-set.LG-CAUS-IMPF-NOM/SH
 ‘fridge’ (Feeling 1975: 29)

Recall also that the counting unit is the mora for tones (H1, H2), while the counting unit is the syllable for the accent (H3, SH), which make the dichotomy all the more striking; that is, it almost looks like as if the Cherokee lexicon is stratified into two categories, one of which is tonal and moraic, while the other is accentual and syllabic:

TABLE 15-4. STRATIFICATION IN CHEROKEE

	[-SH]	[+SH]
WORD-PROSODIC SYSTEM	INCIPIENT TONE	ACCENT
COUNTING UNIT	MORA	SYLLABLE

¹⁹⁰ Of course, some forms have both tones and accent, such as deverbal nouns with ASR -vv?i (§A.1.2).

In this sense, the situation in Oklahoma Cherokee is the closest to Saramaccan (Good 2004), where the lexicon is split into those with tones and those with accent. However, the difference between Saramaccan and Cherokee is that the split is arbitrary in the former while it is morphosyntactically conditioned in the latter, and that the former is contact-induced, while it is not known to be the case in the latter.¹⁹¹ TABLE 15-5 classifies languages according to the two parameters, whether tone and accent co-occur on the same word, and whether the system is (known to be) due to contact or not:

TABLE 15-5. TYPOLOGY OF HYBRID SYSTEMS

	tone and accent co-occur on same word	split b/w words with tones and those with accent
Due to contact	Ma'ya (Remijsen 2002), Papiamentu (Rivera-Castillo 2009, Remijsen & van Heuven 2005),	Saramaccan (Good 2004)
Not know to be due to contact	Serbo-Croatian (Inkelas and Zec 1988), Balsas Nahuatl (Guion et al. 2010), Choguita Rarámuri (Caballero 2010), Pirahã (Everett 1998), Kashibo-Kakataibo (Zariquiey Biondi 2011), Oto-Manguean (Pickett 1951, Nellis & Hollenbach 1980)	Cherokee (this study)

It is particularly interesting to note that it has been argued that such systems, where the lexicon is split up into those with tones and those with accents, do not arise through internal historical change but rather only result from contact-induced change (Good 2004: 617).

It is often argued that pitch (F0) cannot encode both tone and accent (Remijsen 2002: 42). However, in the case of Oklahoma Cherokee, the pitch *levels* (or contour) of the tone (level [3]) and the (superhigh) accent (level [34]) are different, so that the language can still encode both by means of the pitch level. The more problematic cases are H3 and H4, which I have argued to be accentual but are realized as the same pitch as H1, which is an incipient tone.

¹⁹¹ After parting with the rest of the Iroquoian family, Cherokee became in contact with the languages in Southeast, such as Choctaw or Creek (Muskogean). These languages have metrical systems in which iambs are constructed left to right (Hayes 1995: 64-67, 209-211, etc.), and thus contact with these languages do not account for the emergence of lexical tones (lowfall, H1) or the right-to-left trochaic accent (superhigh accent) in Cherokee.

15.2.4. Multiple metrical systems

The fourth outstanding property of the Cherokee tonal and accentual system is that it has two different types of accents: H3, discussed in Ch.13, which resembles a quantity-insensitive iambic accent, and superhigh, discussed in Ch.14, which resembles an unbounded trochee default-to-opposite accent. H2, discussed in Ch.12, resembles a word-tone, and this could also be classified as a subtype of an accentual system, because of its culminativity.

TABLE 15-6 summarizes the properties of each of the accents and illustrates the diversity of each of the accents. The second column (“realization”) indicates how the accents are realized: whether purely by the pitch level, or by something else; the third column (“meter”) indicates whether the accent is iambic (.*) or trochaic (*.); the fourth column (“accent-shift”) shows whether the accent shifts to the right or left when the vowel carrying the accent is deleted; this is support for whether the accent is iambic or trochaic (Kager 1995: 387, Al-Mozainy et al. 1985). The fifth column (“direction”) indicates whether the counting for accent assignment begins from the left-edge (beginning) or the right-edge (ending) of the word; the last column gives the function of each accent.

TABLE 15-6. THREE TYPES OF ACCENTS IN OKLAHOMA CHEROKEE

	REALIZATION	METER	ACCENT-SHIFT	DIRECTION	FUNCTION
H3 (CH.13)	PITCH (LEVEL [3])	IAMBIC	LEFT (§13.2.2)	FROM LEFT EDGE	Mark the presence of PPP/ modal?
SUPERHIGH (CH.14)	PITCH RISE (LEVEL [34])	TROCHEE (SYLLABIC)	RIGHT (§14.1.2.2)	FROM RIGHT EDGE	Various morphosyntactic functions
H2 (CH.12)	PITCH (LEVEL [3])	N/A (WORD-TONE)	NO SHIFT (§12.1.1)	N/A	Lexical contrast; IMP vs. PCT

Such a system, where multiple accents coexist in a single language, is not unheard of. For instance, other Iroquoian languages, Seneca, Cayuga and Onondaga have an accent descended from the penultimate accent in Proto-Iroquoian, realized as a combination of vowel lengthening and a high pitch (Chafe 1977, Michelson 1988), as well as a metrical system the counting of which start from the

beginning of the word: in Onondaga it accounts for vowel lengthening (Chafe 1977: 173-175; Michelson 1988: 90-98; Hayes 1995: 226); in Cayuga, in addition to the vowel lengthening as in Onondaga, this odd-even count accounts for the accent assignment in some cases and also alternating weak strong syllable counting, which conditions metathesis of *h* and a glottal stop with the preceding vowel (Chafe 1977: 175-178; Foster 1982; Michelson 1988: 98-104; Hayes 1995: 222-225). Lastly, in Seneca, odd-even count not only accounts for the vowel lengthening, but also accent assignment (Chafe 1977: 178-180; Michelson 1988: 104-115; Hayes 1995: 225-226; Melinger 2002). Some Japanese dialects, such as Kyoto Japanese, have both a pitch-accent and a word-tone (Hayata 1999: 39-40), and Stoney Dakota has both peninitial and penultimate stresses (Shaw 1985). What is unusual about the Cherokee tonal and accentual system, in my opinion, are: (i) coexistence of three metrical systems, in addition to incipient tones, as we saw in §15.2.3; and (ii) the morphosyntactic use of the metrical systems, which will be discussed in the next section.

15.2.5. Morphosyntactic use of metrical systems

Accents are generally considered to have delimitative (demarcative) or culminative functions (Trubetzkoy 1968; Beckman 1986: 20); the delimitative features mark boundary of words, while culminative features signal the number of words without reference to their boundaries (Trubetzkoy 1969; Beckman 1986: 2). In either case, accents are purely phonological automatic process and its function is more of an organizational, rather than distinctive one (Trubetzkoy 1969, Beckman 1986: 2). What we see in the situation in Cherokee, however, contradicts this general view: Cherokee accents are employed to encode morphosyntactic functions, and thus are *distinctive*, rather than organizational.

One might wonder if the functions of Cherokee accents can be interpreted as pragmatic or “expressive”, since suprasegmental phenomena (intonation) are often employed for such purposes. However, such a view is unlikely. First, we saw in §14.2 that the function of the superhigh accent is as diverse as nominalization, marking of diminutives, location nouns, adjectives, etc., but all of the functions are purely morphosyntactic, and not pragmatic. The following minimal pairs, contrasting only in the

presence/absence of the superhigh accent, illustrate the purely morphosyntactic (and not pragmatic)

nature of the function of the superhigh accent:

- | | | | |
|---------|---|----|--|
| | with SH | | without SH |
| (15.13) | a. digo:hwé:lò:di
tikooohweéllòòti
ti-k-ooohweel-òò (?t-i (< *-o?t-))
DIST-3SG.A-write-INF-NOM/SH
'pencil' (Feeling 1975: 82) | b. | digo:hwě:lô:di
tikooohweélóoti
ti-k-ooohweel-óo(?t-i (< *-o?t-))
DIST-3SG.A-write-INF-NOM
'desk' (Robinson 1989) |
| (15.14) | a. u:hyṽ:dla
uuhyṽvtla
uu-hyvvtl-a
3SG.B-be.cold-IND/SH
'cold' ('cold water') (Feeling 1975: 169) | b. | ù:hyv:dla
ùùhyvvtla
uu-hyvvtl-a
3SG.B-be.cold-IND
'it (weather) is cold'(ibid.) |

The function of the floating high tone from a pre-pronominal prefix (H3, Ch.13) cannot be pragmatic either. H3 arguably indicates the presence of certain pre-pronominal element, or some kind of 'modal' function. In one case, namely hortative ('let's...'), the overt pre-pronominal prefix is lacking and the category is marked solely by the presence of H3 (§13.2.1.2). Compare the forms in (15.15); (a), in the hortative forms, has H3, while its punctual counterpart (b), which is segmentally identical to (a), does not carry H3:

- | | | | |
|---------|--|----|---|
| | HORT | | PCT |
| (15.15) | a. e:ní:gò:wahta
eenííkkòòwahtha

⑧
eenii-koohwahth-a
1DU.IN>3SG.AN-see:PCT-IND
'Let's us two see him' (EJ, July 2011) | b. | è:ni:gò:wáhta
èèniikòòwáhtha

eenii-koohwahth-a
1DU.IN>3SG.AN-see:PCT-IND
'You and I saw him briefly.' (EJ, July 2011) |

In a sense, hortative is a modal category, but it is difficult to seek an iconic relation between the hortative modal category and the peninitial pitch accent; in general, it is somewhat counterintuitive to have a pragmatic or expressive marker on the second syllable of the word, where H3 is assigned.

Lastly, a high tone on the stem final mora (H2, Ch.12) does not have any pragmatic or expressive function, either. First, H2 is a lexical property in the majority of cases (§12.2.1). Second, the other function of H2 is, again, a morphosyntactic marker, namely to differentiate punctual forms from imperative forms, which are segmentally identical (§12.2.2). Compare the punctual form (a), which has H2 on the stem final vowel, with the imperative form (b), which is lacking in it:

	PCT	IMPT
(15.16) a.	higo:hwáhta	b. higo:hwahta
	hikoohwáhtha	hikoohwahtha
	hi-koochwahth-a	hi-koochwahth-a
	2SG.A-see:PCT-IND	2SG.A-see-PCT-IND
	‘You just saw it.’ (EJ, July 2011)	‘See it!’ (ibid.)

Some languages are known to employ a special ‘accent’ or a suprasegmental feature for imperatives (ultimate accent in Dakota (Shaw 1985), or a final glottal stop in Lahu (Matisoff 1973: 353)), but this is clearly not the explanation for Oklahoma Cherokee. If it were a pragmatic, intonational marker for imperative, we would expect *imperative* to have the special suprasegmental marker, instead of the punctual form. Thus, the fact in (15.16) is just the opposite of what one would expect from a pragmatic account.

