

Mood as Verbal Definiteness in a “Tenseless” Language*

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Abstract: This article argues that the mood morphemes found on punctual verbs in Mohawk are to be analyzed semantically as markers of verbal definiteness. In particular, the so-called future marker is actually an indefinite morpheme indicating that the event argument of the verb undergoes Heim’s (1982) rule of Quantifier Indexing. In contrast, the seeming past marker is a definite morpheme, indicating that the event argument is immune to Quantifier Indexing. This explains many apparent peculiarities of the Mohawk verbal system, including the use of “future” as a past habitual form, the use of mood in conditionals, free relatives, and complement clauses, and the incompatibility of “past” and negation. The relationship between indefinite mood and future events, where it exists, is explicated in terms of an observation by Kamp and Reyle (1993) concerning how humans conceive of the future as different from the past.

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Mohawk is a Northern Iroquoian language spoken in Quebec, Ontario, and New York. Typologically, it is a polysynthetic, nonconfigurational head-marking language. General information about the language can be found in Deering and Delisle (1976) and Baker (In press), among other sources. In addition to published sources, new data for this article come from fieldwork done at Kahnawake, Quebec by the first author and his students between 1990 and the present. Several consultants have been used, but in particular Ms. Carolee Jacobs.

The symbols that we use to transcribe Mohawk have roughly their usual phonetic values except that [v] stands for a nasalized mid central vowel, not a consonant; ['] stands for a glottal stop. The glosses of the Mohawk examples include the following abbreviations: fact, factual mood; punc, punctual aspect; plur, plural; rev, reversive; stat, stative aspect; srfl, semi-reflexive; dup, duplicative; cis, cislocative; fut, future mood; sim, simultaneous; opt, optative mood; part, partitive; past, past tense; neg, negative; Q, question particle; trans, traslocative; hab, habitual aspect; iter, iterative; loc, locative; refl, reflexive; purp, purposive; caus, causative. Glosses of agreement morphemes include indication of person/gender (1, 2, M, F, Z(oic), N), number (s, d or p), and series (S (roughly subject), O (roughly object), or P (possessor)). Ne is a particle of uncertain significance and so remains un glossed. Abbreviations for sources from which textual examples have been taken are: D&D (Deering and Delisle 1976), KO (Williams 1976), OK (1991).

One correction about the title: Mohawk is not really a tenseless language: it has tense morphemes -*kwe'* or -*hne'* that attach only to verbs in the habitual and stative aspects; -*kwe'* can be found in some examples below. However, they never appear with the punctual verbs we focus on here, so this part of the Mohawk paradigm is truly “tenseless”. For discussion of why mood appears with punctual aspect while tense appears with habitual and stative aspects, see Baker and Travis (1995).

1. Introduction

For a linguist with comparative interests, a large part of the fun of doing linguistic research is searching out all the fascinating, deep, and intricate differences in how languages work. Indeed, the only thing that gives a comparable thrill is discovering the deep and fascinating ways in which they are all the same.

The tension between these two joys can be seen in a close look at the verbal inflection systems of many Native American languages. For example, in the Mohawk language, eventive verbs in the punctual aspect¹ appear in the following three forms:

- (1) a. *wa-ha-rast-e'*
 ???-MsS-draw-punc
 'he drew it'
- b. *v-ha-rast-e'*
 ???-MsS-draw-punc
 'he will draw it'
- c. *a-ha-rast-e'*
 ???-MsS-draw-punc
 'he should draw it'

Based on a casual inspection of the English translations of these forms, it is tempting to conclude that *wa'* is a past tense morpheme in Mohawk, whereas *v-* is a future tense morpheme. However, many Amerindianists over the years have argued this temptation should be resisted, that what look at first like ordinary tense morphemes actually do not directly express tense or time reference at all. When one gets to know the languages better, one discovers that the forms like (1a) and (1b) are also used in contexts where there is no sense of pastness or futureness intended. Conversely, there are English sentences that have ordinary past or future tenses but their normal translations in Mohawk do not have *wa'* or *v-*. While the most brutish of Eurocentrics might (and have) attribute this to the illogicalness of the aboriginal mind, the standard conclusion is that the inflectional system of Mohawk has a logic of its own, different from that of most Indo-European inflectional systems. Researchers are often rather more vague on the question of what these morphemes actually are than on what they are not, but among the many language-particular names that are used for them, the terms “mood” or “modality” come up frequently. The most famous example of this kind is Benjamin Whorf’s (1956)

¹We consider only the punctual forms of eventive verbs in this article, because those are the simplest forms in which the mood prefixes can appear. Mood prefixes cannot attach directly to the habitual or stative forms of the Mohawk verb, nor to inherently stative (adjectival) verbs. We believe that the reason for this is that the *e* position in the argument structure of the verb is already bound by habitual and stative morphology, and hence is not available to be modified by higher mood morpheme; see Baker and Travis (1995) for discussion. Stative/adjectival verbs, on the other hand, cannot take mood prefixes because they do not to have an *e* (or *e*-like) position as an inherent lexical property.

- (i) (**wa'*/**v-*/**a-*)-ka-rakv-(*'*)
 fact / fut /opt- NsS-be.white-punc
 'It is (was, will be, should be) white.'

This is a result of independent semantic interest, because it suggests that Parsons (1990) and others are wrong to generalize the Davidsonian theory of event roles from eventive predicates to (all) stative predicates. However, space considerations do not allow us to discuss this matter here.

discussion of Hopi—the non-Indo-European language he studied most thoroughly—which he claimed to be so devoid of tense and time expressions, and so structured by its own logic, that Hopis had no concept of time—a notion that someone influenced by European language and culture finds almost inconceivable.

Nevertheless, it seems clear that Whorf and others like him went too far in this. Not only do Mohawks (and Hopis) have a sense of time, but they can easily use their language to express it. In practice, speakers do not usually sense a “radical translation” problem when they are asked to render a simple Mohawk verb in English or vice versa, as one might expect if the two systems were really incommensurate. On the contrary, the English translations in (1) really are the *right* translations for the Mohawk forms in many contexts. Thus, while it may be necessary to resist the temptation of saying that *wa’-* and *v-* are tense morphemes in Mohawk, the correct theory should also account for why this view is so tempting. Temptations are like lies in that they must contain a large measure of truth in order to be powerful. Thus, there are two complementary challenges posed by material of this kind: one must do justice to the logic of the Mohawk system in its own terms, but one must also account for the fact that the end result of that system is individual forms that are comparable to English ones on a token-by-token basis. In other words, one must explain how it can be that English and Mohawk cut the semantic pie quite differently, without undermining the fact that it is to a large degree the same pie that is being cut.

Our goal in this paper is to develop an analysis of mood morphemes in Mohawk that satisfies both these conditions. Our leading idea is that the mood prefixes are not analogous to tense morphemes in English; rather, they are analogous to the article system in English noun phrases, in that they mark the verbal equivalent of definiteness and indefiniteness. Once this perspective is adopted, the peculiar-looking patterns of use of these morphemes can be explained in terms of the influential theory of definiteness initiated by Kamp (1981) and Heim (1982). On the other hand, the equivalences between the mood-based system and the tense-based system come from peculiarities in how humans conceive of time (universally, as far as we can tell). These peculiarities imply that there is only one natural way to associate the basic mood distinctions, which fundamentally have to do with quantification, with time distinctions. If this basic idea is correct, it shows that both English and Mohawk are in fact using the same formal techniques in their representation systems, but different techniques are prominent in different parts of the grammars of the two languages. This then would be another striking example of the notion that the more languages differ, the more they are the same.

2. Inadequacies of a Tense-Based Analysis

Foster (1985, 1986) gives a brief history of how the earliest work on Iroquoian languages took the prefixes illustrated in (1) to be tense morphemes, but how there has been a gradual shift that recognizes that these morphemes are actually markers of mood more than tense, beginning with Lounsbury (1953) and accelerating with the work of Chafe. What is intended by this is that these morphemes are used not so much to locate events in time, as to describe the actuality of the event (see Chung and Timberlake (1985) for a standard characterization of the difference in a crosslinguistic context). For the so-called optative prefix *a-* illustrated in (1c), this is obvious and uncontroversial; (1c) asserts that a certain kind of event takes place in all desirable worlds, not that it has or will take place in the actual world. For the prefixes *wa’-* and *v-*, the distinction between ordinary tense and mood is much more subtle. However, Foster points out that there are at least two environments in which *wa’-* does not mean past. In some situations, a Mohawk verb with this morpheme is properly translated as present, rather than past. Two examples from texts are:

- (2) a. Ka' wa-hs-e-'? Ka-nat-a-ku wa'-k-e-' (D&D 91)
 where fact-2sS-go-punc Ns-town-Ø-in fact-1sS-go-punc
 'Where are you going? I'm going to town.'
- b. Wa-hts-kv-' kv thi rukwe...? (D&D 474)
 fact-2sS/MsO-see-punc Q that man
 'Do you see that man (with the fur coat and the straw hat)?'

For some reason, this reading seems to be found only with certain verbs in Mohawk--particularly verbs of motion--although the exact lexical restrictions are unclear. (Apparently present tense readings of these forms are more freely available in other Northern Iroquoian languages.) Second, Foster observes that the *wa'*- prefix is always used on verbs used in performative situations, where English uses a simple present. An example is (3), as it might be used in a christening ceremony:

- (3) Sak wa'-ku-hsvn-u-'.
 Sak fact-1sS/2sO-name-give-punc
 'I (hereby) give you the name Sak.'

Apparently, then *wa'*- is really neutral between present and past; the fact that the vast majority of examples are understood as past follows from the well-known fact that there are severe restrictions on when one can use a perfective verb with present reference (see Comrie 1976:66-71). Presumably, these facts could simply be treated by analyzing *wa'*- as a nonfuture tense. However, Iroquoianists have the intuition that this is missing the point; the real reason behind this range of meanings is that *wa'*- says that an event of the type in question has definitely taken place in the real world. As such, it contrasts with optative *a-*, and the older term "aorist tense" has been replaced with the term "factual mode". (Compare Whorf's (1956) discussion of the "reportative assertion" category in Hopi.)

