A Future Modal in Cherokee: A Special Case of Distributed Exponence

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1 Introduction

Existing descriptions of Cherokee (ISO639-3:chr) refer to the combination of the "prepronominal prefix" *ta-*, traditionally referred to as a future tense marker, and the "final suffix" *-i,* often called a "motion" suffix, as a distinction of tense, or simply a "future". We argue from morphological and semantic evidence that this combination in fact functions as a future *modal* marker. We show that the combination of *ta-* and *-i* is distributionally a circumfixal modal: The affixes always appear together on the same verbal complex when the future-referring meaning is present; they can co-occur with tense suffixes and some aspect affixes; and they appear in the location predicted for root modality by accounts such as Cinque's (1999). The combination of affixes yields predictive, intent, and deontic meanings consistent with a situation in which there is a circumstantial modal base and several possible ordering sources.

We then provide a morphosyntactic account within the framework of Distributed Morphology (Halle and Marantz 1993) in which *ta-*/*-i* heads a Modal Phrase above Aspect. The proposed feature, [Circumstantial], undergoes Müller's (2007) Enrichment; subsequent Fissioning of the resulting feature bundle creates an additional Position of Exponence. This allows two Vocabulary Items with the same featural content to be inserted, one as a prefix and one as a suffix, yielding a circumfix with one meaning distributed across two pieces.

Our analysis opposes traditional descriptions of *ta-* (or *ta-*/*-i*) as a future tense marker and expands the current picture of the Cherokee functional hierarchy, in line with expectations for the ordering of functional heads as proposed by, e.g., Cinque (1999). We argue that the data under consideration constitute a special case of *distributed exponence* (Caballero & Harris 2012), and as such our analysis represents an important contribution to the literature on this little-studied phenomenon, and to the Distributed Morphology literature in general.

1.1 Cherokee

Cherokee is the only known member of the Southern branch of the Iroquoian language family. It is classified as "threatened" with 10,400 speakers, and only 130 monolinguals

(Ethnologue; Lewis et al. 2013). There are two major dialects: The Western dialect is spoken primarily in Oklahoma, and the Middle dialect in North Carolina. We know of no dialectal differences relevant to the usage of *ta-*/*-i* and have incorporated data from both dialects into our analysis.

Like many American Indian languages, Cherokee is highly polysynthetic, with a substantial amount of information encoded in the verb word. The minimal Cherokee verb consists of a verb root, a pronominal prefix which indicates the person and number of the participants, and an aspectual suffix. Optional affixes include one or more "prepronominal" prefixes (i.e., occurring before the pronominal prefixes), which vary widely in meaning but include things like mood; a reflexive or middle voice prefix; an incorporated noun; one or more derivational suffixes, each inflected for aspect; and a final suffix, which typically indicates tense. The Cherokee verbal complex is represented schematically in (1) below using Montgomery-Anderson's (2008) terminology; required elements are in bold and optional elements are in parentheses.

(1)

(Prepronominal Prefix(es))	**Pronominal Prefix**	(Reflexive or Middle Voice)	(Incorporated Noun)	**Verb Root**	**Aspectual Suffix**	(Derivational Suffix(es))	(Aspectual Suffix(es))	(Final Suffix)
				VERB STEM				

Representative examples of a minimal Cherokee verb (2a) and one that takes advantage of each of these categories at least once (2b) are provided below.[1]

(2) a. *aàkhtoósti*
a–akahthoósti
3A–look.at:PRC
'He's looking at it.' (Montgomery-Anderson 2008:18)

[1] Abbreviations used in this paper are as follows: 1 1st person; 2 2nd person; 3 3rd person; 1/2 (etc.) 1st person subject/2nd person object; A set A pronominal prefix; AFT absolute future; AMB ambulative; A.AN set A with animate object; APL applicative; B set B pronominal prefix; CAU causative; CMP completive; CQ conducive question clitic; CSM cislocative motion; DL dual; DST distributive; DST2 distributive (allomorph); DVN deverbal noun; EX exclusive; EXP experienced past; FC focus clitic; FIM future imperative; FUT future; FUT2 future (allomorph); HAB habitual; INC incompletive; IRR irrealis; MOT motion; NEG negative; NOM nominalizer; NOM2 nominalizer (allomorph); NXP non-experienced past; PL plural; PO potential clitic; PRC present continuous; PRI pre-incipient; PRT partitive; Q question clitic; RFL reflexive; TRN translocative.

b. *yiwakwata•skwalo•staʔnitoʔli*
yi–w–akw–ata–sk–kwalo–st–aʔn–to–ʔl–i
IRR–TRN–1B–RFL–head–bump–CAU–CMP–AMB–CMP–MOT
'If I go about bumping my head at a distant place' (King 1975:37)

The combination of verb root and aspectual suffix in Cherokee is typically referred to as the *verb stem*. There is a lack of transparency at the boundary between these two morphemes, and each aspectual morpheme takes many different phonetic shapes (i.e., there is a lot of allomorphy). Due to these facts, Montgomery-Anderson (2008)—following a convention established by Munro (1996)—glosses the verb plus aspect stem as a single morpheme in the transcription line, with a colon between the two morphemes in the gloss line, as in (2a). There are five verb stems formed in this way: In addition to completive and incompletive, which we will be dealing with throughout this article, there are "present continuous", "immediate", and "deverbal noun" stems, none of which allow any final tense suffixes. Completive and incompletive stems yield approximately perfective and imperfective aspect, respectively, though the details of their aspectual meanings are not our focus here.

The grammatical data in our article come from several published sources, including Pulte & Feeling (1975), a grammar and dictionary of Oklahoma Cherokee; Montgomery-Anderson (2008), a grammar of Oklahoma Cherokee; and King (1975) and Cook (1979), both grammars of North Carolina Cherokee. Ungrammatical examples were checked with a native speaker consultant by Montgomery-Anderson. We have chosen to preserve our examples in full from the original source text unless otherwise noted, in an effort to accurately preserve each author's representation of the phenomenon under investigation. For this reason, differences in glossing should not be taken to have any theoretical import. We have also underlined the morpheme(s) of interest in each example, as glosses vary by source.

Transliteration of Cherokee is similar to the IPA, with the following exceptions: 'v' represents a nasalized schwa /ə̃/; 'j' represents the voiced postalveolar affricate /dʒ/; and 'y' represents the palatal glide /j/. Some authors also represent /t/ with 'd'; thus the prefix under discussion here is rendered either as 'ta-' or 'da-', according to each author's

convention. Tone is contrastive in the Western dialect of Oklahoma, but not in the Middle dialect of North Carolina. As mentioned above, to the best of our knowledge, this and any other dialectal differences are not relevant for the current discussion.

1.2 Background and Theoretical Underpinnings

The distributional portion of our analysis presupposes the theoretical separability of morphemes from stems; otherwise, it is not situated in any particular theory. The second half of the analysis is undertaken within the Distributed Morphology framework, which is discussed in further detail in Section 4.2.

In general we follow Demirdache & Uribe-Etxebarria's (1997 and forward) view of temporal pieces of the grammar. Their model builds off the Reichenbachian tradition (more specifically, the proposal set forth in Klein 1992, 1994, 1995) to argue that tense, aspect, modality, and temporal adverbials share parallel syntactic structures. Tense relates the time of speech (Utterance Time) to the time under discussion (Assertion Time). Grammatical aspect relates this Assertion Time to the time taken up by the event or situation (Event Time). In their discussion of non-root modals (2008a, 2008b), Demirdache & Uribe-Etxebarria define Modal Time as "the time at which the possibility or necessity under discussion holds" (2008b:1790); it is ordered with respect to the Event Time. Although we do not pursue a full analysis of the data under consideration in their terms, we suggest that extending their proposal to the type of modality discussed here would be fruitful. The key point of contact for the current proposal is the presence of the Modal Phrase and Modal head in the syntax.

Next, we claim in this article that *ta-*/*-i* represents a case of *distributed exponence*. Distributed exponence as conceived of here is part of, or at least related to, the wider phenomenon of *extended exponence* or *multiple exponence*. Extended/multiple exponence (see e.g. Matthews 1972, Carstairs-McCarthy 1987, Anderson 2000, Ackerman & Stump 2004, Müller 2007, Baerman & Corbett 2012, Caballero & Harris 2012) involves one morphological feature or property being realized in more than one place; i.e., by more than one exponent. Some have included cases in which more than one exponent realizes a particular feature system-wide (e.g., Matthews 1974 for German and

English plurals), while others restrict their analyses to cases in which one feature is realized at multiple points in an inflected word (e.g. Müller 2007).

The term 'distributed exponence' has been used in several different ways,[2] only one of which corresponds to our use here. We follow the definition found in Caballero & Harris (2012:170): "In distributed exponence[…]no single morphological marker can truly be said to realize a feature or category; the feature is, rather, realized by a combination of morphemes." Circumfixes are a "special case" of this phenomenon, according to the authors (2012:171). Closely related but separate from distributed exponence is *discontinuous exponence* (see e.g. Trommer 2002, Harbour 2008, Cable 2010), which by Caballero & Harris' definition "is defined over syntactic heads or sets of features, such as the set person, number, and gender, or the set tense, aspect, and mood" (2012:171-172). The main distinction between extended/multiple exponence on the one hand and distributed and discontinuous exponence on the other (at least, as typically defined) is that in the former phenomena, each of the exponents carries an identifiable meaning that is related to the others (e.g., different kinds of agreement). In the latter types (but especially distributed exponence), the meaning of the several pieces together (say, future) is not reflected in the meaning (if any) of each piece on its own. Distributed exponence under the definition we employ here has not been addressed much in the literature; Caballero & Harris (2012) cite Gurevich's (2006) work on the Georgian subjunctive as an example of the phenomenon.

Extended/multiple exponence of any sort is a problem for many theories of morphology. For theories that hold that morphophonological forms themselves contribute meaning (Stump's (2001) 'inferential' theories), extended exponence is surprising and difficult to integrate because each "feature" is expected to exist only in that it is introduced by the piece in question. Realizational theories (in which morphosemantic properties and their phonological exponents are separated) can accommodate extended exponence in principle; a priori, at least, a given feature could be realized in more than

[2] For example, Ackerman & Stump (2004) use the term with a very different meaning. For them, 'distributed exponence' describes the situation in which each piece of meaning is represented by exactly one affix—essentially, the opposite of the kind of phenomenon under discussion here. Baerman, et al. (2010) seem to use it as a synonym for multiple/extended exponence, as does Arka (2012).

one place. Some scholars, however, expressly rule out such possibilities in the theory (more on this in section 4), and even those that don't must explain how to deal with individual pieces that themselves do not have a unique featural association. Some scholars have in fact denied the existence of "true" extended exponence (at least from a theoretical standpoint)—arguing, e.g., that the pieces involved in specific cases are clitics (Anderson 2001) or light verbs (Cable 2010) rather than pieces of inflection.

