

The Morphological and Phonological Constituent Structures of Cherokee Verbs¹

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Keywords: Iroquoian, word, polysynthesis, Prosodic Hierarchy, morphological template

Abstract

Cherokee (Iroquoian) is a polysynthetic language and its verbs have complex internal structure. In this paper, I will examine both grammatical and phonological constituent structures, and show that various morphological and phonological processes do not cluster in one domain but rather more than one constituent needs to be posited. This results in the violation of the ‘Clustering Prediction’ of Prosodic Hierarchy. This study further supports the view that Iroquoian verbs have internal layered structure, as argued in Chafe (1960) or Dyck (2009), rather than a flat, templatic structure, assumed in Lounsbury (1953).

1. Introduction

Languages with rich morphology, as in Iroquoian, pose a question with regard to the definition of ‘word’: ideas conveyed by phrases or sentences in languages such as English, Spanish or Japanese can be conveyed by a ‘word’ in a polysynthetic language, as can be illustrated by (1), from Oklahoma Cherokee; the plus sign indicates that the morphemes connected with this sign are synchronically no longer analyzable:

¹ I would like to thank Ryan Bennett, Karin Michelson, Jeff Good, Joyce McDounough, Chris Koops, and Audience at SSILA 2015 at Portland, Oregon for their valuable comments and discussions. Field trips for this project were funded by University at Buffalo and American Philosophical Society. I am also grateful for the Cherokee speakers for providing me with the linguistic data.

- (1) dv:ni:ne:giʔe:li²
 tvvniíneekiʔeeli
 ta-anii-nee+kiʔ-ee-l-i
 CISL-3PL.A-liquid+take-DAT-PFT-MOT
 „They will take it (liquid) from him.“ (Feeling et al. 2003: 206)³

The „word-hood“ and the internal constituent structures of such words in polysynthetic languages have been discussed by various scholars, including Salish (Czaykowska-Higgins 1998), Algonquian (Russell 1999), Athabaskan (Rice 1992, 2000, McDonough 2000), Eskimo (Woodbury 2002; Miyaoka 2002), Iroquoian (Dyck 2009), and Mapudungun and Chintang (Bickel & Zúñiga 2016). Bantu languages are not polysynthetic in the prototypical sense but their internal morphological structures of verbs have been the focus of numerous studies (Myers 1987, Downing 1999, Hyman 2003, Good 2003). Iroquoian, spoken in North America, is also one of such language families, and its verbs are well known for their complex internal structure. In Northern Iroquoian languages, a verb consists minimally of a verb root, an aspectual suffix (asp), and a pronominal prefix (pp). A verb can also optionally take a pre-pronominal prefix (ppp), and the verb root can further be augmented by a middle/reflexive prefix (mid/refl), an incorporated noun root (in) and/or derivational suffixes (deriv). A verb can further be augmented by the clitics. In (2), the raised n indicates that more than one morpheme from that slot can co-occur, and the morphemes in parentheses are optional:

- (2) Template of Northern Iroquoian verbs
 (PPPⁿ) - PP - (MID/REFL) - (IN) - ROOTⁿ - (DERIVⁿ) - ASP = (CLITICSⁿ)⁴

² The Cherokee data are first represented in the modified community orthography in the first line, followed by a phonemic representation in the second line and the segmentation in the third line. Cherokee vowel phonemes are: *i, e, a, u, o, and v* ([ʌ]), and vowel length is phonemic. Vowel length is represented by a colon (: in the first line, following the convention in the community, while a long vowel is represented by doubling the vowels in the second and the third lines. Tones are represented as follows: low (*a*), high (*á*), high-low (*á, áá*), low-high (*ǎ, áá*), lowfall (*à, àà*), superhigh (*ǎ, áá*). Cherokee consonant phonemes are: *t, k, kw, c, tl, s, m, n, l, y, w, ʔ, and h*. In the first lines of the examples, following the conventions in the community, singleton plosives and affricates /t/, /k/, /kw/, /c/, and /tl/ are written as *d, g, gw, j, and dl*, and sequences of plosives and affricates plus *h* (/th/, /kh/, /kwh/, and /tlh/) are represented as *t, k, kw, and tl*. The second line and the segmentation line and morphemes that appear in the text are represented with the phonemic orthography.

³ The data presented in this paper are from my own field notes between 2011-2013 (mainly from four speakers, Ed Jumper (EJ), Junior Scrapper (JRS), DJ McCarter (DJM), and Durbin Feeling (DF)), as well as published and unpublished sources, Feeling (1975), Pulte & Feeling (1975), Holmes & Smith (1976), Feeling et al. (2003) and Montgomery-Anderson et al. (2010), and the recordings made by Durbin Feeling and William Pulte in the 1970’s (WJ1973, JW1973). All of the Cherokee data come from Oklahoma Cherokee, unless specifically mentioned otherwise.

⁴ The abbreviations in this paper are as follows: A: set A (agentive) pronominal prefix, AN: animate, ASP: aspectual suffix, ASR: assertive, B: set B (patientive) pronominal prefix, CISL: cislocative, CMP: compact, DAT: dative, DERIV: derivational

(3) exemplifies the structure in (2), from Mohawk:

- (3) waʔkenuhwarorókhsi?
 waʔ-k-nuhwar-orok-hsy-ʔ
 FACT-1A-head-cover-REV-PCT
 ‘I took off my hat’ (Michelson 1988: 53)

Cherokee, the sole representative of the Southern Iroquoian branch, lacks productive noun incorporation (Cook 1979; Uchihara 2016, among others) and adds to this verb structure the obligatory modal suffix (MOD), as in (4). This is exemplified in (1) above:

- (4) Template of Cherokee verbs
 (PPPⁿ) - PP - (MID/REFL) - ROOTⁿ - (DERIVⁿ) - ASP - MOD = (CLITICSⁿ)

A natural question arises as to the word-hood and the internal structure of the Cherokee and Iroquoian verbs: how can a ‘word’ be defined in these languages? Do the verbs in these languages have internal structures or not? In this paper, I will examine both morphological and phonological constituent structures in Cherokee. The data from Cherokee suggests that the domains do not cluster in one constituent structure but rather more than one constituent need to be posited, as in other languages rich in morphology (Russel 1999; Downing 1999; Schiering et al. 2010; Bickel & Zúñiga 2016). Furthermore, Cherokee facts support the layered structure of verbs (Chafe 1960, Dyck 2009) rather than a flat, templatic structure proposed by Lounsbury (1953).

The organization of this paper is as follows. First, the morphological constituent structure is discussed in §2, followed by the discussions on phonological constituent structure in §3. In §4 looks at compounds and shows that word compounds manifest mixed behaviors with respect to the criteria discussed in the preceding sections, while root compounds consistently form one word. §5 concludes, with theoretical implications and contributions of this paper.

2. The Morphological Constituent Structure in Cherokee

Traditionally (for instance, Lounsbury 1953), Iroquoian verbs have been analyzed to be composed first of a *root*, which combines with an optional middle/reflexive prefix, an incorporated noun root or a derivational suffix to form a *base*, which in turn combines with the aspect suffix to form a *stem*:

suffix, DIST: distributive, DU: dual, EX: exclusive, F: focus, FACT: factual, FL: flexible, H: high tone, HAB: habitual, HL: high-low tone, IMPF: imperfective, IN: inclusive, INAL: inalienable, IND: indicative, IRR: irrealis, ITER, iterative, IN: inclusive, LG: long, LOC: locative, MID: middle, MOD: modal suffix, MOT: motion, MW: morphological word, MS: morphological stem, NOM: nominal, PCT: punctual, PFT: perfective, PP: pronominal prefix, PPL: passive participle, PPP: pre-pronominal prefix, PL: plural, PRS: present, PW: phonological word, PS: phonological stem, Q: interrogative, REFL: reflexive, REL: relative, REP: reportative, REV: reversive, SG: singular, SH: superhigh, STAT: stative, VD: vowel deletion.