The prefix *v-* is more subtle still. For this morpheme, Iroquoianists have generally maintained the label "future", and Foster (1985) describes this (together with *kwe'*, a past tense morpheme that appears with habitual aspect verbs) as the most tense-like morpheme in the Iroquoian languages. When he tentatively suggests changing the name of this morpheme to "predictive mood", his reasoning is based not on a new insight into the meaning or use of *v-*, but rather on the desire to capture the fact that *v-* alternates paradigmatically with *a-* and *wa'*-. However, there are in fact clear cases in Mohawk in which the future morpheme is used without any kind of reference to future time; indeed, we believe that these examples provide a useful key to understanding how the mood system as a whole works.

2.1 Reminiscence Texts

The most striking nonfuture use of "future" verbs appears in texts of the reminiscence genre. (4) is a typical example, drawn from a story about the Kahnawake reservation's first fire brigade, of which the teller had been a member (OK, 14). The immediate context was describing their old fire truck, which had no place to hook the firehose. Therefore:

- (4) O'nvk tsi ki tehnyahse ohnakv v-t-hy-atyv-' tanu
 necessary that this two-people behind fut-dup-MdS-sit-punc and
 v-hni-yena-' ne ohurota.
 fut-MdS-hold-punc NE hose
 'Two men would have to sit behind and hold the hose.'

It is clear from that there is no reference to the absolute future here; the firetruck in question was scrapped decades before. The context also shows that this sentence is not understood as a relative future, describing an event that will happen after some salient moment in the past—say the plans of the main character of the story or foreshadowings (“flash-forwards”) by the narrator. Verbs with *v-* do contrast systematically with verbs with *wa’-* in texts of this kind, but the contrast has nothing to do with time reference or sequencing of events. Thus, (5) is an example from later in the same story, also describing actions performed by the fire brigade on the firehose.

- (5) Tsi kana’tseratatyé tho nu:we y-a’-akwa-hurot-ohw-e’.
 the canal there trans-fact-1pS-hose-put.in.water-punc
 ‘We put the hose into the canal.’

The contrast is that factual verbs are used to describe unique, specific events, whereas “future” verbs are used to describe general practices. Thus, sitting in the back of the firetruck and carrying the hose was a standard operating procedure for the Kahnawake fire brigade. Putting the hose into the canal was not, however; rather the immediate context for (5) was “One time there was a fire in Lachine, and we were called to assist. I parked the fire truck on sixth avenue and then...” Thus, future verbs occurring in this context are nearly equivalent to past habitual verbs (for which Mohawk has distinct morphology, consisting of the habitual morpheme *-ha’* or *-s*, followed by the past morpheme *-kwe’*). Other examples from texts in which future-punctual verbs receive a past habitual reading are given in (6) and (7). (6) is from near the beginning of a story about the traditional Mohawk way to prepare corn flour; (7) is from a story about how the Mohawks used to make Lacrosse balls from part of a sturgeon’s throat.

- (6) Kíkv okára ne tsi ni-ye-yer-hah-kwe’ ak-sótha nónv
 this story is how part-FsS-do-hab-past my-grand.mother when
 v-ye-nvst-ohare-’ tánu’ v-ye-the’ser-uni-’ ohvtu tsi niyóre
 fut-FsS-corn-clean-punc and fut-FsS-flour-make-punc before
 kana’taro-k-húwe v-ye-na’tar-ísa-’.
 bread-Ø-real fut-FsS-bread-finish-punc
 ‘This is the story of what my grandmother used to do when she would clean the
 corn and make the flour before she would make (traditional) corn bread.’ (KO,
 174)

- (7) Ne sé’s yákv’ thi tsi-kúhs-es kvtsu v-kuwa-yéna-’
 that then it’s.said there sim-face-be.long fish fut-3S/ZsO-catch-punc
 tanu’ v-kuwa-nya’t-ó’as-e’.
 and fut-3S/ZsO-throat-slit-punc
 ‘It is said that they would catch a sturgeon and slit its throat.’ (KO, 185)

(6) is particularly interesting in that it uses an explicitly past habitual verb *niyeyerhahkwe’* in parallel with a sequence of future-punctual verbs, illustrating the near-equivalence of the two. Indeed, something similar can be seen in English with the use of the modal *would* in the glosses we have given of (4), (6), and (7); in English too *would catch a sturgeon* is the near equivalent of the explicitly past habitual form *used to catch a sturgeon* in these contexts.

2.2 Conditionals

A second environment in which Mohawk uses “future” verbs without any reference to future times is in conditionals. Verbs with *v-* are common in both clauses of a conditional sentence, and such sentences have a variety of temporal interpretations.

- (8) Toka *v-ke-nvsko-* akaret, *v-yuk-hrewaht-e* ake-nistvha.
 If fut-1sS-steal-punc cookie fut-FsS/1sO-punish-punc my-mother.
 ‘If I steal a cookie, my mother will punish me.’
 OR ‘If I steal a cookie, my mother punishes me.’
 OR ‘If I stole a cookie, my mother punished (would punish) me.’

(8) can be interpreted as a future prediction, but it is also the standard way of expressing timeless, lawlike conditionals, which have simple present tense verbs in English. Even more strikingly, it can receive a purely past interpretation, as for example when spoken by an elderly person talking about her childhood. Factual verbs can (rarely) be used in conditional sentences as well, but with a different interpretation:

- (9) Toka *s-a-ha-ahtvti-* ne Sak, *tsh-a-yu-[a]htvti-*
 if iter-fact-MsS-leave-punc NE Sak sim/trans-fact-FsS-leave-punc
 ki ni ne’e ne Uwari.
 also NE Mary
 ‘If Sak left, then Mary left too (at the same time).’

(8) expresses that there is a systematic relationship between events of one type (cookie-stealings) and events of another type (punishings of me). In contrast, (9) only refers to an ad hoc relationship between two particular events. It has an epistemic quality: the speaker did not actually see Mary leave, but infers that she did from the fact that Sak did. Here too the contrast between *v-* and *wa’-* has nothing to do with time or the sequencing of events, but rather whether it is a general statement about a certain kind of event or a statement about particular events. Other examples of future verbs in timeless, lawlike conditionals are:

- (10) Tóka’ *v-té-hs-ya’k-e* sa-núhkwis nónv o-ráhk-w-ase svha
 if fut-dup-2sS-cut-punc 2sP-hair when NsO-moon-fresh more
 yohsnóre’ *v-se-w-ate-hyáru-*. (KO, 119)
 quickly fut-iter-NsS-srfl-grow-punc
 ‘If you cut your hair during the new moon, it grows back much faster.’

- (11) Wa’-[e]-íru-’ tóka ohvtu ne vtye *v-t-yakw-e-* athwawenékta
 fact-FsS-say-punc if before NE noon fut-cis-1pS-go-punc diaper
 v-keni-yótv-’ kwah tsi yeyothete...
 fut-FdS-hang-punc prt where the-edge?
 ‘She said that if we would come before noon, then the two of them would hang a diaper near the edge (of the clothesline).’ (OK, 8)

(Example (11) comes from a text in which the narrator describes a particular signaling system that she and her sister worked out before there were telephones in Kahnawake.)

From these facts we can conclude that the morpheme *v-* does not have future time reference as an inherent part of its meaning. Indeed, it seems to have little consistent meaning of its own across these various uses; rather its meaning depends on the environment in which it is found. Nor does this seem to be a purely accidental homophony in Mohawk that results from historical factors or mere coincidence. Ultman (1978, 102-4) observes that future morphemes often have the “secondary function” of marking general truths, and customary or habitual events, as well as hypothetical conditions and

consequences. “Past tenses”, on the other hand, do not seem to show this kind of semantic variability.

3. Toward a definiteness analysis of mood

This chameleon-like behavior of the future recalls certain well-known facts about the interpretation of indefinite NPs in English. While the Russellian tradition treats indefinite NPs essentially as existentially quantified NPs, Lewis (1975) pointed out that in fact the understood quantificational force of an indefinite NP varies with its context. Thus, the indefinite NP in the *if*-clause in (12a) is nearly equivalent to one of the explicitly quantified NPs in (12b), depending on which quantificational adverb appears nearby.

- (12) a. Always/usually/sometimes/rarely, if a person falls from the 5th floor of a building, he survives.
b. All/most/some/few people who fall from the 5th floor of a building survive.

In particular, when an indefinite NP is used in a suitable contexts it can receive a generic interpretation. Thus, (13a) is easily understood as making a claim about most or all whales; it means ‘most whales eat 1000 pounds of food per day’.

- (13) a. A whale (generally) eats 1000 pounds of food per day.
b. This whale (generally) eats 1000 pounds of food per day.

Definite NPs typically resist such an interpretation, however; they continue to refer to a unique individual regardless of their environment. Thus, (13b) makes a claim only about a single whale, which may or may not be typical in regard to its eating habits. (*The whale* is basically the same as *this whale*, but it also has a distinct “kind” reading, in which it means (individuals of) the species “whale”.) Similarly, if one replaces *a person* with *that man* in (12a), the sentence is understood as talking about a particular individual—an accomplished stuntman, perhaps.

Thus, there is a significant analogy between the semantics of NPs in English and verbs with mood prefixes in Mohawk: indefinite NPs and future verbs both pick up a generic meaning when they occur in a suitable generic context, whereas definite NPs and factual verbs refer to unique individuals or events in any context. With this in mind, we claim that the so-called future marker *v-* in Mohawk is actually an indefinite marker--the verbal equivalent of an indefinite article. Similarly, the factual prefix *wa’-* is a definite marker--the verbal equivalent of a definite article. This basic intuition has a good deal of precedent, particularly in the descriptive and typological literature. Thus, the factual is sometimes called the “definite mode” in the Iroquoianist literature (Deering and Delisle 1976, p. 149), while the optative (which is closely related to the future, as we will see) is called the “indefinite tense” by Lounsbury (1953) and those who followed him. In a broader comparative context, Ultman (1978, p. 101) makes the following observation:

At least the connection appears to be more than fortuitous, and it would be of interest to look into the relationships that exist between future tenses and other semantically indefinite (or prone to indefiniteness) categories such as interrogatives, evidentials, certain determiners, etc.