I would like to summarize this section by suggesting the diachronic path Oklahoma Cherokee has followed to this synchronically peculiar situation. It appears that this synchronic situation has resulted from phonologization of accents: what was once a purely phonological, automatic process with a demarcative function, has become a distinctive morphosyntactic marker. This is all the more plausible, since the superhigh accent in Oklahoma Cherokee resembles the penultimate accent in Proto-Lake-Iroquoian (Michelson 1988), and H3 in Oklahoma Cherokee somewhat resembles the odd-even counting system beginning from the left-edge of the word in Onondaga, Cayuga and Seneca (Prince 1983: 82ff., Michelson 1988, Hayes 1995: 222-226; Melinger 2002); such a system is lacking from Oneida or Mohawk and is not reconstructed for Proto-Lake-Iroquoian (Michelson 1988: 95), but there is a

possibility that a “seed” for a left-to-right, odd-even counting system was already present when Cherokee split up from the rest of the Iroquoian language family.

Alternatively, Muskogean languages, with which Cherokee came into contact after splitting with the rest of the Iroquoian family, also have an iambic accent (realized as a high pitch in Muskogee and as a vowel length in Choctaw; Hayes 1995: 64-67, 209-211, etc.); Cherokee may have ‘borrowed’ the iambic accent in Muskogean, but again, this iambic accent is automatic and organizational in Muskogean languages, while in Cherokee it has a morphosyntactic function.

As a phonologization of a purely phonological process, Cherokee accents resemble final glottal stops in some Western African languages, whose occurrence is sensitive to the parts of speech and the scope of negation (Hyman 1988); metathesis in Salish, which encodes verbal aspect (Thompson & Thompson 1969); the position of the stress accent to encode parts of speech in English (e.g. *récord* vs. *recórd*); or more controversially, the stress accent in Nilotic, which can be employed as a voice marker (Gilley 2004, Hyman 2006: 248).¹⁹² The case of ‘accents’ in Oklahoma Cherokee may arguably be also close to the ‘meaningful’ post-lexical prosody in Yupik Eskimo, which adds linguistically significant expressive or other pragmatic functions (Woodbury 1987). However, accents in Cherokee are further more ‘grammaticalized’ than such a system in that the function is not expressive or pragmatic but rather morphosyntactic.

15.3. Topics for future research

This study has attempted a comprehensive description and analysis of the tonal and accentual system of Oklahoma Cherokee. However, not all the topics relevant to the word-prosody of Oklahoma Cherokee have been addressed in this study. I would like to conclude this dissertation by offering some suggestions for further research.

¹⁹² Hyman (2006) rejects such an analysis.

15.3.1. Prosody of larger phonological domains

This study has mainly focused on the tonal and accentual phenomena at the word-level, and the prosody of domains larger than the (grammatical) word (i.e. phonological word and intonational phrase) has not been covered in detail. First, clitics have various tonal effects on the final vowel of the word (Lindsey 1985: 139, Haag 1999, Haag 2001, Johnson 2005, Montgomery-Anderson 2008: 141). Thus, Haag (1999: 38) states that the boundary H% tone is assigned to a vowel before certain clitics (such as =sko ‘Q’), thereby suggesting that these clitics are *outside* of the phonological word, while other clitics (such as =khe ‘or’) attract the boundary H% tone, suggesting that they are *within* the phonological word. However, the details of these effects are not yet fully understood.

Second, the intonational prosody has not been addressed in this study, either. Interrogative intonation is discussed in Lindsey (1985: 143-145) and briefly in Pulte & Feeling (1975: 347), but how the word-prosody in Oklahoma Cherokee is incorporated into larger phonological domains is yet to be studied.

15.3.2. Interaction with morphology

Throughout this study, it has been demonstrated that tone/accent and morphology in Oklahoma Cherokee are two sides of the same coin; deep understanding of morphology is crucial in understanding the complex nature of tones and accent in Oklahoma Cherokee, and a deep understanding of the tones and accent is crucial in understanding the complex morphology. Two stem alternations, Laryngeal Alternation and tonicity (§1.7.4), play significant roles in tonal and accentual phenomena. Some tonal processes are sensitive to the morphological domains, such as H1 Spreading (§8.5.2.4). H3 is associated with specific pre-pronominal prefixes (Ch.13), and H2, H3, and the superhigh accent have morphosyntactic functions (§15.2.5). Allomorphy of the distributive pre-pronominal prefix is dependent on tonicity (§A.2.2).

Such interactions between tone/accent and morphology have been mentioned throughout this study, but no general principle governing their interactions has been provided. Specifically, Cherokee tones and accent offer solid evidence for assuming the hierarchical structure of verbs (as Chafe (1960) argues for

Seneca, another Iroquoian language), rather than the templatic, flat structure (as Lounsbury (1953) argues for Oneida, yet another Iroquoian language). A future study will further investigate this area.

15.3.3. Phonetics and the cognitive status of various processes

This study has mostly focused on the phonological analyses of the complex tonal and accentual phenomena in Oklahoma Cherokee, and no detailed phonetic (acoustic and articulatory) study has been provided. Possible phonetic questions would include, for instance, whether all the various high tones from different sources are really always realized at the same pitch level, or the detailed phonetic nature of the glottal stop in Oklahoma Cherokee, which plays an extremely important role in various phonological phenomena.

This study has attempted a synchronic analysis of Oklahoma Cherokee, and the analyses given in this study are not meant to be internal reconstruction (except for the analysis in Ch.11). However, some analyses ended up mildly abstract (such as having both a glottal stop and the tone it has induced in the lexical representation (Ch.9)). Other processes provided in this study are not as abstract, but quite complex and result from interaction of complex phonological and morphological factors, such as H1 Spreading (§8.5), realization of a glottal stop (Ch.10), H3 Association (Ch.13), and Superhigh Assignment (Ch.14). It is interesting to see the productivity of these processes and to discern the cognitive status of these processes.

15.3.4. Dialectal and sociolinguistic variations

Finally, this study has mainly focused on Cherokee spoken in Oklahoma. Another variety, that spoken in Qualla Boundary in North Carolina, has been occasionally cited for comparison, but its detailed phonological study is still scant. Especially, North Carolina Cherokee retains glottal stop in more contexts than in Oklahoma Cherokee (Ch.10), and a detailed phonetic and phonological study of a glottal stop in North Carolina Cherokee would solve the mysteries concerning complex reflexes of glottal stop in Oklahoma Cherokee. Tones and accent in North Carolina Cherokee are not well understood, either. It

appears that a glottal stop has induced H1 in North Carolina Cherokee (Ch.9), but not the lowfall tone (Ch.7). In addition, accentual phenomena are in general known to exhibit significant variation even among closely related dialects (such as various Japanese dialects (Hayata 1999, Igarashi 2012) or Dakota (Shaw 1985)), and thus it will be interesting to compare H3 Association and Superhigh Assignment in both dialects.

Dialectal variations within Oklahoma Cherokee are not yet well known, although there has been a report that there may be as many as seven dialects (Kilpatrick & Kilpatrick 1970: 84-85). Inter- (and intra-) speaker variations within Oklahoma Cherokee have been occasionally mentioned, such as the realization of a glottal stop (§9.4.2). A more detailed study of various dialects within Oklahoma Cherokee would reveal the various stages of historical development of tones and the nature of accents.

Lastly, no information on the variety spoken in the Snowbird community in North Carolina is available; this variety has been reported to manifest intermediate characteristics of Oklahoma Cherokee and North Carolina Cherokee (spoken in Qualla Boundary) (King 1975: 10), but there is no description on this variety.

Appendix A: On Tonicity

A.0. Introduction

Tonicity, which was briefly introduced in §1.7.4.2, is an extremely complicated but nonetheless crucial concept. In this appendix, §A.1 redefines “tonicity”, and §A.2 discusses the various morphosyntactic categories that are tonic and atonic, as well as other factors that determine the tonicity of a word.

A.1. Defining tonicity

Since the study of Cook (1979: 92), it has been assumed that Cherokee distinguishes two verbal forms: *tonic forms*, which exhibit lexical tones, and *atonic forms*, which lack lexical tones and instead carry a superhigh accent (Lindsey 1985). However, the tonic/atonic distinction is not always isomorphic with the absence/presence of a superhigh accent; there are forms which are “atonic” but do not have a superhigh accent, and there are tonic forms with a superhigh accent (§13.2). For instance, (A.1), an imperative form, is “atonic” because Pronominal Tonic Lowering (or TGI, cf. §7.2) does not apply (recall that Pronominal Tonic Lowering assigns a lowfall tone to the vowel-initial pronominal prefix in tonic forms), but it is nonetheless lacking the superhigh accent.

(A.1) e:sd̩:kahv̌:na
 eest̩ikhahv̌na
 eestii:hkhahv̌n-a
 2DU>3SG.AN-move.AN:PCT-IND
 ‘Move him, you two!’ (Feeling et al. 2003: 169).

On the other hand, (A.2) is “tonic”; Pronominal Tonic Lowering does apply, but it has a superhigh accent on the penultimate syllable:

- (A.2) à:dlé:sgv̌:ʔi
 ààtlééskv̌v̌ʔi
 Ø-atléé(?)sk-vvʔi
 3SG.A-turn.off:IMPF-ASR/SH
 ‘turn-off’ (Feeling 1975: 12)

Thus, defining tonicity in terms of the presence/absence of the superhigh accent should be abandoned, and a new redefinition of tonicity is called for. In this study, I define tonicity in terms of two parameters: Pronominal Tonic Lowering and H1.

I define the terms ‘tonic/atonic’ without reference to the presence/absence of the superhigh accent. Instead, I define tonicity in terms of the following two parameters. The first parameter is whether or not Pronominal Tonic Lowering (or TGI; §7.2) applies; Pronominal Tonic Lowering assigns a lowfall tone to vowel-initial pronominal prefixes:

- (A.3) Pronominal Tonic Lowering

$$V \rightarrow V / [_{\text{pron}}V_]$$

$$\quad \quad \quad |$$

$$\quad \quad \quad \text{LF}$$

Pronominal Tonic Lowering applies to tonic forms (A.4a) but not to atonic forms (A.4b). The second parameter is the presence versus absence of H1: in (A.4a) the antepenultimate syllable has H1 before the glottal stop, while (A.4b) lacks it (in Ch.9 it is suggested that H1 has been induced by a glottal stop):

- | | Tonic | Atonic |
|-------|------------------------------------|------------------------------------|
| (A.4) | a. à:dlanv:dáʔdeha | b. u:dlanv:daʔdéhdi ¹⁹³ |
| | ùùtlanvvtáʔteha | uutlanvvtáʔtéhti |
| | uu-(a)tlanvvtat-ʔeh-a | uu-(a)tlanvvtat-ʔéht-i |
| | 3SG.B-have.time-DAT:PRS-IND | 3SG.B-have.time-DAT:INF-NOM |
| | ‘He has time.’ (Feeling 1975: 161) | ‘for him to have time’ |

TABLE A-1 summarizes the two defining parameters of tonicity (PTL is an abbreviation of Pronominal Tonic Lowering):

¹⁹³ The high tone on the penultimate syllable is not explained; it may be H2 (Ch.11).