(5) Morphological constituent structure of Cherokee verbs (traditional view)

$$\text{WORD}[(\text{PPP}^n) - \text{PP} - [\text{STEMBASE} - \text{ASP}]_{\text{STEM}} - \text{MOD}]_{\text{WORD}} = (\text{CLITICS}^n)$$

While I do not intend to challenge this traditional view, two subcategorization principles and one morphophonological process motivate the following internal morphological constituents within the Morphological Word (MW), the Morphological Stem 1 (MS1; §2.2) which has no place in the traditional analysis, and the Morphological Stem 2 (MS2; §2.3) which corresponds to the traditional *stem*. Furthermore, I will argue that the middle or reflexive prefix is outside of the base (justification for which is discussed in §3.3):

(6) Morphological constituent structure of Cherokee verbs (this paper)

$$\text{MW}[(\text{PPP}^n) - \text{MS1}[\text{PP} - (\text{MID/REFL}) - [\text{MS2BASE} - \text{ASP}]_{\text{MS2}} - \text{MOD}]_{\text{MS1}}]_{\text{MW}} = (\text{CLITICS}^n)$$

That is, the Morphological Stem 1 consists of all the morphemes in the Morphological Word with the exclusion of the pre-pronominal prefixes, while the Morphological Stem 2 consists of the base and the aspect suffix.

In this section, the Morphological Word in Cherokee is first defined in §2.1, followed by the discussions on the Morphological Stem 1 (§2.2) and the Morphological Stem 2 (§2.3).

2.1. Morphological Word

The Cherokee Morphological Word is characterized by the morphosyntactic properties commonly observed crosslinguistically for the morphological word (for instance, Dixon 2010): the fixed order of the morphemes, and there is only one inflectional marker per each obligatory inflectional category, namely the pronominal prefix, the aspect suffix and the modal suffix.

The Morphological Word in Cherokee is also the host of cliticization. Cherokee has some second-position clitics, which have adverbial or pragmatic functions (Montgomery-Anderson 2008: 141ff.). These clitics are attached to the end of the first morphological word of the clause, regardless of the part of speech of this first morphological word (Lindsey 1985: 139, Haag 1997). In (7), the interrogative clitic =*sk* is attached to the noun, while in (8), it is attached to the verb. The generalization is that =*sk* attaches to the first Morphological Word of the clause. Note here that Cherokee word order is free and thus the two orders do not reflect any syntactic differences (Scancarelli 1987: §3.7, Montgomery-Anderson 2008: §3.1).

- | | | |
|-----|--------------------------------------|-----------------------|
| (7) | dala:lá:sk | hi:gò:whí |
| | talaaláask | hiikòòwhthí |
| | talaalá=sk(o) | hii-koohw(a)hthí(h-a) |
| | woodpecker=Q | 2SG>AN-see:PRS-IND |
| | 'Do you see a woodpecker?' (JRS2013) | |

This allomorphy of two pre-pronominal prefixes conditioned by modal suffixes justifies the internal constituent structure of verbs within the Morphological Word (which I tentatively label as the Morphological Stem 1), which excludes the pre-pronominal prefixes, as in (11).

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

This is because the modal suffix has to form a constituent along with the sequence of the pronominal prefix, the verb base and the aspect suffix, before the affixation of the pre-pronominal prefixes so that the correct allomorph of the Cislocative and Iterative is selected. This is parallel to the classic cases in English such as *indigestion*, where the subcategorization of the negative prefix *in-*, which can only attach to adjectives or nouns (and never verbs), justifies the internal constituent structure as in (12a) rather than (12b) (Allen 1978: §2.4):

- (12) a. in-[[digest]-ion]
 b. *[in-[digest]]-ion

2.3. Morphological Stem 2

Another subordinate constituent structure within the Morphological Stem 1, which consists of the verb base and the aspect suffix, is motivated by Pronominal Alternation (§2.3.1) and Laryngeal Alternation (§2.3.2). I tentatively label this constituent as the ‘Morphological Stem 2’.

2.3.1. Pronominal Alternation

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

In Cherokee, and in Iroquoian in general (Chafe 1980), an intransitive verb may take either the set A (agentive) or set B (patientive) pronominal prefix. Most verbs take set A prefixes, such as ‘pass’:

- (13) galo:sga
 kalooska
 ka-loo-sk-a
 3SG.A-pass-PRS-IND
 ‘He is passing it.’ (Feeling 1975: 102)

Some intransitive verbs, especially ones with a patientive subject, take set-B pronominal prefixes in all the aspectual forms, such as the verb ‘cough’:

- (14) ù:sihwásga
 ùùsihwáska
 uu-sihwá-sk-a
 3SG.B-cough-PRS-IND
 ‘He is coughing’ (Feeling 1975: 179)

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.

We are concerned here with the verbs which take the set A pronominal prefixes. These verbs take the set-A prefixes in the present, imperfective and the punctual aspect, as in the (a) forms below, but they take the set-B prefixes in the perfective and the infinitive aspect, as in the (b) forms (Cook 1979):

- | | PRS | PFT |
|------|--|---|
| (15) | a. galo:sga
kalooska
ka-loo-sk-a
3SG.A-pass-PRS-IND
‘He is passing it.’ (Feeling 1975:102) | b. ù:lo:sǎ:ʔi
ùùloosvǎʔi
uu-loo-s-vǎʔi
3SG.B-pass-PFT-ASR
‘He passed it.’ (ibid.) |
| (16) | a. jinu:gó:ga
cinuukóóka
ci-nuukoo-(ʔ)k-a
1SG.A-exit-PRS-IND
‘I’m exiting’ (Feeling 1975: 111) | b. à:gínu:gó:jǎ:ʔi
ààkinuukóócvǎʔi
aki-nuukoo-(ʔ)c-vǎʔi
1SG.B-exit-PFT-ASR
‘I exited’ (WJ 1973) |

This alternation in the series of the pronominal prefix can be interpreted as a justification for the internal structure where the verb base and the aspect suffix forms a constituent (the Morphological Stem 2) to which the pronominal prefix is attached; the aspect suffix subcategorizes for the series of the pronominal prefix, just like in the case of the allomorphy of the pre-pronominal prefixes discussed in §2.2.

2.3.2. Domain of Laryngeal Alternation

The Morphological Stem 2, as motivated in §2.3.1, is also the domain of a stem alternation process, Laryngeal Alternation. Laryngeal Alternation is triggered by certain pronominal prefixes (Cook 1979: 40, Munro 1996, Uchihara 2007, Uchihara 2013: Ch.4). Most pronominal prefixes take the *h*-grade of the stem. In the *h*-grade, the first laryngeal consonant of the stem is *h* (17a). Other prefixes (such as those involving 1SG agentive argument or those with animate patients) take the glottal grade, where the first laryngeal consonant is a glottal stop (17b). *h* in question is underlined:

	<i>h</i> -grade	glottal grade
(17)	a. à:de:lo <u>h</u> o:sga	b. gade:loʔo:sga
	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.)

Laryngeal Alternation applies to any *h* of the Morphological Stem 2 (= verb base + aspect suffix). Thus, in the examples above, Laryngeal Alternation applies to *h* of the verb base, but *h* in the aspect suffix can also undergo Laryngeal Alternation, as in (18b). In the examples below, the square bracket ([]) indicates the boundary of constituents:

	<i>h</i> -grade	glottal grade
(18)	a. ga:jagalí <u>h</u> a	b. ji:jagalí:ʔa ⁵
	kaacakalí <u>h</u> a	ciicakalíʔa
	ka-[:cakal-íh-a	ci-[:cakal-íh-a
	3SG.A-rip-PRS-IND	1SG.A-rip-PRS-IND
	‘He is ripping it’ (Feeling 1975: 97)	‘I am ripping it’ (ibid.)

In contrast, *h* of the pronominal prefix fails to undergo Laryngeal Alternation, even when the pronominal prefix requires Laryngeal Alternation. Instead, *h* of the Morphological Stem 2 undergoes Laryngeal Alternation:

	<i>h</i> -grade	glottal grade
(19)	a. gal <u>h</u> v:ʔiha	b. hi:yaʔlv:ʔiha ⁶ (*ʔi:yaʔlv:ʔiha)
	kal <u>h</u> v:ʔiha	hiiyaʔlv:ʔiha
	k-[alhv-ʔih-a	hiiy-[alhv-ʔih-a
	3SG.A-tie.up-PRS-IND	2SG>AN-tie.up-PRS-IND

⁵ The lengthening of the penultimate vowel is not explained.

⁶ The glottal grade of a *Ch* sequence is ʔC, due to the general constraint against a *Cʔ sequence in Oklahoma Cherokee (Munro 1996: 59, Uchihara 2013: Ch.5).