However, as far as we know this intuition has not been developed into a formal theory of mood in Mohawk or similar languages.

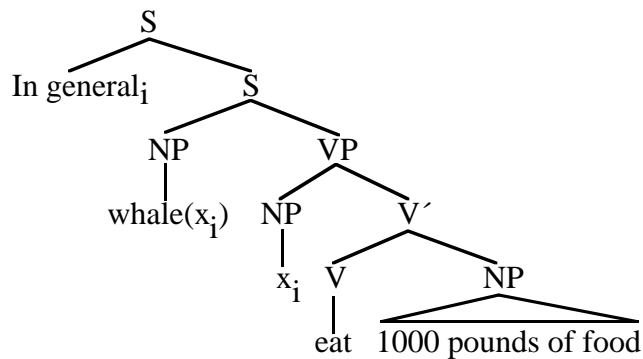
The natural starting point for such a theory is the analysis of definiteness in Kamp (1981) and Heim (1982), which is explicitly developed to account for Lewis’s facts cited

above. In this approach, definite and indefinite articles do not have any distinctive semantic value of their own; rather, they indicate that the argument of the NP they are attached to is to be understood as a free variable. The difference between the two involves how this free variable interacts with other elements in the environment, such as adverbs of quantification. In Heim's terminology, indefinite expressions but not definite ones undergo an obligatory rule of Quantifier Indexing, which is stated as follows:

- (14) Quantifier Indexing: Copy the referential index of every indefinite NP as a selection index onto the lowest c-commanding quantifier. (Heim 1982, p. 146)

(In this paper, we will primarily use Heim's terminology and representations, while recognizing that the two systems are thought to be largely equivalent.) Sentences like (13a) are, then, treated roughly as follows. The quantificational adverb and/or the present tense of the verb cause a generic operator to be introduced into the semantic analysis, with scope over the rest of the sentence. This operator acts like an unselective binder that can bind more than one variable inside the clause. When the subject is indefinite, the variable associated with it is coindexed with the quasi-universal generic adverb, giving a representation like in (15).²

- (15)



This makes it nearly equivalent to an NP with its own universal quantifier; thus (13a) is approximately synonymous to “Almost every whale eats 1000 pounds of food per day.” The representation of (13b) would be geometrically very similar. The only difference would be that the subject NP is marked as definite. Hence, it is immune to Quantifier Indexing, and remains a free variable. Heim shows that this is interpreted as referring to an individual already known to the hearer.

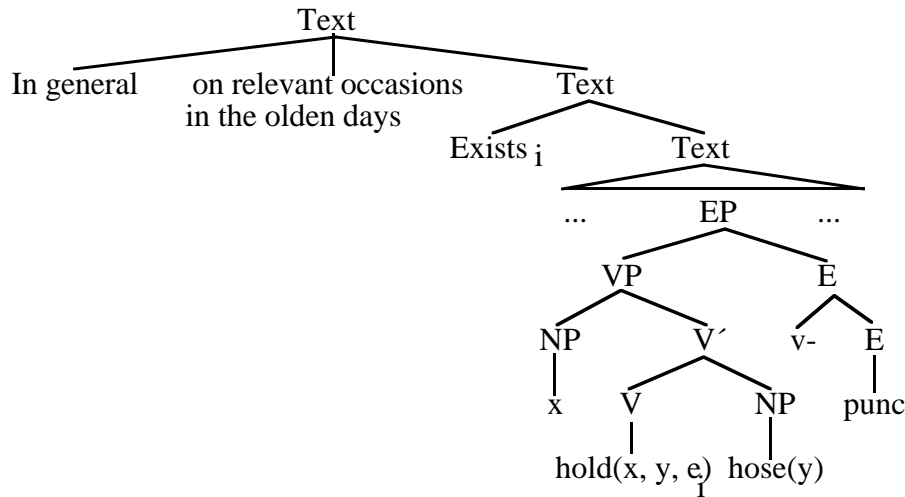
Suppose, then, that we generalize these techniques to clauses in Mohawk to account for sentences such as (4) and (5) in reminiscence texts. Following Davidson (1967), Higginbotham (1985), Parsons (1990) and others, we assume that the verb are predicates that take event arguments, symbolized as “e”, in their argument structures. In the syntax, we take the punctual morpheme to be a functional head of category E (to suggest “event”), which selects for a VP complement containing an undischarged e role (see Travis (1994, forthcoming)).³ *v-* and *wa'-* are definiteness markers adjoined to the E node; their primary

² In fact, the analysis needs to be complicated somewhat, in order to determine what elements of the sentence act as the restriction on the generic quantifier, and which elements are the nuclear scope; see Diesing (1992) and Kamp and Reyle (1993) for some discussion of this so-called “box-splitting” problem, conjecturing that the solution often has to do with focus. However, we gloss over this problem here.

³ However, the exact label of this functional category is not crucial for current purposes, and readers may

semantic function is to indicate whether the event argument of the associated VP undergoes Quantifier Indexing or not. Finally, sentences (4) and (5) happen to be embedded in a text which is inside the nuclear scope of a (past) generic operator of some kind. We have not investigated in detail exactly what linguistic factors are responsible for introducing this operator and its restriction into the representation of the text, but typical factors include explicit adverbials like *wahunise* ‘in the old days’ or *shikeksa’a* ‘when I was a child’ as well as verb forms inflected for the past habitual, which have their own inherent quantificational force (as in (6)). Thus, the LF representation of the second conjunct of (4) is roughly (16), after Quantifier Indexing has applied:⁴

(16)



Consistent with Heim (1982), we represent quantification as a tripartite structure at LF, with the first part representing the quantificational force, the second part representing the restriction on the quantifier (if any), and the third representing the nuclear scope. An existential quantifier is adjoined to the nuclear scope by Heim’s rule of Existential Closure. Because the morpheme *v-* is present, the existential quantifier is coindexed with the *e* position of the head of the VP by the rule of Quantifier Indexing. This gives the correct interpretation that on most suitable occasions in the old days--the occasions in which the firetruck was called out--there was an event which consisted of two men holding the hose. The relevant aspects of the morphology of the verb are also easily derived from this structure. We assume that the head of the verb phrase *yena* ‘hold’ undergoes head movement, adjoining to left of the minimal head of the dominating phrase, in accordance with the principles of head movement in polysynthetic languages defined in Baker (1995b). This yields the surface morpheme order *fut-hold-punc*, which is essentially correct.⁵

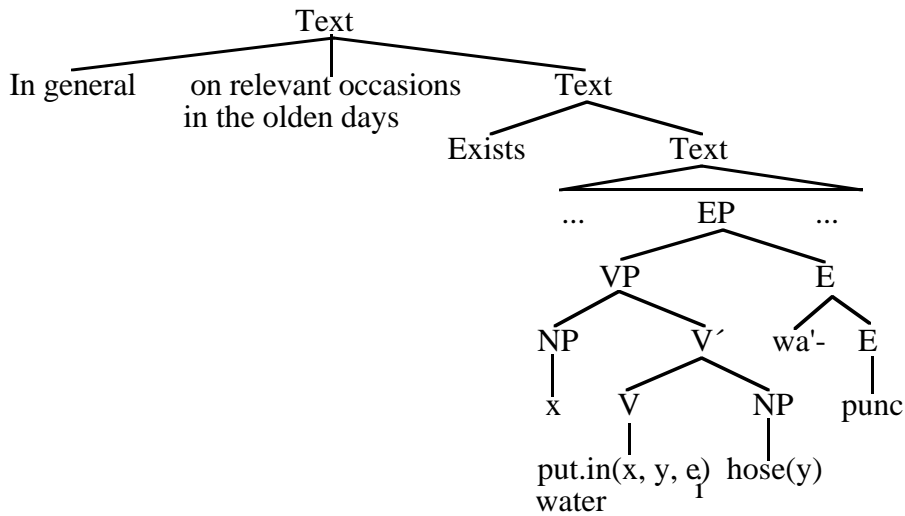
The analysis of (5), a factual clause from the same text, is largely the same, except that *wa’-* indicates that the associated event argument is not bound by the quantifiers above it.

substitute their favorite Infl-type functional category as they wish. See Baker and Travis (1995) for a more complete discussion of the various verb inflections in Mohawk and their relationships to functional categories.

⁴Here and many places below we abstract away from Heim’s rule of NP-Prefixing because it is irrelevant to our primary concern, the interpretation of the verbs. In fact, this rule is largely unneeded in Mohawk, because most nonpronominal NPs are already peripheral to the clause in syntax, given the nonconfigurational structure of the language (see Baker (1991, 1995a, 1995b)).

⁵See Baker (1995) for discussion of the syntax and morphology of the agreement prefix, which is the fourth morpheme in the verb, coming between the verb root and the mood prefix.

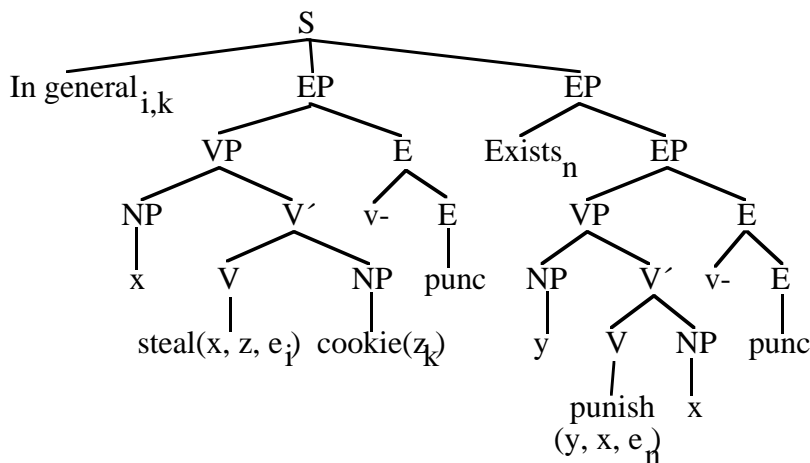
(17)



Here the e variable of the verb is left free, so it is not influenced by the generic quantifier; instead it refers to a specific (unique) event within the relevant time. Thus, this structure implies that there was only one event of putting the hose in the water of the canal, as desired. In this way, the Kamp-Heim theory of definiteness extends rather naturally to explain the use of punctual verbs in reminiscence texts in Mohawk. In particular, we do not have to say that v - is ambiguous between future and habitual (as Ultman (1978) does, for example). Rather, we say that “future” verbs are actually indefinites that sometimes pick up universal-like generic force from their environment.