Cable (2010) notes that while extended/multiple exponence (what he calls "non-radically discontinuous exponence"—cases where different features of a single head are realized in different places) is problematic, it is less worrisome because "the individual morpho-phonological units have an identifiable, coherent featural 'trigger'...thus, they can each be viewed as the exponent of some identifiable inflectional feature(s). (The only analytic challenge is getting those morpho-syntactic features where we see them in the phonological form of the word…)" (p. 3). With "radically discontinuous exponence", or what we're calling here 'discontinuous exponence' and 'distributed exponence', there are pieces of morphophonology that reflect a feature *only when considered together*. This constitutes a greater challenge. In this article we claim that *ta-/-i* in Cherokee is indeed a case of (radically) distributed exponence, and that furthermore it is able to be accommodated within the theory of Distributed Morphology.

The remainder of the article is organized as follows: Section 2 discusses previous analyses of *ta-* and *-i* from the descriptive literature on Cherokee, focusing on the fact that all of these analyses consider *ta-/-i* to be a marker of future tense. In Section 3, we provide a detailed distributional analysis, showing that *ta-/-i* is distributionally modal. Section 4 presents a morphosyntactic analysis of *ta-/-i* within the framework of Distributed Morphology, in which we propose that, syntactically, *ta-/-i* heads a Modal Phrase above Aspect and below Tense. Finally, in Section 5, we offer some concluding remarks and suggest areas for future research.

2 Previous Analyses of *ta-* and *-i*

In this section, we provide an overview of previous descriptive accounts of *ta-* and *-i*, covering many of these morphemes' roles in the grammar of Cherokee but focusing primarily on their forward-referring[3] properties.

2.1 *ta-/-i* As Future

The affixal combination *ta-/-i* consists of the prepronominal prefix *ta-* and the suffix *-i*. This combination has historically been described as a future tense marker, a point on which we elaborate in detail in this section. *Ta-* is standardly referred to as a "future" prefix and *-i* as a "motion" suffix. The combination is usually rendered in English either with simple future (3) or 'going to' (4) and requires the completive stem.[4]

(3) *takeekiiseelvvhi*
ta–keekii–steelvv́h–i
FUT–3.PL/1.PL–help:CMP–MOT
'They will help us.' (Montgomery-Anderson 2008:247)

(4) *takawóoniisi*
ta–ka–wóoniis–i
FUT–3A–talk:CMP–MOT
'She is going to talk.' (Montgomery-Anderson 2008:330)

Pulte & Feeling (1975) have the following to say about the affixal combination *ta-/-i*: "da- is prefixed to a verb form to indicate that the action of the verb will take place in the future[…]. Note that da- occurs together with the future tense suffix -i in these instances[…]. da- is used with the future suffix followed by the past tense suffix -vʔi to indicate that the subject of the verb was planning to perform the action of the verb in the past" (p. 250). Pulte & Feeling suggest that *ta-/-i* marks future tense, although the fact that these affixes can appear in combination with the past tense suffix is a cause for concern; typically future and past tense cannot co-occur in a single clause. Instead, this description is consistent with an analysis of *ta-/-i* as aspect or modality rather than tense.

[3] We say "forward" rather than "future" reference since we are arguing that *ta-/-i* instantiates a modal head whose meanings include forward-pointing reference, rather than a tense head whose meaning is to point forward from the utterance time, specifically.
[4] As we show in section 3, the tense markers in Cherokee can occur with either the completive or incompletive stem, yielding perfective or imperfective aspect, respectively.

In his grammar of North Carolina Cherokee, King (1975) refers to the *ta-/-i* combination as the "unconditional future tense" (p. 66). He calls *ta-* a "cislocative" prefix, as the piece when used alone carries cislocative meaning. He goes on to note that "[t]o express approaching actions temporally this prefix [ta-] is used in conjunction with the modal[5] suffix -i and the perfect[ive] stems of motion and non-motion verbs…" (p. 66). King suggests a kind of metaphorical use here, where cislocative *ta-*, which typically indicates motion toward the speaker, has been extended in use to indicate the temporal approach of some event. As with Pulte & Feeling, King suggests that *ta-/-i* marks tense.

Cook (1979) shares a similar perspective; he writes, "[W]ith non-motion verbs it [cislocative *ta-*] is used in construction with the perfective stem and the 'motion' suffix -i to form an absolute future (cf. English 'I am going to...')" (p. 76). However, he adds that "[t]he ta-future[...]can thus be analysed as an idiom using the cislocative[...]which can be translated literally as 'I am coming to...' parallel to English 'I am going to...'" (p. 127). Here, Cook takes the analysis one step further by directly comparing *ta-/-i* with the English *be going to* construction. Yet he still maintains that its primary function is to mark tense (which *be going to* does not—it has been argued to be aspectual or modal; see e.g. Copley 2009).

The description provided by Montgomery-Anderson (2008) is similar: "Future *ta-* attaches to a Completive stem with a final Motion (MOT) suffix *i-*.[…] The *ta-* Future indicates an event will happen in the near future and is sometimes translated with 'going to'" (pp. 329-330). Like Pulte & Feeling (1975), Montgomery-Anderson also notes that "to express a future idea in the past the Future prefix and Motion suffix must be used" (p. 332). Again, this ability to appear with past tense marking would be quite unexpected if *ta-/-i* marked future tense.

In spite of their subtle differences, these accounts share a common core: They all refer to *ta-/-i* as a marker of future tense. Another recurrent theme is the apparent oddity that the so-called "*ta-* future" can combine with other tense markers. These facts can be reconciled if *ta-/-i* actually marks modality rather than future tense.

[5] King refers to all the final suffixes as "modal" suffixes.

2.2 *ta-* and *-i* in Other Contexts

In addition to the future-referring use of *ta-*/*-i* just discussed, there are several other morphemes that appear as *ta-* and *-i* in Cherokee. We briefly discuss each in turn, so that it is clear which pieces we are addressing in this article.

"Future" *ta-* is typically thought to be diachronically related to the cislocative motion prefix *ta-* (King 1975, Cook 1979, Uchihara 2013). This prefix and its properties are discussed in more detail in Section 3.4.1 below.

The suffix *-i* found in the *ta-*/*-i* construction is linked by some previous authors (e.g. King 1975, Cook 1979, Uchihara 2013) to the Cherokee "motion suffix" *-i*, which is associated with the present stem of motion verbs (Cook 1979:127). However, Montgomery-Anderson (2008:395, fn. 12) notes that "many non-motion verbs[…]take this ending ('to look at', 'to like', to name just a few examples) and some verbs of motion don't take this ending (the most obvious example being the verb 'to go')." We remain agnostic as to whether the motion suffix *-i* is diachronically related to the suffixal portion of *ta-*/*-i*, as this potential historical relationship is not relevant to the present synchronic analysis.

In addition to the "motion suffix", there is also a nominalizing suffix in Cherokee that has the form *-i*. This suffix appears with incompletive and deverbal noun stems to form derived nominals. No previous analyses have suggested that this is the same suffix as the one found in *ta-*/*-i*. We agree that homophony is likely, given distributional and semantic considerations.

2.3 Summary

Leaving aside these additional appearances of *ta-* and *-i*, this article aims to resolve the apparent conflict between the future-referring properties of *ta-*/*-i* discussed in Section 2.1 above and its ability to appear with other tense markers. We suggest that treating *ta-*/*-i* as a modal rather than as tense yields the desired result. In the following section, we argue from the distribution of the morphemes that *ta-* and *-i*, when both present, constitute a future modal rather than a marker of future tense or literal motion. Then we present an analysis within the Distributed Morphology framework.

3 Distributional Analysis of *ta-/-i*

In order to account for the incongruences in previous descriptions of *ta-/-i* as tense noted above, we now argue from distributional evidence that this affixal combination instantiates root modality. First, we show that these affixes can co-occur with tense morphology. There are three affixes that convey tense meanings and that are prohibited from appearing on the same verbal complex in any combination; each of these three affixes is allowed with *ta-/-i*. Second, root modal meaning is present when both *ta-* and *-i* appear in a verbal complex, but not when only one or the other does. Finally, we explicate the modal meanings we believe to be in play and lay out our proposal for the hierarchy of affixes surrounding the verb stem that we will formalize in the subsequent sections.

3.1 Distribution of *ta-/-i* With Tense "Final Suffixes"

An analysis of *ta-/-i* as tense would predict that the affixes should be able to co-occur with different instantiations of grammatical aspect or modality, but not with other instantiations of tense. However, this is not what we see. Instead, we find that *ta-/-i* appears with the completive stem but not the incompletive stem, does appear with at least some other aspectual affixes, and can also occur with both past and future tense suffixes. We detail these distributions below. For comparison, when no tense marking appears on the verb word, present reference results (unless there is another element such as *ta-/-i* that affects the temporal reference), as seen in the following example:

(5) *hila* *nikoóstaàya* *hiʔa* *hayelsta*
hila ni-koóstaàya hiʔa hayelsta
how PRT-sharp this knife
'How sharp is this knife?' (Montgomery-Anderson 2008:316)

3.1.1 *ta-/-i* With No Tense Marking

When *ta-/-i* occurs without separate marking for tense, a future-referring meaning is most often yielded, as in the examples below. Specifically, the meaning is one in which the time of the event or situation (Event Time) follows the time of speech (Utterance Time).[6]

[6] This could theoretically be accomplished in a number of ways; for instance, future tense with simple aspect (Assertion Time and Event Time are covalued, and follow Utterance Time) or present tense with prospective aspect (Event Time follows Assertion Time and Utterance Time, which are covalued).

Translations into English include *am*/*are*/*is going to* and *will*. Both telic (6, 7) and atelic (8, 9) predicates are allowed:

(6) *walóosíju* *thiihwahthvvhi*
walóosi=ju ta–hii–hwahthvvh–i
frog=CQ FUT–2A.AN–find:CMP–MOT
'Are you going to find the frog?' (Montgomery-Anderson 2008:144)

(7) *tastvvyeèyoh* *jalaki*
ta–stvv–ehyoh–i jalaki
FUT–1/2.DL–teach:CMP–MOT Cherokee
'I will teach both of you Cherokee.' (Montgomery-Anderson 2008:202)

(8) *takawóoniisi*
ta–ka–wóoniis–i
FUT–3A–talk:CMP–MOT
'She is going to talk.' (Montgomery-Anderson 2008:330)

(9) *thiwóonisi [tʰiwóonisi]*
ta–hi–wóonis–i
FUT–2A–speak:CMP–MOT
'You will speak.' (Montgomery-Anderson 2008:97)

We also have at least one example of this combination being rendered into English with a futurate,[7] as in (10).

(10) *jookateehlkwastíís* *theétóòli*
ti–ookii–ateehlkwast–íí?i=s ta–hi–eétóòl–i
DST2–1B.PL.EX–learn:DVN–NOM2=Q FUT–2A–walk.around:CMP–MOT
'Are you coming to our school?' (Montgomery-Anderson 2008:414)

More on these translations in section 3.4.2 below.