‘he is tying him up’ (Feeling 1975: 96) ‘You are tying him up’ (Feeling 1975: 257)

h does not occur in pre-pronominal prefixes in Oklahoma Cherokee. However, *h* does occur in the Iterative pre-pronominal prefix in North Carolina Cherokee (Cook 1979), and this *h* of the Iterative pre-pronominal prefix also fails to undergo Laryngeal Alternation (and again, *h* of the verb base undergoes Laryngeal Alternation instead):

	<i>h</i> -grade		glottal grade
(20) a.	hi:çhaneha ⁷	b.	hi:hi:ʔneha (*ʔi:hi:hneha)
	hiichaneha		hiihiiʔneha
	hii-ca-[hneh-a		hii-hii-[hneh-a
	ITER-2SG.B-give.CMP:PRS-IND		ITER-2SG>AN-give.CMP:PRS-IND
	‘he is giving it back to you’ (Cook 1979: 77)		‘you are returning it to him’ (Cook 1979: 78)

Thus, the domain of Laryngeal Alternation is the constituent consisting of the verb base and the aspect suffix⁸, which is coextensive with the Morphological Stem 2 motivated by Pronominal Alternation in §2.3.1.

2.4. Summary

In this section, we have seen that Cherokee morphological constituent structure consists of the Morphological Word, defined as the host of the second position clitics (§2.1); the Morphological Stem 1, motivated by the pre-pronominal allomorphy (§2.2); and the Morphological Stem 2, motivated by Pronominal Alternation and as the domain of Laryngeal Alternation (§2.3). (21) schematizes morphological constituent structure in Cherokee, repeated from (6):

(21) Morphological constituent structure

$$[_{\text{MW}}(\text{PPP}^n) - [_{\text{MS1}}\text{PP} - (\text{MID/REFL}) - [_{\text{MS2}}\text{BASE} - \text{ASP}]_{\text{MS2}} - \text{MOD}]_{\text{MS1}}]_{\text{MW}} = (\text{CLITICS}^n)$$

As was mentioned earlier, this constituent structure does not align perfectly with the traditional view on the Iroquoian verb structure, which I repeat here from (5):

(23) Morphological constituent structure (traditional view)

$$\text{WORD}[(\text{PPP}^n) - \text{PP} - [_{\text{STEM}}\text{BASE} - \text{ASP}]_{\text{STEM}} - \text{MOD}]_{\text{WORD}} = (\text{CLITICS}^n)$$

⁷ Here I transliterated the original source to fit the orthography employed in this paper. The original form given in Cook (1979) is *hi:tshaneha*. *h* of the verb base metathesizes with the preceding vowel due to *h*-Metathesis (§7.4 Cook 1979, Flemming 1996, Uchihara 2013: Ch.3).

⁸ No modal suffix (which comes after the aspect suffix) has *h*, and thus it leaves us indecisive if the modal suffix is within the domain of the Laryngeal Alternation or not.

That is, the traditional *word* corresponds to our Morphological Word and the traditional *stem* corresponds to our Morphological Stem 2, while the Morphological Stem 1 in this paper is not a morphological constituent in the traditional analysis. Furthermore, the middle or reflexive prefix is considered to form part of the base in the traditional analysis but I consider it to be outside of the base, justification of which will be discussed in §3.3.

3. The phonological constituent structure in Cherokee

In this section, we will consider how the morphological constituent structure interacts with the phonological processes. As we will see in this section, the constituent structure motivated by the phonological processes does not perfectly align with the morphological constituent structure, although they manifest parallel structures.

Some phonological processes target the Phonological Word (§3.1), while other constituents target constituents smaller than the Phonological Word, namely the Phonological Stem 1 (§3.2) and the Phonological Stem 2 (§3.3). (24) schematizes the phonological constituent structure proposed in this paper:

- (24) Phonological constituent structure
 $[_{PW}(PPP^n) - [_{PS1}PP - (MID/REFL) - [_{PS2}BASE - ASP]_{PS2} - MOD]_{PS1} = (CLITICS^n)]_{PW}$

The following subsections look at each of these phonological constituents.

3.1. Phonological word

Three phonological processes, word-final phenomena (§3.1.1), syllabification (§3.1.2) and *h*-Metathesis and Vowel Deletion (§3.1.3), target the Phonological Word, which include not only the Morphological Word as defined in §2 but also the enclitics as their domain.

- (25) Phonological Word
 $[_{PW}(PPP^n) - PP - (MID/REFL) - BASE - ASP - MOD = (CLITICS^n)]_{PW}$

The following subsections look at each of these phonological processes.

3.1.1. Domain of word-final phenomena

The Phonological Word is the domain of the word-final phenomena. First, final vowels of Cherokee words are generally not pronounced, unless the vowel is in the utterance-final position (Word Final Deletion; Bender & Harris 1947: 17; Feeling 1975: xii; Scancarelli 1987: 22, 46; Montgomery-Anderson 2008: 58ff., Uchihara 2013: §2.3). Some speakers do not pronounce word final vowels even in the 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:

- (26) jà:l̩sdâ:y̆:hvsk
 cààl̩stáayv̆hvsk
 c-Ø-al(i)stáa(?)yvvhvsk-(a)
 REL-3SG.A-have.meal:PRS-IND/SH
 ‘the one who is having a meal’ (JRS 2012)

Another peculiarity of the word-final vowel is that when it is retained, the word-final vowel is assigned a boundary H% or HL% tone, as in (27) (H% Assignment; Lindsey 1985: 125, 168, Haag 2002: 414, Johnson 2005: 17).⁹ Note that the form in (27) is a different form of the same verb in (26) above.

- (27) à:nalsdâ:yv:h̩vsga [à:nalsdâ:yv:h̩vsgâ]
 àànalstáayvvh̩vska
 an-alistáa(?)yvvh̩vska
 3PL.A-have.meal:PRS-IND
 ‘They are having meal’ (Montgomery-Anderson et al. 2010)

Clitics behave as if they are part of the Phonological Word in terms of Word Final Deletion (cf. Haag 1997, 1999). When an enclitic is attached, the word-final vowels (of the Morphological Word) are obligatory, even for speakers for whom deletion of the final vowels is the norm (Lindsey 1985: 139). In (28), (a) is an isolation form and the final vowel is deleted, while the (b) form has a clitic =h̩v̆ and thus the final vowel of the verb is retained:

- | | without a clitic | | with a clitic |
|------|------------------|------------------------------|---------------------------------------|
| (28) | a. tlás | yà:go:hwáht | b. v:, à:go:hwáhtád̩v̆: ¹⁰ |
| | tlhás | yààkoohwáht | vv, ààkoohwáhtáhtád̩v̆ |
| | tlha=s | y-a-koohwáht-Ø-(a) | vv a-koohwáht-Ø-a=t̩v̆ |
| | not=Q | IRR-3SG.A-see-PCT-IND | yes 3SG.A-see-PCT-IND=F |
| | | ‘Didn’t he see it?’ (DF1972) | ‘Yes, he saw it.’ (ibid.) |

When the clitic has a final short vowel, this final vowel of the enclitics is deleted instead. In (29), (a) is an isolation form and the final vowel (as well as the onset ?) is deleted, while the (b) form has a clitic =sk(o) (interrogative), and thus the final vowel of the (morphological) word is retained, but the final vowel of this clitic, *o*, is deleted instead. The presence of the underlying final vowel *o* of this clitic is evident when this clitic itself is followed by another clitic, as in (c):

⁹ Furthermore, 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).

¹⁰ The high tone before the clitics will be discussed below.

- (29) a. hi:nâ:hlâ
 hiinâahlâa
 hii-nâa(?)hlâ(?-a)
 2SG>AN-own.AN:PRS-IND
 ‘You own it (AN).’ (JRS2013)
- b. hi:nâ:hlâ?ask
 hiinâahlâ?ask
 hii-nâa(?)hlâ?-a=sk(o)
 2SG>AN-own.AN:PRS-IND=Q
 ‘Do you own it (AN)?’ (ibid.)
- c. gawó:nihásgò:hv
 kawóoniháskòòhv
 ka-woó(?)nih-a=skòò=hvv
 3SG.A-speak:PRS-IND=Q=BUT
 ‘But is he speaking?’ (Pulte & Feeling 1975:294)

Some, but not all, clitics also behave as if they are within the Phonological Word with respect to H% Assignment (Haag 1999). Thus, when clitics such as =*khe* (disjunction Q) or =*na* (focus) are attached, these clitics are assigned the word-final H% boundary tone and not the word-final vowel of the (morphological) word. However, not all the clitics behave this way. Other clitics, such as =*sko* (interrogative), behave as if they are outside of the Phonological Word with respect to H% Assignment (§7.2; Lindsey 1987, Haag 1997, 1999), and the vowel before the clitic =*sk* is assigned the boundary H% tone, as in (30).