This analysis extends easily to the contrastive uses of v - and wa' - in conditionals, illustrated in (8) and (9). Following Angelika Kratzer, Heim (1982) analyzes *if*-clauses as providing the restriction on a phonetically null universal-like modal necessity operator. The main clause then gives the nuclear scope for this operator. Hence, a sentence like (8) would have the representation in (18).

(18)



Since the first clause is marked with v -, the event position of its verb is coindexed with the closest c -commanding operator ‘in general’. Similarly, the event position of the main verb of the second clause is coindexed with the existential quantifier above it. The resulting structure thus means that for (almost) every event that is a stealing of a cookie by me there is an event that is a punishing of me by a particular person (my mother)--which is correct.

Note that there is no time reference here; hence it is left to contextual factors or pragmatics to determine whether the relevant period is limited to a present, future, or past interval, if it is limited at all. This explains why (8) could be translated with any tense in English.

Suppose that one or the other of the verbs in (8) had the prefix *wa'*- rather than *v*-. If the first clause were factual, then its event argument would not be indexed with the generic operator. In effect, this means that the operator has no restriction; nothing defines the domain over which the universal quantifier ranges. The result is a deviant interpretation, since natural language generally does not permit unrestricted universal quantification. On the other hand, if the second clause had a factual prefix, then its argument would not be indexed with the existential operator introduced by Existential Closure. This would mean that in effect there is nothing in the nuclear scope for the generic operator to quantify over. Again the result is deviant, since natural language does not permit vacuous quantification, as pointed out by Chomsky (1982). In this way we explain the fact that both clauses of an *if*-then construction are typically in the future in Mohawk. The clauses can only be factual if the *if*-then construction does not have a quantificational interpretation. This is what we find in (9), which expresses an inferential relationship between two unique events, not a modal relationship between classes of events.

Before closing this section, it is instructive to explicitly compare the use of the future verb in a reminiscence text with the true past habitual verb in Mohawk. While both end up having very much the same LF representations, those representations are arrived at in different ways. The habitual verb presumably bears its own quantificational force (see Baker and Travis (1995)), whereas on our view the future-punctual verb has no inherent quantificational force, but can pick up that force from the environment. From a sentence-level perspective, the end result is very much the same. However, our analysis correctly predicts that these two forms are used somewhat differently in texts. For example, it is common for a text to begin with a past-habitual verb and use future verbs thereafter. An illustration of this is (19), which consists of the first two sentences of a text about life at Kahnawake during the Great Depression.

(19) Nónv svhs akohser-á-'ke kíkiv ron-úkwe te-hu-atat-snyéinv-**hs-kwe'**.
 when past depression-Ø-loc this MpS-person dup-MpS-refl-help-**hab-past**
 'During the depression people used to help each other.'

V-hati-yvt-a-kó-ha-', s-ha-yá't-a ra-uhwvts-á-yv okh
fut-MpS-wood-Ø-pick-purp-punc iter-MsS-body-one MsO-land-Ø-have and
 ne s-ha-yá't-a ro-náhsqw-a-yv nv' né'e akohsátvhs.
 NE iter-MsS-body-one MsO-animal-Ø-have NE horse
 'Two men would go to cut wood, one a land-owner and the other a horse-owner.'

However, the reverse order is atypical. This makes sense as follows. Since the habitual verb has its own quantificational force built in, there are few or no contextual requirements on its use. In particular, it can felicitously be used at the beginning of a narrative, even though there is little or no context built up yet. The future-punctual, on the other hand, has no quantification force, and it needs there to be a covert past-generic operator present in order to receive the interpretation under consideration. One way that such an operator can be introduced into the representation (though not the only one) is precisely by the prior use of a past habitual verb. Example (6) may be another instance of this type.

Even more strikingly, sequences of future-punctual verbs in middle of a text are understood somewhat differently from sequences of past-habitual verbs. Sequences of future verbs are very commonly used to describe sequences of events that all fall within a single, prototypical episode. For example, the text in (19) continues with the following two sentences, which contain three more verbs in the future-punctual.

(20) Onv t-v-hy-atat-snyéinv-'.

then dup-fut-MdS-refl-help-punc
 ‘Then they would help each other.’

Tékeni y-v-ka-yv-ht-e’ v-hni-karéni-’ ne óyvté’.
 two trans-fut-NsS-lie-caus-punc fut-MdS-bring-punc NE wood
 ‘They would bring two loads of wood (i.e. one for each).’

Clearly, these three actions (going to cut, helping, bringing two loads) was a typical sequence of events that was habitually repeated in those days. In contrast, later in the same story one finds sequences of habitual verbs, such as the following:

(21) Yáhtv nowv’tu úhka te-yako-[a]tuhkaryá’k-u ne tsi akwéku svhs
 not ever anyone neg-FsO-hunger-stat because all past
 ye-yvtho-s-kwe’.
 FsS-plant-hab-past
 ‘No one ever starved because everyone used to plant (crops).’

Kitkit óni svhs rati-nahskw-a-yv-s kweskwes tanu tyuhnhúhskwaru.
 chicken also past MpS-animal-Ø-put-hab pig and cow
 ‘They also used to raise chickens, pigs, and cows.’

In this case, planting and raising animals do not constitute a typical sequence of events; rather they are two activities that went on quasi-independently during the period in question. This difference in usage seems to be general, and follows from our theory. Since future verbs are indefinite, their event arguments are all coindexed with the same generic operator that has scope over the whole stretch of text:

(22) Gen_t [t an occasion] $\text{Exists}_{i,k,n}$ [... gather-wood(x, e_i) & help(x, e_k) & bring-wood(x, e_n) ...]

This means that for each choice of an occasion, there is an event of wood-gathering, one of helping, and one of wood-bringing, all within that same occasion. Habitual verbs, on the other hand, each have their own quantificational force. Therefore, the event positions of the two verbs in (21) are each bound by their own quantifier:

(23) Gen_t [t an occasion] Exists_i [plant(x, e_i)]
 & Gen_t [t an occasion] Exists_k [raise(x, animals, e_k)]

Here no connection is made between individual events of planting and individual events of animal-raising; indeed a time which is a suitable occasion for one may not be a suitable occasion for the other, given the rhythms of the agricultural year. The only thing that ties these together is that both happened regularly during the same contextually defined period (the Depression). The fact that these subtle differences follow immediately from our theory confirms that it is on the right track.

4. Other contrasts between definite and indefinite mood

An important test of any theory is whether it sheds light on phenomena other than those that motivated it in the first place. In this section, we show that this is true of our theory of Mohawk mood prefixes in terms of definiteness. In particular, we show that the idea that treating *wa’-* as a marker of verbal definiteness and *v-* as a marker of verbal indefiniteness helps to explain differences in the use of these morphemes in free relatives, in negated sentences and in complement clauses. In the course of this section, we will

also have cause to integrate into the the analysis the so-called optative prefix--the third and last member of the Mohawk mood paradigm. We will argue that this morpheme is essentially a variant of the future prefix *v-*.

4.1. Mood and Free relatives

The most straightforward extension of the theory is to the use of the mood prefixes in free relatives—those relative clauses that contain an interrogative-type word but no other head noun. Either factual or future morphology can appear in such a clause, as shown by the minimal pair in (24).

- (24) a. Khe-nuhwe'-s uhka v-khe-kv-'.
 1sS/3O-like-hab who fut-1sS/FsO-see-punc
 'I like whoever I see.'
- b. Khe-nuhwe'-s uhka wa'-khe-kv-'
 1sS/3O-like-hab who fact-1sS/FsO-see-punc
 'I like (all the people) who I saw.'

Once again, the semantic contrast is not one of time reference; rather, (24b) is understood as saying that there was a well-defined event in which the speaker saw people, and he likes the people seen in that particular event. (24a) is more general; it says that for any seeing event, the speaker likes the people he saw in that event.

While we are neither willing nor able to give a full account of free relatives, there is a clear similarity between (24) and the other examples we have seen: *wa'*- is used to refer to a specific event, whereas *v-* is used to define a class of events for purposes of quantification. For concreteness, we may suppose that a universal quantifier is inserted in these structures (somehow), and the relative clause functions as the restriction on that quantifier. The main clause, in contrast, constitutes the nuclear scope of the quantification. The argument position within the relative clause that is associated with the interrogative word (which we take to be an indefinite NP) is then coindexed with the universal quantifier by Quantifier Indexing. Thus, the logical form of both sentences in (24) is something like (25).

- (25) $\text{All}_{x, (e)} [\text{see}(I, x, e)] [\text{like}(I, x)]$

The crucial difference between the two is that the event position of the verb in the relative clause is also coindexed with the quantifier if and only if the verb is marked as indefinite by the prefix *v-*. In that case, the interpretation is that for all pairs of a person and an event such that the event is a seeing of the person by me, I like the person of the pair. This is a suitable interpretation for (24a). In (24b), on the other hand, the e-role of the relative verb is marked as definite by *wa'*; hence it is not copied as a selection index on the quantifier, but is left as a free variable. Therefore, in (24b) there is no quantification over seeing events, but only over people who are seen in a single event. This too corresponds with the intuitions of Mohawk speakers.

A similar elicited contrast is given in (26), except that inanimate 'what' is used instead of animate 'who'.

- (26) a. Akweku shvs wak-eka'-s tsi nahotv ake-nistvha v-ye-khuni-'.
 all past 1sO-like-hab what my-mother fut-FsS-cook-punc
 '[When I was a child] I used to like whatever my mother cooked.'
- b. Uk-eka'w-e' tsi nahotv ake-nistvha wa'-e-khuni-' thetvre'.
 fact/1sO-like-punc what my-mother fact-FsS-cook-punc yesterday.

