A FEATURE GEOMETRIC APPROACH OF VERBAL INFLECTION IN ONONDAGA[1]

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Abstract. Iroquoian inflectional verbal morphology is well-documented in the descriptive literature (Chafe 1961, Lounsbury 1949, 1953, Michelson and Doxtator 2002), but has received less attention from a generative perspective. Most generative analyses of verbal inflection rely on the notion of tense as a central category and the universal projection of a T(ense) Phrase. Onondaga (Northern Iroquoian), however, often makes very little use of tense as a grammatical concept, capitalizing instead on the notions of aspect and mood, thereby rendering the standard generative approach inappropriate. Instead, we propose that a feature geometric analysis (Cowper 2005), which does not rely on tense as a central concept, is better suited for analysing the Onondaga verbal inflectional domain.

Keywords: Onondaga, tense, aspect, mood

1. Introduction

Onondaga is a Northern Iroquoian language spoken in southern Ontario, Canada, and in New York State in the US. The Onondagas make up part of the Iroquois Confederacy, or Haudenosausee, which also includes the Senecas, Mohawks, Cayugas, Oneidas and the Tuscaroras (who joined after the original formation of the Confederacy). The origins of Onondaga society can be traced back to at least the eleventh century in northern New York (Bradley, 1987). The Onondagas, along with the other members of the Confederacy, continue to live in the same areas they have occupied for about a millennium.

Iroquoian inflectional verbal morphology is well-documented in the descriptive literature (Chafe 1961, Lounsbury 1949, 1953, Michelson and Doxtator 2002), but has received less attention from a generative perspective. The goal of this paper is to provide a formal account of the Onondaga verbal inflectional system in a language where tense is not the crucial ingredient of INFL, but where the realis versus irrealis distinction, alongside aspectual distinctions seem paramount. In order to do so, we employ a feature geometric account following work by Cowper (2005), Cowper and Hall (1999), Kyriakaki (2006), and Slavin (2008). However, prior to proposing the theoretical account, we first discuss the empirical properties of the T(ense), A(spect), M(ood) system in Onondaga and show that this language appears to be, at least in some cases, tenseless. The analysis has interesting consequences for syntactic theory more generally, especially

[1] The Onondaga data in this paper were gathered at the Onondaga Learning Centre, Ohsweken, Ontario, Canada or are from Woodbury (2003), as indicated. While we are very grateful to our consultants, and especially Nora Carrier and Gloria Williams, all errors are our own. This research was partially supported by a Sogang Research Grant of 2011 and 2012 and a SSHRC standard research grant (410-2011-2417).
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under views which take finiteness to be equivalent to tense (e.g. Carnie 2002: 149, inter alia).

2. Mood, tense, and aspect in Onondaga

The chart in Table 1 (based on Lounsbury 1949, 1953) illustrates the order of morphemes for all Northern Iroquoian languages. The elements bolded and contained in double edged boxes are required in all verbal constructions. Crucially, the one constant of the Northern Iroquoian, and implicitly, Onondaga, Infl domain is the presence of aspect and not of tense.

pre-pronominal prefixes	**pronominal prefixes**	SRFL or REFL	Incorporated Noun	**Verb √**	Derivational suffixes	**aspect suffixes**	Expanded aspect suffixes

Table 1. Verbal Template for Northern Iroquoian

There are four aspects in Onondaga. The first is the "habitual" aspect (HAB). This aspect is used to refer to an event that takes place repeatedly or on an on-going basis. The second is the "punctual" aspect (PUNC). This aspect refers to an entire event in its completeness. When used in the past tense, the event is described as "over and done-with." The PUNC cannot describe an event that is interrupted or incomplete. The third aspect is the "stative" (STAT) aspect and it refers to an event that is ongoing or incomplete or, if it occurs in the past tense, an event that has some bearing on the present (i.e. like the English present perfect). Finally, there is the "purposive" aspect (PURP), which refers to imminent action, and usually implies intent or volition on the part of the subject. Active verbs can appear with any of the first three aspects. Motion verbs can appear with any of all four aspects. Lexically specified stative verbs can only appear with the stative aspect (Woodbury 2003: 38). Since of the four aspect types, only the HAB, PUNC, and STAT aspects are used productively, we focus our discussion on them[2].

2.1 Simplex aspect constructions

Simplex aspect constructions refer to verb forms that contain one of three aspect markers introduced above: habitual (HAB), stative (STAT), and punctual (PUNC). In this section, we discuss each type of aspect in turn.

[2] In addition, it is unclear whether 'purposive aspect' is indeed aspectual in the same way as the HAB, PUNC, and STAT aspects are. Not only is intent/volition implied, but the PURP can be used together with the stat, see (i), where it denotes a higher head in the Infl domain.

(i) sahohdęd**y**o̧**h**a:dye**ʔ**
s- wa**ʔ**- ho- ahdęd**y**o̧-**h**- adye-**ʔ**
REP-FACT- 3SG.M.ACC-travel- STAT-CONT-PURP
'He is going home.' / 'He is on his way home.'