TABLE A-1. MANIFESTATIONS OF TONICITY

	PTL	H1
TONIC	YES	YES
ATONIC	NO	NO

With this definition of tonicity in mind, we can now classify verb forms according to the following two parameters: tonicity and presence/absence of a superhigh accent.

TABLE A-2 lists the morphosyntactic categories of Oklahoma Cherokee, along with their tonicity and presence/absence of a superhigh accent. For (d) and (e), the presence of H1 is subject to complex phonological environments (§9.2.2.1), and for (i) and (j), H1 is not always predictable (§9.2.2.2). More prototypical tonic categories are listed first.

TABLE A-2. CLASSIFICATION OF VERB FORMS

FORMS	TONICITY			SUPERHIGH
	PTL	H1	TONICITY	
(a) Indicative verb	YES	YES	TONIC	NO
(b) A verb in a subordinate clause	YES	YES	TONIC	YES
(c) Nominalization with ASR - <i>vvʔi</i> ¹⁹⁴	YES	YES	TONIC	YES
(d) INF (action/state noun)	NO	YES/NO	ATONIC?	NO
(e) INF (instrumental, predicate)	NO	YES/NO	ATONIC?	YES
(f) Agentive nominalization (not referring to the original argument)	NO	NO	ATONIC	NO
(g) Agentive nominalization (referring to the original argument)	NO	NO	ATONIC	YES
(h) Imperative	NO	NO	ATONIC	NO
(i) Nouns	NO	YES/NO	ATONIC?	YES/NO
(j) Adjectives	NO	NO	ATONIC	YES

As can be seen from TABLE A-2, tonicity itself is not a discreet category; the applicability of Pronominal Tonic Lowering and presence of H1 correlate in most cases, but not always. Thus, INF ((d) and (e)) is atonic in the sense that Pronominal Tonic Lowering does not apply to such forms, but they

¹⁹⁴ ASR requires the verb to be in the tonic form (§A.2.3).

may or may not have H1. However, such forms are small in number exceptional, and my definition of tonicity as in TABLE A-1 should not be abandoned because of the existence of these forms.

In the following section, we will look at the morphosyntactic categories that are tonic/atonic, as well as other factors which determine the tonicity of the verb.

A.2. Factors determining the tonicity

Any verb can be in the tonic form or in the atonic form. Whether a verb takes the tonic or the atonic form is determined by complex morphosyntactic factors. This section looks at such factors. Tonicity is determined by the morphosyntactic categories (§A.2.1). Tonicity is also determined by pre-pronominal prefixes (§A.2.2) and the modal suffix (§A.2.3).

A.2.1. Morphosyntactic categories

First, morphosyntactic categories are divided into tonic forms and atonic forms, as can be seen from TABLE A-2 above: indicative verbs take the tonic form, while imperative, infinitive and agentive nominalization take the atonic form (cf. TABLE A-2). The (a) and (b) forms below are built on the same verb stem forms, but (a) forms are indicative and thus tonic, while (b) forms are atonic: imperative (A.5b), infinitive (A.6b), and agentive nominalization (A.7b). Note that in the tonic forms in (a) we observe both Pronominal Tonic Lowering and H1, while not in atonic forms in (b):

	Tonic	Atonic
(A.5)	a. ò:sdadv:ʔṽ:ga òðstatṽʔṽka oost-atṽʔṽ(?)k-a 1DU.EX.A-hang.FL:PCT-IND ‘Hang him up, you two!’ (Feeling et al. 2003: 137)	b. e:sdadv:ʔṽ:ga (IMP) eestatṽʔṽka eest-atṽʔṽ(?)k-a (< *-atṽʔṽk-) 2DU>3SG.AN-hang.FL:PCT-IND ‘She and I just now hung him up.’ (Feeling et al. 2003: 137)
(A.6)	a. ù:dlanv:dáʔdeha ùùtlanvvtáʔteha uu-(a)tlanvvtat-ʔeh-a 3SG.B-have.time-DAT:PRS-IND ‘He has time.’ (Feeling 1975: 161)	b. u:dlanv:daʔdéhdi (INF) uutlanvvtatʔtéhti uu-(a)tlanvvtat-ʔéht-i 3SG.B-have.time-DAT:INF-NOM ‘for him to have time’ (ibid.)

- (A.7) a. gáʔni:yí:sgóʔi
káʔniiyíísgóʔi
ka-nʔiiy-íísk-óʔi
3SG.A-catch-IMPF-HAB
‘He habitually catches it.’
(Feeling 1975: 109)
- b. gaʔnĩ:yí:sgi (AGT)
kaʔniíyííski
ka-nʔiiy-iisk-i
3SG.A-catch-IMPF-NOM/SH
‘(he is a) catcher’
(ibid.)

Adjectives are always atonic, whether derived or not, in the sense that Pronominal Tonic Lowering never applies and H1 is not found (note also that adjectives always carry a superhigh accent):

- (A.8) Adjectives
- a. ulsduʔí:da
ulstuʔiíta
uu-(a)l(i)-stuʔ-iit-a
3SG.B-MID-open-PP-IND
‘open’ (Feeling 1975: 174)
- b. ayoʔú:hli
ayoʔuúhli
a-yoʔuuhli
3SG.A-lame/SH
‘lame, crippled’ (Feeling 1975: 65)

Pronominal Tonic Lowering never applies to root nouns:

- (A.9) Nouns
- a. asgaya
askaya
a-skaya
3SG.A-man
‘(he is a) man’ (Feeling 1975: 50)
- b. uwě:ji
uweéci
uw-eéci
3SG.B-offspring
‘his offspring’ (Feeling 1975: 183)

H1 may or may not be found in root nouns. See §9.2.2.2 for a detail.

A.2.2. Pre-pronominal prefixes

Second, pre-pronominal prefixes determine the tonicity of the form, which may override the tonicity to which the morphosyntactic category belongs to (§1.7.1.6, Ch.13): some prefixes (IRR, TRNSL, nonlexicalized PART, CISL and NEG) require the verb to be in the atonic form, while ITER, REL and some lexicalized PART require the verb to be in the tonic form.

The following forms show examples with pre-pronominal prefixes which require the verb to be in the atonic form: (A.10) IRR, (A.11) TRNSL, (A.12) PART, (A.13) CISL and (A.14) NEG. Observe that neither Pronominal Tonic Lowering nor H1 is observed with these forms. Note also that some pre-pronominal prefixes assign a floating high tone to the verb stem (Ch.13), which is represented with ⑨ (but this is orthogonal to the discussion here):

PPPs requiring the atonic forms
 (A.10) yagwálà:sdaʔe:ha
 IRR y-akwálààstaʔeeha
 ⑨
 y-akw-alaà(?)staʔeeh-a (< *-alaʔstaʔeeh-)
 IRR-1SG.B-tromp.on:PRS-IND
 ‘He is not tromping on me.’ (EJ, July 2011)

(A.11) wagwáde:li:ga
 TRNSL w-akwáteeliika
 ⑨
 w-akw-ateeliì-(?)k-a (< *-ateeli-)
 TRNSL-1SG.B-go.out.of.sight-PRS-IND
 ‘I am going out of sight.’ (Feeling 1975: 189)

(A.12) nagó:whtiha
 PART n-akóóhw(a)hthiha
 ⑨
 n-a-koohw(a)hth-ih-a
 PART-3SG.A-see-PRS-IND
 ‘He sees it (from a lateral position).’ (Pulte &Feeling 1975: 245)

(A.13) dǔ:ní:ne:giʔe:li
 CISL t-vǔnǐíneekiʔeeli
 Ⓣ
 ta-anii-neekiiʔ-eel-i
 CISL-3PL.A-take.LQ-DAT:PFT-MOT
 ‘They will take it from him.’ (Feeling et al. 2003: 206)

(A.14) gv:wani:wò:nǐ:hisdi
 NEG k-vvniiwòðniǐhisti
 ka-uunii-wòð(?)nii-hist-i
 NEG-3PL.B-speak-INF-NOM/SH
 ‘They are able to speak.’ (Pulte & Feeling 1975: 321)

The following forms show examples with pre-pronominal prefixes which require the verb to be in the tonic form: (A.15) REL, (A.16) ITER and (A.17) PART.¹⁹⁵ Here, both Pronominal Tonic Lowering and H1 are observed:

PPPs requiring the tonic forms
 (A.15) jà:lsgwé:tuhgǐ:ha
 REL c-ààlsgwééʔthuhkiǐha
 ↓
 H₁
 c-∅-al(i)skwée(?)thuhk-iih-a
 REL-3SG.A-take.off.hat-PRS-IND/SH
 ‘the one who is taking off his hat’ (DJM, Aug 2012)

(A.16) áni:wó:ni:ha
 ITER ániiwóóniha¹⁹⁶
 ↓ ↓
 Ⓣ H₁
 iʔ-anii-wóo(?)nii-h-a
 ITER-3PL.A-speak-PRS-IND
 ‘They are speaking again.’ (EJ, July 2011)

¹⁹⁵ Note that some PART requires the verb to be in the atonic form, as in (A.12), while some others in the tonic form, as in (A.17). The difference appears to be that PART which occurs with the verbs which lexically take PART (A.17) requires the tonic form of the verb, while PART which is not lexical requires the atonic form (A.12).

¹⁹⁶ Tonic Pronominal Lowering fails to apply to this form, since ITER fuses with the first vowel of the pronominal prefix and carries H3 (§12.2.1).

(A.17) nà:dV:neha
 PART n-ààtV́veha
 |
 H₁
 n-Ø-atV́v(?)neh-a
 PART-3SG.A-do:PRS-IND
 ‘He is doing.’ (Pulte & Feeling 1975: 246)

The remaining pre-pronominal prefix, distributive (DIST), does not determine the tonicity of the verb, but rather its alternation is conditioned by the tonicity of the verb; the allomorph *t(ee-)* (DIST (i)) is selected by the tonic form of the verb, while the allomorph *t(i)- ~ c-* (DIST (ii)) is selected by the atonic form of the verb. Compare (a) and (b) forms in (A.18) and (A.19); (a) is in the tonic form and (b) in the atonic form due to their morphosyntactic categories (indicative vs. imperative/infinitive). The fact that (a) is in the tonic form is evident from Pronominal Tonic Lowering on 3SG.A *a-* in (A.18) and the presence of H₁; the fact that (b) is in the atonic form is clear from the lack of lowfall tone on 3SG.B *uu-* in (A.19b) and the lack of H₁. In (a), the verb takes the allomorph (i) of DIST, *t(ee-)*, while (b) takes the allomorph (ii) of DIST, *t(i)- ~ c-*:

(A.18) a. Tonic, DIST (i)
 dà:kwayó?vska
 t-ààkwhayó?vska (*tiikwhayó?vska)¹⁹⁷
 |
 H₁
 t-a-(h)kwhayó?vsk-a
 DIST-3SG.A-sprinkle:PRS-IND
 ‘He is sprinkling it.’ (Feeling 1975: 72)

b. Atonic, DIST (ii)
 tikwáyo?v:ga
 t-hikwháyo?v̀̀ka (*tee-)
 ⊕
 t-hi-(h)kwhayó?v̀̀k-a
 DIST-2SG.A-sprinkle:PCT-IND
 ‘Sprinkle it!’ (ibid.)