3.1.2 *ta-*/*-i* With Past Suffixes

Two suffixes mark past tense in Cherokee: the "experienced past" (EXP) suffix *-vv?i*, as in (11), and the "nonexperienced past" (NXP) suffix *-é?i*, as in (12). These terms are due to Pulte (1985). The difference between these is evidential in nature; Montgomery-Anderson (2008) notes that "the Experienced Past indicates the speaker has first-hand knowledge of an event that took place in the past" (p. 269) while "the Non-experienced Past suffix indicates an action in the past that the speaker has not witnessed, either

[7] A futurate sentence conveys future reference without apparent morphosyntactic future marking of any kind. English simple and progressive presents can have these readings (e.g., *John leaves*/*is leaving tomorrow at 9 o'clock*). See e.g. Binnick (1991), Landman (1992), Portner (1998), Copley (2009).

because he or she was physically absent or the event has not actually taken place" (p. 270). The following examples show the past suffixes attached to the stems of *-wóoniha* 'to speak, talk'. With the completive stem, past perfective meaning obtains:

(11) *uùniiwóonisvʔi*
uunii–wóonis–vʔi
3B.PL–talk:CMP–EXP
'They talked.' (Montgomery-Anderson 2008:261)

(12) *uùniiwóonisée?i*
uunii–wóonis–éʔi
3B.PL–talk:CMP–NXP
'They talked (somebody told me).' (Montgomery-Anderson 2008:261)

The incompletive stem gives past imperfective meaning:

(13) *kawóoniiskvʔi*
ka–wóoniisk–vʔi
3A–speak:INC–EXP
'He was speaking.' (Montgomery-Anderson 2008:227)

(14) *aàniiwóoniiskée?i*
anii–wóoniisk–éʔi
3A.PL–talk:INC–NXP
'They were talking (somebody told me).' (Montgomery-Anderson 2008:256)

These suffixes cannot appear together on the same verbal complex:

(15) *uunii–wóonis–éʔi–vʔi
3B.PL–talk:CMP–NXP–EXP (Brad Montgomery-Anderson, p.c.)

(16) *uunii–wóonis–vʔi–éʔi
3B.PL–talk:CMP–EXP–NXP (Brad Montgomery-Anderson, p.c.)

However, either is allowed along with *ta-*/*-i*, with the meaning difference between the two suffixes maintained (17 and 18 vs. 19 and 20):

(17) *tootajiloónéʔisv*
tee–ta–ji–loónéʔ–is[8]–vʔi
DST–FUT–1A–oil:CMP–MOT–EXP
'I was going to oil it.' (Pulte & Feeling 1975:101), (Montgomery-Anderson 2008:332)

[8] The alternation between *-i* and *-is* is phonologically conditioned; *-i* becomes *-is* before a vowel (Pulte & Feeling 1975:250).

(18) *dạ²gạ²wo³²ni²si³sv²³ʔi*[9]
da–ga–wonis–is–vʔi
FUT–3A–speak:CMP–MOT–EXP
'He was going to speak.' (Pulte & Feeling 1975:289)

(19) *dị²gạ²wo³²ni²si³se³ʔi*
da–ga–wonis–is–eʔi
FUT–3A–speak:CMP–MOT–NXP
'He was reportedly going to speak.' (Pulte & Feeling 1975:250)

(20) *to:titsiʔne:ʔtsi:seʔi*[10]
tee–ta–ji–hneej–is–eʔi
DST–FUT–1A–speak[2]:CMP–MOT–NXP
'I must have been going to speak.' (Cook 1979:123)

The meaning of past tense plus *ta-*/*-i* can be rendered into English with *was going to*, which allows the combination of past tense and forward reference. Pulte & Feeling (1975) note that in such examples, "the subject of the verb was planning to perform the action of the verb in the past" (p. 250) and "forms like [this] are neutral with respect to whether the action was actually performed subsequently or not" (p. 290). That is, there is no entailment that the event in question did not end up occurring; there is perhaps not even the presupposition that seems to exist in English past tense *going to* (*he was going to V [but he didn't]*), though more data are necessary to draw solid conclusions.

Finally, note the meaning of 'supposed to' expressed in the free translation in (21):

(21) *svvhi* *akhthvvkaanv* *siíkwu* *tikawóoniisíisv*
svvhi aki–ahthvvkaan–vvʔi siíkwu ti[11]–ka–wóoniis–is–vvʔi
yesterday 1B–hear:CMP–EXP again FUT2–3A–speak:CMP–MOT–EXP

kohi *iika*
kohi iika
this day
'I heard yesterday that he was supposed to speak again today.'
(Pulte & Feeling 1975:153), (Montgomery-Anderson 2008:530)

More on these meanings in section 3.4.2 below.

[9] Pulte & Feeling's examples are the first line and the gloss; the second line is our morpheme breakdown and the third line our Montgomery-Anderson-style morpheme gloss.
[10] Cook's examples are the first line and the gloss; the second and third lines are our Montgomery-Anderson-style morpheme breakdown and gloss, respectively.
[11] *Ti-* is an allomorph of *ta-* that appears in Feeling's (1975) data.

3.1.3 *ta-/-i* With the Future Tense Suffix

The future tense suffix *-éesti* (Montgomery-Anderson's "absolute future"/AFT), appended to the completive stem, yields a future perfective, translated with English *will* (22) or occasionally *will have* (23):

(22) *aàniihwathiihéesti*
anii–hwathiih–éesti
3A.PL–find:CMP–AFT
'They will find it.' (Montgomery-Anderson 2008:349; from Scancarelli 2005:369)

(23) *uùniiwóoniséesti*
uunii–wóonis–éesti
3B.PL–talk:CMP–AFT
'They will have talked.' (Montgomery-Anderson 2008:278)

With the incompletive stem, a future imperfective results:

(24) *aàniiwóoniiskéesti*
anii–wóoniisk–éesti
3A.PL–talk:INC–AFT
'They will be talking.' (Montgomery-Anderson 2008:256)

The suffix is disallowed with either of the past tense suffixes:

(25) a. *uunii–wóonis–éesti–vvʔi
3B.PL–talk:CMP–AFT–EXP

b. *uunii–wóonis–éesti–éʔi
3B.PL–talk:CMP–AFT–NXP

c. *uunii–wóonis–vvʔi–éesti
3B.PL–talk:CMP–EXP–AFT

d. *uunii–wóonis–éʔi–éesti
3B.PL–talk:CMP–NXP–AFT (Brad Montgomery-Anderson, p.c.)

With *ta-/-i*, though, a "future-in-the-future" results (as in 26). Unlike the past and present tense translations, the future with *going to* is somewhat marginal in English;[12] this does not seem to be the case with *ta-/-i* and the absolute future suffix:

(26) *to:titsiʔne:ʔtsi:se:sti*
tee–ta–ji–hneej–is–éesti
DST–FUT–1A–speak:CMP–MOT–AFT
'I will be going to speak.' (Cook 1979:123)

[12] Note that English *will be about to* does not share this marginal grammaticality.

Pulte & Feeling (1975:290) clarify this meaning: "[This form] could be used in response to the question 'What will he be doing at 1:30?' if the person in question is due to speak at 2:00. On the other hand, [the present tense form] would be the appropriate response to the question 'What will he do at 2:00?'"

With these three final tense suffixes, then, *ta-/-i* yields exactly the combinatorial meanings we would expect if it were a distinction of aspect or modality, rather than tense.

3.1.4 *ta-/-i* With the "Habitual"

In addition to these tense suffixes, the "habitual" final suffix *-oʔi* can also co-occur with *ta-/-i*. These affixes combine to yield habitual plus forward-referring meaning. Pulte & Feeling (1975:250) note: "da- is used with the future suffix followed by the habitual suffix -oʔi to indicate that the subject of the verb is accustomed to speaking whenever the opportunity presents; see ([27])".

(27) *dį²gą²wo³²ni²si³so³ʔi*
da–ga–wonis–is–oʔi
FUT–3A–speak:CMP–MOT–HAB
'He's always about to speak.' (Pulte & Feeling 1975:250)

Pulte & Feeling (1975:290) also note that the combination can have an intent reading (cf. 21 above): "The habitual -oʔi can be used with -i to indicate that the subject of the verb habitually intends to speak, as in ([28])".

(28) *dį²gą²wo³²ni²si³so³ʔi*
da–ga–wonis–is–oʔi
FUT–3A–speak:CMP–MOT–HAB
'He always intends to speak.' (ibid.) [N.B.: Same form as 27 above]

Although the suffix often conveys habitual meaning, it is not clear to us that *-oʔi* is strictly a habitual marker, or even a marker of aspect at all. It cannot occur with any tense suffixes, which undermines its status as an aspectual marker. In addition, it is used for present tense propositions with stative verbs, and these propositions are not specifically habitual:

(29) *aàkohwthiísko*
a-kowahthiísk-óʔi
3A-see:INC-HAB
'He sees it.' (Montgomery-Anderson 2008:78)

These facts point to a possible alternative analysis of the affix as another instantiation of the tense head. At the very least, though, the occurrence of *-oʔi* with *ta-/-i* does not present any immediate danger to our analysis of the latter as an instantiation of a Modal head. In fact, if *-oʔi were* located in Tense, its position with respect to a deontic modal would be as predicted by the Mirror Principle. (For more on our proposed skeleton, see section 3.4.2.)

3.2 Distribution of *ta-/-i* With Aspect

3.2.1 Aspect Near the Root

Recall that the experienced and nonexperienced past and "absolute future" tense suffixes can occur with either the completive or incompletive stem.[13] With *ta-/-i*, however, the only stem employed is the completive stem (Montgomery-Anderson 2008:329). This stem is also obligatorily employed when multiple "derivational suffixes" (expressing meanings like ambulative, attributive, and repetitive) attach to the stem. Each of these suffixes is able to be inflected for aspect in the same ways the verb root can. Only the final instance is inflected for the aspect whose meaning appears in the sentence; the rest receive completive inflection. These facts lead us to an analysis of the completive in Cherokee as the "default" verb form; that is, the form that appears when there is no true Aspect head present. *Ta-/-i*, then, does not pattern with the tense suffixes in terms of distribution; instead, it acts more like the possibly aspectual "derivational" affixes found elsewhere in the verb word. However, *ta-/-i*, unlike these other affixes, cannot receive any aspectual inflection (completive, incompletive, or otherwise). So far, then, *ta-/-i* is patterning with neither tense nor (in)completive aspect nor other aspect-like affixes. We turn to some of these that can occur with *ta-/-i* next.