2.1.1 Description of the habitual (HAB)

Iroquoain descriptive literature gives the following descriptions for the HAB. Lounsbury (1953: 85) states that, "Forms in the serial [HAB] aspect represent actions which take place at repeated points in time; for the most part these correspond to the simple 'present tense' form in English," and Woodbury (2003:30) mentions that, " They [HAB forms] are usually glossed in the simple present, e.g. *I sew*, or in the progressive, *I am sewing*, or both [...]."

Our findings show that the habitual is used to indicate an ongoing activity or state of affairs, see (1a-d). As in (1d), it often appears in nominalized forms and in professions:

(1) a. hayę́thwas[3]
ha- yę́thw-as
3SG.M.NOM-plant- -HAB
'He plants / He is planting.'

b. khenowę́khwaʔ neʔ Meri
khe- nowę́hgw-haʔ ne Mary[4]
1SG.NOM:3SG.F.ACC-love- -HAB NE Mary
'I love Mary.'

c. henǫ́hshǫnyę́nik
he- nǫ́hsh-ǫny- ę́ni- k
1.SG.NOM:3.SG.M.ACC-house-make-BEN-HAB
'I'm making a house for him.'

d. ǫdę́ihǫ:nyę́nik
ǫ- adę́- Rih- ǫny- ę́ni- k
3.SG.F.ACC-SRFL-matter-make-BEN-HAB
'She's a teacher.' / 'She is teaching.'

In sum, the HAB covers both states and imperfective events, so is durative and unbounded, hence an instance of imperfective viewpoint (in the sense of Comrie 1976, etc).

2.1.2 Description of the stative (STAT)[5]

With respect to the [STAT] aspect, there is a slight discrepancy in the descriptive literature. Lounsbury (1953: 85) claims that, "Forms in the perfective [STAT] aspect represent states; some of these are the results of actions," while Woodbury (2003: 30)

[3] The following abbreviations and notations are used: ACC = accusative, BEN = benefactive, CIS = cislocative, CONT = continuative, DIS = dislocative, DU= dual, DUC = dualic, EPEN = epenthetic vowel, F = feminine, FACT = factual, HAB = habitual, HAB.PST = habitual past, JOIN = joiner vowel, epenthetic vowel that occurs between incorporated noun and verb stem, M = masculine, MOD = modalizer, NE = element of unclear function found in nominal expressions, NOM = nominative, NT = neuter, OPT = optative, PRES = present tense, PUNC = punctual, PURP = purposive, REFL= reflexive, REP = repetitive, SG = singular, SRFL = semi-reflexive, STAT = stative, STAT.PST = stative past, TLOC = translocative, √ = root, R = ancient 'r', ʔ = glottal stop.

[4] In the habitual and expanded habitual aspects, the sequence *hgw-ha* is replaced by *khwa* (cf. Zeisberger 1887: 117 in Woodbury 2003: 717).

[5] STAT aspect forces ACC/patient marking on subjects of intransitives; we do not focus on this issue here.

mentions that, "In English they [STAT] are usually glossed with the perfect, e.g., *I have sewn it*, or, depending on the meaning of the base, with the progressive, *I am sewing*, Chafe (1980)".

Our findings seem to concur more with those of Lounsbury (as well as Abbott 2000, for Oneida), in that all the meanings of the [STAT] suggest states and its progressive use is restricted in predictable ways.

For lexically stative roots, typically translated as adjectival non-verbal predication in English, STAT indicates a state, as in (2):

(2) hodaʔgaideʔ
ho- atɬdaʔkgaid- eʔ
3SG.M.ACC-be.healthy-STAT
'He is healthy/feels good.'

Otherwise, use of STAT signals a state that is the result of some previous action and, in this case, it is translated with the present perfect in English, as shown in (3):

(3) a. (onihsih dya) gonęhayęthwih
(long.time.ago dya-) ko- nęh- a- yęthw- ih
CISLOC-3SG.F.ACC-corn-JOIN-plant-STAT
'She has planted corn (a long time ago).'
b. ho- ahtǫ- h
3.SG.M.ACC-disappear-STAT
'He has disappeared.'

The data in (4)-(5) show that a progressive rendering in English seems to only be an option when HAB has a specialized function so that its insertion is blocked; compare (4a) with (4b) and (5a) with (5b):

(4) a. hodaʔks
ho- itaʔk- s
3SG.M.ACC-sleep-HAB
'He is sleepy.'
b. hodaʔwih
ho- itaʔw-ih
3SG.M.ACC-sleep-STAT
'He is asleep/sleeping.'

(5) a. ekhǫnyahaʔ
e- khw-ǫny- ahaʔ
3SG.F.NOM-food-make-HAB
'She is a cook.'/'She cooks (habitually).'
b. hokhǫnih
ho- khw-ǫny- ih
3SG.M.ACC-food-make-STAT
'He is cooking.'