‘I liked what my mother cooked yesterday.’

We have not happened to collect many examples of free relatives from published texts, but (27) is one that we have noticed. It comes from a story in which the narrator is telling how her grandmother survived with her four small children during a time when her husband was away and given up for dead.⁶

- (27) Tsi nahótv v-yé-hsa-’ kayo’tvshera’ t-v-yu-[a]tát-u-’,
 what fut-FsS-finish-punc bead.work dup-fut-FsS-refl-give-punc
 atvnátshera’ tanu’...
 food and
 ‘She would exchange whatever beadwork she finished (would finish) for food and [fuel].’

In this sentence both the matrix verb (‘exchange’) and the verb in the relative clause (‘finish making’) are future, although the circumstances being discussed are strictly in the past. As expected, the interpretation is that there was no unique event of finishing beadwork or of exchanging it. Rather, the events are understood quantificationally: (27) can be glossed as saying that for all pieces of beadwork such that there was an event of her finishing that beadwork, there was also an event of her exchanging that beadwork for food and fuel. The fact that “future” morphology should be used in both the main clause and the embedded clause of this sentence is similar to what we saw in conditional sentences such as (8) in section 2.2. Given the Heim-Kamp approach this is not surprising. On the contrary, if-then sentences and sentences with quantified NPs containing a relative clause are treated in parallel fashion in their framework, these being the two main contexts for donkey anaphora. Therefore, it is expected that the same restrictions on mood morphology should be found in both these contexts as well.

4.2 Mood and Negation

A somewhat different source of evidence for the definiteness theory of mood comes from certain co-occurrence restrictions that hold between mood and clausal negation in Mohawk. Clausal negation is expressed by the combination of a preverbal particle *yah(tv)* ‘not’ and a prefix on the verb *te-* or *th-*. Interestingly, clausal negation is entirely impossible with the factual morpheme; rather the negation of a past event must be expressed by a verb in the stative aspect:

- (28) a. *Uwari yahtv th-a’-u-[a]ther-a-hninu-’
 Mary not neg-fact-FsS-basket-Ø-buy-punc
 ‘Mary did not buy a basket.’
 b. Uwari yahtv te-yako-[a]ther-a-hninu-Ø
 Mary not neg-FsO-basket-Ø-buy-stat
 ‘Mary has not bought a basket.’

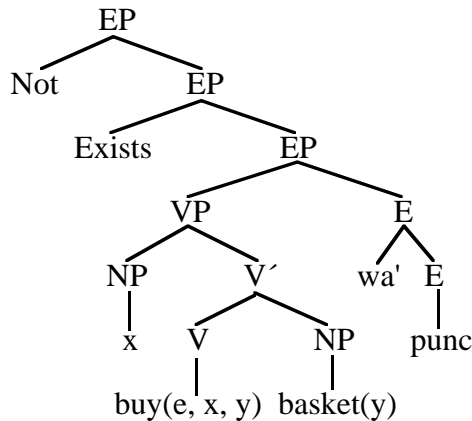
Why should this be? Notice that if we take factual-punctual verbs to be the equivalent of simple past verbs in English, no deep explanation of this fact is possible, since simple past clearly is compatible with clausal negation. Rather, one would have to introduce a stipulative rule of the morphology to replace factual-punctual features with stative features

⁶This example is also interesting in that the wh-word *tsi nahótv* ‘whatever’ is separated from its head *kayo’tvshera’* ‘bead’. This kind of discontinuous dependency is found in Mohawk relative clauses of all kinds; see Baker (1995, section 4.3) for examples and analysis.

in the context of negation, as Chafe (1970, 44) does to account for cognate patterns in Onondaga. Alternatively, within a realizational approach to inflectional morphology, one could stipulate that the negative prefix and the factual prefix cannot co-occur, even though the morphemes in question would not be realized in the same position class in traditional structuralist terms (see Lounsbury (1953)). This is in effect what Stump (1992) does for somewhat similar long distance dependencies between tense and negation in Swahili.

However, once we realize that *wa'*- is not a tense marker, but rather a mood marker, a more principled and elegant explanation becomes possible. In the Heim-Kamp system of NP interpretation, negation is also an operator that induces existential closure (Heim 1982, 142-44). Thus, the representation of a sentence like (28a) would be something like (29).

(29)



In this structure the *wa'*- prefix indicates that the *e* role of *buy* is *not* bound by the existential quantifier introduced by negation. What then does the structure mean? The event role is left to be interpreted as a free variable. Therefore, this structure would be used to assert that there is an event (presumably in the past) such that that event was not a buying of a basket by Mary. This is an extremely weak statement, which is always true in any nontrivial possible world. Thus, a sentence like (28a) will never be informative, and therefore is ruled out as deviant, or at least unusable. In this way, we explain the incompatibility of negation and factual mood on general semantic grounds, without recourse to morphological stipulations.

This account as it stands predicts that an example like (28a) should be grammatical if *wa'*- is replaced by the indefinite future marker *v-*. *v-* indicates that the *e* role of the verb does undergo Quantifier Indexing, so it would be coindexed with the existential quantifier in a structure like (29). The result is a representation which denies that there exists an event which is an event of her buying a basket—either in general or within a time period given by context or pragmatic inference. This is a meaningful and standard interpretation. Surprisingly, however, the future prefix also does not occur with negation:

(30) *Uwári yáhtv th-v-yu-[a]ther-a-hnínu-'
 Mary not neg-fut-FsS-basket-Ø-buy-punc
 'Mary will not buy a basket.'

Instead, the future prefix is replaced by the optative prefix in this context; the result is understood as a future negation:

(31) Uwári yáhtv th-a-yu-[a]ther-a-hnínu-'

Mary not neg-opt-FsS-basket-Ø-buy-punc
 ‘Mary will not buy a basket.’

This too has traditionally been analyzed as a kind of low-level morphological replacement operation (see Chafe (1970), Deering and Delisle (1976)). This time, however, we believe that this view is more or less correct. More precisely, this paradigm suggests that we think of optative *a-* as being a “negative polarity” alternate of *v-*; both are indefinite, but *a-* replaces *v-* in certain semantically defined contexts. Thus, the shift from future to optative in (30)-(31) is analogous to the switch from *some* to *any* in (32) in English.

- (32) a. Mary bought *something*.
 b. Mary didn’t buy *anything*.

The complete comparison between the English determiner system and the Mohawk mood system is shown in (4).

(33)		<u>definite</u>	<u>indefinite</u>	<u>polarity indefinite</u>
	nominal system (English)	<i>the</i>	<i>a, some</i>	<i>any</i>
	verbal system (Mohawk)	<i>wa’-</i>	<i>v-</i>	<i>a-</i>

Like *v-*, *a-* indicates that the event argument of the verb it attaches to undergoes Quantifier Indexing, but it also indicates that that quantifier is of a particular type. Still to be explained is where (31) gets its future force; we return to this below in a more general context.

In general, then, we see that the quirks that hold between “tense” and negation in Mohawk become understandable once tense is reanalyzed as mood in the way we have suggested. Interactions of this type seem to be reasonably common across languages; we conjecture that our analysis will generalize to explain much of this range of phenomena.⁷ If so, negation will provide a useful diagnostic for distinguishing true tenses from moods: tenses do not change under negation, whereas moods may.

Confirming evidence that optative is essentially a variant of the future comes from conditionals. Above we saw that the future can appear in both clauses of a conditional sentence, but that the factual typically does not. Optatives also may appear in both clauses of a conditional; (34) is an example from a text (KO, p.2).

- (34) Tóka au-sa-k-atkáhtho-’ au-s-a-k-yvt’ere’-ne’ ne ókwire.
 if opt-iter-1sS-see-punc opt-iter-1sS-know-past? NE tree
 ‘If I saw it again, I would remember the tree [the one which the speaker’s
 grandma used the bark of to make cataract medicine from].’

(34) is like (8) in that it draws a connection between events of one type (seeings) and events of another type (recognizings). Therefore, *a-* causes the event roles of the verbs it attaches to to be coindexed with the operators involved in the conditional. However, (34) differs from (8) in that it is counterfactual: there is a presupposition that there will be no events of either type in the actual world, because the specific tree in question was cut down years before. Once again, *a-* acts like a kind of negative polarity variant of *v-*. This is

⁷Languages in which this kind of analysis seems appropriate include Mayali (Evans 1991) and other Gunwinjguan languages, and probably Swahili (cf. Stump (1992)) although there are some complications. Dravidian languages are also known to have tense-negation interactions, but we have not looked into them at all.

Within the Northern Iroquoian languages, Onondaga has the same patterns as Mohawk (Chafe 1970), while those of Seneca are very similar although perhaps not identical (Chafe 1967). Curiously, Lounsbury (1953) reports that negation can appear with any “tense” in Oneida, which is generally the language closest to Mohawk. We have no explanation for this.

comparable to English, in which NPs with negative polarity determiners are licensed in counterfactual conditionals as well as in the context of clausal negation:

- (35) a. If I see *something* on my way to town, I will pick it up.
 (it is reasonably likely that I will)
 b. If I had seen *anything* on my way to town, I would have picked it up.
 (in fact, I didn't)

In later sections we will see that there are several other ways in which future and optative behave in parallel in Mohawk, different from factual. Moreover, we have the impression that there are other languages which are generally like Mohawk in having the primary distinction between definite and indefinite mood, but that lack the secondary distinction between positive and negative polarity mood.⁸ For example, the Kiowa language has a single mood affix (called “future”) which is used in a set of situations that is approximately the union of the situations in which Mohawk uses *a-* and the situations where Mohawk uses *v-* (Watkins 1984, 170-72). In particular, the Kiowa affix is used in both simple future statements and deontic statements, and in both actual and counterfactual conditionals. It is also compatible with negation, at least when the future is understood as an imperative.