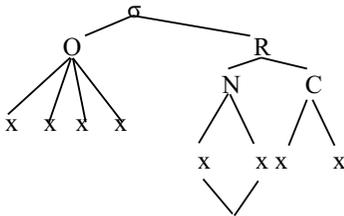
- (30) a. jv:yásk galò:we
 cvvyásk kalòòwee
 c-vvy-a=sk(o) kalòòwee
 2SG.B-have.LG-IND=Q gun
 ‘Do you have a gun?’ (JRS2013)
- b. galò:wé:s jǎ:y
 kalòòwee s cvýy
 kalòòwee =s c-výy-(a)
 gun=Q 2SG.B-have.LG-IND
 ‘Do you have a gun?’ (JRS2013)

3.1.2. Domain of syllabification

The Phonological Word is the domain of syllabification in Cherokee. Cherokee Phonological Words are syllabified according to the following maximal syllable template (in (31), O = onset, R = Rhyme, N = nucleus, C = coda, and V = vowel), which is also subject to phonotactics constraints. Such a syllable template is justified by the Maximal Onset Principle (Selkirk 1982a, Clements & Keyser 1983),

Closed Syllable Shortening which applies only in certain contexts, and native speaker judgments. See Uchihara (2016: Ch. 3) for more detail.

(31) Maximal Syllable Template in Oklahoma Cherokee



(32) demonstrates that this syllabification is applied regardless of the morpheme boundaries within the Phonological Word. Note in (32) that the syllable boundaries (marked with dots) come within the base and the aspect suffix.

- (32) gâ:.ni.gí.ʔa
 kâà.nii.kí.ʔa
 k-a:hnik-iʔ-a
 1SG.A-start-PRS-MOD
 ‘I am starting (to walk)’ (Feeling 1975: 25)

The pre-pronominal prefixes are also parsed into syllables according to (33) above, again confirming its status as part of the Phonological Word:

- (33) hla ya.gwá:nh.ta
 hla ya.kwáánh.tha
 hla y-akw-aanhth-a
 not IRR-1SG.B-know:PRS-IND
 ‘I don’t know’ (Pulte & Feeling 1975: 242)

Syllabification is in most cases indecisive whether clitics form part of the Phonological Word, since all of the clitics begin with a consonant, and forms a separate syllable on their own. However, Durbin Feeling’s transcription (he writes the tonal superscript after the syllable boundary in his 1975 dictionary) below suggests that he analyzes the interrogative clitic =s as forming a syllable along with the preceding sequence *ha*:

- (34) $ga^2wo^3ni^2has^3$
 ga.wó:.ni.hás
 kawóónihás
 ka-woó(?)nih-a=s
 3SG.A-speak:PRS-IND=Q
 ‘Is he speaking?’ (Pulte & Feeling 1975: 293)

Syllabification does not apply across word boundaries, as (35) shows. In (35), the word-final *n* of the first word (which results from the Word Final Deletion (§3.1.1)) does not constitute the onset of a syllable with the initial vowel of the following verb.

- (35) jí:.sdv:n à:.wa.du:.lí (*jí:.sdv:.nà:.wa.du:.lí)
 cíi.stvvn àà.wa.tuu.lí
 cíístvvn(a) aw-atuulí(h-a)
 crawdad 1SG.B-want:PRS-IND
 ‘I want a crawdad’ (JRS2013)

3.1.3. Domain of *h*-Metathesis and Vowel Deletion

Finally, the Phonological Word is the domain of *h*-Metathesis and Vowel Deletion. These two process are motivated by the dispreference of a *CVh* sequence 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 (36), or ‘metathesizing’ *V* and *h* when *h* is followed by a resonant, as in (37) (henceforth ‘*h*-Metathesis’; Cook 1979, Flemming 1996, Uchihara 2007, Uchihara 2013: Ch.3). 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.

- | | Vowel Deletion/ <i>h</i> -Metathesis | No Vowel Deletion/ <i>h</i> -Metathesis |
|------|--|--|
| (36) | a. kdiha
<u>kh</u> tíha
<u>k-(v)ht</u> -íh-a
3SG.A-use-PRS-IND
‘He is using it.’ (Feeling 1975: 142) | b. hvhda
<u>hv</u> hta
<u>h-vht</u> -Ø-a
2SG.A-use-PCT-IND
‘Use it!’ (ibid.) |
| (37) | a. kanalu:sga
<u>kh</u> analuuska
<u>ka-h</u> naluu-sk-a
3SG.A-ascend-PRS-IND | b. hihnalü:hi
<u>hi</u> hnaluuhi
<u>hi-h</u> naluu-h-i
2SG.A-ascend-PCT-IND |

‘He is ascending.’ (Feeling 1975: 138) ‘Ascend!’ (ibid.)

Deletion is also triggered by an *s*. From this fact, we can propose that Oklahoma Cherokee has a constraint against *CVh* or *CVs* sequences, which is remedied as in (38). In (38), *C* = any consonant, *T* = plosives and affricates, and *R* = resonants.:

- (38) **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 or *h*-Metathesis applies regardless of the morpheme boundary, as long as the target sequence is within the Phonological Word. (36) and (37) above illustrate cases where Vowel Deletion or *h*-Metathesis applies between the pronominal prefix and the verb base. (39) shows that Vowel Deletion applies between a pre-pronominal prefix and a pronominal prefix, confirming its status as part of the Phonological Word. Again, the (b) form confirms the underlying vowel of the Cislocative pre-pronominal:

- | | <i>h</i> -Metathesis | No <i>h</i> -Metathesis |
|------|-----------------------------|-------------------------|
| (39) | a. tíʔgi | b. dajíʔgi |
| | <u>th</u> íʔki | tacíʔki |
| | <u>t(a)-hi</u> -k-ʔ-i | ta-ci-k-ʔ-i |
| | CISL-2SG.A-eat-PFT-MOT | CISL-1SG.A-eat-PFT-MOT |
| | ‘you will eat it’ (JRS2012) | ‘I will eat it’ (ibid.) |

The following example illustrates a case where *h*-Metathesis is applied between the verb base and the aspect suffix. Again, the (b) form justifies the underlying position of *h*:

- | | <i>h</i> -Metathesis | No <i>h</i> -Metathesis |
|------|---------------------------------------|----------------------------------|
| (40) | a. ù:sestánv̌:ʔi | b. ù:wu:tahnv̌:ʔi |
| | ùùsest <u>hán</u> v̌v̌ʔi | ùùwuuth <u>ahn</u> v̌v̌ʔi |
| | uu-(a)sest- <u>ahn</u> -v̌v̌ʔi | uw-uuth- <u>ahn</u> -v̌v̌ʔi |
| | 3SG.B-include-PFT-IND | 3SG.B-snow-PFT-IND |
| | ‘He included him.’ (Feeling 1975: 49) | ‘It snowed.’ (Feeling 1975: 125) |

No modal suffix contains *h* and thus it leaves us indecisive whether modal suffix is within the domain of *h*-Metathesis/Vowel Deletion or not.