(A.19) a. de:j̄:kwayó?vska
 tee-cíikwhayó?vska
 |
 H₁
 tee-ci-hkwhayó?vsk-a
 DIST-1SG.A-sprinkle:PRS-IND
 ‘I am sprinkling it.’ (ibid.)

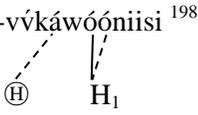
b. ju:kwayò:di
 c-uukwhayòòti
 c-uu-(h)kwhayò?t-i
 DIST-3SG.B-sprinkle:INF-NOM
 ‘for him to sprinkle it’ (ibid.)

¹⁹⁷ The combination of DIST (i) *t(ee-)* plus the 3SG.A pronominal prefix *a-* yields *taa-*, while the combination of DIST (ii) *t(i)-* plus the 3SG.A pronominal prefix *a-* yields *tii-*. Thus, the allomorph of DIST is DIST (i).

(A.20) summarizes the effects of pre-pronominal prefixes on the tonicity of the verb:

- (A.20) PPP and tonicity
- a. VERB → [-tonic]/ IRR, REL TRNSL, PART (some), CISL, NEG
 - b. VERB → [+tonic]/ ITER, REL. PART (some)
 - c. 1. DIST → *t(ee)-* / [+tonic]
 - 2. DIST → *t(i)- ~ c-* / [-tonic]

When a verb has more than one pre-pronominal prefix, the tonicity of the verb is determined by the last pre-pronominal prefix. Thus, when the last pre-pronominal prefix is ITER, which requires the verb to be in the tonic form (A.16), the verb is in the tonic form (A.21). Observe that H1 is found with these forms:

- (A.21) dǎ:gáwó:ni:si
t-vvkáwóóniisi ¹⁹⁸

t-vv-ka-wóo(?)nii-s-i
CISL-ITER-3SG.A-speak-PFT-MOT
‘He will speak again.’ (Pulte & Feeling 1975: 340)

If the last pre-pronominal prefix is either TRNSL or PART (but not CISL; cf. (A.23)), which require the verb to be in the atonic form, the verb is in the atonic form, and thus Pronominal Tonic Lowering does not apply and H1 is not found:

- (A.22) yinagwádǎ:né:la
yin-akwátǎǎneela

yi-n-akw-atǎǎ(?)n-eel-a
IRR-PART-1SG.B-do-PFT-IND
‘If I do (wrong),’ (CED-EJ, 2010: 169)

When CISL occurs by itself, CISL requires the verb to be in the atonic form (A.13). However, when CISL is combined with another pre-pronominal prefix, the resulting sequence requires the verb to

¹⁹⁸ Again, Tonic Pronominal Lowering is not applied in these cases, since the vowel of CISL merges with that of the pronominal prefix.

be in the tonic form and thus H1 is found. This is illustrated by the forms below. The (a) forms only have CISL, and thus the verb is in the atonic form and H1 is not found. In (b), on the other hand, CISL is preceded by another pre-pronominal prefix and thus the verb is in the tonic form, and H1 is found:

- | | | | |
|--------|---|--|---|
| | CISL [-tonic] | | PPP+CISL [+tonic] |
| (A.23) | a. dv:né:dò:li
t-vv ^{né} é ^t ò ^d ò ^l i

Ⓜ | | b. yidagé:dó:li
yita-ké ^t ó ^l í

Ⓜ H ₁ |
| | ta-an-eetò(?)l-i
CISL-3PL.A-walk:PFT-MOT
'They will come.' (EJ, July 2011) | | yi-ta-k-eetó(?)l-i
IRR-CISL-1SG.A-walk:PFT-MOT
'I will not come.' (EJ, July 2011) |
| (A.24) | a. dayo:sdí:wò:ni:si
tay-oostí ^w ò ⁿ i ⁱ si

Ⓜ | | b. yidayó:sdi:wó:ni:si
yitay-ó ^o ostii ^w ó ⁿ i ⁱ si

Ⓜ H ₁ |
| | tay-oostii-wò(?)n-iis-i
CISL-1DU.EX-speak-PFT-MOT
'You two will speak.' (EJ, July 2011) | | yi-tay-oostii-wó(?)n-iis-i
IRR-CISL-1DU.EX-speak-PFT-MOT
'You two will not speak.' (EJ, July 2011) |

Recall also from §13.2.5.1 that CISL shows idiosyncratic property with regard to H3 assignment when preceded by another pre-pronominal prefix.

As was mentioned above, DIST does not determine the tonicity of the verb, but its alternation itself is dependent on the tonicity of the verb. Thus, DIST takes the allomorph (ii) *ti-/c-* after IRR, TRNSL and PART, which requires the verb to be in the atonic form. This is illustrated by comparing (a) and (b) forms in (A.25) and (A.26). The (a) forms only have DIST, and since the verbs are in the indicative forms, the verbs are in the tonic form according to the morphosyntactic condition (§A.2.1) and thus DIST takes the allomorph (i). In (b), on the other hand, DIST is preceded by another pre-pronominal prefix which require the verb to be in the atonic form, and thus DIST takes the allomorph (ii):

(A.25) a. DIST
 de:gó:hwě:lâ:neha
 tee-kóóhweéláaneha

 tee-k-ooohweel-áa(?)n-eh-a (< *-aʔn-)
 DIST-3SG.A-write-PFT-DAT:PRS-IND
 ‘He is writing them for him.’
 (Pulte & Feeling 1975: 245)

PPP+DIST
 b. widigö:hwé:lâ:neha
 witi-koóhweélàaneha

 wi-ti-k-ooohweel-àà(?)n-eh-a (< *-aʔn-)
 TRNSL-DIST-3SG.A-write-PFT-DAT:PRS-IND
 ‘He is writing them to him.’
 (ibid.)

(A.26) a. de:gó:ginahlv:ʔiha
 tee-kóókininalhvʔiha

 tee-kookini-nalhvʔi-h-a
 DIST-3PL>1DU.EX-tie.up-PRS-IND
 ‘They are tying up you and me.’
 (Pulte & Feeling 1975: 264)

b. yidigo:gíni:nv:tlo:híha
 yiti-kookíniinvʔtlhoohíha

 yi-ti-kookinii-nvʔ(?)tlhoo-híh-a (*-nvʔ-)
 IRR-DIST-3PL>1DU.EX-tie.up.leg-PRS-IND
 ‘They are not tying up the legs of you and me.’
 (EJ, July 2011)

As expected, DIST takes the allomorph (i) *t(ee)-* after REL, which requires the verb to be in the tonic form¹⁹⁹:

(A.27) a. jide:gágà:tin v:dé:ʔa
 citee-kákààthin vvtééʔ-a

 ci-tee-k-akahthin vvtééʔ-a
 REL-DIST-1SG.A-take.off.glasses:PRS-IND
 ‘(that’s why) I’m taking off glasses.’ (CED, 2010)

b. jidà:ni:sgâ:ho
 cit-ààniiskáaho

 ci-t-anii-skáa(?)h-o(ʔi) (< *-skaʔh-)
 REL-DIST-3PL.A-be.afraid:IMPF-HAB
 ‘(why) are people afraid of them.’ (CED, 2010)

¹⁹⁹ The other pre-pronominal prefix which requires the verb to be in the tonic form, ITER (as well as CISL), occurs after DIST in the template and requires a special allomorph of DIST, *too-*.

A.2.3. Assertive modal suffix

Finally, the assertive modal suffix (ASR) *-vʋʒi* always requires the verb to be in the tonic form and overrides all the conditioning factors we saw in §A.2.1 and §A.2.2, while other modal suffixes are not marked for the feature of tonicity. This is evident by comparing forms with ASR (a) and those without it in (b) in (A.28) and (A.29). Both the (a) and (b) forms share the same pre-pronominal prefix, person and aspect. (a) forms have ASR and thus the verb is in the tonic form despite the presence of the TRNSL pre-pronominal prefix which requires the atonic forms, and thus Pronominal Tonic Lowering applies and H1 is found. On the other hand, (b) forms do not have ASR and thus TPI does not apply, and H1 is not found. The (b) forms have H3 due to the translocative pre-pronominal prefix, represented as $\textcircled{\text{H}}$, which is blocked in (a) due to Pronominal Tonic Lowering (§13.3.2), but again this is orthogonal to the discussion on tonicity here.

	with ASR		without ASR
(A.28)	a. wù:wě:dô:lʋ w-ùùweéʔóolvʋʒi		b. wuwé:dò:lé w-uwééʔòòlé
	↓ H ₁		Ⓜ
	w-uw-eetóo(ʔ)l-vʋʒi		w-uw-eetòò(ʔ)l-é(ʒi)
	TRNSL-3SG.B-walk.around:PFT-ASR		TRNSL-3SG.B-walk.around:PFT-EVID
	‘He went there (I saw it).’ (EJ, July 2011)		‘(I heard) he went there.’ (ibid.)
(A.29)	a. wù:dě:lí:jǔ:ʒi w-ùùteéʔííicvʋʒi		b. wǔ:dé:li:ga w-uúteéʔíìika
	↓ H ₁		Ⓜ
	w-uu-(a)teeli-(ʔ)c-vʋʒi		w-uu-(a)teeli-(ʔ)k-a
	TRNSL-3SG.B-go.out.of.sight-PFT-ASR		TRNSL-3SG.B-go.out.of.sight-PRS-IND
	‘He went out of sight.’ (Feeling 1975: 189)		‘He is going out of sight.’ (ibid.)

As we saw above, the allomorph of DIST is determined by the tonicity of the verb. Since ASR requires the verb to be in the tonic form, DIST selects the allomorph (i) *t(ee)-*, which occurs with the tonic form, whenever the verb takes ASR. This condition overrides other factors that determine the tonicity of the verb. Thus, in (A.30) the verb takes the translocative pre-pronominal prefix, which requires the verb

to be in the atonic form and thus we would expect DIST to take the allomorph (ii) *t(i)-*. However, this verb takes ASR, and thus the verb is in the tonic form and thus DIST takes the allomorph (i) *t(ee)-*.