3.2.2 Aspect Elsewhere?

In addition to the aspect near the verb root, there are at least three other affixes that can occur with *ta-/-i* that carry something we might call aspectual meaning: the iterative

[13] In addition to completive and incompletive stems, there are "present continuous", "immediate", and "deverbal noun" stems, none of which allow any final tense suffixes. We take the present continuous and immediate to express a fusion of aspect and tense (or possibly mood) information. The function and formal properties of the deverbal noun stem are still unclear as well. For a preliminary investigation of these matters, see Stone (2010).

prepronominal prefix, the terminative "derivational" suffix, and the "duplicative" "derivational" suffix. Both the iterative and the "duplicative" (Montgomery-Anderson's term) indicate "that an action has been repeated" (Montgomery-Anderson 2008:333, 378). While the formal status of these affixes is left for future study, we include them in our proposed arrangement of functional heads. The type of aspect these affixes seem to convey is different from the types usually discussed in (neo-)Reichenbachian/Kleinian discussions of aspect (i.e., perfect, prospective, perfective, imperfective). Instead, they carry something like "quantificational" (after Dik 1989) or repetitive meaning, or focus on an endpoint (terminative). In (30) we see *ta-/-i* outside the iterative prepronominal prefix:

(30) *tvvtahneskehiísáhni* *uunoole* *uùyóosthanv̋*
ta-ii-iitii-ahneskehiísáhn-i uunoole uu-yoó-sthan-v́v̋ʔi
FUT-ITR-1A.PL-build:CMP-MOT tornado 3B-break-CAU:CMP-DVB
'We will build the house again after the tornado destroyed it.' (Montgomery-Anderson 2008:105)

In (31) and (32) we see *ta-/-i* outside the terminative and "duplicative" "derivational" suffixes, respectively:

(31) *nikááta* *tvvnikîsohni*
nikááta ta-a-anikíìs-ohn-i
all FUT-3A-leave:CMP-TRM:CMP-MOT
'It will be all gone.' (*Cherokee Phoenix* May 2006)
(Montgomery-Anderson 2008:383)

(32) *takvvùthaniisáhni*
ta-ji-vhthan-iisáhn-i
FUT-1A-use:PRF-DPL:PRF-MOT
'I'm going to use it again.' (Montgomery-Anderson 2008:330)

In both cases, the forward reference is still conveyed by *ta-/-i*.

3.3 The Irrealis Prepronominal Prefix

Finally, the prepronominal prefix that Montgomery-Anderson calls "Irrealis"[14] (*yi-*) can also co-occur with *ta-/-i*. This prefix "indicates that an action has not occurred" (Montgomery-Anderson 2008:297), and appears alongside other affixes and/or stems to

[14] As Montgomery-Anderson notes (2008:393), King (1975:61) refers to the prefix as "conditional or negative".

form constructions such as negation, conditionals, contrary-to-fact statements, some questions, etc. The prefix appears outside of *ta-/-i*, as seen in (33-34):

(33) *hla svvk yitvvkhiwasi*
hla svvki yi–ta–aki–hwas–i
NEG onion IRR–FUT–1B–plant:CMP–MOT
'I'm not going to plant onions.' (Montgomery-Anderson 2008:331)

(34) *thlátvv yitakeekakhwiyvv?eéli*
thla=tvv yi-ta-keekii-akhwiyvv-eél-i
NEG=FC IRR-FUT-3.PL/1.PL-pay:CMP-APL:CMP-MOT
'They will not pay us.' (Montgomery-Anderson 2008:153)

In this section we have shown that a number of affixes can appear in, and lend their meaning to, a verb word that also contains *ta-/-i*. Specifically, past and future tense suffixes, the "habitual" final suffix, and the irrealis prefix appear outside *ta-/-i*, while iterative, terminative, and duplicative affixes appear between the stem and *ta-/-i*. We will have more to say about these orderings in section 4.

3.4 Instantiation of Modal Semantics

Now that we have shown that *ta-/-i* patterns with neither tense nor aspect in Cherokee, we next present distributional evidence that indicates that the prefix *ta-* and suffix *-i* together represent the non-contiguous instantiation of a root modal head, and make a claim about the particular kind of modality that is at play.

3.4.1 *ta-* and *-i* in Isolation

We have already given examples in which both *ta-* and *-i* are present and forward reference results; here we show that this meaning does not obtain when only one or the other is present.[15] First, a prefixed *ta-* without *-i* is possible, but no additional future meaning is involved. In (35), for example, future meaning is contributed by the Absolute Future suffix, but *ta-* does not yield the future-in-the-future meaning we would expect if *-i* was also there (as we saw in example 26 above):

[15] Of course, there are other ways to convey future meaning in Cherokee—the absolute future suffix, some uses of the Immediate stem, etc. We are showing that *ta-* and *-i* together yield the meaning that they do, rather than just one or the other piece.

(35) *dị²ga³ʔi²se³sdi*
da–g–aʔis–esdi
CSM–1A–walk:INC–AFT
'I will be walking (in the direction of the speaker).' (Pulte & Feeling 1975:252)

We analyze this *ta-* (as our data sources do) as a cislocative motion (CSM) prefix, which the modal use of *ta-* is taken to have developed from diachronically.

We are aware of a single data point showing modal/future meaning occurring when *-i* (the "motion" suffix) but not *ta-* is present. In this example, negation, the "potential" clitic, and the partitive verbal prefix are present:

(36) *thlale* *nikatv́vneeli*
thla=le ni–ka–atv́vneel–i
NEG=PO PRT–3A–do:CMP–MOT
'I'm not going to do it.' (Montgomery-Anderson 2008:151)

Negation itself, at least, does not eliminate the need for *ta-*, as seen in (37-38):

(37) *hla* *svvk* *yitvvkhiwasi*
hla svvki yi–ta–aki–hwas–i
NEG onion IRR–FUT–1B–plant:CMP–MOT
'I'm not going to plant onions.' (Montgomery-Anderson 2008:331) (repeated from 33 above)

(38) *thlátvv* *yitakeekakhwiyvvʔeéli*
thla=tvv yi–ta–keekii–akhwiyvv–eél–i
NEG=FC IRR–FUT–3.PL/1.PL–pay:CMP–APL:CMP–MOT
'They will not pay us.' (Montgomery-Anderson 2008:153)

The meaning contributed by the potential clitic (=le) is unclear. Montgomery-Anderson (2008:150) notes: "This clitic is not frequent and it is difficult to determine its exact function. Haag states that it indicates doubt and calls it a 'Potential marker' (Haag 2001:418)". About the example above in (36), he says, "the clitic attaches to the negation word *thla*; the speaker gives the same meaning when the clitic is left off" (Montgomery-Anderson 2008:150). The partitive prefix, too, has a number of functions (Montgomery-Anderson 2008:312-313), such as referring to completed actions (translated with *already*), to a time that continues into the present, or to an event that almost occurred (along with an adverb *hale* 'almost'). Given the presence of these other morphemes, it is not at all clear whether the future meaning present in the translation is coming from the *-i*

588 suffix or elsewhere. Since this seems to be an isolated example, we leave its investigation
589 for future work.

590 **3.4.2 Modal Meaning and the Functional Hierarchy**

591 Now that we have looked at the patterns involved in its placement, we need to decide on
592 the identity of *ta-/-i*. In section 3.2, we saw that *ta-/-i* does not pattern with the tense or
593 aspect affixes in the language distributionally. It can co-occur with tense suffixes, which
594 themselves cannot co-occur, so it does not act like tense. It can occur with iterative,
595 terminative, and duplicative affixes, so it seems not to be any of these aspect types. Like
596 the derivational affixes, it can only occur with a verb stem inflected for the completive,
597 but unlike them, it cannot itself be inflected for either completive or incompletive
598 aspect.[16]

599 Turning to the meanings involved, recall that with a past or future tense suffix, the
600 meaning portrayed by *ta-/-i* is forward-referring from the time established by tense, rather
601 than an absolute meaning of "the future with respect to now". When no tense suffix is
602 present so that the meaning defaults to present tense, the time established by tense *is* now,
603 so a simple future meaning obtains with *ta-/-i*. This leads to the English translations of
604 "was going to", "will be going to", and "is going to/will", respectively (see 17, 26, and 6,
605 for example). This points to *ta-/-i* being a distinction not of tense, which relates a time to
606 now/Utterance Time, but of aspect or modality. We've shown that *ta-/-i* does not pattern
607 with aspect distributionally. Here we also argue that the different meanings we see with
608 *ta-/-i* fall out of a modal analysis.

609 The facts we have been considering can be captured if, instead of tense or aspect, *ta-*
610 */-i* is a modal. First, the meanings found with *ta-/-i* can all be accounted for if it is a
611 modal with a circumstantial/metaphysical base, with the different readings arising from

[16] There is another way to express a kind of deontic modality (other than with adverbs) in Oklahoma Cherokee: the modal highfall tone (Montgomery-Anderson 2008:265). It frequently occurs on the Deverbal Noun stem, which is then "used to indicate ability or obligation" (Montgomery-Anderson 2008:252). Since *ta-/-i* must occur with the Completive stem, the tone cannot co-occur with *ta-/-i*. We leave a complete analysis of this other modal marker to future work. If it were also instantiating the Mod head, we could propose that it is specified for the feature [Deontic]; then Mod would have another possible specification (in addition to [Circumstantial]) and another Vocabulary Item competing for insertion (in addition to /ta-/ and /-i/).

612 different ordering sources. Then, if *ta-/-i* instantiates the head of a deontic Modal phrase,
613 its ordering with respect to the other functional heads is predicted by accounts like
614 Cinque's (1999).
615 In Kratzer's (1991) modal semantics, the modal base tells us which worlds are
616 accessible given a particular conversational background—that is, in which worlds the
617 propositions in the conversational background are all true. Epistemic modality involves
618 an epistemic base—the propositions whose truth someone is aware of. *Ta-/-i* does not
619 seem to be involved with epistemic surety. Deontic modality involves a modal base
620 containing the propositions that are true in the real world—the "circumstantial" or
621 "metaphysical" base. This is *ta-/-i*'s domain: it is used to make predictions, signal
622 intentions and plans, or discuss adherence to laws or principles in the real world.
623 Ordering sources provide a ranking for the accessible worlds, allowing them to be
624 ordered in terms of goodness compared to an ideal. The modal then quantifies over the
625 "best" worlds in the modal base. With an inertial ordering source,[17] the speaker is
626 expressing a degree of certainty that the way things are in the world will lead to a certain
627 situation—that is, she is making a prediction. A bouletic ordering source is involved
628 when a speaker is articulating a level of confidence in some person's ability to
629 accomplish something or their commitment to accomplishing it (measuring intent). A
630 deontic ordering comes into play when a speaker is concerned with someone's adherence
631 to some sort of standard or principle.
632 We propose that *ta-/-i* has a metaphysical base, with (at least) three ordering sources
633 available: inertial, bouletic, and deontic. We can see these at work in the following
634 examples. First, *ta-/-i* can be used to make predictions about the way things will turn out,
635 as in the following readings of (39-41) (an inertial ordering source):

636 (39)	*toowýhn*	*takalstan*	*nvýwi*
637	kato=kwu=hno	ta-ka-alistan-i	nvýwi
638	what=DT=CN	FUT-3A-happen:CMP-MOT	now

639 'Now what is going to happen?' (Montgomery-Anderson 2008:142)

[17] See Copley (2009) for more on ordering sources involved in futures.

