

Temporal interpretation in Navajo

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We discuss temporal location in Navajo. Considering whether Navajo has the category of tense, we argue for a multi-feature approach. We propose, among other features, that tense contributes to atemporal meanings in conditionals and counter-factuals. On this basis we show three kinds of temporal forms in Navajo: a Future tense; Past and Future particles with some tense properties; and temporal adverbials. All are optional, so that many sentences have no direct temporal forms.

In such cases aspectual information gives pragmatic cues to the temporal location of a situation. The key factor is boundedness: in the default case, unbounded situations are taken as Present and bounded situations as Past. To go from aspect to temporal location we posit three pragmatic principles. The principles apply to verb words with overt viewpoints and to zero-marked verb words. These principles hold for languages generally, we conjecture.

In this article we discuss how temporal location is conveyed in Navajo. The language has several forms that give information about time. We ask whether some or all of them should be considered tenses. To do this, we must consider the nature of tense as a linguistic category. We hope to better understand the Navajo system, tense, and the contribution of aspect to temporal interpretation.

The temporal forms are syntactically optional, so that a well-formed sentence may contain no direct temporal information. Aspect gives information about time indirectly; all verb words have aspectual information. We propose pragmatic principles that apply to aspectual information, arriving at a default temporal interpretation.

Part I presents the relevant resources of the language and gives examples of the temporal forms. Part II discusses the systematic account of tense. Part III shows how aspect contributes to temporal interpretation. In Part IV, we comment briefly on the syntax of temporal forms and aspectual viewpoints in Navajo. Part V concludes.

I – Temporal resources of the language

We assume the standard distinction between temporal location and aspect (Comrie 1976). The former locates a situation in time, in the basic cases relative to Speech Time. The latter - aspect - gives information about the internal temporal structure of a situation. The verb word is the obligatory part of a Navajo sentence; it contains a 'verb base' that expresses a situation of some kind, and inflectional morphemes. We will concentrate on verb words, along with temporal adverbs. We list the relevant forms in (1) and (2) and then discuss each type, with examples.¹

(1) Direct temporal forms

- (a) Future Mode: inflectional form available for event verb words
- (b) Temporal particles: Future and Past; optional; available for all verb words
- (c) Adverbs: optional; available for all verb words

(2) Indirect temporal information

- (a) Verb bases that convey state and event situation type
- (b) Aspectual viewpoints - perfective, imperfective, progressive

The Future mode is optional, in a sense: it is the one directly temporal form among seven modes. Choice of exactly one mode morpheme is obligatory for every event verb word.

Whether Navajo has tense is problematic. In the literature, the Future mode and sometimes the Future particle are often called "future tense"; the Past particle and the perfective morpheme are often called "past tense."² We will argue below that the Future mode is a tense; that the Past and Future particles are tense-like; and that the perfective is not a tense.

There is no direct Navajo counterpart to the simple surface verbs of languages like English. The verb word consists of a verb stem and one or more verbal prefixes that together constitute the 'verb base'; a verb word also has pronominal prefixes, and a conjugational or 'mode' prefix (Young & Morgan 1987, or YM). The linear order of the prefixes does not correspond to their hierarchical order (Speas 1990).

The Future mode is conveyed by a conjugational prefix and an associated verb stem shape.³ There are seven modes. Besides Future, modes express the aspectual viewpoints Perfective, Imperfective, and Progressive - the latter a type of imperfective that appears with a certain class of verbs in Navajo. The other modes are the Optative, conveying desires and wishes, and the Usitative and Iterative, for habitual and repeated events. The latter three will not be discussed here.⁴ The modes contrast with each other, so that if the Future mode conjugation appears in a verb word, no overt viewpoint can be expressed. The examples illustrate the Future mode:⁵

- (3) a Deeshchah
1p-Fut-cry
I will cry - cf Yishcha (I crying)
- b Shimá kindéé ch'iyáán la' bá nahideeshnih
my-mother groceries some for-her pref-1p-Fut-buy
I'll buy some groceries for my mother
- c [context: Mary's boyfriend is coming to visit her]
Mary yiskáágo bil hodoozhooł
Mary tomorrow to-her 3p-Fut-become happy
Mary will be happy tomorrow

The Future mode may appear with a future adverb as in (3c), but not with the future particle. Since the verb forms express the Future mode, they have no overt aspectual viewpoint. We will say that such cases are 'aspectually zero-marked' (Klein et al 2001).