In sum, use of the STAT aspect: (i) either is resultative – in this case it also contains perfectivity (hence its alternate name) in that there is some previous finished event which results in some state, or (ii) indicates a lexically "stative" root, or (iii) replaces the HAB idiosyncratically. Crucially, in all its meanings, STAT instantiates imperfective aspect and its prototypical use is to encode result state since the last two uses are lexically determined, so not part of the core syntactic derivation.

2.1.3 Description of the punctual (PUNC)

Following Lounsbury (1953: 85), "Forms in the punctual aspect represent actions which take place at some particular point in time; this point in time may be past, future, or indefinite, depending on the pre-pronominal tense prefix." For Woodbury (2003: 30), on the other hand, "The punctual aspect requires one of three modal prefixes, the *factual* waʔ, the *future* ę-, or the *optative* a:-. The factual is glossed with the simple English past, e.g. *She sewed it*; the future is glossed with the English future, e.g. *I will sew it*, and the optative is glossed variously in English as *I may sew*, *I should sew*, *I would sew*, etc." (6) illustrates the PUNC with some of our own data:

(6) a. waʔhayęthwaʔ
waʔ- ha- yęthw-aʔ
FACT-3SG.M.NOM-plant- PUNC
'He planted it.'

b. aʔsehdeʔwaʔkhyadǫʔ
aʔsehtdeʔ waʔ-k- hyatǫ-
yesterday **FACT**-1SG.NOM-write-PUNC
'I wrote it yesterday.'

c. ęhayęthwaʔ
ę- ha- yęthw-aʔ
FUT-3SG.M.NOM-plant- PUNC
'He will plant (it).'

d. ęgek
ę- k- ek-Ø
FUT-1SG.NOM-eat-PUNC
'I will eat it.'

e. a:gek
a- k- ek- Ø
OPT-1SG.NOM-eat-PUNC
'I would eat it.'

The one thing to note is that all verbal forms with PUNC aspect have a pre-pronominal prefix (bolded in (6)). While these pre-pronominal prefixes are ruled out with the HAB and the STAT aspects in simplex constructions, they are obligatory with the PUNC (this is a well known fact of Iroquoian – see Abbott 2000, Chafe 1960a, b, c, d, 1961, Froman et al. 2002, Lounsbury 1949, 1953, Michelson and Doxtator 2002, Woodbury 2003). Examples are shown in (7):

(7) a. ahse:deh *(waʔ)hayenawaʔs
waʔ- ha- yenawaʔs- -Ø
yesterday FACT-———3SG.M.NOM- help- -PUNC
'He helped yesterday.'

b. (*waʔ)hayenawaʔseh
waʔ- ha- yenawaʔs____-eh
FACT-3SG.M.NOM-help- ____-STAT
Intended: 'He has/had helped.'

c. *(ęʔ)hayenawaʔs
ęʔ- ha- yenawaʔs-Ø
FUT-3SG.M.NOM-help- --PUNC
'He will help.'

d. (*ęʔ)hayenawaʔsek/eh
ęʔ- ha- yenawaʔs-ek/eh
FUT-3SG.M.NOM-help- --HAB/STAT

e. *waʔhayęthwas
waʔ- ha- yęthw-as
FACT-3SG.M.NOM-plant- --HAB

f. *hayęthwaʔ
ha- yęthw-aʔ
3SG.M.NOM-plant- --PUNC

Compare (7e) to (6a) and (7f) to (6c). These properties can be summarized in Table 2.

prepronominal prefix		Root		Aspect Suffix
FACT FUT OPT				PUNC
Ø				HAB
Ø				STAT

Table 2. Interim summary

At this point, the following questions arise: (i) what is the role of PUNC and how does it differ from that of STAT and HAB? (ii) why does PUNC require pre-pronominal prefixes, while STAT and HAB cannot combine with these? (iii) are these pre-pronominal prefixes instances of Tense or Mood?

For (i), the preliminary answer is that, unlike the HAB and the STAT, which we have seen are instances of imperfective aspect, PUNC denotes a situation viewed in its entirety, so, instantiates perfective viewpoint aspect. As for (ii), the data as in (8) might provide some insight:

(8) waʔeyęnędaʔnhaʔ gokhǫnih /*waʔekhǫnyaʔ
waʔ- e- yęnętdaʔ-nhaʔ kgo- khw-ǫny- ih /waʔ-e-khw-ǫny-aʔ
FACT-3SG.F.NOM-finish- PUNC 3SG.F.ACC-food-make-STAT /FACT-…-PUNC
'She finished cooking.'

(8) shows that, while PUNC appears with 'finish', it cannot appear on the event of cooking and the STAT is required instead. While the event of finishing is punctual, the event of making food cannot be momentary, so must be durative. Since, following Smith (1991), non-durative/punctual situations present a "closed structure which appears at a point in time," we can assume they need some manner of temporal anchoring. In the next section, we argue that, in Onondaga, temporal anchoring is realized via modality in conjunction with (im)perfectivity, rather than via tense[6].