(40) *nikááta* *tvvnikîsohni*
nikááta ta-a-anikíis-ohn-i
all FUT-3A-leave:CMP-TRM:CMP-MOT
'It will be all gone.' (*Cherokee Phoenix* May 2006; Montgomery-Anderson 2008:383, repeated from 31 above)

(41) *vv naàhiyu* *takalúhji*
vv naàhiyu ta-ka-lúhj-i
yes then FUT-3A-arrive:CMP-MOT
'Yes, at that time he will arrive.' (Montgomery-Anderson 2008:140)

Second, *ta-/-i* can be used to talk about intended actions of animate entities, as in possible readings of (42-45) (a bouletic ordering source):

(42) *takintlecheéli*
ta-kinii-atlej-eél-i
FUT-1B.DL-take.revenge:CMP-APL:CMP-MOT
'He will take revenge on us.' (Montgomery-Anderson 2008:354)

(43) *walóosíju* *thiihwahthvvhi*
walóosi=ju ta–hii–hwahthvvh–i
frog=CQ FUT–2A.AN–find:CMP–MOT
'Are you going to find the frog?' (Montgomery-Anderson 2008:144, repeated from 6)

(44) *dị²gą²wo³²ni²si³so³ʔi*
da–ga–wonis–is–oʔi
FUT–3A–speak:CMP–MOT–HAB
'He always intends to speak.' (Pulte & Feeling 1975:250, repeated from 28)

(45) *jookateehlkwastíís* *theétóòli*
ti–ookii–ateehlkwast–íiʔi=s ta–hi–eétóòl–i
DST2–1B.PL.EX–learn:DVN–NOM2=Q FUT–2A–walk.around:CMP–MOT
'Are you coming to our school?' (Montgomery-Anderson 2008:414, repeated from 10)

Finally, *ta-/-i* can be used to discuss adherence to norms, rules, or expectations (a deontic ordering source):

(46) *svvhi akhthvvkaanv siíkwu tikaẃooniisíisv*
svvhi aki–ahthvvkaan–vv̓ʔi siíkwu ti–ka–ẃooniis–is–vv̓ʔi
yesterday 1B–hear:CMP–EXP again FUT2–3A–speak:CMP–MOT–EXP

kohi iika
kohi iika
this day
'I heard yesterday that he was supposed to speak again today.' (Pulte & Feeling 1975:153; Montgomery-Anderson 2008:530, repeated from 21)

With the distributional and semantic evidence laid out, we are now in a position to suggest a possible arrangement of functional categories for the pieces we have been discussing. Since we have not presented argumentation or even extensive data concerning affixes other than *ta-*/*-i*, this analysis should be considered merely suggestive for the other affixes. We have been considering completive and incompletive aspect; habitual, terminative, iterative, and duplicative; irrealis mood; past tense specified for evidentiality; and future tense. In the examples we can also see the location of the agreement prefixes with respect to these affixes.

We will assume that the tense suffixes instantiate T; that completive and incompletive instantiate Asp; that terminative, iterative, and duplicative[18] instantiate Asp2; and that irrealis instantiates Mood. If we wanted to explore a more "exploded" functional hierarchy like Cinque's (1999), we would end up with T(past) and T(future);[19] $Asp_{completive}$; $Asp_{terminative}$, $Asp_{frequentative}$, and $Asp_{repetitive}$, respectively; and $Mood_{irrealis}$.[20] Nothing in our analysis is contingent on these details, however. Then, *ta-*/*-i* should instantiate Mod (or Mod_{root}). If we look back at the ordering of the affixes in the examples we've been considering, we can see that they conform to the expected hierarchy, given Baker's (1985) Mirror Principle, if *ta-*/*-i* instantiates a Modal head. Starting from the stem and working our way out, we can see that *ta-*/*-i* occurs outside the stem and any "derivational suffixes", as well as agreement morphology: *-i* follows the

[18] Since the status of the "habitual" affix is highly in question, we exclude it here.
[19] As the past tense suffixes are also specified for evidentiality, we tentatively suggest that the T(past) head is fused with $Mood_{evidential}$, while there is no such fusion with the T(future) head.
[20] While we do not assume this kind of head formally, we sometimes use the notation below for convenience.

suffixes, and *ta-* precedes agreement. In (47) we can see the arrangement of *ta-*/*-i* around agreement, stem, and the applicative suffix (as an example of a derivational suffix).

(47) *takintlecheéli*
ta-kinii-atlej-eél-i
FUT-1B.DL-take.revenge:CMP-APL:CMP-MOT
'He will take revenge on us.' (Montgomery-Anderson 2008:354, repeated from 42)

Then, *ta-*/*-i* occurs outside terminative (48), iterative (49), and duplicative (50) markings:

(48) *nikááta* *tvvnikîsohni*
nikááta ta-a-anikíis-ohn-i
all FUT-3A-leave:CMP-TRM:CMP-MOT
'It will be all gone.' (*Cherokee Phoenix* May 2006; Montgomery-Anderson 2008:383, repeated from 31)

(49) *tvvtahneskehiísáhni* *uunoole* *uùyóosthanv̋*
ta-ii-iitii-ahneskehiísáhn-i uunoole uu-yoó-sthan-v́v̋ʔi
FUT-ITR-1A.PL-build:CMP-MOT tornado 3B-break-CAU:CMP-DVB
'We will build the house again after the tornado destroyed it.' (Montgomery-Anderson 2008:105)

(50) *takvv̀thaniisáhni*
ta-ji-vhthan-iisáhn-i
FUT-1A-use:PRF-DPL:PRF-MOT
'I'm going to use it again.' (Montgomery-Anderson 2008:330, repeated from 32)

Finally, the tense suffixes (51-53) and the irrealis prefix (54) come outside *ta-*/*-i*:

(51) *dạ²gạ²wo³²ni²si³sv²³ʔi*
da–ga–wonis–is–vʔi
FUT–3A–speak:CMP–MOT–EXP
'He was going to speak.' (Pulte & Feeling 1975:289, repeated from 18)

(52) *dị²gạ²wo³²ni²si³se³ʔi*
da–ga–wonis–is–eʔi
FUT–3A–speak:CMP–MOT–NXP
'He was reportedly going to speak.' (Pulte & Feeling 1975:250, repeated from 19)

(53) *to:titsiʔne:ʔtsi:se:sti*
tee–ta–ji–hneej–is–éesti
DST–FUT–1A–speak:CMP–MOT–AFT
'I will be going to speak.' (Cook 1979:123, repeated from 26)

(54) *hla* *svvk* *yitvvkhiwasi*
hla svvki yi–ta–aki–hwas–i
NEG onion IRR–FUT–1B–plant:CMP–MOT
'I'm not going to plant onions.' (Montgomery-Anderson 2008:331, repeated from 33)

In (49) we can also see that the iterative prefix comes between *ta-* and the agreement morphology.

From these data, we have evidence for tense and irrealis mood being outside *ta-/-i*; iterative (Cinque's "frequentative"), duplicative ("repetitive"), and terminative aspects as well as agreement being outside completive aspect and inside *ta-/-i*; and iterative aspect being outside agreement but inside *ta-/-i*. Thus we propose the following partial ordering of functional heads in Cherokee (we have included the Cinquean subscripts for clarity, but nothing in our analysis hinges on their details): T[21] / $\text{Mood}_{\text{irrealis}}$ > $\text{Mod}_{\text{deontic}}$ (*ta-/-i*) > $\text{Asp}_{\text{repetitive}}$/$\text{Asp}_{\text{frequentative}}$/$\text{Asp}_{\text{terminative}}$ > Agr > $\text{Asp}_{\text{completive}}$. This is precisely the ordering predicted by the Mirror Principle.[22]

If we return to the traditional template we discussed in Section 1.1, we can see that in fact it must be more detailed: for instance, although *-i* has been called a "final suffix", it clearly cannot exist in the same spot in the template as the other so-called final suffixes such as tense (and "habitual"), since tense suffixes attach outside *-i*. We hope the current work is useful in the pursuit of a detailed functional hierarchy.

With the distributional analysis in place, we now turn to the formal analysis in the Distributed Morphology framework.

4 Distributed Morphology Analysis

4.1 Overview

We claim that *ta-/-i* is (informally) a circumfix around the verb root (and other material). Formally, we claim within the Distributed Morphology framework that the phonological

[21] Or perhaps T(past) and $\text{Mood}_{\text{evidential}}$ are fused, and both precede T(future). Note that we don't have direct evidence for the ordering between Tense and Irrealis Mood, since there are no tense prefixes, nor do we have evidence for the ordering among the aspectual affixes that occur outside the stem. We collapse these "other" aspects into Asp2 in the following section.

[22] Note that while Agr is, predictably, outside $\text{Asp}_{\text{completive}}$ and inside $\text{Mod}_{\text{deontic}}$, it is also inside at least the iterative prefix, which we've assumed instantiates $\text{Asp}_{\text{frequentative}}$. As Cinque (1999) notes, negation and agreement notoriously vary in their placement in the hierarchy cross-linguistically. Since the location of the Asp heads with respect to agreement is not crucial to our analysis, we will not be concerned with it further.

exponents /ta-/ and /-i/ are inserted into the positions of exponence that result from the Enrichment (Müller 2007) of a modal feature ([Circumstantial]), and the subsequent Fission (Noyer 1992/1997) of the Modal node. This analysis adds to the relatively sparse literature on the phenomenon of circumfixation, and distributed exponence in general. Ours represents a novel theoretical solution to this issue within Distributed Morphology.

4.2 Distributed Morphology

Two features of Distributed Morphology (Halle & Marantz 1993) especially distinguish it from other morphological theories. The first is *late insertion*, which is the idea that the phonological features of a given morpheme (i.e., bundle of morphosyntactic features) are not specified until after the syntax. The second is the *underspecification of Vocabulary Items*. This is the hypothesis that Vocabulary Items (relations between phonological strings and their contexts of insertion) "need not be fully specified for the syntactic positions where they can be inserted" (Harley & Noyer 1999:3). That is, a given Vocabulary Item may have a list of features that is a subset of all the possible features that *could* be listed at the terminal node. This feature, in combination with the Subset Principle, can lead to ruling out the insertion of a Vocabulary Item with more features specified, in favor of one with fewer specified, if the more specified Vocabulary Item contains features not listed in the terminal node. That is, the Vocabulary Item that matches the highest number of features in the terminal node, but none not listed there, "wins".