Clitics fall in the domain of *h*-Metathesis and Vowel Deletion, thus confirming its status within the Phonological Word. The interrogative clitic =*s(k)(o)* satisfies the condition for Vowel Deletion when the preceding vowel is short, and there are a couple of instances where this preceding vowel is deleted, as in (41) and (42).¹¹

- | | | |
|------|---|--|
| (41) | a. <i>ǎysk</i>
ay(a)=sk
1SG=Q
'me?' (JW1973) | b. <i>aya</i>
aya
1SG
'I' (Feeling 1975: 65) |
| (42) | a. <i>u:nǎ:ts</i>
uunvǎd(i)=s
milk=Q
'milk?' (Holmes & Smith 1976) | b. <i>u:nǎ:di</i>
uunvǎti
milk
'milk' (ibid.) |

h-Metathesis or Vowel Deletion never applies across the word boundary. In (43), the sequence *kwa + h* satisfies the condition for Vowel Deletion, but it is not applied, since the sequence strides over the word boundary:

- | | | | | | | | | | | | | | | | | |
|--------------------------------------|---|------------------------------|--------------------|------------------------------|---------------|--------------------|--|---------------|----------------------|--|------|-----------------------|--|--------------------------------------|--|--|
| (43) | <table border="0"> <tr> <td style="padding-right: 10px;"><i>jí:sgwa</i></td> <td style="padding-right: 10px;"><i>hihye:lí:ʔa</i></td> <td style="padding-left: 20px;">(*<i>jí:skwihye:lí:ʔa</i>)</td> </tr> <tr> <td><i>čískwa</i></td> <td><i>hihyeelí:ʔa</i></td> <td></td> </tr> <tr> <td><i>čískwa</i></td> <td><i>hi-hyeelí:ʔ-a</i></td> <td></td> </tr> <tr> <td>bird</td> <td>2SG.A-imitate:PRS-IND</td> <td></td> </tr> <tr> <td colspan="3">‘You are imitating a bird.’ (EJ2011)</td> </tr> </table> | <i>jí:sgwa</i> | <i>hihye:lí:ʔa</i> | (* <i>jí:skwihye:lí:ʔa</i>) | <i>čískwa</i> | <i>hihyeelí:ʔa</i> | | <i>čískwa</i> | <i>hi-hyeelí:ʔ-a</i> | | bird | 2SG.A-imitate:PRS-IND | | ‘You are imitating a bird.’ (EJ2011) | | |
| <i>jí:sgwa</i> | <i>hihye:lí:ʔa</i> | (* <i>jí:skwihye:lí:ʔa</i>) | | | | | | | | | | | | | | |
| <i>čískwa</i> | <i>hihyeelí:ʔa</i> | | | | | | | | | | | | | | | |
| <i>čískwa</i> | <i>hi-hyeelí:ʔ-a</i> | | | | | | | | | | | | | | | |
| bird | 2SG.A-imitate:PRS-IND | | | | | | | | | | | | | | | |
| ‘You are imitating a bird.’ (EJ2011) | | | | | | | | | | | | | | | | |

3.1.4. Summary

In this subsection, we saw three phonological processes, word-final phenomena, syllabification and *h*-Metathesis/Vowel Deletion, which motivate the Phonological Word. Clitics, which constitutes a Morphological Word on its own, is nevertheless part of the Phonological Word.

3.2. The Phonological Stem 1: Accentuation

As we have seen in §3.1 above, three phonological processes target the same domain, the Phonological Word. However, with respect to two accentual processes, H3 Assignment (§3.2) and

¹¹The deletion of the vowel could also be due to Final Vowel Deletion (§3.1.1), which applies at the final position of the Phonological Word; as we saw in §3.1.1, some enclitics, including the interrogative =*sk(o)*, may or may not be within the domain of H% Assignment.

Superhigh Assignment (§3.2), the pre-pronominal prefixes (with short vowels) fall outside of their domain; I tentatively call this domain of accentuation as the Phonological Stem 1 (PS1):

- (44) Phonological Stem 1
 $[_{PW}(PPP^n) - [_{PS1}PP - (MID/REFL) - BASE - ASP - MOD = (CLITICS^n)]_{PS1}]_{PW}$

Crosslinguistically, prefixes are known to fall outside of the principal phonological constituent of a morphological word (Cohn 1989; Czaykowska-Higgins 1998; Kim 2015), and this also holds for Cherokee. In the following, we will first look at H3, a high tone assigned from certain pre-pronominal prefixes (§3.2.1), which is essentially an iambic accent; and superhigh accent (and its high variant, H4), an accent assigned in certain morphosyntactic constructions (§3.2.2), which is essentially a default-to-opposite trochaic accent.

3.2.1. Domain of H3 Assignment

Certain pre-pronominal prefixes in Oklahoma Cherokee assign a high tone (henceforth H3) somewhere within the initial three syllables of the Phonological Word (Lindsey 1987, Wright 1996; Uchihara 2016: Ch.10). In (45a), the Distributive (DIST) pre-pronominal prefix *de:-* assigns H3 to the syllable *hi*; this tone is absent from the form without the pre-pronominal in (b). The pre-pronominals are separated by a hyphen in the second lines.

- | | | | |
|------|-------------------------------|--|-----------------------------|
| | with PPP | | without PPP |
| (45) | a. <i>de:higo:whtíha</i> | | b. <i>higo:whtíha</i> |
| | <i>tee-hjkoowhthíha</i> | | <i>hikoowhthíha</i> |
| | ⋮ | | |
| | Ⓜ | | |
| | <i>tee-hi-koohw(a)hthíh-a</i> | | <i>hi-koohw(a)hthíh-a</i> |
| | DIST-2SG-see:PRS-IND | | 2SG.A-see:PRS-IND |
| | ‘You are seeing them’ | | ‘You are seeing it’ |
| | (Pulte & Feeling 1975: 248) | | (Pulte & Feeling 1975: 268) |

H3 is not only found on the second syllable of the Phonological Word as in (45), but also on the third syllable of the Phonological Stem:

- (46) *tla yiginí:gowhtí:ha*
tlha yi-kiníjkwowhthíiha
 ⋮
 Ⓜ
tlha yi-kinii-kohw(a)hthíih-a
 not IRR-1DU.IN.B-see:PRS-IND
 ‘He is not seeing you and me.’ (EJ, July 2011)

Uchihara (2016: Ch.10) showed that the relevant factor here determining the position of H3 is the vowel length (or the presence/absence) of the pre-pronominal prefix; with a pre-pronominal prefix with a long vowel, as in (45), H3 is assigned to the second syllable of the Phonological Word, while with a pre-pronominal prefix with a short vowel or no vowel, as in (46), H3 is assigned to the third syllable of the Phonological Word. Uchihara (2016: Ch.10) further argued that this difference due to the vowel length of the pre-pronominal prefix can be accounted for by analyzing that the H3 is an iambic pitch-accent, rather than a tone, as in (47), and that the short vowel of a pre-pronominal is extrametrical; that is, it is excluded from syllable counting for assigning the iambic pitch accent, as in (48) (the extrametrical syllable is marked with angle brackets).

(47) (. x)
 de:hígo:whtíha
 teehíkoohw(a)hthíha
 tee-hi-koohw(a)hth-íh-a
 DIST-2SG.A-see-PRS-IND
 ‘You see them’ (Pulte & Feeling 1975: 248)

(48) <x>(. x)
 yi gi ní:gowhtí:ha
 yi ki nííkwowhthííha
 yi-kinii-kohw(a)hth-ííh-a
 IRR-1DU.IN.B-see-PRS-IND
 ‘He is not seeing you and me.’

In terms of the Prosodic Hierarchy (Nespor & Vogel 2007), the short vowel of a pre-pronominal being extrametrical can be interpreted as follows: the domain of H3 Assignment, the Phonological Stem 1, excludes the short vowel of the pre-pronominal.

3.2.2. Domain of Superhigh Assignment

In §3.2.1, we saw that H3 Assignment can be accounted for by analyzing that the pre-pronominals with a short vowel to be outside of its domain. Another type of an accent in Cherokee, superhigh accent, also treats a pre-pronominal with a short vowel to be outside of its domain, thereby further confirming the peripheral status of the pre-pronominals.

Superhigh accent is carried by a verb in a subordinate clause, by deverbal nouns, and by adjectives (Cook 1979: 92, Lindsey 1985: 125; Uchihara 2013: §14.2). Although its occurrence is morphosyntactically conditioned, it manifests some properties common to ‘accentual’ systems: it is culminative (one per word), and its assignment is a ‘default-to-opposite’ footing pattern (Wright 1996: 21; Hayes 1995: 296-299; Kager 1995: 384; Kager 2012), as illustrated below: the prominence is

assigned to the last non-final long vowel in the word, while the prominence is assigned to the first syllable of the word when there is no long vowel in the word.

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). In (49), the penultimate syllable has the superhigh accent:

- (49) gv:jalhánv̌:hi
 kvvcalhánv̌hi
 k-v:cal-áhn-v:hi
 3SG.A-fry-PFT-PPL/SH
 ‘fried’(Feeling 1975: 127)

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), as in (49) above, regardless of its internal structure (Uchihara 2016: 224-225):

- (50) Superhigh Assignment
 Assign a superhigh accent to the last non-final long vowel of the word.