2.2 Modality as temporal anchoring

There are three prepronominal prefixes in Onondaga, all illustrated in (6). At first glance the data in (6) might indicate that the factual morpheme (FACT) expresses past tense, the future morpheme (FUT), future tense, while the optative morpheme (OPT) expresses irrealis mood. Since both tense and mood seem to be involved, one could think of Onondaga as having a high Infl head in which tense and mood features merge (i.e., similar to English T, which hosts both tense and mood, typically in complementary distribution). It is perhaps unsurprising then that labelling varies between "tense" (see Lounsbury 1953, for Oneida) and "mood" (Baker and Travis 1997, for Mohawk, Chafe 1960a, b, c, d, 1961, for Seneca, Foster 1985, 1986). Our findings suggest that a modal account is more accurate given the semantics (either realis or irrealis) and the distribution of these prefixes (recall restriction to PUNC aspect in simplex situations).

A more careful investigation reveals that the FACT modal prefix is not a past tense marker but rather indicates that the speaker knows that the event has happened for a fact. Since we are normally only sure about events that happened in the past, it typically has a past tense reading. However, it is not always the case that anteriority to the moment of speech is denoted. Also possible are: (i) a root/dynamic modal value, as in (9a-b), (ii) a performative value, as in (10), and a (iii) factual/indubitable present tense value, as in (11).

(9) a. wąʔsgéʔ kheh neʔ jihahʔ
wąʔ- s- kę- ʔ kheh neʔ jihah
FACT-2SG.NOM-see-PUNC QU NE dog
'Did you see the dogʔ' /
'Can you/are you able to see the dog?'

b. wąʔhgeʔ neʔ sanohsaʔ
wąʔ- k- kę- ʔ neʔ sanohsaʔ
FACT- SG.NOM-see-PUNC NE your.house
'I saw your house.' /
'I'm able to/can see your house.' (say, from my home)

(10) wąʔgnihsé:noh neʔ shagoksdeʔtshä:ʔ dehseʔ howahksdeʔtshä:ʔ
wąʔ- kni- hsęn- o- h …
FACT-1SG.NOM:2DU.ACC-name- give-PUNC
'I name you husband and wife.'

[6] See Jaszczolt (2009) on conceptualisations of temporal distinctions in terms of possibility and necessity.

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(11) gaę no:h hwaʔheʔ
kaę no:h (h)- waʔ- ha- e- ʔ
which place TLOC-FACT-3SG.M.NOM-go/be-PUNC
'Where is he going?'

In addition, FACT...PUNC sequences are ruled out with negation, as seen in (12):

~~(12) 'She didn't cook':~~
(12) hiya deʔagokhonih /*hiya deʔwaʔekhonyaʔ
hiya ~~td~~eʔ- ago- khw-ony- ih / hiya ~~td~~eʔ- waʔ- e- khw- ony-aʔ
no NEG-3SG.F.ACC-food-make-STAT / NEG FACT-3SG.F.NOM-food-make-PUNC
'She didn't cook'

One concern could be whether it is the PUNC (and not the FACT) that is ruled out in negative contexts. However, the data in (13) show that complementarity of distribution is between the FACT modal prefix and NEG and not between NEG and PUNC aspect[7].

(13) hiya tha:yekhonyaʔ
hiya tha:- ye- khw-ony- aʔ
no CONTR.OPT-3SG.F.NOM-food-make-PUNC
'She might not cook.'

So, while temporal distinctions are clearly available in Onondaga (see also Baker and Travis 1995, for Mohwak), FACT does not represent an instance of past tense but rather denotes **a necessarily true proposition** (i.e. one which is true in any circumstance and cannot be false).

The default past tense interpretation of FACT ... PUNC follows in a straightforward manner once we agree that Onondaga does not mark tense in these constructions. Following Smith (2007), perfective events are by default interpreted as past, while imperfective events are interpreted as present in "tenseless" languages. As such, the perfectivity of PUNC will automatically trigger a past tense interpretation, while the imperfectivity of STAT and HAB will render the situation in the 'now'.

We next need to account for the FUT and OPT. Foster (1985) argues that FUT is more about probability and calls it a 'predictive' mood, while the OPT expresses what the speaker thinks is desirable or possible, so has a more "indefinite" flavour to it (but see Baker and Travis 1995 for some counter-arguments). Neither express events that have happened, so can be true or false (which is why they can combine with negation). Our findings support the claim that both FUT and OPT denote irrealis modality and seem to support the fact that FUT is predictive. Consider the data in (14):

[7] Note in passing that HAB, on a par with the STAT, (12), and PUNC, (13), can also occur with negation; see (i) – this is unsurprising:
(i) hiya deʔekhonyahaʔ
hiya ~~td~~eʔ- e- khw-ony- ahaʔ
no NEG-3SG.F.NOM-food-make-HAB
'She never cooks.'