The operation of *Fission* is important to our proposal. Fission was proposed by Noyer (1992/1997) to account for cases in Afro-Asiatic languages in which more than one Vocabulary Item qualified for insertion, and more than one was inserted. Halle's (1997) formulation of Fission involves the following steps: First, a terminal node with more than one feature specified undergoes Vocabulary Insertion. The Vocabulary Item inserted only matches a subset of those features, and only those features are spelled out. Fission then serves to form another Position of Exponence with the remaining feature(s); it is here that a second Vocabulary Item can be inserted (and so on, in a cyclic fashion). We will see Fission in action in the next section.

Of particular interest to us here are cases of *extended/multiple exponence*, introduced in Section 1.2, which have traditionally given Distributed Morphology pause. This has been especially true when the exponents are non-local; Noyer (1992/1997) introduced *primary and secondary (expression of)* exponents to deal with such situations. Halle & Marantz (1993), in fact, expressly claim that multiple exponence of a syntactic node's features is not possible. This requirement for "unique exponence," Anderson (2001) points out, comes in spite of the fact that Halle & Marantz call for operations such as Fusion, Fission, and Impoverishment that result in exponents that are not necessarily in a neat, one-to-one relationship with their associated features. Even less investigated in Distributed Morphology is *distributed exponence* (see Caballero & Harris 2012), that is, when two (or more) pieces of inflection realize the feature or property in question *only when taken together*. This is our take on *ta-/-i* in Cherokee. More specifically, *ta-/-i* is a circumfix; Caballero & Harris call circumfixes "a special case of distributed exponence" (2012:171). These phenomena pose a challenge for traditional Distributed Morphology that we present a solution to here.

In our analysis of this phenomenon in Cherokee we employ Müller's (2007) operation of Enrichment (discussed in more detail in Section 4.3.2). Enrichment is meant to be the counterpart of Impoverishment; Müller establishes Enrichment rules as a way to "account for extended exponence without invoking a concept of secondary exponence via contextual features" (p. 253). He claims that Enrichment rules have a theory-internal motivation: Just as there are both Fission and Fusion of nodes, given that Impoverishment is an established operation, we should expect Enrichment as well. This type of rule allows us to explain the phenomenon we see in Cherokee.

4.3 Distributed Morphology Analysis of Tense and Future-Referring Modality in Cherokee

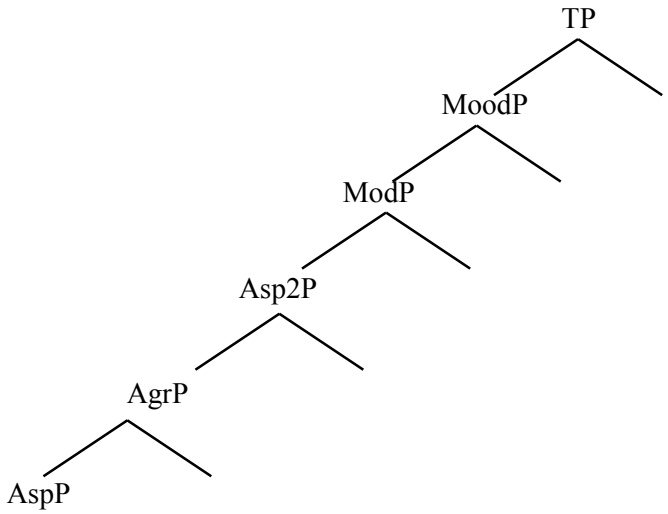
First, we take the nonexperienced and experienced past suffixes and "absolute future" suffix to be instantiations of Tense. The completive and incompletive "stems", then, are composed of the verb root plus perfective/imperfective-type aspectual morphology

instantiating Aspect.[23] Immediate and present continuous stems are made up of the verb root plus morphology that represents a fusion of tense and aspect information, not addressed here. Finally, *ta-* and *-i* instantiate a Mod(ality) head.[24] We propose the Mirror Principle-consistent hierarchical arrangement of TAMM functional heads in Cherokee to be as follows:

(55) [T[$\text{Mood}_{\text{irrealis}}$[$\text{Mod}_{\text{deontic}}$[Asp2[Agr[Asp[V]]]]]]]

The relative embeddedness of the heads is specified by the syntax; this in combination with the affixal specifications (determined by the Vocabulary Items) produces the correct output order for the morphemes at Linearization. The arrangement of the functional heads can be seen in (56).

(56) Arrangement of Cherokee TAMM Functional Heads



[23] A number of class-based morphophonological alternations muddy these waters; we do not treat these phenomena here.

[24] Demirdache & Uribe-Etxebarria (2008a, 2008b, 2011) propose that a ModP with a Mod head is involved in non-root modality. It relates a Modal Time ("the time at which the possibility or necessity under discussion holds"; 2008b:1790) to the Event Time. A similar approach might well be fruitful for root modality like that under discussion here.

4.3.1 The Tense Node

We assume that the syntactic terminal node of interest for tense is Tense; the proposed features are [past], [future] and [experienced].[25] The following (underspecified) Vocabulary Items compete for insertion into the Tense node:

(57) **Tense**

/-vv́ʔi/	⟷	[past, experienced]	(“Experienced Past”)
/-éʔi/	⟷	[past]	(“Nonexperienced Past”)
/-éesti/	⟷	[future]	(“Absolute Future”)
∅	⟷	elsewhere	

Then, of the logically possible combinations of features available to the terminal nodes, the specifications resulting in instantiation by these Vocabulary Items would be as in (58):

(58) Tense terminal nodes and Vocabulary Items

Terminal Node	[past, experienced]	[past]	[future]	
Winning Vocabulary Item	/-vv́ʔi/ ⟷ [past, experienced]	/-éʔi/ ⟷ [past]	/-éesti/ ⟷ [future]	∅ ⟷ elsewhere

4.3.2 The Mod Node

Now we turn to the syntactic expression of modality. We adopt Racy’s (2008) proposal that modal expressions involve only a handful of universal features. Considering many different types of modality, she proposes the following features: [CIRCUMSTANTIAL], [DEONTIC], [NECESSITY], [POSSIBILITY] and [EPISTEMIC]. While she takes “the unique lexical semantics of deontic expressions” (p. 197) as evidence that there is a deontic modal base in addition to Kratzer’s (1991) proposed circumstantial and epistemic bases, we will continue under the assumption that there are only two, as *ta-*/*-i* allows both deontic and non-deontic root meanings. Instead, the different meanings originate from different ordering sources, which arise pragmatically. Of her proposed features,

[25] We adopt privative features here because they are the more restrictive possibility, and equipollent features are not required given these data. However, if the “habitual” suffix is really an instantiation of Tense, we would need equipollent [past] and [future] features; [-oʔi] could then be specified as [-past, -future]. An alternate analysis would involve a T(past) node separate from T(future); T(past) and $\text{Mood}_{\text{evidential}}$ would undergo fusion.

[NECESSITY] and [POSSIBILITY] are interpretable (the difference being located in the lexical semantics of the modal expressions), while [CIRCUMSTANTIAL], [DEONTIC], and [EPISTEMIC] are uninterpretable features that need to be checked. We will employ the feature [CIRCUMSTANTIAL], but with the assumption that it encompasses several types of root modal meanings (given the right ordering source). Since *ta-*/*-i* does not distinguish either necessity or possibility, after the proposal in Racy (2008) we assume that it is realizing just the [CIRCUMSTANTIAL] feature, and is underspecified for [NECESSITY] / [POSSIBILITY].[26]

The syntactic terminal node of interest here is Mod, which heads a Modal Phrase (ModP). The feature in question is [Circumstantial]. The Vocabulary Items competing for insertion into the Mod node are as follows:

(59) **Mod**

/ta-/	←→	[Circumstantial]
/-is/ /__V; /-i/ elsewhere	←→	[Circumstantial]
∅	←→	elsewhere

If the Mod terminal node is not specified for [Circumstantial], both non-elsewhere Vocabulary Items are unavailable since they contain features not present at the terminal node, so the Vocabulary Item inserted will be the one with the null phonological exponent. A Mod node specified for [Circumstantial], on the other hand, corresponds to two Vocabulary Items with identical featural specifications but different phonological strings. Halle & Marantz's original proposal for Distributed Morphology on principle does not allow for one set of featural content to be realized in more than one place. Fission was introduced by Noyer (1992/1997) to create additional Positions of Exponence (terminal nodes) from a single complex feature bundle, but the situation here is a different one—we do not have multiple features from a bundle being realized by different strings, but two strings realizing a single feature. Our solution is to adopt

[26] "In cases where features are expressed in isolation, there will only be specification along one of these parameters. For example, if a modal only expresses [CIRCUMSTANTIAL], then it is underspecified for [NECESSITY] / [POSSIBILITY] and thus may express either" (Racy 2008:228-229).

Müller's (2007) rule of Enrichment,[27] which (as a kind of counterpart to Impoverishment) adds features post-syntactically but before Vocabulary Insertion. It is restricted to features that *already exist* in a structure (thus differentiating it from Dissociation): it is essentially doubling of a feature. The proposed rule is as follows:

(60) **Mod Enrichment**
∅ → [Circumstantial] / [Circumstantial] ____

This Enrichment rule operates on the Mod node after the syntax in the case that it is specified for [Circumstantial]; after Enrichment, Mod carries two [Circumstantial] features. This application of Enrichment is followed by Vocabulary Insertion, and the first Vocabulary Item is inserted into the terminal node as usual. However, Fission is triggered in this case, and an additional Position of Exponence created. Now there is a second terminal node with a [Circumstantial] feature, and the second Vocabulary Item specified for [Circumstantial] is inserted into this node.

Note that the two pieces of inflection appear on either side of the verb root, and in specific positions with respect to other pieces of inflection. The position of the Mod head in the hierarchy is determined by the syntax, i.e., outside Asp2 and inside (irrealis) Mood and Tense. In the case of a Mod head specified as [Circumstantial], Enrichment doubles the feature. This results in a single terminal node in a particular hierarchical position specified for two identical features. After Fission, there are two Positions of Exponence at the same level of the hierarchy, each specified for [Circumstantial]. Since each Vocabulary Item is specified as being a prefix or a suffix, linearization will result in the correct order of the pieces of inflection in the end with respect to the verb root, and the hierarchical structure ensures their proper location with respect to the other material. The figure in (61) shows the Vocabulary Items that win for each of the Mod terminal node specifications.

[27] Müller advocates Enrichment as an alternative to Noyer's analysis via secondary exponence, in (presumably) all cases of extended exponence. We do not adopt this stance here, per se, as we are not discussing extended exponence in general; rather, we support Enrichment as an option for instances of distributed exponence in particular.