4.3 Mood and Complementation

A fifth area on which this analysis of mood sheds light is the area of clausal complementation. Some Mohawk verbs allow their CP complements to be in any of the three moods; these include verbs of saying, thinking, and knowing, for example. Other verbs take primarily optative complements; a few of these also allow future complements. Two examples of this second type are:

- (36) Wa-shako-rharatstv-’ tsi {v-/a-/*wa}-ha-kúrek-e’.
 fact-MsS/FsO-promise-punc that fut-/opt-/fact-MsS-hit-punc
 ‘He promised her to hit it.’

- (37) Ro-kwény-u {a-/*v-/*wa-}ha-ya’t-ata’.
 MsO-be.able-stat opt-/fut-/fact-MsS-body-bury-punc
 ‘He has been able to bury it.’

Mohawk has no verbs that require factual complements, however.

These patterns make sense when analyzed as follows. Verbs that require the optative and/or future are essentially verbs with modal meanings of some kind: ‘to want’, ‘to be necessary’, ‘to try’, etc. These meanings are roughly the same as those of verbs that take infinitive or subjunctive complements in Indo-European languages. Semantically these verbs can be analyzed as operators that quantify over events of the kind defined by their

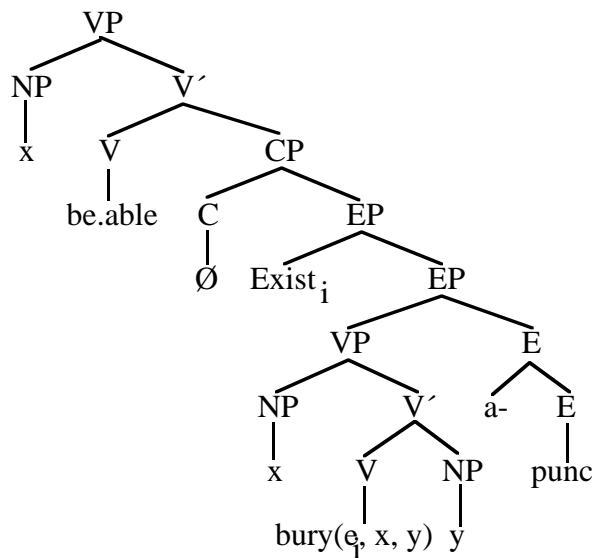
⁸The other obvious place that negative polarity determiners are licensed in English is in yes/no questions, such as *Did you see anything?* Following the parallels through, one might expect that factual would be impossible with yes/no questions in Mohawk while future would be replaced by optative. This is false: yes/no questions in Mohawk are expressed by adding a second position clitic *kv* to the clause; this clitic can co-occur with a punctual verb in any mood. We conjecture that these questions in Mohawk are semantically more like tag questions in English, which presuppose a positive answer and ask for confirmation, rather than true yes/no questions. Crucially, tag questions in English do not license negative polarity items:

- (i) You bought something/*anything, didn't you?

This conjecture accords with Chafe's (1970, 45) impressions of Onondaga, which he says has “confirmation questions” but not true “alternative questions”.

complement in suitable possible worlds. Thus, ‘He is able to bury it’ means something like ‘In most worlds such that he tries (or wills) to bury it, there is an event of him burying it’. Similarly, ‘He promised her to hit it’ means that ‘In all worlds in which he fulfills his obligations to her, there is an event such that he hits it.’ These verbs thus trigger Existential Closure over their domain, being similar in this respect to negation and if-then constructions (Heim 1982, 258). *A-* and *v-* indicate that the event position in the complement verb is bound by the existential operator that is inserted, giving the intended interpretation. The logical form of (37) is roughly (38) (we ignore the aspect-mood morphology of the matrix clause).

(38)



Once the quantificational force of the lexical verb ‘be-able’ is cached out as something like ‘for all worlds *w* such that *x* tries in *w*...’ this gives the desired interpretation. (Like Heim, we leave open how exactly how this is done.) Now suppose that the *a-* adjoined to the lower E node were replaced by *wa’-*. Then the event variable of the lower verb would be left free. This gives an effect comparable to a wide scope interpretation: it would mean something like ‘there is an event *e*, such that for all worlds *w* such that *x* tries in *w*, *e* is an event of *x* burying *y*.’ Here the quantification associated with ‘be able’ has no impact on the interpretation; therefore the representation is ruled out as a kind of vacuous quantification—a violation of Chomsky’s (1986) Principle of Full Interpretation.⁹ In this way, we account for the fact that these verbs can only appear with an indefinite mood prefix. Whether the mood prefix under a given verb will be the optative or the future is a second order effect, presumably depending on semantic properties of the operator-verb that induces the existential closure. However, we will not pursue the exact rule here. (It should be noted, however, that the parallelism between *any* in English and *a-* in Mohawk

⁹Suppose that there were an indefinite NP in the embedded clause. Then the selection index of this NP would be copied onto the existential operator induced by the verb. In this case, the modal verb is having an impact on the interpretation. However, the interpretation would still be deviant: the sentence would mean something like ‘In the real world there exists an event such that in all worlds in which John tries there is an object (say a box) that John buries.’ In other words there is a single event in the real world that consists of burying (potentially) different boxes in different possible worlds. Presumably, there could be no such event.

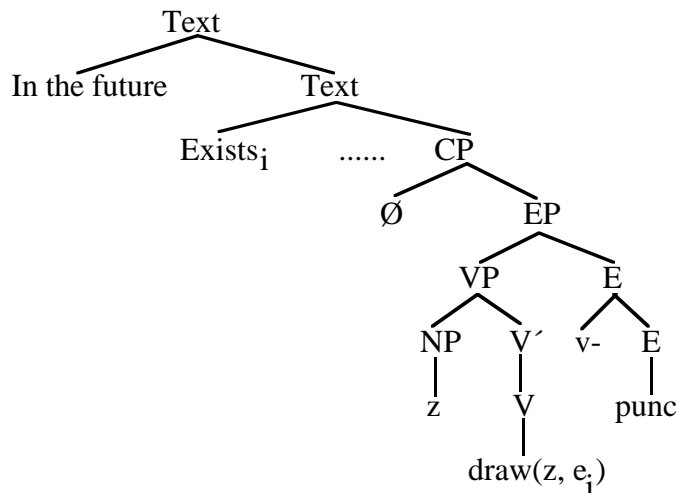
breaks down somewhat here: predicates like ‘be able’ trigger the use of *a-* in Mohawk but not *any* in English (*He is able to buy something/#anything.*)

5. On the near-equivalence between mood and tense

Summarizing so far, we have developed a theory of the mood prefixes that appear on punctual verbs in Mohawk that has some explanatory force. In particular, it explains the usage of these morphemes in a variety of contexts where time reference is not relevant, as well as their interactions with sentence-level logical operators of various kinds. The key to this analysis is that *a-* and *v-* pick up quantificational force from their environment, while *wa’-* is immune to influence from quantifiers. This leaves one important task undone, however: we must still explain why *v-* is associated with future interpretations in standard or ‘neutral’ contexts. Similarly, we must explain why *wa’-* is generally associated with past interpretations. Putting the problem another way, given that Mohawk has a mood-based inflectional system, why does it come out looking so much like a tense-based system in most cases?

The natural first point of comparison is with the way that definite and indefinite NPs are interpreted in Heim’s system for English. Heim assumes that in addition to the rule of Existential Closure that applies to the nuclear scope of operators, there is a second rule of Existential Closure that applies to texts as a whole. Thus, any indefinite NP in the discourse that is not c-commanded by a more specific operator will have its selection index copied onto this text-level operator by the rule of Quantifier Indexing. This accounts for the fact that the default reading of indefinite NPs is an existential reading. (See however Diesing (1992, 56-58) and references cited there for some criticisms of this aspect of Heim’s approach.) The equivalent of this within the verbal domain would be to say that in Mohawk there is some kind of covert Future operator that has scope over any text. If an *e* argument is marked as indefinite, it will automatically be bound by this covert future operator, unless it is within the domain of some other operator of the kind we have discussed above. This expresses formally the fact that the default interpretation of a verb marked with *v-* is a future interpretation. This would give representations such as (39) for a simple example like *vharaste’* ‘he will draw’.

(39)



While this works formally, it is not very intuitive: why should what is generally considered the most marked tense function as the default in the system? Moreover, this is

not just a peculiarity of Mohawk. If our proposals are on the right track, then future must be the default interpretation of an indefinite event in other languages as well, given that typological surveys point to a general relationship between future tense and indefinite, irrealis moods (Chung and Timberlake 1985, Ultmann 1978). Arguably, it can even be seen in English. Thus, modals and tense are in complementary distribution in standard English. Nevertheless, formally “tenseless” clauses with a modal always receive a kind of future interpretation.¹⁰ This can be seen in examples like (40).

- (40) a. John may buy a car
b. John must buy a car
c. John might buy a car

For example, (40a) does not just mean that in some worlds, there is an event such that John buys a car; that event must also be in the future with respect to the moment of speech. This seems to be more than a pragmatic implicature, since it is not defeasible; thus, it is very odd to say “I am sure that John may buy a car, because in fact I saw him buy one yesterday”. Similarly, the responsibility of John expressed in (40b) would not be considered fulfilled if he was known to have had bought a car at some point in the past. Significantly, all of the modals are future-oriented in this sense. Thus, (40c) has the same kind future meaning as (40a), in spite of the fact that *might* is historically a past tense form of *may*. Perhaps related to this is Stowell’s (1982) observation that many infinitives in English receive a relative future reading. For example, (41a) is understood as meaning that an event of remembering happens before an event of locking, while (41b) and (41c) show that this effect cannot be attributed purely to the meaning of the matrix verb.

- (41) a. Sue remembered to lock the door.
b. Sue remembered locking the door.
c. Sue remembered that she locked the door.