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(14) a. ęsa:hahdę:dyaʔ
ę- sa- ha- ahtdętdyo-aʔ
FUT-REP-3SG.M.NOM-leave- PUNC
'He will be going home.' ("predictive" irrealis)

b. he:heʔ osahahdę:dyaʔ
ha- eR- heʔ o- sa- ha- ahtdętdyo-aʔ
3SG.M.NOM- want-HAB OPT-REP-3SG.M.NOM-travel- PUNC
'he want' 'he might/may/could go home.'
'He is planning on going home.' ('indefinite' irrealis)

c. sahohdędyohá:dyeʔ
sa- waʔ- ho- ahtdętdyo-h- atdye-ʔ
REP-FACT-3SG.M.ACC-travel- STAT-CONT-PURP
'He is going home.' / 'He is on his way home.' (indubitable)

In sum, while sometimes labelled "tense", these pre-pronominal prefixes are best viewed as marking a realis-irrealis/factual-non-factual distinction, so as modal elements, rather than tense elements. Thus, at least in simplex aspectual constructions, temporal anchoring in Onondaga is realized either via the interaction of mood and aspect (i.e. for perfectivity) or via the default present tense interpretation for imperfective aspect.

2.3 Complex aspect constructions

Closer investigation, however, reveals that, in addition to the simplex aspect constructions, Onondaga exhibits constructions where the habitual and stative can be augmented by suffixes that the speakers refer to as the "habitual past" (HAB.PST) and the "stative past" (STAT.PST), respectively. These are traditionally described as past tense morphemes. Semantically speaking, the data reveal that the HAB.PST is an imperfective past, see (15), while the STAT.PST is a perfective past, see (16)[8]:

(15) a. howakhonyeníhgwaʔ
howa- khw-ony- eni- k- kwaʔ
3SGF.NOM:3SGM.ACC -food-make-BEN-HAB-HAB.PST
'She used to cook for him.'

b. khenowękhwahgwaʔ
khe- nowęhkew-haʔ- kwaʔ
1SG.NOM:3SG.F.ACC-love- HAB-HAB.PST
'I used to love her.'

[8] The STAT.PST can appear alongside the purposive too, as long as past perfectivity is implied, as in (i):
(i) hadowäthęʔnaʔ
ha- atowät-h- ęʔ- naʔ
3SG.M.NOM-hunt- DIS-PURP-STAT.PST
'He had intended to hunt.' (Woodbury 2003: 38)
The dislocative (DIS) is a future suffix meaning 'going to' and showing intention here (or movement, elsewhere); it is used with purposive aspect.

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c. thayęthwasgwaʔ
t- ha- yęthw-as- kwaʔ
CIS-3SGM.NOM- plant- HAB-HAB.PST
'He used to plant.'

d. hadaʔgwaʔ
ha- tɗ- aʔ- kwaʔ
3SG.M.NOM-stand-STAT-HAB.PST
'He was standing.'

(16) a. howakhonyęnihnaʔ
howa- khw-ony- ęni- h- naʔ
3SGF.NOM:3SGM.ACC-food-make-BEN-STAT-STAT.PST
'She had cooked for him.'

b. agidaʔwihnaʔ
wak- itaʔw-ih- naʔ
1.SG.ACC-sleep- STAT-STAT.PST
'I had been sleeping.'

c. shagoyęthwęníːhnaʔ
shako- yęthw-ęni- ih- naʔ
3.SG.M.NOM:3.ACC-plant- BEN-STAT-STAT.PST
'He had planted it for her.'

As was shown in section 2.1.3, the habitual and stative cannot appear with modal prefixes. We suggest that this is due to their semantics.

On the one hand, imperfectives, as ongoing eventualities do not focus on the event as a whole unit, so cannot denote a necessarily true proposition (in this sense they are indefinite like the future and the optative). Consequently, both FACT ... STAT and FACT ... HAB sequences are semantically impossible, so ruled out in the morphosyntax.

On the other hand, the imperfective in Onondaga refers to situations in the actual world and cannot have in intentional/future value as, for instance, in some Slavic languages (Arregui and Rivero 2010). Unlike with the FACT, imperfectives can appear with the FUT and the OPT provided their default realis connotation has been 'annihilated.' This can obtain in one of two ways: (i) either by adding the modalizer [MOD] *–(e)k*, as in (17), or by using a complex aspect construction (i.e. expanding the HAB and STAT with the HAB.PST and STAT.PST, respectively), as in (18)-(20). The examples under (17) further show that, unlike with the complex aspect constructions seen in (15)-(16), modal prefixes are obligatorily required when the modalizer is present, (17e) – though, of course, the factual prefix is impossible, (17b):

(17) a. dyęgwaʔ akhenowękhwak
tyękwaʔ a- khe- nowęhkɛw-haʔ- ek
maybe OPT-1SG.NOM:3SG.F.ACC-love- HAB-MOD
'Had I loved her.'

b. * waʔkhenowękhwak
waʔ- khe- nowęhkɛw-haʔ - ek
FACT-1SG.NOM:3SG.F.ACC-love- HAB-MOD