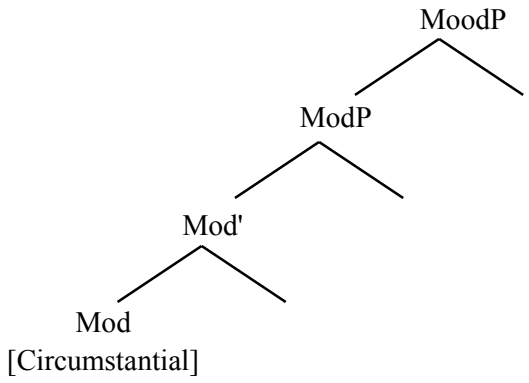
(61) Mod Terminal Nodes and Vocabulary Items

Terminal Node	[Circumstantial]	
Winning Vocabulary Item	/ta-/ ⟷ [Circumstantial] /-i(s)/ ⟷ [Circumstantial]	∅ ⟷ elsewhere

Because /ta-/ and /-i/ have the same contexts for insertion, and the two halves of the Fissioned Mod head carry the same featural specification, the Subset Principle does not determine which Vocabulary Item gets inserted into each head. However, it does not matter which Vocabulary Item is inserted first. We assume that the order of operation is random, but after one Vocabulary Item is inserted it cannot be inserted again. Regardless of whether /ta-/ or /-i/ is inserted first, their specifications as prefix and suffix, respectively, determine their relative ordering around the root in the final verb word. We show them in their final order in (62) for expository purposes.

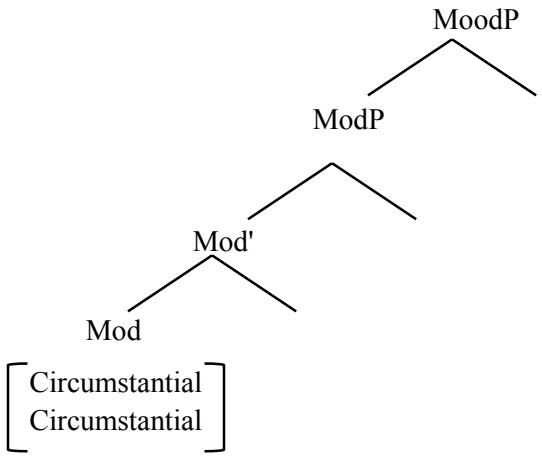
The structures in (62) show the stages of the derivation:

(62) a. After Syntax, Before Enrichment

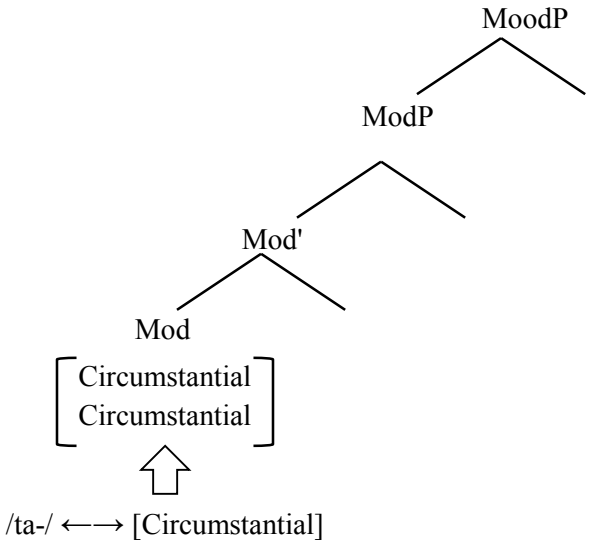


b. Enrichment (doubles the [Circumstantial] feature)
∅ → [Circumstantial] / [Circumstantial] ____

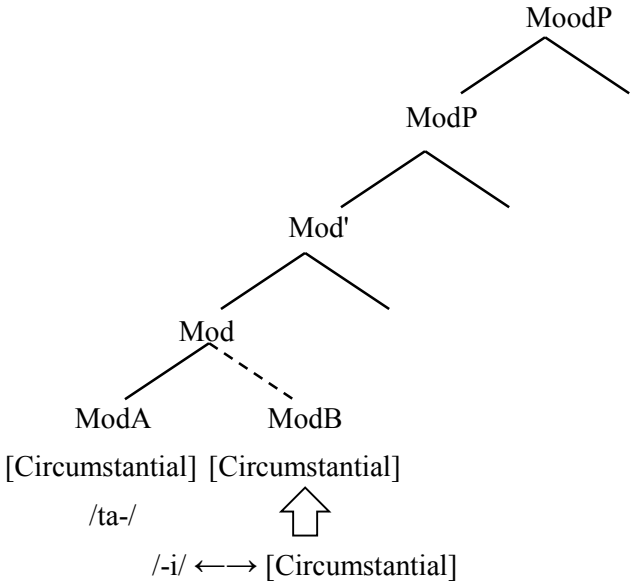
c. After Enrichment



d. Vocabulary Insertion Begins and Triggers Fission



e. Fission Has Created a Second Position;[28] Vocabulary Insertion Continues



The analysis we have presented here accounts not just for the realizations of the (relatively straightforward) Tense head in Cherokee, but also the interesting case of distributed exponence found in the instantiation of the Mod head.

4.3.3 A Possibly Similar Phenomenon in Na-Dene

Before we conclude, we would like to briefly make note of a phenomenon involving the future in the Na-Dene languages that the Cherokee data might bring to mind.[29] Rice (2000), for example, discusses future reference in Athabaskan languages (focusing on Slave),[30] which is accomplished in several ways (including by means of an optative morpheme). The morphemes of interest here are an "inceptive" prefix *d-* and an "activity" aspectual prefix *gh-* (appearing as its allomorph *a-* in the example below), which can lead to a future interpretation when they appear together. In Slave, the combination yields what Rice terms an "immediate future" (p. 250):

(63) a. d-a-łe
inceptive-situation aspect-stem
'S/he is just ready to go.'

[28] We follow Poot & McGinnis (2005) in our manner of labeling the two positions of exponence resulting from Fissioning (here, of Mod).
[29] Thanks to an anonymous *Morphology* reviewer for making us aware of this phenomenon.
[30] For Navajo, see e.g. Speas (1984 and forward); Hale (2001).

b. łá-de-d-a-dheh
‘S/he is starting to die.’

c. lí-de-d-a-ts’i
‘The wind is just starting to slow down.’

As seen in (63), the two morphemes together in Slave seem to yield a compositional meaning of inceptive + activity; however, Rice notes that in other Athabaskan languages this combination yields a “general way of marking the future” (p. 250). Cable (2010), for instance, considers data from Tlingit and the Athabaskan language Koyukon; the relevant combination of morphemes in these languages is far from compositional in appearance.

The Na-Dene cases are illustrative of discontinuous exponence, which unlike distributed exponence is characterized over a set of features (here, tense/mood/aspect). The discontinuous exponence is system-wide within this set, and involves more affixes (if that is what they are) than what we see in Cherokee, and in an order that can be described as “chaotic” (Cable 2010:14). Cable briefly considers a possible analysis of the Tlingit future in which the [FUT] head is associated with three different Spell-Out rules, and then “some kind of ‘magic’” (p. 15) allows the head to be spelled out three times.[31] Cable ultimately rejects this analysis, given that it will result in massive “accidental” homophony if implemented system-wide. Instead, he argues that while the Na-Dene cases are descriptively “radical discontinuous exponence”, formally what is involved is not inflection but a series of light verbs. While our analysis does result in some accidental homophony, it is limited and of the sort expected when reanalysis and grammaticalization occur.

While the analysis we have proposed here for Cherokee might not be right for a situation with broad, systemic discontinuous exponence, we suggest that a similar analysis would be applicable to languages with more limited distributed exponence. Just as in Cherokee, one head would undergo Enrichment and Fission, and the resulting Positions of Exponence would be filled by the two Vocabulary Items. If we are using a simplified, generalized version of Athabaskan as an example, in which the affixes in

[31] Of course, this is essentially what we have suggested for Cherokee, only we have employed an Enrichment rule instead of magic.

question are *d-* and *gh-*, both Vocabulary Items would be specified as prefixes. A complication arises in that there is no way in our proposal to specify the relative ordering of two prefixes with respect to each other—the specification of each Vocabulary Item as a prefix or suffix is with respect to the verb root. While we leave the details of this issue to future work, we suggest that a form-based rule could be used to account for the ordering—one prefix would select for the other (in this case, /d-/ would need to select for /gh-/). Vocabulary insertion is cyclic; it can "see" the results of the previous cycle (but not what lies ahead). Formally, we can treat /d-/ and /gh-/ in a way that resembles contextual allomorphy (in the spirit of Bobaljik 2000). If we are inserting the Vocabulary Item in front of the *gh-* morpheme, /d-/ is inserted; if not, /gh-/ is inserted. The Vocabulary Items would be as follows:

(64) /d-/ ⟷ [Future] /__{ gh- }
(65) /gh-/ ⟷ [Future] elsewhere

The process would be similar to what we have established for Cherokee. After the syntax, Enrichment doubles the [Future] feature on Tense (or Modality). When Vocabulary insertion begins, the elsewhere Vocabulary Item /gh-/ is inserted because the contextual environment for /d-/ is not met. Fission is triggered, and another Position of Exponence is created, specified for [Future]. Vocabulary Insertion continues; since /gh-/ is already present, the Vocabulary Item /d-/ is inserted.

5 Conclusion

This analysis accounts for the forward-referring properties of Cherokee *ta-/-i*. It also accounts for the fact that *ta-/-i* can appear across tenses with forward-pointing meaning in each case, improving on traditional descriptions of *ta-/-i* as a future tense marker. Finally, our Distributed Morphology analysis paves the way for further formal treatment of the TAMM morphology in the language, as well as the treatment of "circumfixes" cross-linguistically (Caballero & Harris 2012:171, for example, cite the Georgian circumfix *me-/-e*, which creates ordinal numbers out of cardinals; Reed 2014 discusses a possible circumfix marking perfect aspect in Classical Greek).

Our analysis has implications beyond the specific analysis of *ta-/-i* presented here. While existing work on Cherokee has generally taken there to be aspect and tense

expressed in various places throughout the verb word, no account has yet attempted to sort out the TAMM hierarchy. Our work takes an important step towards an analysis that includes all TAMM morphology in Cherokee, and possibly in other Iroquoian languages as well. This work points to several areas for future research, including investigation into the nature of "habitual aspect" in Cherokee and where it fits into the hierarchy outlined here. The "derivational" suffixes and "prepronominal" prefixes are also both unexplored areas for future research: Which of these morphemes have aspectual or modal semantics and/or functions, and what significance does their ordering within the verb word have on the interpretation of the verbal complex as a whole?

Answers to these questions will help create a more complete understanding of the verbal system of Cherokee. Here we have provided an analysis of Cherokee *ta-*/*-i* as a marker of modality rather than future tense and expanded our understanding of Cherokee's verbal hierarchy.

Acknowledgments

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References

Ackerman, F., & Stump, G. (2004). Paradigms and periphrastic expression: a study in realization-based lexicalism. *Projecting Morphology*, 111-157.