Thus, it is a quite general fact that formally tenseless expressions with a mood-like functional category receive a future interpretation.¹¹

Some insight into why this should be so can be gleaned from common-place observations about how humans conceptualize time. In particular, we conceptualize the future in quite a different way from the past. Kamp and Reyle (1993, 534) express the basic intuition as follows:

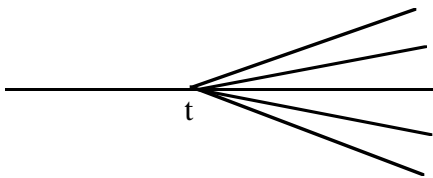
The tense logical systems we discussed in Section 5.1 treat past tense and future tense as mirror images of each other. We already noted in passing that this is one of the points on which those systems are open to criticism. For our use of the future tense differs in many ways from the uses we make of the past tense. In fact, that the two tenses should be used differently is hardly surprising, given that our attitude toward the future is so very different from our attitude towards the past. It is part of our conception of ourselves and of our role in the world in which we live that the future is “open” while the past is “closed”. What the future will be like is to a significant degree undetermined, and we ourselves are among those who can help to shape it. As to the past, nothing we do can make any difference.

¹⁰ This holds if the main verb has an event argument; stative verbs work somewhat differently.

¹¹ Note that modal sentences and infinitives must be distinguished from completely bare eventive verbs such as those found in gerund constructions ((41b)), “headline” English, and Creoles such as Haitian. The former group has an E node but no tense morpheme in that node, whereas that latter group lack an E (and T) node entirely. Examples of the second kind generally get a past interpretation, not a future one (Stowell 1994, Déchaine 1993).

In the immediately following discussion, they briefly discuss certain linguistic reflexives of this fact, such as the close relationship between future tense and modals in English, and the fact that the modal particles are future oriented. Then they comment on the implications of this for semantic theory as follows (pp. 534-55):

To describe the differences between them [the various modals] model-theoretically, we would need models with a more complex temporal structure than those discussed in Section 5.1. At each point in time, the future, as seen from that point, would have to be open in that several possible futures issue from it, whereas in the opposite direction there is only one past. In other words, our models should not be based on a time structure which can be represented as a straight line but rather on a structure part of which (the part that is relevant from the perspective of the time t) looks something like this:



(of course, there would be such ramifications at each time point on each branch!)

Unfortunately, Kamp and Reyle do not go on to implement these intuitions in their formal theory, but rather put aside modals and concentrate on simple uses of the future for which this complex time structure can be ignored.¹²

While it is also not our purpose either to develop a full-fledged formalization of this kind of time structure and the temporal-modal logic that would go with it, we believe that this general conception sheds some light on our problem concerning how mood distinctions get associated with temporal distinctions. On this conception, it is impossible to refer directly to a future event, simply because there is more than one future with respect to any given point of time. The closest one could come would be to say that in each of the futures associated with that point in time, there is an event of a certain type. However, it makes little sense to say that these are all the *same* event in every possible future. Thus, the logical form of a sentence like (42a) would be something like (42b), rather than (42c).

- (42)
- a. Mary will buy a basket tomorrow.
 - b. In all worlds w such that w is a future of n , there exists an event e such that e is a buying of a basket by Mary.
 - c. There exists an event e such that e is a buying of a basket by Mary and e is in all the worlds w which are futures of n .

Thus, we judge that (42a) can be true in a situation where Mary has determined to buy a basket, but depending on her husband's travel plans she might be in Montreal or Toronto tomorrow. (42b) allows for this straightforwardly, while (42c) does not: events have

¹²Note that we do not need to interpret this theory as a making any metaphysical claims about the true nature of time. Time need not actually have this kind of future-past asymmetry in for our analysis to work; all that is necessary is that people think it does. Indeed, an even weaker claim suffices: it need not be the case that humans (necessarily) have this view of time, but only that this be the way time is used in the language faculty. If the human mind is modular, than the science forming faculty (or the theological faculty, or whatever) could have conceptions of time that are quite different.

spatial location (Parsons 1990), so if one event (in one possible future) takes place in Toronto and another (in another possible future) takes place in Montreal, they cannot be the same event. In short, we see that quantificational techniques are inherently necessary in order to talk about the future. Now we have seen that there is no verb form in Mohawk that has future quantificational force inherently built into it.¹³ Since talking about the future necessarily involves quantification, it follows that one must use indefinite verbal expressions put in suitable environments to speak about the future. In contrast, there is only one past with respect to any given point in time. Thus, events in the past can be referred to directly, without the use of quantificational techniques. From this perspective, it begins to make sense that factual verbs, which are immune to Quantifier Indexing and hence are left as free variables, are generally understood as referring to past events. It is clearly no accident, then, that indefinite mood often comes out as equivalent to future tense and definite mood to past tense, not vice versa.

The major remaining question, then, is what textual factors trigger the introduction of a covert future operator. Some insight into this matter comes from the interpretation of sentences like (43).

- (43) Thetvre' Sak wa-hak-hrori-' tsi Tyer uwa v-ha-torat-e'.
 yesterday Sak fact-MS/1sO-tell-punc that Tyer today fut-MS-hunt-punc
 'Yesterday Sak told me that Tyer would hunt today.'

In this sentence the lower clause receives a future interpretation, not a generic/habitual interpretation or some other kind. Moreover, it is clearly a *relative* future interpretation, not an absolute one: given the temporal adverbs, Tyer's hunting could very well be cotemporaneous with the utterance time of the sentence as a whole, or even before it. What (43) says is that Tyer's hunting was in the future with respect to the event of Sak's telling me about it. Here, then, we have a case of a covert future operator which does not have scope over the entire text, but only a subpart of it—namely the complement of *hrori* 'tell'.¹⁴

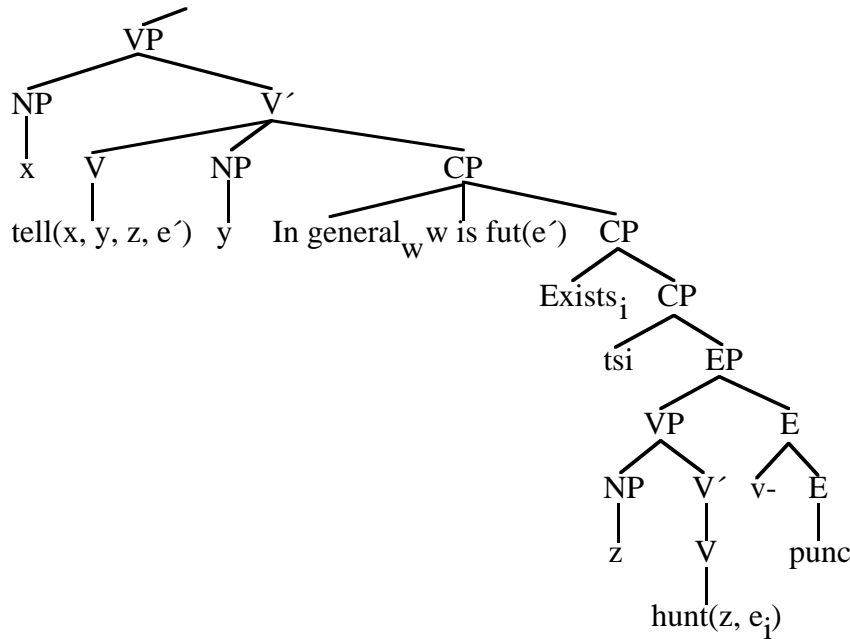
- (44)

¹³This is a particular property of Mohawk. For example, there is a future morpheme with inherent quantificational force in Hopi. Indeed the Hopi future is a kind of universal quantification, as shown by the fact that it patterns similarly to the nomic/habitual inflection in the language (see Baker (in preparation)).

¹⁴Our theory predicts that whereas future verbs get a shifted, "future in the past" reading when embedded under a verb of speaking, factual verbs should not get a similar "past in the past" reading. To see why this is so, suppose that the verb in (43)/(44) were factual rather than future. Then the event argument of the embedded verb will be left as a free variable, not bound by the operators above it. It should then get the same interpretation as a free event variable in the matrix clause—i.e. it should refer to an event in the absolute past (or present), with no restrictions on the temporal relation between 'tell' and 'hunt'. We have not been able to investigate systematically whether this is true or not. It seems to be true that the normal spontaneous translation of a sentence like *Sak told me that Tyer hunted* does not use a factual verb in the embedded clause, but rather a past stative verb (comparable to the past perfect in English).

- (i) Thetvre' Sak wa-hak-hrori-' tsi Tyer oya tsetvre ro-torat-u-hne'.
 yesterday Sak fact-MS/1sO-tell-punc that Tyer other day MSO-hunt-stat-past
 'Yesterday Sak told me that Tyer had hunted the other day.'

This is compatible with our prediction; what we do not know is if this is indeed the only possibility.



Here we assume that Fut is a function that maps events or times onto sets of worlds w such that each w is a possible continuation of the actual world up to that event or time. These are the possible futures. In this case, the argument of that function is the event argument of the verb of speaking. The normal future operator is, then, a near universal generic quantification over these worlds. This fits with the intuition, reported in the grammars, that future verbs in isolation make quite a strong claim: “The future prefix [v-] is only used if something is definitely going to happen” (Deering and Delisle 1976, 335). However, this quantificational force can be weakened by certain modifying particles or higher verbs. Thus, the equivalent of an English sentence with the modal *may* or *might*, *can* or *could* is a biclausal construction with the higher verb *atu* ‘to be possible’. Significantly, both this verb and its complement have the prefix v-:

- (45) V-w-atu-’ kv n-v-s-kwá’tho-’? (D&D 330)
 fut-NsS-be.possible-punc Q NE-fut-2sS-come.by-punc
 ‘Could you come by?’

Thus, v- in Mohawk covers a wider range of modal meanings than does *will* in English. Returning to (43), we see that one possible source of future operators is verbs of speaking and other logophoric verbs that introduce a perspective, including a temporal perspective. Where, then, does the “default” future operator that has scope over the entire clause come from? It is a short step to say that it is automatically introduced by the temporal perspective implicit in the speech act itself. One way to think of this is in terms of the view, characteristic of Generative Semantics, that at the head of any text is a speech act verb such as ‘I say’ that does not get realized phonetically. This verb then introduces a future operator and existential closure over its nuclear scope in exactly the same way as ‘tell’ in (43) does. However, there is no need to go quite that far: we can simply posit the future operator and the existential closure without literally having ‘I say’ in the representation at any level.

Above we mentioned that factual verbs can sometimes be understood as referring to present events instead of past events (see example (2)). This fact follows immediately from the analysis given here. We have said that with respect to any moment of time there is a unique past, but many possible futures. Notice, however, that there is a unique present as well: one cannot change the present any more than one can change the past.