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c. ęgayęthwik
ę- ka- yęthw-ih- ek
FUT-3SG.F.ACC- plant- STAT-MOD
'It will have been planted.'

d. ęhayęthwasek
ę- ha- yęthw-as- ek
FUT-3SG.NOM-plant- HAB-MOD
'He will plant.'

e. *hokhǫnihek
ho- khw-ǫny- ih- ek
PAT-food-make-STAT-MOD

(18) FUTURE HABITUAL:
ęhesninowękhwahgwaʔ
ę- hesni- nowęhkgw-haʔ- kwaʔ
FUT-2DU.NOM:3.SG.M.ACC-love- HAB-HAB.PST
'You two will be acting kindly towards him.'
(Woodbury, 2003: 716)

(19) FUTURE STATIVE:
a. ęwagegihnaʔ
ę- wak- ek-ih- naʔ
FUT-1.SG.ACC-eat-STAT-STAT.PST
'I might have eaten it'

b. ęwagegik
ę- wak- ek- ih- ek
FUT-1SG.ACC-eat-**STAT-MOD**
'I will have eaten it.'

(20) Complex aspect with OPT modal prefix:
a. ahǫwakhǫnyęnihnaʔ
a- hǫwa- khw-ǫny- ęni- h- naʔ
OPT-3SG.F.NOM:3SG.M.ACC-food-make-BEN-STAT-STAT.PST
'She should have cooked for him.'

b. ahesninowękhwahgwaʔ
a- hesni- nowękghw-haʔ- kwaʔ
OPT-2DU.NOM:3.SG.M.ACC-love- HAB-HAB.PST
'You two should have loved him.'

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2.4 Taking Stock

To summarize, the following generalizations hold with regards to the distribution of modal and aspectual affixes. The bare habitual and stative cannot appear with modal prefixes, while the punctual requires presence of a modal prefix. A modalizer stacked onto the habitual and stative enables these imperfective aspects to occur with the future and the optative. On the other hand, the habitual past and the stative past allow either the future or the optative to be present. Lastly, only the punctual may appear with the factual. We are now in a position to provide a full summary in Table 3.

prepronominal prefix	Root	Aspect Suffix	Expanded Aspect Suffix
FACT FUT OPT		PUNC	Ø
Ø		HAB	Ø
FUT OPT		HAB	MOD
(FUT) (OPT)		HAB	HAB.PST
Ø		STAT	Ø
FUT OPT		STAT	MOD
(FUT) (OPT)		STAT	STAT.PST

Table 3. Full summary

We next provide an analysis of our empirical findings.

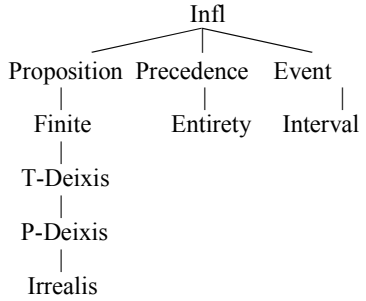
3. Analysis

We have argued that, in Onondaga, temporal anchoring is realized via modality in conjunction with (im)perfectivity, rather than via tense as is more standardly assumed in generative grammar and as is known to hold of Indo-European languages. Since in this language tense does not seem to be the crucial ingredient of Infl, we propose a feature geometric account, following Cowper (2005), in order to better capture the Onondaga verbal inflectional system.

3.1 Feature geometries (Cowper 2005)

Cowper (2005) proposes the schema in (21) as the maximal dependency structure for Infl. In (21), each label represents a verbal feature made available by UG and connected by entailment bottom-up. A certain feature is only present in a given language provided there is a binary opposition for that property (i.e. contrast). It is also assumed that the absence of a feature triggers a default interpretation of the node dominating that feature. "Proposition", "Finite", "Deixis", and "Irrealis" are Mood features. "Entirety" and "Precedence" are Tense features. "Interval" and "Event" are Aspect features.

(21)



(Cowper 2005)

In Cowper (2005), as well as Cowper and Hall (1999), the various concepts in (21) are monovalent features with syntactic or semantic content. [Event] distinguishes events (where this feature is present) from states (where this feature is absent). The feature [Interval], a dependent of [Event], encodes imperfective viewpoint aspect. A perfective event is a temporal point with no internal structure. These are the two aspectual features of Infl. Insofar as Tense is concerned, there is [Precedence], whose presence signifies that at least one moment of the event or state precedes the temporal anchor of the clause, and [Entirety], present when all moments of the event or state precede the temporal anchor.