The Future particle is *dooleel*, with a short form, *doo*. The particle usually appears to the right of the verb word, and appears with verb words of all types. If the verb word expresses an event it has an overt aspectual viewpoint (or other mode); the Future particle appears with all viewpoints, perfective, imperfective, and progressive. The particle is notated as FPrt. State verb words are known as 'neuter', marked 'neut' in the examples. They do not express contrasting modes (see Section III):

- (4) a 'Asháa dooleel
1p-impf-eat FPrt
I will be eating -cf 'ashá (I'm eating)
- b [context: Mary's boyfriend is coming to visit her]
Mary yiskáágo bil hózhoo doo
Mary tomorrow to-her be-happy(neut) FPrt
Mary will be happy tomorrow

Future adverbs appear quite freely with all kinds of verb words. They may occur with the future mode and particles. The question of just when they are used is beyond the scope of this discussion; we simply present two illustrative examples:

- (5) a Nínáádeezidgo Na'nízhoozhígóó deeyá
next-month Gallup-to 3p-go-perf
He's going to Gallup next month
- b Yiskáágo azeé' yil shaa 'anáá'átsééh
tomorrow medicine with-it to-me out-of-sight-again-3p-impf-jab something
He is giving me another injection tomorrow (YM p 363)
- c [context: Mary's boyfriend is coming to visit her]
* Mary yiskáágo bil hozhó
Mary tomorrow to-her be happy(neut)

¹ All examples from E. Perkins, Irene Silentman, or as noted. We thank Aryeh Faltz for his comments and careful proofreading.

² For instance, Elgin 1973, Hardy 1979, Young & Morgan 1987.

³ The morphological details of the verb word will not be considered here; see Young & Morgan.

⁴ The Optative expresses non-actual situations; the Usitative and Iterative express either a pattern of events, or simple repetition.

⁵ The verb words are glossed only with detailed information relevant to the discussion: person, mode, and base meaning; other prefixes are simply translated or noted as 'pref'.

Future adverbs are good with both the imperfective and perfective viewpoints (5a, 5b). The situations that are appropriate for these adverbs are constrained, requiring that a situation be scheduled, in a sense. Thus (5c) is unacceptable. The contrast of (5c) with (3c and 4b) is like the contrast between *will* and the futurate in English. *The ship will arrive tomorrow*, *The ship arrives tomorrow* are both good; but $\sqrt{\text{Mary will be happy tomorrow}}$, **Mary is happy tomorrow*.

There are two past particles: *ń'téé'* is syntactically optional; *-dǎǎ'* is an enclitic that marks subordinate clauses. They appear with all aspectual viewpoints, including zero-marking; they are available for all verb words:

- (6) a 'Ashǎǎńt'éé' ...
1p-impf-eat PPrt
I was eating -cf 'ashǎ (I'm eating)
- b Siláo nishlǎńńt'éé'
policeman 1p-be(neut) PPrt
I was (used to be) a policeman
- c Kingóó 'aneeshkaǎńt'éé' shee níkihónítǎ
store toward 1p-prog-move along PPrt on-me 3p-begin-perf-rain
As I was going to the store it began to rain
- d Ashkii nishlǎńńéédǎǎ' ...
boy 1p-be(neut)+PPrt (when I was a boy...)

In a single clause with the perfective viewpoint the past particle *ńt'éé'* is unlikely to occur, because the perfective is standardly taken as talking about the Past (see Section II below).

Both particles indicate a connection to the context, often explicit but sometimes implicit. In (6c) two clauses are connected by the independent particle *ńt'éé'*, whereas (6d) has the enclitic *-dǎǎ'* and requires continuation. We are unable to pursue the nature of the contextual connection here, but hope to address it at another time. The particles can appear with nouns, where they mean 'former', or 'deceased'.

Past adverbs such as *yiskǎǎgo* (tomorrow), *adǎǎdǎǎ* (yesterday), etc, appear with all verb words and viewpoints. Example (7) has an event verb word and the imperfective:

- (7) Adǎǎdǎǎ' Jáan Tségháhoodzáńígóó naaghá
yesterday John Window Rock around-3p-impf-go
John was at Window Rock yesterday

Like the other adverbs, these are syntactically optional. The language has Present adverbs as well, not illustrated here.