- (A.30) wide:jígò:whtí:sgvʔi
 wi-teecíkòðwhthíiskvʔi
 ①
 wi-tee-ci-koohw(a)hth-íisk-vʔi
 TRNSL-DIST-1SG.A-see-IMPF-ASR
 ‘I was seeing them (facing away).’ (Pulte & Feeling 1975: 247)

A.2.3. Summary

In this section, we have seen three morphosyntactic factors which are relevant for the tonicity of the verb: the morphosyntactic category (§A.2.1), the pre-pronominal prefixes (§A.2.2) and the modal suffix (§A.2.3). These factors can be summarized as follows. Each morpheme and morphosyntactic category can be classified according to whether it requires the tonic form of the verb, atonic form of the verb, or unmarked as to tonicity:

TABLE A-3. FACTORS DETERMINING THE TONICITY OF A VERB

	TONIC	ATONIC	NOT MARKED
MORPHOSYNTACTIC CATEGORIES	Indicative verb	Infinitive	
		Imperative	
		Nominalized verb	
		Nouns	
		Adjectives	
MODAL SUFFIXES	ASR -vvʔi		other modal suffixes
PRE-PRONOMINAL PREFIXES	REL	IRR	DIST
	ITER	TRNSL	
	some PART	some PART	
		CISL	
		NEG	

When the tonicity of each of the factors does not match, the tonicity of the verb is determined according to the following ranking:

- (A.31) Ranking of factors determining the tonicity of a verb
 ASR » pre-pronominal prefixes » morphosyntactic categories

Thus, as we saw in (A.28) and (A.29), when ASR occurs with a pre-pronominal prefix which requires the verb to be in the atonic form, ASR wins out and the resulting verb is in the tonic form. When the verb is in the indicative form but when it has a pre-pronominal prefix which requires the atonic form of the verb, the result is the atonic form. Lastly, when a verb is nominalized but has ASR, the nominalized form is in the tonic form:

- (A.32) à:dlé:sgṽ:ʔi
 ààtlééskṽʔi
 Ø-atlé(ʔ)sk-vvʔi
 3SG.A-turn.off:IMPF-ASR/SH
 ‘turn-off’ (Feeling 1975: 12)

Some morphosyntactic categories might override other factors. First, in the punctual forms (but not imperative forms, which are segmentally identical to the punctual forms; see §12.2.2), Pronominal Tonic Lowering applies in some cases even when there is a pre-pronominal prefix which generally requires the verb to be in the atonic form:

- (A.33) Punctual
 a. yà:dlo:yhga
 y-ààtlooyhka
 y-Ø-atlooy-hk-a
 IRR-3SG.A-cry-PCT-IND
 ‘he would cry’ (CED, 2010: 57)
 b. yà:dlv:kwi
 y-ààtlvvkwhi
 y-Ø-atlvvkwh-i
 IRR-3SG.A-brag-PCT-IND
 ‘he would brag’ (CED, 2010: 57)

Adjectives appear to be always in the atonic form, even in the presence of ASR, and thus Pronominal Tonic Lowering is not observed:

- (A.34) Adjectives
- a. u:li:hwò:jǘ:ʔi
 uuliihwòðcvǘʔi
 uu-liihwòð(?)c-vvʔi
 3SG.B-die:PFT-ASR/SH
 ‘dead (non-human)’ (Feeling 1975: 173)
- b. u:yo:hu:sǘ:ʔi
 uuyoohuusvǘʔi
 uu-yoohuu-s-vvʔi
 3SG.B-die-PFT-ASR/SH
 ‘dead (human)’ (Feeling 1975: 186),
- c. u:yò:jǘ:ʔi
 uuyòðcvǘʔi
 uu-yòð(?)c-vvʔi
 3SG.B-break:PFT-ASR/SH
 ‘broken’ (ibid.).

A.3. Conclusion

This Appendix redefined “tonicity” in Oklahoma Cherokee and laid out the morphosyntactic phenomena which are relevant to the tonicity of the forms. Tonicity is a mysterious phenomenon, both for its idiosyncratic functions and for the conditioning factors which determine the tonicity. Tonicity may not have any function besides being “morphomic” (Aronoff 1994), in the sense that they serve a purely morphological functions, and do not have any morphosyntactic functions, just like conjugation classes in Romance languages.

Diachronically, the tonic forms could have been the “strong” form, while atonic forms could have been the “weak” form; as we saw in §9.1.7, in order for a glottal stop to induce a high tone, both the thyroarytenoid and the cricothyroid muscles have to be contracted at the same time, while in order for a glottal stop to induce a lowfall tone, only the thyroarytenoid muscle has to be contracted (Kingston 2007: 425). Pronominal Tonic Lowering in the tonic form might also be some indication of this ‘strengthening’ effect. However, it still does not explain why some forms are marked as “stronger” than others.

Appendix B. Summary of Effects of Laryngeal Alternation

Laryngeal Alternation was first mentioned in §1.7.4.1 and its various manifestations have been mentioned throughout the dissertation. This section summarizes such various effects of Laryngeal Alternation for reference.

TABLE B-1 summarizes the various effects of Laryngeal Alternation; the glottal grades of $\acute{V}hV$ and $\acute{V}\acute{V}s$ were not mentioned in the body of the dissertation.

TABLE B-1. INCIDENTS OF LARYNGEAL ALTERNATION

<i>h</i> -grade	glottal grade	sections
VhV	V?V	§1.7.1.4
$\acute{V}hV$	$\acute{V}\acute{V}?$ V	
VCh	V?C	§1.7.1.4, §4.1.2
VCh (C = <i>kw, tl</i>)	VC	§4.1.4
VhC	$\acute{V}\acute{V}C$	§1.7.1.4
VhCh	$\acute{V}\acute{V}Ch$	§4.1.3
Vs	$\acute{V}\acute{V}s$	§2.2.3
$\acute{V}\acute{V}s$	$\acute{V}\acute{V}s$	

The following examples exemplify each type in TABLE B-1.

	<i>h</i> -grade	glottal grade
(B.1)	a. à:de:loho:sga	b. gade:lo?o:sga
<i>VhV</i>	ààteelo <u>h</u> ooska	kateelo?ooska
	Ø-ateelohoo-sk-a	k-ateelohoo-sk-a
	3SG.A-find.out-PRS-IND	1SG.A-find.out-PRS-IND
	‘He is finding it out.’ (ibid.)	‘I am finding it out.’ (Feeling 1975: 9)

When the vowel before *h* is short and carries a high tone (H2 in Ch.12), the corresponding glottal grade form has a long vowel:

(B.2)	a. ganv:galíha	b. jinv:galí:ʔa
$\acute{V}hV$	kanv <u>v</u> kalí <u>h</u> a	cin <u>v</u> vkalí <u>í</u> ʔa
	ka-nv <u>v</u> kal-í <u>h</u> -a	ci-nv <u>v</u> kal-í <u>h</u> -a
	3SG.A-clean-PRS-IND	1SG.A-clean-PRS-IND
	‘He is cleaning it.’ (Feeling 1975: 112)	‘I am cleaning it.’ (ibid.)

The following examples illustrate when the first *h* of the stem is after another consonant:

- | | | | | |
|-----------------------|----|-------------------------------|----|-------------------------|
| (B.3) | a. | hatvhi | b. | gaʔdvsga |
| <i>VCh</i> | | hathvhi | | kaʔtvska |
| | | h-athv-h-i | | k-athv-sk-a |
| | | 2SG.A-grow-PCT-IND | | 1SG.A-grow-PRS-IND |
| | | ‘Grow up!’ (Feeling 1975: 62) | | ‘I am growing.’ (ibid.) |
| | | | | |
| (B.4) | a. | hakwiya | b. | gagwiyíha |
| <i>VCh</i> | | hakwhiya | | kakwiyíha |
| (<i>C = tl, kw</i>) | | h-akwhiy-Ø-a | | k-akwhiy-íh-a |
| | | 2SG.A-pay-PCT-IND | | 1SG.A-pay-PRS-IND |
| | | ‘Pay it!’ (Feeling 1975: 36) | | ‘I am paying’ (ibid.) |

The following are examples where the first *h* of the stem is pre-consonantal:

- | | | | | |
|-------------|----|--|----|--|
| (B.5) | a. | à:de:hlohgwáʔa | b. | gadè:llohgwáʔa |
| <i>VhC</i> | | ààteehlohkwáʔa | | katèèlohkwáʔa |
| | | Ø-ateehlohkw-áʔ-a | | k-ateehlohkw-áʔ-a |
| | | 3SG.A-learn-PRS-IND | | 1SG.A-learn-PRS-IND |
| | | ‘He is learning it.’ (Feeling 1975: 8) | | ‘I am learning it.’ (ibid.) |
| | | | | |
| (B.6) | a. | hatv:dâ:stanv:ʔi | b. | gà:tv:dâ:sdiha |
| <i>VhCh</i> | | hathvvtáasthanvvʔi | | kàathvvtáastiha |
| | | h-a(h)thvvtáa(?)st-ahn-vvʔi | | k-ahthvvtáa(?)st-ih-a (<*-ahthvvtáaʔst-) |
| | | 2SG.A-listen-PFT-FUT.IMP | | 1SG.A-listen-PRS-IND |
| | | ‘Listen later!’ (Feeling et al. 2003: 164) | | ‘I am listening to it.’ (Feeling 1975:) |

(B.7) is an example with *s*:

- | | | | | |
|-----------|----|---|----|---------------------------|
| (B.7) | a. | galo:sga | b. | jilò:sga |
| <i>Vs</i> | | kalooska | | cilòòska |
| | | ka-loo-sk-a | | ci-loo-sk-a |
| | | 3SG.A-pass-PRS-IND | | 1SG.A-pass-PRS-IND |
| | | ‘He is passing it.’ (Feeling 1975: 102) | | ‘I am passing it. (ibid.) |

When the vowel preceding *s* has a low-high tone (H2 discussed in Ch.12) in *h*-grade as in (B.8a), Laryngeal Alternation manifests itself as a tonal change: a low-high tone in *h*-grade alternates with long high tone in the glottal grade (Lindsey 1987: 10; Munro 1996: 52, fn. 19).

- (B.8) a. gale:yǎ:sga
ǎ:s kaleeyvǎska
ka-leeyvǎ-sk-a
3SG.A-LG.fall-PRS-IND
'LG is falling.' (Feeling 1975: 100)
- b. jile:yǎ:sga
cileeyvǎska
ci-leeyvǎ-sk-a
1SG.A-LG.fall-PRS-IND
'I (LG) am falling.' (ibid.)