Extrametricity plays a role when there is no long vowel within the word. If there is no long vowel in the word, a high tone (H4 henceforth) is assigned to the first vowel of the word, instead of a superhigh accent (Lindsey 1985: 127, Wright 1996: 21; Uchihara 2013: §14.1.2):

- (51) ákisdi
 ákhisti
 a-khi-st-i
 3SG.A-swallow-INF-NOM/SH
 ‘pill’ (< a thing to swallow) (Feeling 1975: 33)

There is a systematic exception to this generalization stated above; that is, the short vowel of a pre-pronominal cannot carry H4. In (52), H4 is assigned to the second syllable rather than the expected first syllable, which is the vowel of the pre-pronominal prefix.

- (52) No H4 on short V of pre-pronominal prefixes
 a. ditsdóhdi (*dítsohdi)
 titstóhti
 ti-c-(v)ht-oht-i
 DIST-2SG.B-use-INF-NOM/SH
 ‘You have to use them.’ (JRS, Aug 2012)

- b. jigáhliha (*jígahliha)
 cikáhliha
 ci-ka-lh-ih-a
 REL-3SG.A-sleep-PRS-IND/SH
 ‘the one who is sleeping’(DJM, Aug 2012)
- c. yicháwasa (*yíchawasa)
 yicháwasa
 yi-ca-hwa-s-a
 IRR-2SG.B-buy-PFT-IND/SH
 ‘If you buy it’ (JRS, Aug 2012)

The fact that the short vowel of a pre-pronominal cannot carry H4 is consistent with the extrametrical analysis given in §3.2.1 above; there, I argued that the short vowel of a pre-pronominal is outside of the domain of H3 Assignment. This extrametricality also holds for H4 Assignment (“across-the-board invisibility” in Inkelas 1989). The fact that the long vowel of a pre-pronominal can carry a superhigh accent (49) is also consistent with the extrametrical analysis, which argues that the long vowel of a pre-pronominal is part of the Phonological Stem 1.

3.2.3. Summary

In this section, we have seen that the Phonological Stem 1, which excludes the pre-pronominals with short vowels, is the domain for the two accentual phenomena, H3 Assignment and Superhigh Assignment.

As we saw in §2.2 and in this section, the pre-pronominals are the most peripheral elements of the verb. However, they are nevertheless part of the Morphological and Phonological Word and does not form a Morphological or a Phonological Word in their own. This is first evident from the fact that the native speakers never write pre-pronominals separately from the rest of the verb (and in many cases the pre-pronominals fuse with the following pronominal prefix so that separation is impossible). This is in contrast to the case of clitics, which speakers often write separately. Moreover, the second position clitics discussed in §2.1 never attach after the pre-pronominals, confirming that the pre-pronominal prefixes are part of the Morphological Word.

- | | | | |
|------|--------------------------------|------------|------------------|
| (53) | de:jádu:lí:sk | di:li:yo | (*de:sk jadu:li) |
| | teecátuulíisk | tiiliyo | |
| | tee-c-atuulí(h-a)=sk(o) | ti-aaliyoo | |
| | DIST-2SG.B-want:PRS-IND=Q | DIST-sock | |
| | ‘Do you want socks?’ (JRS2013) | | |

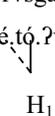
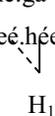
The pre-pronominals also constitute part of the Phonological Word; neither Word Final Deletion nor H% Assignment (§3.1.1) applies at the end of the PPPs.

3.3. Phonological Stem 2: Domain of H1 Spreading

One phonological process, H1 Spreading, motivates yet another prosodic constituent subordinate to the Phonological Stem 1. This constituent consists of the verb base and the aspect suffix:

- (54) Phonological Stem 2
 $[_{PW}(PPP^n) - PP - (MID/REFL) -]_{PS2}[BASE - ASP]_{PS2} - MOD = (CLITICS^n)]_{PW}$

H1 is one class of high tone, which was induced by a glottal stop (Uchihara 2009, 2016: Ch.7). H1 spreads leftward to the preceding mora, as long as it satisfies complex phonological conditions, such as that the preceding syllable is long and does not carry a marked tone (Uchihara 2016:§6.5):

- | | | | |
|---------|--|----|--|
| (55) a. | à:tawě:dóʔvsga
àà.tha.weé.tó.ʔv.ska
<div style="text-align: center;">  </div> H ₁
a-thaweetóʔvsk-a
3SG.A-kiss:PRS-IND
‘He is kissing her.’ (Feeling 1975: 58) | b. | à:kě:hê:ga
àà.kheé.hée.ka
<div style="text-align: center;">  </div> H ₁
a-kheehée(?)k-a
3SG.A-chase:PRS-IND
‘He is chasing him.’ (Feeling 1975: 33) |
|---------|--|----|--|

Crucially, H1 that is lexically linked to the Phonological Stem 2 (base + aspect suffix) cannot spread to a syllable which belongs to the pronominal prefix (56) or the reflexive/middle prefix (57), even if the other conditions for spreading are met (i.e. the preceding syllable is long and does not carry a marked tone). That is, the domain of H1 Spreading is the Phonological Stem 2, which excludes the pronominal prefixes and the reflexive/middle prefix:

- (56) Pronominal prefix
 ji:nâ:wi:díha
 ciináawitíha (*ciináawitíha)



 H₁
 cii-[náa(?)wítíh-a
 1SG>AN-carry.FL-PRS-IND
 ‘I am taking him somewhere.’ (Feeling 1975: 104)

- (57) Reflexive
 à:da:sdá:yv:hv́sga
 ààtaastáayvvh́ska (*ààtaastáayvvh́ska)
 |
 H₁
 Ø-ataa-[stáa(?)yvvh́sk-a
 3SG.A-cook.meal:PRS-IND
 ‘He is cooking a meal.’ (Feeling 1975: 7)

That the reflexive is outside of the domain of H1 spreading suggests that the reflexive/middle prefix is not part of the verb base, while previous studies have assumed that these prefixes belong to the verb base (Lounsbury 1953: §6.2).

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 (or reflexive/middle) prefix or not. This prediction is born out. Compare the form *-kíʔ-* ‘eat:PRS’ with a pronominal prefix *oostii-* ‘1DU.EX.A’ in (58a) and *-stiikíʔ-* ‘eat.LG:PRS’ in (58b), 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.

- | | No spreading | Spreading |
|------|--|---|
| (58) | a. ò:sdí:gíʔa
òðstiikíʔa

H ₁
oostii-[k-íʔ-a
1DU.EX.A-eat-PRS-IND
‘He and I are eating it.’
(DF, July 2013) | b. à:sdí:gíʔa
ààstiikíʔa ¹²

H ₁
aa-[stiik-íʔ-a
3SG.A-eat.LG-PRS-IND
‘He is eating it (something long).’
(Feeling 1975: 47) |

We have seen above that the left-edge of H1 Spreading is the left-edge of the verb base, since H1 fails to spread to the preceding pronominal prefix or the reflexive/middle prefix. The right-edge of the domain of H1 Spreading is the right-edge of the aspectual suffix: H1 in the aspect suffix can spread to the verb base, as can be seen in (58b) above.

¹² 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).