Anderson, S.R. (2001). On some issues in morphological exponence. In G. Booij and J. van Marle (Eds.), *Yearbook of Morphology 2000*, Kluwer Academic Publishers, Dordrecht/Boston/London, pp. 1-18.

Arka, W. (2012). Projecting morphology and agreement in Marori, an isolate of southern New Guinea. Language Documentation & Conservation Special Publication No. 5 (December 2012) *Melanesian Languages on the Edge of Asia: Challenges for the 21st Century*, ed. by Nicholas Evans and Marian Klamer, 150–173.

Baerman, M., Brown, D., & Corbett, G. G. (2010). Morphological complexity: a typological perspective. Surrey: University of Surrey, MS. Online: http://www. morphology.surrey.ac.uk/Papers/Morphological_complexity pdf.

1102 Baerman, M. & Corbett, G.G. (2012). Stem alternations and multiple exponence. *Word*
1103 *Structure 5.1*, 52-68.
1104 Baker, M. (1985). The Mirror Principle and morphosyntactic explanation. *Linguistic*
1105 *Inquiry* 16(3), 373-415.
1106 Binnick, R.I. (1991). *Time and the Verb*. Oxford: Oxford University Press.
1107 Bobaljik, J.D. (2000). The ins and outs of contextual allomorphy. *University of Maryland*
1108 *working papers in linguistics*, *10*, 35-71.
1109 Caballero, G. & Harris, A.C. (2012). A working typology of multiple exponence. In
1110 Ferenc Kiefer, Mária Ladányi & Péter Siptár (Eds.), *Current Issues in Morphological*
1111 *Theory: (Ir)Regularity, Analogy and Frequency*. *Selected papers from the 14th*
1112 *International Morphology Meeting*, *Budapest, 13-16 May 2010*. John Benjamins, pp.
1113 163-188.
1114 Cable, S. (2010). Radically Discontinuous Exponence in the Inflectional Morphology of
1115 Na-Dene Languages. University of Massachusetts, Amherst. (Handout from talk
1116 given at 2010 LSA Meeting). Online: http://people.umass.edu/scable/papers/RDE-in-
1117 NaDene.pdf.
1118 Carstairs-McCarthy, A. (1987). *Allomorphy in inflexion*. New York: Croom Helm.
1119 Cinque, G. (1999). *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. New
1120 York: Oxford University Press.
1121 Cook, W. (1979). *A grammar of North Carolina Cherokee*. Ph.D. Dissertation, Yale.
1122 Coon, J. (2010). *Complementation in Chol (Mayan): A Theory of Split Ergativity*. Ph.D.
1123 Dissertation, MIT.
1124 Copley, B. (2009). *The Semantics of the Future*. New York: Routledge.
1125 Dik, S. C. (1989). *The Theory of Functional Grammar*. Berlin: Mouton de Gruyter.
1126 Demirdache, H., & M. Uribe-Etxebarria. (1997). The syntax of temporal relations: a
1127 uniform approach to tense and aspect. In *Proceedings of the WCCFL 16*, 145-159.
1128 --. (2000). The primitives of temporal relations. In: Martin, R., Michaels, D., Uriagereka,
1129 J. (Eds.), Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik.
1130 MIT Press, Cambridge, MA, 157–186.

--. (2002). Temps, aspects et adverbes. *Temps et Aspect. De la morphologie à l'interprétation. Collection Sciences du Langage, Presses Universitaires de Vincennes*, ed. by B. Laca. Paris, 125–175.

--. (2004). The syntax of time adverbs. In *The Syntax of Time*, ed. by Jacqueline Guéron & Jacqueline Lecarme. MIT Press, Cambridge, MA, 143-179.

--. (2005). Aspect and temporal modification. In: Kempchinsky, P., Slabakova, R. (Eds.), *The Syntax, Semantics and Acquisition of Aspect*. Kluwer Academic Publishers, Dordrecht/Boston/London, pp. 191–221.

--. (2007a). Economy Constraints on Temporal Subordination. In *Recent Advances in the Syntax and Semantics of Tense, Aspect and Modality*, ed. by Louis De Saussure, Jacques Moeschler, & Genoveva Puskás, 169-192. Berlin: Mouton de Gruyter. 169-192.

--. (2007b). The syntax of time arguments. In: Zagona, K. (Ed.), Special Issue on Tense. *Lingua* 117:330-366.

--. (2008a). 'On the temporal syntax of non-root modals.' In Jacqueline Guéron, Jacqueline Lecarme, eds., *Time and Modality*, 79-113.

--. (2008b). Scope and anaphora with time arguments: The case of 'perfect modals'. *Lingua* 118.1790-1815.

--. (2011). Non-root past modals. *Cahiers Chronos* 23:43-60.

Gurevich, O. (2006). *Constructional Morphology: The Georgian Version*. Ph.D. dissertation, University of California, Berkeley.

Haag, M. (2001). Cherokee tone associations with overt morphology. *Chicago Linguistics Society* 37.2: 413-425.

Hale, K. (2001). Navajo Verb Stem Position and the Bipartite Structure of the Navajo Conjunct Sector. *Linguistic Inquiry* 32: 678-693.

Halle, M. (1997). Distributed Morphology: Impoverishment and Fission. In B. Bruening, Y. Kang, and M. McGinnis (Eds.), *MIT Working Papers in Linguistics 30: PF: Papers at the Interface*, pp. 425–450.

1159 Halle, M., & Marantz, A. (1993). Distributed morphology and the pieces of inflection. In
1160 K. Hale & S. J. Keyser (Eds.), *The View from Building 20* (pp. 111-176). Cambridge,
1161 MA: MIT Press.
1162 Harbour, D. (2008). "Discontinuous Agreement and the Syntax-Morphology Interface".
1163 *Phi Theory: Phi-Features across Modules and Interfaces* ed. by Daniel Harbour,
1164 David Adger & Susana Béjar, 185–230, Oxford: Oxford University Press.
1165 Harley, H., & Noyer, R. (1999). State-of-the-Article: Distributed Morphology. *Glot*
1166 *International* 4, 3-9.
1167 Iatridou, S., Anagnostopoulou, E., & Izvorski, R. (2001). Observations about the form
1168 and the meaning of the Perfect. In M. Kenstowic (Ed.), *Ken Hale: A Life in Language*
1169 (pp. 189-238). Cambridge, MA: MIT Press.
1170 Kiefer, F., Ladányi, M., & Siptár, P. (Eds.). (2012). *Current Issues in Morphological*
1171 *Theory: (Ir)regularity, Analogy and Frequency: Selected Papers from the 14th*
1172 *International Morphology Meeting, Budapest, 13-16 May 2010 (Vol. 322).*
1173 Amsterdam: John Benjamins.
1174 King, D. (1975). *A grammar and dictionary of the Cherokee language*. Ph.D.
1175 Dissertation, University of Georgia.
1176 Klein, W. (1992). The present perfect puzzle. *Language* 68.525-52.
1177 --. (1994). *Time in Language*. New York: Routledge.
1178 --. (1995). A time relational analysis of Russian aspect. *Language* 71.669-695.
1179 Kratzer, A. (1991). Modality. In A. von Stechow and D. Wunderlich (Eds.), *Semantics:*
1180 *An International Handbook of Contemporary Research*, pp. 639– 650. Berlin: de
1181 Gruyter.
1182 Landman, F. (1992). The progressive. *Natural Language Semantics* 1.1-32.
1183 Lewis, M. P., Simons, G. F., & Fennig, C. D. (Eds.). (2013). *Ethnologue: Languages of*
1184 *the World, Seventeenth edition*. Dallas, Texas: SIL International. Online version:
1185 http://www.ethnologue.com.
1186 Matthews, P.H. (1972). *Inflectional Morphology*. Cambridge: Cambridge University
1187 Press.

--. (1974). *Morphology*. Cambridge: Cambridge University Press.

Montgomery-Anderson, B. (2008). *A reference grammar of Oklahoma Cherokee*. Ph.D. Dissertation, University of Kansas.

Müller, G. (2007). Extended exponence by enrichment: Argument encoding in German, Archi, and Timucua. In T. Scheffler, J. Tauberer, A. Eilam, & L. Mayol (Eds.), *Proceedings of the 30th Annual Penn Linguistics Colloquium* (pp. 253-266). Philadelphia: University of Pennsylvania.

Munro, P. (Ed.). (1996). *Cherokee Papers from UCLA*. *UCLA Occasional Papers in Linguistics 16*. Los Angeles: University of California.

Noyer, R. (1992). Features, positions and affixes in autonomous morphological structure. Doctoral dissertation, MIT. [Published by Garland, New York, 1997.]

Pancheva, R., & von Stechow, A. (2004). On the present perfect puzzle. In K. Moulton & M. Wolf (Eds.), *Proceedings of NELS 34* (pp. 469-485). BookSurge Publishing.

Poot, A.G., & McGinnis, M. (2005). Local versus long-distance fission in Distributed Morphology. In *Proceedings of the 2005 Canadian Linguistics Association Annual Conference*.

Portner, P. (1998). The progressive in modal semantics. *Language* 74:4.760-87.

Pulte, W. (1985). The experienced and nonexperienced past in Cherokee. *International Journal of American Linguistics* 51.4: 543-544.

Pulte, W., & Feeling, D. (1975). *Outline of Cherokee grammar with Cherokee-English dictionary*. Tahlequah, OK: Cherokee Nation of Oklahoma.

Reed, S. (2014). A Distributed Morphology analysis of tense and aspect in Greek. In Annamaria Bartolotta, ed. *The Greek Verb*. *Morphology, Syntax, and Semantics*. *Proceedings of the 8th International Meeting on Greek Linguistics, Agrigento, October 1-3, 2009*, 277-290. Walpole, MA: Peeters, Louvain-la-Neuve.

Scancarelli, J. (2005). Cherokee. In J. Scancarelli & H. K. Hardy (Eds.), *Native Languages of the Southeastern United States* (pp. 351-384). Lincoln: University of Nebraska Press.

1216 Speas, M. (1984). Navajo Prefixes and Word Structure Typology. In Speas, Margaret and
1217 Richard Sproat (eds.), *MIT Working Papers in Linguistics 7*. MIT Working Papers in
1218 Linguistics. Cambridge, MA.
1219 Stone, M.S. (2010). Nominalizations without tense: Evidence from Cherokee. Ms.,
1220 University of Arizona.
1221 Stump, G. (2001). *Inflectional morphology: a theory of paradigm structure*. Cambridge:
1222 Cambridge UP.
1223 Trommer, J. (2002). "The Interaction of Morphology and Syntax in Affix Order". *The*
1224 *Yearbook of Morphology* 2002 ed. by Geert Booij & Jaap van Marle, 283–324.
1225 Uchihara, H. (2013). *Tone and accent in Oklahoma Cherokee*. Ph.D. Dissertation, The
1226 University at Buffalo, State University of New York.