REFERENCES

- Al-Mozainy, H, R. Bley-Vroman, and J. McCarthy. 1985. Stress shift and metrical structure. *Linguistic Inquiry* 16: 135-144.
- Altshuler, Daniel. 2009. Quantity-insensitive Iambs in Osage. *International Journal of American Linguistics* 75: 365-98.
- American Bible Society. 1860. *Cherokee New Testament*. American Bible Society.
- Anderson, Steven. 1974. *The organization of phonology*. New York: Academic Press.
- Antilla, Arto. 2002. Morphologically conditioned phonological alternations. *Natural Language and Linguistic Theory* 20: 1-42.
- Antilla, Arto. 2005. Variation and Optionality. In Paul de Lacy ed., *The Cambridge Handbook of Phonology*. Cambridge: Cambridge University Press. 519-536.
- Aronoff, Mark. 1994. *Morphology by itself: Stems and Inflectional Classes*. Cambridge, MA: MIT Press.
- Beckman, Mary. 1986. *Stress and Non-Stress Accent*. Dordrecht: Foris.
- Bender, Margaret. 2007. *Signs of Cherokee Culture: Sequoyah's Syllabary in Eastern Cherokee Life*. NC: University of North Carolina.
- Bender, Ernest and Zellig S. Harris. 1946. The phonemes of North Carolina Cherokee. *International Journal of American Linguistics* 12: 14-21.
- Bickmore, Lee S. 2001. *Bantu Tone spreading and displacement as asignment and minimal misalignment*. ms.
- Bladon, Anthony. 1986. Phonetics for Hearers. In Graham McGregor ed., *Language for Hearers*. Oxford: Pergamon.
- Blankenship, Barbara. 1996. Classificatory verbs in Cherokee. *Anthropological Linguistics* 39: 92-110.
- Blevins, Juliette. 1995. The Syllable in Phonological Theory. In J. Goldsmith ed., *The Handbook of Phonological Theory*. Oxford: Blackwell. 206-244.
- Blevins, J. and A. Garrett. 1998. The origins of consonant-vowel metathesis. *Language* 74: 508-56.
- Blevins, J. and A. Garrett. 2004. The evolution of metathesis. In Bruce Hayes, Robert Kirchner, and Donca Steriade eds., *Phonetically based phonology*. Cambridge: Cambridge University Press: 117-56.
- Brown, Jason C. 2004. Some tonogenetic properties of Upriver Halkomelem. In Lea Harper and Carmen Jany eds., *Proceedings from the Seventh Workshop on American Indigenous Languages* 40-48.

- Brown, Dunstan & Marina Chumakina. 2012. What there is and what there might be: an introduction to Canonical Typology. In Dunstan Brown, Marina Chumakina and Greville G. Corbett eds., *Canonical morphology and syntax*. Oxford: Oxford University Press. 1-19.
- Buckley, Eugene. 1994. *Theoretical Aspects of Kashaya Phonology and Morphology*. Stanford, CA: CSLI Publications.
- Buckley, Eugene. 2011. Metathesis. Van Oostendorp, M., Colin, E., Hume, E. and Rice, K eds., *The Blackwell Companion to Phonology*. Oxford: Blackwell. Ch. 59.
- Caballero, Gabriela. 2010. Scope, phonology and morphology in an agglutinating language: Choguita Rarámuri (Tarahumara) variable suffix ordering. *Morphology* 20.1: 165-204.
- Caballero, Gabriela. 2011 Morphologically conditioned stress assignment in Choguita Rarámuri (Tarahumara). *Linguistics* 49.4: 749-790
- Casali, Roderic. 1997. Vowel elision in hiatus contexts. Which vowel goes? *Language* 73: 493-533.
- Chafe, Wallace. 1960. Seneca morphology I. *International Journal of American Linguistics* 26: 11-22.
- Chafe, Wallace. 1977. Accent and related phenomena in the Five Nations Iroquois languages. In L. Hyman ed., *Studies in stress and accent*. Southern California Occasional Papers in Linguistics 4: 169-81.
- Chafe, Wallace. 1980. Consequential verbs in the Northern Iroquoian languages and elsewhere. Klar, Kathryn, Margaret Langdon, & Shirley Silver eds., *American Indian and Indoeuropean studies*. The Hague: Mouton. 43-9.
- Chafe, Wallace. 1996. Sketch of Seneca, an Iroquoian language. Ives Goddard ed., *Handbook of North American Indians* 17. Washington, D.C.: Smithsonian Institution. 225-53.
- Chafe, Wallace. 2012. Are adjectives universal? The case of Northern Iroquoian. *Linguistic Typology* 16: 1-39.
- Chafe, Wallace & J.F. Kilpatrick. 1963. Inconsistencies in Cherokee spelling. V. Garfield, ed., *American Ethnological Society Symposium on language and culture*. Seattle: University of Washington. 60-3.
- Cherokee Nation. 2003. *Ga-du-gi: A Vision for Working Together to Preserve the Cherokee Language. Report of a Needs Assessment Survey and a 10-year Language Revitalization Plan*. Final report submitted in fulfillment of FY 2001 DHS ANA Grant #90-NL-0189.
- Cho, Taehong and Peter Ladefoged. 1999. Variation and universals in VOT: evidence from 18 languages. *Journal of Phonetics* 27: 207-229.
- Clements, G.N. 1990. The role of the sonority cycle in core syllabification. In J. Kingston and M.E. Beckman eds., *Between the Grammar and Physics of Speech: Papers in Laboratory Phonology I*. Cambridge: Cambridge University Press. 283-333.

- Clements, G.N. and Elizabeth Hume. 1995. The internal organization of speech sounds. In J. Goldsmith ed., *The Handbook of Phonological Theory*. Oxford: Blackwell. 245-306.
- Clements, G. N. and S. J. Keyser. 1983. *CV Phonology: A Generative Theory of the Syllable*. Cambridge, MA: MIT Press.
- Comrie, Bernard and Sandra Thompson. 1985. Lexical nominalization. In Shopen T. ed., *Language Typology and syntactic Description: Volume III, Grammatical Categories and the Lexicon*. Cambridge: Cambridge University Press. 349–398.
- Cook, William. 1979. *A grammar of North Carolina Cherokee*. Ph.D. dissertation, Yale University.
- Corbett, Greville. 2006. *Agreement*. Cambridge: Cambridge University Press.
- Corbett, Greville. 2007. Canonical typology, suppletion and possible words. *Language* 83.8-42.
- Dixon, R.M.W. 1994. *Ergativity*. Cambridge: Cambridge University Press.
- Dixon, R.M.W. 2010. *Basic Linguistic Theory 2: Grammatical Topics*. Oxford : Oxford University Press.
- Downing, Laura, Alan Hall, and Renate Raffelsiefen. 2005. *Paradigms in phonological theory*. Oxford: Oxford University Press.
- Dryer, Matthew. 2006. Descriptive theories, explanatory theories, and basic linguistic theory. In Felix Ameka, Alan Dench, and Nicholas Evans eds., *Catching Language: The Standing Challenge of Grammar Writing*. Berlin: Mouton de Gruyter. 207-234.
- Dyck, Carrie. 1990. *Cayuga syllable structure and epenthesis*. M.A. thesis, University of Toronto.
- Everett, Daniel. 1988. On Metrical Constituent Structure in Piraha Phonology. *Natural Language and Linguistic Theory* 6: 207–246
- Feeling, Durbin. 1975. *Cherokee-English dictionary*. William Pulte ed. Tahlequah, OK: Cherokee Nation of Oklahoma.
- Feeling, Durbin, Craig Kopsis, Jordan Lachler, and Charles van Tuyl. 2003. *A Handbook of the Cherokee Verb: A Preliminary Study*. Tahlequah, OK: Cherokee National Historical Society.
- Feeling, Durbin, Christine Armer, Charles Foster, Marcellino Berardo and Sean O'Neill. 2010. Why Revisit Published Data of an Endangered Language with Native Speakers? An Illustration from Cherokee. *Language Documentation & Conservation*. Vol. 4: 1-21.
- Flemming, Edward S. 1996. Laryngeal Metathesis and Vowel Deletion in Cherokee. In Pamela Munro ed., *Cherokee papers from UCLA*. University of California Occasional Papers in Linguistics 16. Los Angeles: University of California, Los Angeles. 23-44.
- Foley, Lawrence. 1980. *Phonological variation in Western Cherokee*. New York: Garland.
- Foreman, Grant. 1938. *Sequoyah*. Norman, OK: University of Oklahoma Press.

- Foster, Michael. 1982. Alternating weak and strong syllables in Cayuga words. *International Journal of American Linguistics* 48: 59-72.
- Frey, Benjamin. 2013. *Toward A General Theory Of Language Shift: A Case Study In Wisconsin German And North Carolina Cherokee*. Ph.D. dissertation, University of Wisconsin.
- Von der Gabelentz, H.G.C. 1852. Kurze Grammatik der Tscherokesischen Sprache. *Zeitschrift fur die Wissenschaft der Sprache*. 3: 257-300.
- Gilley, Leoma. 2003. The Feature of Stress in Nilotic. Anyanwu, Rose-Juliet ed., *Stress and Tone - the African Experience*. *Frankfurter Afrikanistische Blaetter* 15. Koeln: Ruediger Koeppel Verlag, 99-118
- Goldsmith, John A. 1976. *Autosegmental Phonology*. Ph.D. dissertation, Massachusetts Institute of Technology.
- Goldsmith, John A. 1990. *Autosegmental and metrical phonology*. Oxford: Blackwell.
- Good, Jeff. 2004. Tone and accent in Saramaccan: Charting a deep split in the phonology of a language. *Lingua* 114: 575-619.
- Good, Jeff. 2011. The Typology of Templates. *Language and Linguistics Compass* 5/10: 731-747.
- Gordon, Matthew. 2002. A factorial typology of quantity-insensitive stress. *Natural Language and Linguistic Theories* 20: 491-552.
- Guion, S.G., Amith, J.D., Doty, C.S. and Shport, I.A. 2010. Word-level prosody in Balsas Nahuatl: The origin, development, and acoustic correlates of tone in a stress accent language. *Journal of Phonetics* 38, 137-166.
- Guyette, Susan. 1981. An examination of Cherokee language vitality. *Anthropological Linguistics* 23.5: 215-26.
- Haag, Marcia. 1997. Cherokee evidence of the separateness of the morphological and prosodic words. X. Li, L. Lopez, & T. Stroik, eds., *Papers from the 1997 Mid-America Linguistic Conference*. Columbia, MO: University of Missouri-Columbia. 343-9.
- Haag, Marcia. 1999. Cherokee Clitics: The Word Boundary Problem. *Kansas Working Papers in Linguistics* 24. 33-44.
- Haag, Marcia. 2001. Cherokee tone associations with overt morphology. *Chicago Linguistic Society* 37-2: 413-423.
- Haag, Marcia and Henry Willis. 2001. *Choctaw Language and Culture: Chahta Anumpa*. Norman, OK: University of Oklahoma Press.
- Hale, K. and J. White Eagle. 1980. A Preliminary Metrical Account of Winnebago Accent. *International Journal of American Linguistics* 46: 117-132.