The modal suffix, which follows the aspect suffix, is outside of the domain of H1 Spreading. This is because H1 in the modal suffix never spreads to the Phonological Stem 2 (base + aspect suffix). Among the modal suffixes, two suffixes, the habitual (HAB) *-óʔi* ~ *-óóʔi*, and the reportative (REP) *-éʔi* ~ *-ééʔi*, have H1. However, these suffixes conspire to avoid their H1 to spread to the preceding morpheme. These suffixes have two allomorphs, one with a short vowel and another with a long vowel. The length alternation of these suffixes is conditioned by the tone of the last vowel of the Phonological Stem 2 (Montgomery-Anderson 2008: 271). That is, the allomorph with a short vowel is selected after a high tone on the final mora of the Phonological Stem 2, as in (59a), while the allomorph with the long vowel is selected otherwise (60). (59b) shows that this verb lexically has a high tone on *i*, and that the high tone on the penultimate syllable is not due to spreading of the H1 of the modal suffix *-óʔi*:

- | | | |
|------|---|--|
| (59) | a. à:dlo:hyíhóʔi
ààtloohyíhóʔi

H H ₁
Ø-[atlo:y-híh]-óʔi
3SG.A-cry-IMPF-HAB
‘He habitually cries.’ (Feeling 1975: 13) | b. à:dlo:hyíha
ààtloohyíha

H ₂
Ø-[atlo:y-híh]-a
3SG.A-cry-PRS-IND
‘He is crying.’ (ibid.) |
|------|---|--|

- (60) à:di:tasgóʔi
 ààtiithaskóóʔi
 |
 H₁
 Ø-[atiitha-sk]-óóʔi
 3SG.A-drink-IMPF-HAB
 ‘He habitually drinks it.’ (Feeling 1975: 11)

H1 of these modal suffixes have the possibility of spreading to the preceding morpheme only when it has an allomorph with a short vowel, as in the (a) forms, but in all such instances the final vowel of the Phonological Stem 2 has a high tone, and thus H1 of these modal suffixes cannot spread. This fact can be interpreted as conspiracy to avoid spreading of the H1 from the modal suffix to the Phonological Stem 2 (base + aspect suffix).

3.4. Summary

In this section, we have seen that Cherokee phonological constituent structure consists of the Phonological Word, motivated as the domain of Word-final phenomena, syllabification and Vowel Deletion/h-Metathesis (§3.1); the Phonological Stem 1, motivated by accentual phenomena (§3.2); and the Phonological Stem 2, motivated by H1 Spreading (§3.3). (61) schematizes the grammatical constituent structure in Cherokee, repeated from (24). For comparison, the morphological constituent structure proposed in §2 is shown in (62):

(61) Phonological constituent structure in Cherokee

$[_{PW}(PPP^n) - [_{PS1}PP - (MID/REFL) - [_{PS2}BASE - ASP]_{PS2} - MOD = (CLITICS^n)]_{PS1}]_{PW}$

(62) Morphological constituent structure in Cherokee

$[_{MW}(PPP^n) - [_{MS1}PP - (MID/REFL) - [_{MS2}BASE - ASP]_{MS2} - MOD]_{MS1}]_{MW} = (CLITICS^n)$

As can be seen, the morphological and phonological constituent structures in Cherokee are parallel, but not isomorphic, since the clitic is outside of the Morphological Word while it is part of the Phonological Word.

4. Compounds

So far, we have only been looking at non-compounding words. Cherokee also has compounds, both at the root level and the word level. §4.1 will look at the word-hood of root compounds, and §4.2 at that of word compounds.

4.1. Root Compounds

Root compounding is operated within the verb base, and they consistently show the word-internal properties, morphologically and phonologically. The second position clitics never intervene the two compounded roots, and phonological processes that take the Phonological Word (word-final phenomena, Syllabification and Accentuation) as their domain treat the entire form as one Phonological Word. (63) is an example of a compound of noun + verb (noun incorporation), and (64) is an example of a verb compounding. Neither noun incorporation nor verb compounding is productive in Cherokee, as was mentioned earlier. Note that (63a) and (64a) are forms with a superhigh accent, and that only one superhigh accent occurs per word, confirming their status as a single Phonological Word. The (b) and (c) forms demonstrate that the each member of the compounded roots can occur by themselves.

(63) a. jidù:hyṽ:sdò:sk

ciṽṽhyvṽstòòsk

ci-t-uu-hyvvs+stòò(?) -sk-(a)

REL-DIST-3SG.B-nose+crush-PRS-IND/SH

‘the one who is sneezing’ (JRS2012)

b. à:sdó:ʔa

ààstóóʔa

a-stoo-ʔ-a

3SG.A-crush-PRS-IND

‘He is crushing it’ (Feeling 1975: 48)

c. kayv:só:li

khayvvsóóli

ka-hyvvs-oóli

3SG.A-nose-INAL

‘his nose’ (Feeling 1975: 143)

- (64) a. jà:gǔ:halù:sk
 cààkvǔhalùùsk
 c-a-kvvhal+lùù(?) -sk-a
 REL-3SG.A-cut+chop-PRS-IND
 ‘the one who is chopping it up’ (JRS2012)
- b. à:gǔ:halíha
 ààkvvhalíha
 a-gvvhal-íh-a
 3SG.A-cut-PRS-IND
 ‘He is cutting it’ (Feeling 1975: 19)
- c. galù:ysga
 kalúuyska
 ka-lúu(?)y-sk-a
 3SG.A-chop-PRS-IND
 ‘He is chopping it’ (Feeling 1975: 103)

Root compounding is found in nouns too. Again, note that (65a) has only one superhigh accent, confirming its status as a single Phonological Word:

- (65) a. ù:hnâ:suhgahlǔ:ʔi
 ùùhnâasuhkahlǔǔʔi
 uu-hnâa(?) + (?)suhkahlǔǔʔi
 3SG.B-toe+claw
 ‘his toenail’ (Feeling 1975: 167)
- b. kanâ:saʔdǔ:ʔi¹³
 khanâasaʔtvǔʔi
 ka-hnâasatʔvǔʔi
 3SG.A-toe
 ‘his toe’ (Feeling 1975: 139)
- c. ú:suhgahlǔ:ʔi
 úúsuhkahlǔǔʔi
 uu-(?)suhkahlǔǔʔi
 3SG.B-claw
 ‘his claw’ (Feeling 1975: 179)

4.2. Word Compounds

Feeling (1975) lists a few nouns and adjectives which appear to be compounds made up of two Morphological Words. He writes these compounds as one word, without the space between the members of the compound, as in (66). In the following, the word compound boundaries are connected with a hyphen followed by a single space following the Leipzig Glossing Rules, and each member of the compound is put in square brackets.

¹³ This form consists of the root for ‘toe’ (*-hnâaʔ-*) followed by a synchronically unanalyzable part.

- (66) adě:ljü:lhṽ:ʔi
 ateélcuúlhṽʔi
 [ateél(a)]- [c-uu-lh-vvʔi]
 [money]-[DIST-3SG.B-set.CMP.into.container:STAT-ASR/SG]
 ‘California (lit. ‘a place to put money in (?)’)’ (Feeling 1975: 9)

Unlike root compounds, Cherokee word compounds show mixed behavior with respect to the criteria given above for the word-hood, leaning more towards the separate word-hood. Some word compounds behave as one Morphological Word with respect to Cliticization, while others behave as two (§4.1). Word compounds behave as two separate Phonological Words with respect to Superhigh Assignment and H% Assignment, but they behave as one Phonological Word with respect to Syllabification (§4.2).

4.2.1. Morphological constituent structure of word compounds

Word compounds show mixed behaviors with respect to Cliticization (§2.1). Thus, for some word compounds, such as in (67), the second position clitics attach after the whole compound.

- (67) yú:ne:gaké hiwó:ni
 yúúneekakhé hiwóóni
 [y'ṽw(i)]- [ú-neeka]=khe hi-woóʔni(h-a)
 [person]-[3SG.B-white=]Q 2SG.A-speak:PRS-IND
 ‘Do you speak English?’ (Holmes & Smith 1976)

On the other hand, with other word compounds the second position clitics attach after the first element of the word compound (Haag 1999: 36). The (b) form is the form without the clitic.

- (68) a. anijesgo yusdi¹⁴ b. ijéʔiyú:sdi
 anicesko yusti icéʔiyuústi
 anii-ce=sko yuusti [icéʔ]- [iyuústi]
 3PL.A-new=Q like [new]-[like]
 ‘is it green?’ (Haag 1999: 36) ‘green’ (Feeling 1975: 132)

4.2.2. Phonological constituent structure of word compounds

According to Superhigh Assignment, the last long vowel of the Phonological Stem 1 (§3.2) is assigned the superhigh accent. However, in (69), the superhigh accent is not assigned to the first syllable yṽ:, even though it is long, and instead H4 (the high variant of the Superhigh Accent when there is no

¹⁴ Tone and vowel length are not marked in the original source.

vowel; §3.2.2) is assigned to the first vowel of the second member of the compound. This shows the status as separate Phonological Words of word compounds.