Therefore, present events can also be referred to directly, without using quantificational techniques. This explains why *wa'*- can translate into English as present as well as past. The fact that a present tense interpretation is so rare, at least in Mohawk, presumably follows from the fact that punctual verbs refer to complete, bounded events, and it is rare for such an event to exactly coincide with the moment of speech. The one case in which the two systematically coincide is in performative utterances, in which the event of (say) giving a baby a name is in fact identical to the event of uttering a certain sentence. And, indeed Mohawk productively uses factual-punctual verbs in this context, as pointed out by Foster (1985, 1986) (see example (3)). More generally, we conjecture that many of languages in which the fundamental distinction in the “tense” system is between future and past-present (“retrospective languages” in the terminology of Ultman (1978)) are actually mood-based systems, while languages like English in which the fundamental distinction is between past and present-future (Ultman’s “prospective languages”) are probably true tense systems. In this we give somewhat more formal grounding to the intuitions of many Amerindianists (including Whorf) that such “homophonies” indicate that quite a different system is at work.

The last case to consider is the optative-punctual verb, and how it is interpreted when it appears in matrix clauses. In fact, this situation does not arise very often; by far the most common use of the optative in texts is as the complement of a modal or propositional attitude verb, or in the context of negation. In these cases, it receives its quantificational force from the matrix verb or the negation in the way we have already discussed. When an optative form does appear as a matrix verb, it is interpreted as having deontic modal force, usually translated into English as ‘should’:

- (46) Kak nu: y-a-yétew-e-’ n-v-yó-karahw-e’ (D&D 310)
 someplace trans-opt-1pinS-go-punc NE-fut-NsO-get.dark-punc
 ‘We (inclusive) should go someplace tonight.’

Thus, while a verb marked *v*- picks up a force like “in all likely future worlds, there is an event...”, verbs marked *a*- pick up a force like “in all desirable/proper future worlds, there is an event...”. Thus, we must say that *a*- in Mohawk is not just a negative polarity item, but a negative/deontic polarity item; it appears whenever an indefinite clause is bound by a negative operator (as in clausal negation or counterfactual conditionals) or a deontic operator (under verbs like ‘want’, in purposive clauses, in matrix contexts like (46)). It would clearly be desirable to identify something that negation and deontic moods had in common to justify this treatment, but we have no specific proposal to make in this regard. Finally, while a covert future operator is available in all texts due to their qualities as speech acts, a covert deontic operator seems to be more limited. Perhaps a closer study of Mohawk discourse would reveal that specific licensing conditions are required to introduce this operator; for example, at least one of our consultants does not accept optative matrix verbs like the one in (46) unless *wahi* —a particle of uncertain meaning— is also present.

6. Differences between Verbal and Nominal Definiteness

We have now discussed how the three forms of the punctual verb are interpreted in a variety of contexts. The fundamental assumption has been that the three prefixes are moods, which mark the definiteness of the event in a way that is parallel to how determiners mark the definiteness of NPs in English according to Kamp (1981) and Heim (1982). We should, however, emphasize that while there are many important parallels between how NPs are interpreted in the Kamp-Heim system and how clauses are interpreted in our system, there are also some important differences.

The key parallel centers around the rule of Quantifier Indexing: indefinite NPs and indefinite clauses pick up quantificational force from their environment, while definite NPs and clauses do not, as emphasized throughout. However, Heim's theory also posits a second major difference between definite and indefinite NPs: definite NPs must refer to something that is already present in the text or in the shared background assumptions of the speaker and hearer, while indefinite NPs must refer to something that is new in the discourse (her Novelty/Familiarity Condition). This aspect of the theory of definiteness has no application in the clausal domain, as far as we can tell. Thus, while factual verbs refer to actual, hence knowable events, they do not necessarily refer to known events. Put in Heim's terms, definite NPs presuppose their descriptive content, but definite clauses do not. In many cases, both factual and future clauses assert information that is assumed by the speaker to be new to the hearer. We conjecture that this difference between NPs and clauses is closely related to the mysterious fundamental difference between verbs and nouns, between events and entities. Entities are assumed to be relatively stable over time and can take part in many different events, so it is an important question whether an entity of a particular type that is involved in a given event is the same as or different from a previously mentioned entity of the same type. Events, on the other hand, are transitory and unique; hence the question of whether a given event is the same or different from another event of the same type generally does not arise in the same way.

An interesting comparison can be made at this point with Haitian and Fongbe, as described by Lefebvre (1995). These languages have overt definite determiners that appear with nominals.

- (47) M manje krab la. HAITIAN
 N Dú àsón ó. FONGBE
 I eat crab det
 'I ate the crab.'

These have the expected interpretation; thus, Lefebvre writes (p. 2):

As has been extensively discussed in the literature on Haitian and Fongbe, the presence of the determiner with a noun phrase necessarily identifies old or known information; it entails that the information conveyed by the noun phrase is part of the shared knowledge of the participants The semantics of the Haitian and Fongbe determiners suggest that they are minimally specified for the feature [+definite] (following Heim's (1982) analysis of definite and indefinite noun phrases).

Interestingly, this same lexical item can also be used with a clause, as shown in (48).

- (48) Jan rive a. HAITIAN
 Jan wá ó FONGBE
 John arrive det
 'Actually, John arrived.'

Lefebvre presents various arguments to show that the element in (48) is in fact the same as the one in (47), including the fact that they show the same phonologically conditioned allomorphy. Nevertheless, in (48) the definite determiner functions as an *assertion* marker: "In one of its functions, the Haitian and Fongbe determiner may be used to assert the content of the proposition... (Lefebvre 1995, 7)."¹⁵ Thus, these languages show the

¹⁵In fact, this is only one of several uses of the definite determiner inside a clause in Haitian and Fongbe according to Lefebvre. We cannot do justice to the full richness of the facts she uncovers in a paper of this

same asymmetry as in Mohawk: definite NPs presuppose their descriptive content, as in English; definite clauses may assert their descriptive content, as in Mohawk. Moreover, the facts of Haitian and Fongbe confirm that this difference is not the result of some lexical semantic difference in the definiteness markers (since they are the very same morpheme), but rather a fundamental difference in how nominals and clauses are interpreted.

There is a flip-side to this basic verb-noun asymmetry: events but not entities are temporally ordered and stand in relationships of causation with one another. Thus, temporal and modal operators have a discernable effect on indefinite event arguments, but not on indefinite entity arguments. To take a concrete example, consider the sentences in (49), which have indefinite NPs as well as an indefinite verb.

- (49) a. Uwári áthere' v-ye-hnínu-'.
 Mary basket fut-FsS-buy-punc
 'Mary will buy a basket.'
- b. Uwári áthere' wa'-ye-hnínu-'.
 Mary basket fact-FsS-buy-punc
 'Mary bought a basket.'

The LFs of these sentences are given in (50).

- (50) a. $\text{Gen}_w [w \in \text{Fut}(\text{now})] \text{Exists}_{e,y} [\text{Mary}(x) \ \& \ \text{basket}(y) \ \& \ \text{buy}(x, y, e)]$
- b. $\text{Gen}_w [w \in \text{Fut}(\text{now})] \text{Exists}_y [\text{Mary}(x) \ \& \ \text{basket}(y) \ \& \ \text{buy}(x, y, e)]$

(50a) says roughly that in most of the possible futures there exists a pair of an entity and an event such that the entity is a basket and the event is a buying of that basket by Mary, as desired. (50b) says that there is an event in the real world (therefore in the past) such that there exists a basket and the event is a buying of that basket by Mary. However, there seems to be a problem with (50b) in that the existential operator that binds the R argument of 'basket' is under the scope of the generic future operator. This could be taken to mean not that Mary bought a basket, but that she bought something that would be a basket in most future worlds—a basket kit, perhaps. This is not the desired interpretation. To avoid this consequence, we follow Enç (1986) in assuming that the temporal interpretation of nominals is accomplished quite independently of the temporal interpretation of verbs; nouns have their own (covert) time arguments, which are not influenced by other operators. Thus, the future operator has no effect on the interpretation of the indefinite NP in (50b), even though it does affect the interpretation of the formally parallel indefinite clause in (50a).¹⁶

scope.

¹⁶This view has a corollary for the study of nominalizations. Parsons (1990) treats both verbs and event nominalizations as having identical argument structures in English. On our view, this must be an oversimplification, since the argument of the nominalization is treated like an NP argument in English, not like a VP argument in Mohawk:

- (i) The singing will take place tomorrow. (= the singing you know about, not a past or present one)
 (ii) A singing took place yesterday. (= a singing you don't know about, not a future one)
 (iii) The singing will cause a riot when everyone hears about it. (singing not influenced by the future operator; it could be a past singing.)

Formally, we could say that nominalization takes the e argument of V and makes it an R argument of the corresponding N. The Novelty/Familiarity condition must then be sensitive to this distinction between e

7. Conclusion

In this paper, we have developed an analysis of the mood-based inflectional system of Mohawk that tries to do justice to both its similarities with tense based systems and its differences. Once the mood morphemes are analyzed as definiteness markers for the clause rather than as tenses, various otherwise mysterious properties of their use fall into place, including the use of “future” morphology in past habitual contexts, in nomic conditional contexts, and in free relatives, as well as the incompatibility of “past” morphology with negation and its inability to appear as the complement of certain matrix verbs. Each of these properties follows from a generalization of the Kamp-Heim system of NP interpretation to the clausal domain. It turns out, however, that the parallelism is not complete: while Heim’s rule of Quantifier Indexing finds many uses in the clausal domain, her Novelty/Familiarity Condition does not seem to be relevant. We conjecture that this is ultimately related to the mysterious but fundamental difference between nouns and verbs in human language. Then in order to account for why Mohawk mood sentences turn out so much like English tensed sentences in simple contexts, we proposed that humans conceive of time as unidirectional, with many possible futures but only one past at any given point. This helps to explicate the often-observed connections between definiteness and pastness on the one hand, and indefiniteness and futureness on the other hand.

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