- Halle, M. and W. Idsardi. 1995. General Properties of Stress and Metrical Structure. In J. Goldsmith ed., *The Handbook of Phonological Theory*. 403-443.
- Haspelmath, Martin. 2010. Framework-free grammatical theory. In Heine, Bernd & Narrog, Heiko eds., *The Oxford handbook of grammatical analysis*. Oxford: Oxford University Press. 341-365.
- Haspelmath, Martin and Andrea Sims 2010. *Understanding Morphology 2nd edition*. London: A Hodder Arnold Publication.
- Hayata, Teruhiro. 1999. *Onchō no taiporojī*. Tōkyō. Taishūkan shoten.
- Hayes, Bruce. 1982. Extrametricality and English Stress. *Linguistic Inquiry* 13: 227-296.
- Hayes, Bruce. 1995. *Metrical Stress Theory: Principles and Case Studies*. Chicago: University of Chicago Press.
- Hollenbach, Barbara. 1977. Phonetic vs. phonemic correspondence in two Trique dialects. In William R. Merrifield, ed., *Studies in Otomanguean phonology*. (Summer Institute of Linguistics Publications in Linguistics 54.) Dallas: Summer Institute of Linguistics. 35-67.
- Holmes, Ruth and Betty Smith. 1976. *Beginning Cherokee*. Norman: University of Oklahoma.
- Hombert, Jean-Marie, John J. Ohala and William G. Ewan. 1979. Phonetic explanations for the development of tones. *Language* 55: 37-58.
- Hooper, Joan B. 1976. *An Introduction to Natural Generative Phonology*. New York: Academic Press.
- Hopkins, Alice. 1987. Vowel dominance in Mohawk. *International Journal of American Linguistics* 53: 445-59.
- Huff, Charlie Thain. 1977. *The Phonology of Qualla Cherokee*. MA thesis, University of North Carolina, Chapel Hill.
- van der Hulst & N. Smith. 1988. The variety of pitch accent systems: Introduction. In H. van der Hulst and N. Smith eds., *Autosegmental studies on pitch accent*. Dordrecht: Foris. ix–xxiv
- van der Hulst, Harry, Rob Goedemans and Ellen van Zanten. 2010. *A survey of word accentual patterns in the languages of the world*. New York: Mouton de Gruyter.
- Hyman, Larry. 1970. How concrete is phonology? *Language* 46: 58-76.
- Hyman, L.M., 1978. Tone and/or accent. In: Napoli, D.J. ed., *Elements of Tone, Stress and Intonation*. Georgetown University Press, Washington, pp. 1–20.
- Hyman, Larry. 1985. *A Theory of Phonological Weight*. Dordrecht: Foris.
- Hyman, Larry. 1988. The phonology of final glottal stops. *Proceedings of the Western Conference on Linguistics* 1. Fullerton, California State University. 113-130.

- Hyman, Larry. 2006. Word-prosodic typology. *Phonology* 23. 225-257.
- Hyman, Larry. 2009. How (not) to do phonological typology: a case of pitch-accent. *Language Sciences* 31: 213-238.
- Hyman, Larry. 2012. In defense of prosodic typology: A response to Beckman & Venditti. *Linguistic Typology* 16: 341-385.
- Hyman, Larry, and Russell Schuh. 1974. Universals of tone rules: Evidence from West Africa. *Linguistic Inquiry* 5: 81-115.
- Igarashi, Yosuke. 2012. Prosodic typology in Japanese dialects from a cross-linguistic perspective. *Lingua* 122: 1441-1453.
- Inkelas, Sharon. 1989. *Prosodic constituency in the lexicon*. Ph.D. dissertation, Stanford University.
- Inkelas, Sharon. 1993. Nimboran position class morphology. *Natural Language and Linguistic Theory* 11:559-624.
- Inkelas, Sharon and Draga Zec. 1988. Serbo-Croatian Pitch Accent: The Interaction of Tone, Stress and Intonation. *Language* 64.2: 227-248.
- Inkelas, Sharon and Cheryl Zoll. 2007. Is Grammar Dependence Real?. *Linguistics* 45:133-171.
- Inkelas, Sharon, C. Orhan Orgun, and Cheryl Zoll. 1997. The implications of lexical exceptions for the nature of grammar. In I. Roca ed., *Derivations and constraints in phonology*. Oxford: Clarendon Press. 393-418.
- Johnson, Keith. 2005. Tone and Pitch Accent in Cherokee Nouns. *UC Berkeley Phonology Lab Annual Report (2005)*.
- Kager, René. 1999. *Optimality Theory*. Cambridge: Cambridge University Press.
- Kager, René. 2007. Feet and metrical stress. In Paul de Lacy ed., *The Cambridge Handbook of Phonology*. Cambridge: Cambridge University Press. 195–227.
- Kager, René. 2012. Stress in windows: Language typology and factorial typology. *Lingua* 122: 1454-1493.
- Kavitskaya, Darya. 2001. *Compensatory lengthening: phonetics, phonology, diachrony*. Ph.D. dissertation, UC Berkeley.
- Kenstowicz, Michael. 1994. *Phonology in Generative Grammar*. Oxford: Blackwell.
- Kenstowicz, Micheal and Charles Kisseberth. 1979. *Generative Phonology: Description and Theory*. New York: Academic Press.
- Kilpatrick, Jack Frederick, and Anna Gritts Kilpatrick. 1970. Notebook of a Cherokee shaman. *Smithsonian contributions to anthropology* 2.6: 83-125.

- King, Duane. 1975. *A grammar and dictionary of the Cherokee language*. Ph.D. dissertation, University of Georgia.
- Kingston, John. 1985. *The phonetics and phonology of the timing of oral and glottal events*. Ph.D. dissertation, University of California, Berkeley.
- Kingston, John. 2007. The phonetics-phonology interface. P. de Lacy ed., *The Cambridge Handbook of Phonology*, Cambridge, UK: Cambridge University Press. 435-456.
- Kingston, John. 2011. Tonogenesis. M. van Oostendorp, C. J. Ewen, E. Hume, and K. Rice eds. *Blackwell Companion to Phonology*. Oxford, UK: Blackwell Publishing. v. 4, Chapter 97.
- Kiparsky, Paul. 1968. How Abstract is Phonology? (reprinted in P. Kiparsky, *Explanation in phonology*, 1982, Foris Publications.)
- Kiparsky, Paul. 1971. Historical Linguistics. W.O. Dingwall ed., *A survey of Linguistic Science*. University of Maryland. 576-650.
- Kiparsky, Paul. 1982. Lexical Phonology and Morphology. In I.-S. Yang ed., *Linguistics in the Morning Calm*, 3-91. Hanshin, Seoul: Linguistic Society of Korea.
- Koops, Christian. 2011. *Ground phrase in Cherokee*. Paper presented at the annual meeting of SSILA, Pittsburgh.
- Krauss, Michael E. 2005. Athabaskan Tone. In S. Hargus and K. Rice eds., *Athabaskan Prosody*. Amsterdam: John Benjamins. 55-136.
- Krueger, John R. 1963. Two early grammars of Cherokee. *Anthropological Linguistics* 5.3: 1-57.
- Kubozono, Haruo. 1999. Mora and syllable. N. Tsujimura. ed., *The Handbook of Japanese Linguistics*. Blackwell. 31-61.
- de Lacy, Paul. 2002. The interaction of tone and stress in Optimality Theory. *Phonology* 19.1: 1-32.
- Ladefoged, Peter and Ian Maddieson. 1996. *The sounds of the world's languages*. Oxford: Blackwell.
- Leben, Williams. 1977. *Suprasegmental Phonology*. Ph.D. dissertation, Massachusetts Institute of Technology.
- Leer, Jeff. 2001. Shift of tone markedness in Northern Tlingit and Southern Athabaskan. Kaji S. ed., *Proceedings of Symposium: Cross-Linguistic Studies of Tonal Phenomena, Tonogenesis, Japanese Accentology, and Other Topics*. Tokyo: Institute of the Study of the Languages and the Cultures of Asia and Africa. 61-86.
- Lewis, M.P. ed. 2009. *Ethnologue: Languages of the World, Sixteenth edition*. Dallas, TX: SIL International. Online version: <http://www.ethnologue.com>
- Lieberman, M. and A. Prince. 1977. On Stress and Linguistic Rhythm, *Linguistic Inquiry* 8, 249-336.

- Lindsey, Geoffrey. 1985. *Intonation and interrogation: tonal structure and the expression of a pragmatic function in English and other languages*. Ph.D. dissertation, University of California, Los Angeles.
- Lindsey, Geoffrey. 1987. *Cherokee Pitch Phonology*. Ms., University College, London.
- Lindsey, Geoffrey and Janine Scancarelli. 1985. Where have all the adjectives come from? The case of Cherokee. *Berkeley Linguistics Society* 11: 207-15.
- Lounsbury, Floyd. 1942. *Phonology of the Oneida language*. M.A. thesis, University of Wisconsin.
- Lounsbury, Floyd. 1953. *Oneida verb morphology*. Yale University Publications in Anthropology 48. New Haven: Yale University Press.
- Maddieson, Ian. 1976. Universals of tone. In Greenberg, Joseph ed., *Universals of human language*, vol. 2 (Phonology). Stanford, CA: Stanford University Press. 335-365.
- Maddieson, Ian. 1984. *Patterns of Sounds*. Cambridge: Cambridge University Press.
- Matisoff, James. 1973. *A Grammar of Lahu*. University of California Publications in Linguistics 75. University of California Press.
- McDonough, Joyce. 2003. *Navajo sound system*. Dordrecht: Kluwer Academic.
- Melnar, Lynette. 1998. *Caddo verb morphology*. Ph.D. dissertation, University of Chicago.
- Melinger, Alissa. 2002. Foot Structure and Accent in Seneca. *International Journal of American Linguistics* 68.3:287-315.
- Michelson, Karin. 1988. *A comparative study of Lake-Iroquoian accent*. Dordrecht: Kluwer.
- Michelson, Karin. 1989. Invisibility: vowels without a timing slot in Mohawk. In Gerds, Donna and Karin Michelson, eds., *Theoretical perspectives on Native American Languages*. Albany: SUNY Press. 38-69.
- Mithun, Marianne. 1979. Iroquoian. In L. Campbell and M. Mithun eds., *The Languages of Native America*. Austin: University of Texas Press.
- Mithun, Marianne. 1984. The evolution of noun incorporation. *Language* 60: 847-94.
- Mithun, Marianne. 1991. Active/ Agentive case marking and its motivations. *Language* 60(3): 510-546.
- Mithun, Marianne. 1996. Multiple reflections of inalienability in Mohawk. Hilary Chappell and William McGregor, eds., *The Grammar of Inalienability: A Typological Perspective on Body Parts and the Part-Whole Relation. Empirical Approaches to Language Typology*. Berlin: Mouton de Gruyter. 633-649.
- Mithun, Marianne. 1999. *The Languages of Native North America*. Cambridge: Cambridge University Press.