- (69) yv:wági:sgi¹⁵ (*yṽ:wagi:sgi)
 yvwwákiiski
 [yvvw(i)]- [a-kii(?)sk-i]
 [person]-[3SG.A-eat:IMPF-NOM/SH]
 ‘cannibal’

The word compounds also behave as separate Phonological Words with respect to H% Assignment. As we saw in §3.1.1, the word-final vowels are assigned a boundary H% tone when this vowel is not deleted. This H% boundary tone is observed at the end of the first member of the word compounds. The (b) and (c) forms show the isolation forms of each of the members of the compounds:

- | | | | |
|------|--|--|--|
| (70) | a. gǎ:dágù:gu
kaátakùùku
[kata]- [kùùku]
[soil]-[bottle]
‘crock’ (Feeling 1975: 91) | b. gǎ:da
kaáta
‘soil’ (ibid.) | c. gù:gu
kùùku
‘bottle’ (Feeling 1975: 124) |
| (71) | a. kuwájú:ne:ga
khuwácúúneeka
[khuwa]- [c-uu-neeka]
[mulberry]-[DIST-3SG.B-white]
‘sycamore’ (Feeling 1975: 145) | b. kuwa
khuwa
‘mulberries’ (ibid.) | c. ju:né:ga
cuuneéka
c-uu-neeka
DIST-3SG-B-white
‘white’ (Feeling 1975: 176) |

In contrast, word compound behave as one Phonological Word with respect to Syllabification (§3.1.2). In the following examples, note that the Syllabification applies regardless of the word compound boundaries.

- (72) ja.la.gú.we:.tí:.ʔi
 ca.la.kú.wee.thií.ʔi
 [calak(i)]- [uw-eeth-iiʔi]
 [Cherokee]-[3SG.B-old-LOC/SH]
 ‘North Carolina (Feeling 1975: 134)

¹⁵ The penultimate long vowel is not assigned the superhigh accent because this vowel is historically short, lengthened due to the loss of the glottal stop (Uchihara 2016: Ch.11).

- (73) yv̄:.wú.ne:.ga
 yv̄v̄.wú.nee.ka
 [ȳv̄v̄w(i)]- [ú-nee.ka]
 [person]-[3SG.B-white]
 ‘white person, English’ (Feeling 1975: 189)

h-Metathesis and Vowel Deletion (§3.1.3) leave us indecisive whether they treat word compounds as one word or not, since in none of the cases of word compounding the second compounded element begins with *h* or *s* (or *Vh* or *Vs*), which conditions *h*-Metathesis and Vowel Deletion.

4.3. Summary

Cherokee root compounds consistently show word-internal properties, both morphologically and phonologically (§4.1). On the other hand, Cherokee word compounds show mixed properties with respect to the criteria for word-hood (§4.2). Morphologically, Cherokee word compounds are heterogeneous in that some word compounds receive the second clitic after the whole compound, while others receive it after the first member of the word compound. Phonologically, Cherokee word compounds behave as separate Phonological Words with respect to H% Assignment and Superhigh Assignment, while they behave as one Phonological Word with respect to Syllabification.

5. Conclusion

In this paper, I have shown that Cherokee verbs have multiple levels of constituency, both in terms of morphology (§2; Morphological Word, Morphological Stem 1, Morphological Stem 2) and phonology (§3; Phonological Word, Phonological Stem 1, Phonological Stem 2). The morphological and phonological constituent structures are parallel, but not isomorphic, since the clitics are part of the Phonological Word but they constitute the Morphological Word on its own. We have also seen that root compounds consistently show word-internal properties both phonologically and morphologically, while word compounds show mixed properties with respect to the criteria discussed in §2 and §3.

The following table summarizes each of the morphological and phonological constituents discussed in this paper. The domains of each process in question are in gray.

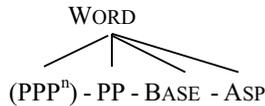
TABLE 1. SUMMARY OF MORPHOLOGICAL AND PHONOLOGICAL CONSTITUENTS

(PPP -)	PP -	Base	- ASP	- MOD	(= clitic)	Constituents	Justification
						Morphological Word (§2.1)	Cliticization
						Morphological Stem 1 (§2.2)	PPP allomorphy
						Morphological Stem 2 (§2.3)	Pronominal Alternation
							Laryngeal Alternation
						Phonological Word (§3.1)	Word final phenomenon
							Syllabification
							<i>h</i> -Metathesis/VD
						Phonological Stem 1 (§3.2)	Accentuation
						Phonological Stem 2 (§3.3)	H1 Spreading

The discussions in this paper have the following theoretical consequences. First, we have seen that the domains do not cluster in one constituent but rather more than one constituent (Phonological Stem 1, Phonological Stem 2) needs to be posited, as in other languages rich in morphology (Russel 1999; Downing 1999; Schiering et al. 2010; Bickel & Zúñiga 2016). This leads to the violation of the ‘Clustering Prediction’ of Prosodic Hierarchy, which states that phonological patterns will be sensitive to the single universal set of domains and not more (Inkelas & Zec 1995: 547ff.; Nespor & Vogel 2007), as pointed out by Schiering et al. (2010). Various solutions have been proposed to address this issue. One solution is to employ a superordinate constituent, Phonological Phrase, in place of the Phonological Word in the traditional sense (Hall & Hildebrandt 2008; Dyck 2009); this way, what corresponds to the Phonological Word in this paper would be the Phonological Phrase, thereby our Phonological Stem 1 would now be the Phonological Word. Another solution is to postulate a subconstituent between the Phonological Word and the foot, namely the Phonological Stem (Inkelas 1989, Czaykowska-Higgins 1998, Downing 1999, Good 2003), as adopted in this paper. A more radical approach is to claim that the prosodic word is not universal but emergent, and that prosodic word is merely the domain that is most frequently referenced by phonological patterns in the language (Schiering et al. 2010). It is beyond the scope of this paper to conclude which solution best explains the Cherokee facts.

The second contribution of the paper is that it has shown that Cherokee facts support the view that Cherokee verbs have a layered internal structure, rather than a flat templatic structure. There have been proposed two views of the morphological structure of verbs in Iroquoian. The first view is a ‘flat’, or a ‘linear’ model, which is ‘[p]urely linear constructions on a single level’ (Lounsbury 1953: 20), schematized in (74):

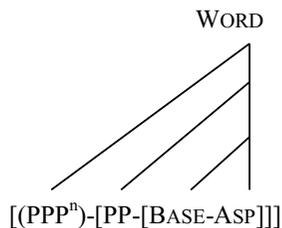
(74) Flat model (Lounsbury 1953)



That Lounsbury assumed this model for Iroquoian verbs is evident from his statement that ‘linear type is highly elaborated in Iroquoian morphology (ibid.)’, and that ‘[t]he second type, (...) is confined to two positions in the Iroquoian morphological pattern (ibid.)’¹⁶. This view is implicit, if not explicitly expressed, in many grammars of Iroquoian languages, including those of Cherokee (King 1975, Cook 1979, Montgomery-Anderson 2008).

The second view is the ‘layered’ or ‘hierarchical’ model, which is a ‘[c]onstructions in depth, involving successive levels, one within another (Lounsbury 1953: 20)’, and in which ‘morpheme sequences are ... organized into immediate constituents (ICs) (Chafe 1960: 14). Such a view is explicit in Chafe’s work on Seneca, schematized in (75). Note that the tree structures are not explicit either in Lounsbury (1953) or in Chafe (1960), but are inferred from their descriptions in their works:

(75) Layered model (Chafe 1960)



The observations in this paper support the latter hypothesis, the layered structure, as in (75), rather than a flat, templatic structure, as in (76).

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¹⁶ It is not clear which “two positions” Lounsbury refers to. They could be the positions of incorporated nouns and the derivational suffixes.

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チェロキー語動詞の音韻的・形態的構成素構造

内原洋人

キーワード： イロコイ語族、複統合性、韻律階層、スロット型形態論

要旨

チェロキー語（北米イロコイ語族）は複統合的な言語であり、その動詞は複雑な内部構造を呈する。本論文では、チェロキー語動詞の形態的、音韻的な構成素構造を考察し、様々な形態的、音韻的な現象が同一の領域をその適用範囲とするのではなく、複数の構成素を立てる必要があることを示す。これは韻律音韻論における「収斂予想」（clustering prediction）に反するものである。本論文の考察はまた、チェロキー語の動詞はスロット型（Lounsbury 1953）ではなく、内部階層構造を有するとの仮説（Chafe 1960, Dyck 2009）を支持するものである。

（うちらは・ひろと メキシコ国立自治大学）