The other features in (21) determine the clausal properties traditionally associated with mood. A proposition is taken to be a cognitive manifestation of a state or event. The feature [Proposition] takes an event or state and "transforms it into its cognitive manifestation by linking it to *consciousness*" (Hall 2001: 20). Since not all clauses are propositional, [Proposition] is an optional feature of Infl. Following Cowper (2005), [Finite], [Deixis], and [Irrealis] are its dependent features.[9] The feature [Finite] is purely syntactic; it licenses nominative Case and subject phi-features. The feature [Deixis] sets the temporal and or personal anchor of the clause to the deictic centre of the utterance/discourse. The temporal (i.e. T-Deixis) and personal (i.e. P-Deixis) indexing can be kept apart (e.g. Spanish) or bundled together (e.g. English). Simplifying somewhat, the feature [T-Deixis] sets the temporal anchor to the Utterance Time/Time of Speech, while the feature [P-Deixis] is the set of propositions believed by the speaker (i.e. the consciousness). Lastly, the feature [Irrealis] establishes a marked relation between the proposition and the consciousness at the deictic centre.

3.1 Sketch of a feature-geometric analysis for Onondaga

In this section, we discuss the featural properties of the various Onondaga Infl morphemes introduced in section 2 with a view to sketching a feature-geometric analysis for this Iroquoian language. We also assume Distributed Morphology (Halle and Marantz 1993), in which the syntactic component only manipulates features and vocabulary items are inserted cyclically, post Spell-Out, with a vocabulary item specified for most of the features winning out over a less specified vocabulary item at the insertion site.

The first thing to note is that Onondaga disallows non-finite clauses and so, even non-propositional events are finite. This is illustrated in (22), which shows that the complement clause to a verb of sensory perception (i.e. a bare event) comes equipped with phi-features and nominative Case. Note that (22) means that 'he' visually saw the event of a man sitting there.

(22) hwaʔhogęʔ hęgweh hatgodaʔ
h- waʔ- ho- gę- ʔ hęgweh ha- tgod-aʔ
TLOC-FACT-3.SG.M.ACC-see-PUNC man 3SG.M.NOM-sit- STAT
'He saw a man sitting there.'

(Woodbury 2003: 1328)

Thus, since there is no contrast, we assume the feature [finite] is absent in this language (rather than being a dependent of the feature [Proposition]).

[9] Though see Kyriakaki (2006) who proposes a different arrangement between [Proposition] and [Finite].

The habitual aspect appears with both states and imperfective events. As such it cannot be specified for the feature [Event]. In addition, within events it covers both homogenous events (*she's teaching*) and non-homogenous events (*she's a teacher*) in the sense of Slavin (2008). Therefore, it also cannot be specified for the feature [Interval]. We suggest the habitual has no specific Infl features at all but rather spells out *v*. Specifically, the Asp head will not have any specific features, but neither will the Tense head (since there is no [Precedence], see (23), showing this for both the habitual), or the Mood head and all these three Infl domains will automatically have default interpretations (i.e. realis)[10].

(23) *ahse:deh hayenawaʔsek
ha- yenawaʔs-ek
yesterday 3.SG.M.NOM-help- HAB

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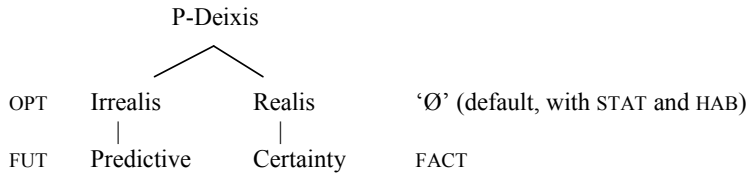
Recall that stative aspect prototypically indicates a result state. Following Ramchand (2008), result events instantiate an 'R' head and are deeply embedded within the VP – crucially, lower than viewpoint aspect. Consequently, R competes for insertion with *v* (and 'wins' because it's more specified). Just as with habitual aspect, this imperfective also has no specific Infl features.

Given the perfective viewpoint aspect realized by the punctual, we assume it has the feature [Event], whose default reading is moment (Cowper, 2005). After head movement of *v* to Asp [Event], PUNC will be inserted over HAB as it is more specified.

Moving beyond aspectual features into those of Tense, we suggest that the habitual past, which denotes imperfective in the past, is specified for the feature [Precedence], while the stative past is specified for the feature [Entirety]. In both these cases, since tense is deictic, the feature [T-Deixis] must be present in Mood, but we assume it piggybacks on [P-Deixis] (it can never occur on its own).

Regarding the mood node, we observed that all modal prefixes instantiate [P-Deixis] in Onondaga, as follows. The factual corresponds to a marked version of realis in that certainty is implied, while both the optative and the future instantiate irrealis, with future being more specific in that it is predictive. Consequently, we propose that a specified feature [P-Deixis] is always marked, either by the feature [Certainty], entailing [Realis], by [Predictive] entailing [Irrealis], or simply by [Irrealis]. However, this yields a split as in (24), rather than an entailment relationship between realis and irrealis:

(24)



[10] Note that Cowper (2005) argues the present tense in Spanish, which essentially covers the same imperfective meanings as the Onondaga HAB, has the feature P-Deixis. This cannot be the case for Onondaga as the HAB is not in complementary distribution with irrealis (i.e. FUT and OPT). Assuming Distributed Morphology (Halle and Marantz 1993), the more specified FUT/OPT should block insertion of HAB, contrary to fact.