- Montgomery-Anderson, Brad. 2008. *A reference grammar of Oklahoma Cherokee*. Ph.D. dissertation, University of Kansas.
- Montgomery-Anderson, Akira Yamamoto, Anna Sixkiller, Ed Jumper, Greg Trihus, Beth Bryson, and Andrew Sikora. 2010. *Cherokee electronic dictionary*. Cherokee Nation Foundation. (<http://www.cniec-edu.org/wp-choerokee/>)
- Montler, Timothy. 1986. *An Outline of the Morphology and Phonology of Saanich, North Straits Salish*. Occasional Papers in Linguistics No. 4. Missoula: Linguistics Laboratory, University of Montana.
- Mooney, James. 1861-1921. *James Mooney's history, myths, and sacred formulas of the Cherokees*. Asheville, NC: Historical Images.
- Munro, Pamela. 1996a. Cherokee Papers from UCLA: An Introduction. In Pamela Munro ed. *Cherokee papers from UCLA*. University of California Occasional Papers in Linguistics 16. Los Angeles: University of California, Los Angeles. 3-7.
- Munro, Pamela. 1996b. The Cherokee Laryngeal Alternation Rule. In Pamela Munro ed. *Cherokee papers from UCLA*. University of California Occasional Papers in Linguistics 16. Los Angeles: University of California, Los Angeles. 45-60.
- Munro, Pamela ed. 1996. *Cherokee papers from UCLA*. University of California Occasional Papers in Linguistics 16. Los Angeles: University of California, Los Angeles.
- Murray, R.W. and T. Vennemann 1983. Sound change and syllable structure in Germanic phonology. *Language* 59: 514-528.
- Myers, Scott. 1987. Vowel shortening in English. *Natural Language and Linguistic Theory* 5: 485-518.
- Myers, Scott. 1997. OCP effects in Optimality Theory. *Natural Language and Linguistic Theory* 5: 485-518.
- Nellis, Donald G. and Barbara E. Hollenbach. 1980. Fortis versus Lenis in Cajonos Zapotec Phonology. *International Journal of American Linguistics* 46: 92-105.
- Palancar, Enrique. 2012. The conjugation classes of Tilapa Otomi : An approach from canonical typology. *Linguistics* 50: 783-832.
- Pankratz, Leo and Eunice Pike. 1967. Phonology and Morphophonemics of Ayutla Mixtec. *International Journal of American Linguistics* 33:4: 287-299.
- Peter, Lizette, Tracy Hirata-Edds, Tracy, and Brad Montgomery-Anderson. 2008. Verb development by children in the Cherokee language immersion program, with implications for teaching. *International Journal of Applied Linguistics*, 18.2: 166-187.
- Pickering, John 1831. *A Grammar of the Cherokee Language*. Boston.

- Picket, Velma. 1951 Nonphonemic stress: a problem in stress placement in Isthmus Zapotec. *Word*, 7: 60-65.
- Pike, Kenneth. 1948. *Tone languages: A Technique for Determining the Number and Type of Pitch Contrasts in a Language, with Studies in Tonemic Substitution and Fusion*. Ann Arbor: The University of Michigan Press.
- Prince, Alan S. 1983. Relating to the Grid. *Linguistic Inquiry* 14.1: 19-100.
- Pulleyblank, D. George. 1986. *Tone in Lexical Phonology*. Dordrecht: Kluwer.
- Pulte, William. 1976. Writing systems and underlying representation: the case of the Cherokee syllabary. *1975 Mid-America Linguistics Conference Papers*. Lawrence, Kansas: University of Kansas Linguistics Department. 388-93.
- Pulte, William. 1979. Cherokee: a flourishing or obsolescing language? W. McCormack & S. Wurm, eds.. *Language and Society*. The Hague: Mouton.423-32.
- Pulte, William. 1985. The experienced and nonexperienced past in Cherokee. *International Journal of American Linguistics* 51: 543-4.
- Pulte, William and Durbin Feeling. 1975. Outline of Cherokee Grammar. In Durbin Feeling. 1975. *Cherokee-English dictionary*. William Pulte ed. Tahlequah, OK: Cherokee Nation of Oklahoma. 235-355.
- Raffelsiefen, Renate. 2005. Paradigm uniformity effects versus boundary effects. In Downing et al. ed., *Paradigms in phonological theory*. Oxford: Oxford University Press. 211-262.
- Remijsen, Bert. 2002. *Word-prosodic systems of Raja Ampat languages*. Utrecht: LOT.
- Remijsen Bert and van Heuven, V. J. 2005. Stress, tone and discourse prominence in the Curaçao dialect of Papiamentu. *Phonology* 22: 205-235.
- Reyburn, William D. 1953-54. Cherokee verb morphology I-III. *International Journal of American Linguistics*, 19, 20.
- Riad, Tomas. 2012. Culminativity, stress and tone accent in Central Swedish. *Lingua* 122: 1352-1379.
- Rivera-Castillo, Yolanda. 2009. Subsystem interface and tone typology in Papiamentu. In Clements, J. Clancy and Shelome Gooden eds., *Language Change in Contact Languages* 33.2: 437-458.
- Robinson, Prentice. 1989. *Cherokee Made Easy*. Tulsa, OK: Cherokee Language and Culture.
- Rudes, Blair. 1984. Reconstructing word order in a polysynthetic language : from SOV to SVO in Iroquoian. Jacek Fisiak ed., *Historical Syntax*. Berlin: Walter de Gruyter. 471-508.
- Rudes, Blair. Iroquoian Vowels. *Anthropological Linguistics* 37.1: 16-69.
- Sapir, Edward. 1938. Glottalized continuants in Navajo, Nootka, and Kwakiutl with a note on Indo-European. *Language* 14: 248-274.

- Scancarelli, Janine. 1986. Pragmatic roles in Cherokee grammar. *Berkeley Linguistics Society* 12: 224-34.
- Scancarelli, Janine. 1987. *Grammatical relations and verb agreement in Cherokee*. Ph.D. dissertation, University of California. Los Angeles.
- Scancarelli, Janine. 1992. Aspiration and Cherokee orthographies. P. Downing, S. Lima, and M. Noonan eds., *The linguistics of literacy*. Amsterdam: John Benjamins. 135-52.
- Scancarelli, Janine. 2005. Cherokee. Heather Hardy & Janine Scancarelli eds., *Native Languages of the Southeastern United States*, 351-384. University of Nebraska Press.
- Seay, Elizabeth. 2003. *Searching for Lost City*. Guilford, Connecticut: The Lyons Press.
- Selkirk, Elisabeth O. 1982. The Syllable. In Harry van der Hulst and Norval Smith eds., *The Structure of Phonological Representations Part II*. Dordrecht: Foris. 337-383.
- Selkirk, Elisabeth. 1984. *Phonology and Syntax: the relation between sound and structure*. Cambridge, MA: MIT Press.
- Shaw, Patricia. 1980. *Theoretical issues in Dakota phonology and morphology*. New York: Garland Publishing.
- Shaw, Patricia. 1985. Coexistent and competing stress rules in Stoney (Dakota). *International Journal of American Linguistics* 51: 1-18.
- Shaw, Patricia. 1989. The Complex Status of Complex Segments in Dakota. In Donna Gerdtz and Karin Michelson eds., *Theoretical Perspectives on Native American Languages*. Albany: SUNY press. 3-37.
- Silva, David. 2006. Acoustic evidence for the emergence of tonal contrast in contemporary Korean. *Phonology* 23: 287-308.
- Simpson, J. and M. Withgott 1986. Pronominal clitic clusters and templates. In H. Borer ed., *Syntax and Semantics 19: The syntax of pronominal clitics*. New York: Academic. 149-174.
- Smith, Jennifer. 2011. Category-specific effects. In Marc van Oostendorp, Colin Ewen, Beth Hume, and Keren Rice eds., *Companion to phonology*. Oxford: Wiley-Blackwell. 2439-2463.
- Steriade, Donca. 1982. *Greek prosodies and the nature of syllabification*. Ph.D. dissertation, Massachusetts Institute of Technology.
- Steriade, Donca. 2000. Paradigm Uniformity and the Phonetics/Phonology Boundary. In J. Pierrehumbert and M. Broe eds., *Papers in Laboratory Phonology* vol. 6. Cambridge: Cambridge University Press.
- Stevens, K.N. and Keyser, S.J. 1989. Primary features and their enhancement in consonants. *Language* 65.1, 81-106.
- Stone, Megan. 2012. Aspect in Cherokee Nominals. *Coyote Papers* 19. University of Arizona.

- Svantesson, Jan-Olof and David House. 2006. Tone production tone perception and Kammu tonogenesis. *Phonology* 23: 309-333.
- Teeter, Karl V. 1964. Descriptive Linguistics in America: Triviality vs. Irrelevance. *Word* 20: 197-206.
- Thiesen, Wesley & David Weber, 2012. *A Grammar of Bora, with special attention to tone*. Dallas, TX: SIL International.
- Thompson, Laurence & M. Terry Thompson. 1969. Metathesis as a grammatical device. *International Journal of American Linguistics* 35: 213-9.
- Trubetzkoy N.S. 1969. *Principles of Phonology* (translated by Christiane A. M. Baltaxe from Trubetzkoy, N.S. 1958. *Grunzüge der Phonologie*. Göttingen: Vandenhoeck & Ruprecht.). Berkeley & Los Angeles, CA: University of California Press.
- Uchihara, Hiroto. 2007a. *Cherokee Phonology and Verb Morphology*. M.A. thesis, the University of Tokyo.
- Uchihara, Hiroto. 2007b. Laryngeal Alternation, Laryngeal Metathesis and Aspirated Consonants in Oklahoma Cherokee. *Tokyo University Linguistic Papers* 26:49-72.
- Uchihara, Hiroto. 2009. High Tone in Oklahoma Cherokee. *International Journal of American Linguistics* 75.3: 317-336.
- Uchihara, Hiroto. 2014. Noun Incorporation in Cherokee Revisited. *International Journal of American Linguistics*. (in press).
- Vennemann, Theo. 1972. On the Theory of Syllable Phonology. *Linguistische Berichte* 18: 1-18.
- Walker, Willard. 1969. Notes on native writing systems and the design of native literacy programs. *Anthropological Linguistics* 11.5: 148-66.
- Walker, Willard. 1975. Cherokee. In Crawford ed., *Studies in southeastern Indian languages*. Athens: U. of Georgia. 186-236.
- Walker, Willard. 1981. Native American writing systems. In C. Ferfuson and S. Heath eds., *Language in the USA*. Cambridge: Cambridge University Press. 145-74.
- Woodbury, Anthony. 1987. Meaningful phonological processes: a consideration of Central Alaskan Yup'ik Eskimo prosody. *Language* 63: 685-740.
- Wright, Richard. 1996. Tone and Accent in Oklahoma Cherokee. In Pamela Munro ed., *Cherokee papers from UCLA*. U. of California Occasional Papers in Linguistics 16. Los Angeles: U. of California, Los Angeles. 11-22.
- Yip, Moira. 1988. The Obligatory Contour Principle and phonological rules: a loss of identity", *Linguistic Inquiry*: 65–100.

Yip, Moira. 2002. *Tone*. Cambridge: Cambridge University Press.

Zariquiey Biondi, Roberto. 2011. *A grammar of Kashibo-Kakataibo*. Ph.D. dissertation, Research Centre for Linguistic Typology, La Trobe University

Zec, Draga. 2007. The syllable. In Paul de Lacy ed., *The Cambridge Handbook of Phonology*. Cambridge: Cambridge University Press. 161-194.