Since this feature split is not possible from under the same node, we suggest that perhaps the feature [Irrealis] is realized in C, while the feature [Realis] is realized in Infl. Some support for a hierarchy between these two features is found when looking at interaction of mood markers with other pre-pronominal prefixes. Consider (25) repeated from (14):

(25) a. ęsa:hahdę:dyaʔ
ę- sa- ha- ahtdętdyǫ-aʔ
FUT-REP-3SG.M.NOM-leave- PUNC
'He will be going home.' ('predictive' irrealis)

b. sahohdędyǫhá:dyeʔ
sa- waʔ- ho- ahtdętdyǫ-h- atdye-ʔ
REP-FACT-3SG.M.ACC-travel- STAT-CONT-PURP
'He is going home.' / 'He is on his way home.' (indubitable)

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Notice that the repetitive morpheme *sa-* follows the irrealis future mood marker in (25a) but, crucially, precedes the realis factual mood marker in (25b), suggesting that irrealis is higher than realis/factual[11].

In conclusion, with respect to the Mood domain, we assume the following: (i) there is no Finite node (as mentioned above), (ii) there is [P-Deixis] with both realis and irrealis mood, and (iii) there may be [T-Deixis] complementing [P-Deixis]. Crucially, the deixis entailment is reversed from what Cowper (2005) observes for languages like English and Spanish, hence the 'tenseless' flavour of Onondaga.

Recall further that the punctual, which is perfective, requires an anchor (traditionally a temporal anchor). We argued that in Onondaga this anchoring is realized by modality, which necessitates [P-Deixis]. Thus, perfectives are situated with respect to the speaker's beliefs rather than to the utterance time. On the other hand, the stative and habitual, as imperfectives do not need this anchoring, so do not necessitate [P-Deixis]. However, recall that there are situations in which the stative and habitual appear with irrealis modal prefixes in one of two contexts: (i) with the habitual past and with the stative past, and (ii) with the modalizer /-ek/. In situations involving (i), we assume that the feature [Precedence] removes the situation from the "now" so that [T-Deixis] (with its sub-features) becomes available. In situations involving the modalizer, we propose that this morpheme encodes the feature [General Tense]. By this we mean that it encodes the existence of a set of points related to the situation. We further assume that feature [General Tense] is inserted in the derivation to remove the situation from the default, hence its obligatory need for specific features of [T-Deixis], namely the [Irrealis] feature or the feature [Predictive].

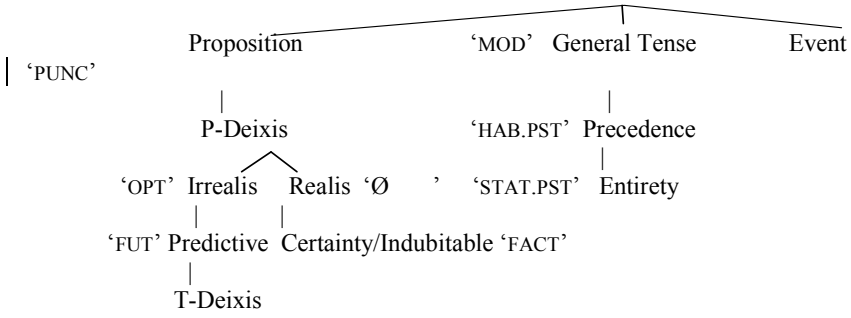
In sum, this yields (26) and the feature geometry for the Onondaga Comp-Infl as in (27). By positing [T-Deixis] as the most marked feature of [Irrealis], (27) correctly captures the empirical observation that no tense feature specifications are possible with the factual mood (i.e. [Certainty]) in Onondaga.

(26) a. HAB: no Infl features, *v*
b. STAT: no Infl features, R

[11] Note that Irrealis Mood is higher that Repetitive (Aspect) in Cinque's (1999) hierarchy of projections too.

c. PUNC: [Event]
d. HAB.PST: [Precedence] ([General Tense])
e. STAT.PST: [Entirety] ([Precedence], [General Tense])
f. FACT: [Certainty/Indubitable]([Realis],[P-Deixis], Proposition])
g. OPT: [Irrealis] ([P-Deixis], [Proposition])
h. FUT: [Predictive] ([Irrealis], [P-Deixis], [Proposition])
i. MOD: [General Tense]

(27) Onondaga Comp-Infl



4. Conclusions

In this paper, following Cowper (2005) and Cowper and Hall (1999), we have laid out the foundation for a feature-geometric analysis of the mood/tense/aspect features in Onondaga. As with other non-Indo-European (see also Clarke, 2009, Slavin, 2008), a feature-geometric approach is better suited at handling Infl systems that are not 'tense-centric'. Clearly, however, Onondaga is not really 'tenseless' but, crucially, [T-deixis] is not only incumbent on [P-Deixis], but is at the very bottom of the feature ladder. It is this reversed hierarchy that we hold responsible for giving Onondaga its tenseless flavour.

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