Summarizing, for event verb words the Future is expressed by the future mode. For both event and state (neuter) verb words, future particles and/or adverbs express Future; past particles and/or adverbs express Past.

II – Analysis

With the background sketched in, we consider how to analyze the temporal system of Navajo. One standard typological distinction is between tensed and tenseless languages. But recent studies have brought out variations among tense systems and shown that tense differs widely among languages (Dahl 1985). Evidently tense is not an all-or-nothing phenomenon. We will not try to recapitulate this material, but will state criteria for tense and apply them to Navajo. Before doing so, we outline very briefly our views on some relevant issues.

One issue is the nature of the Future mode in Navajo, and more generally the status of the future as a tense. Recall that modes are only available for event verb words, and that the future mode does not contrast with other temporal morphemes. Moreover, the future is unlike past and present: it is never an expression of simple temporal location. Semantically the future always has an element of modality, though symmetrical with the past in relation to the moment of speech. For some, e.g. Bybee, "the future does not belong in the same grammatical category as the past" (1985:157). Across languages, future time expressions tend to have 'special' formal behavior (adduced in Stassen 1997:354 et seq; Stassen excludes future from the category of tense). Given these considerations, and the limited nature of the Future mode, one might say that Navajo is a tenseless language. We take the more inclusive view of the future, with Dahl & Vallupulai (to appear b). The future may be part of a tense system, if it meets the criteria for tense. On the other hand, the future is always at least partly modal semantically.

Another issue is the status of the Navajo particles that convey Past and Future for all verb words. They are not inflectional morphemes, and they are not syntactically obligatory. Yet we will show they are integral to the system in a way that adverbials are not, acting as enclitics and participating in complex meanings.⁶ We elaborate this point below.

The status of the perfective and imperfective viewpoints is related to the topic of tense, and to the expression of time in Navajo. As noted, the aspectual viewpoints are sometimes called past and present tenses respectively (e.g., YM). Are they tenses in their own right? Or does the aspectual information they convey have temporal implications? We take the latter view for both formal and semantic reasons. We comment briefly on aspectual viewpoints here, and discuss them directly in the following section.

The grammatical category of tense can be defined in relatively broad or narrow terms. There is general agreement that tense is a fuzzy category, but not all agree as to its main features. We take a relatively narrow approach here. We try to elucidate the traditional category of tense, partly in order to enable clearer understanding of the different types of systems found across languages. This complements the broader view, for instance that endorsed in a current cross-linguistic study of Dahl and Velupillai (to appear a). Noting that languages differ widely, they regard tense-mood-aspect as appearing in systems, wholes with individual grams that express such notions as past, perfective, perfect. They contrast such broad systems with the traditional alternative which takes tense and the others as distinct grammatical categories.

We identify four features as characteristic of tense morphemes. The first three are quite close to those proposed in Comrie 1986.

⁶ We thank Peggy Speas for pointing out to us the possibility that the particles are tenses, or tense-like.

- (8) Features of tense
- (i) Inflectional verbal morpheme
 - (ii) Obligatory
 - (iii) Temporal meaning 'basic'
 - (iv) Atemporal meanings in certain contexts

We assume that if all the features apply to a form, it is a tense; and that the more features apply to a given form, the more tense-like it is.

The criterion that tense be inflectional means that it has ramifications in the grammar of a language. The inflectional morphemes of tense form the 'spine' of an independent sentence: tenses participate in agreement, case assignment, and subjectivity, and the distinction between finite and non-finite clauses.

The criterion that tense be obligatory means that a tense morpheme is required in all clauses - perhaps all finite clauses. All clauses must have tense coded on the verb, expressing temporal information of one kind or another.

Applying the criterion to Navajo, we note that the future mode is the only inflectional form relevant to tense. Every event verb word must have a mode morpheme and the future is one of the modes. However, the other modes express aspectual viewpoint and modality: they do not code temporal meanings. Therefore, it is not obligatory in Navajo that all clauses have tense coded on the verb, and express temporal information.

Moreover, the future mode is not obligatory in conveying a future interpretation for a sentence. As we have shown above, the future particle *dooleel*, and/or future adverbs, can also do this.

The other two criteria are semantic. The third simply guarantees that a tense morpheme have temporal meaning: it must express location in time.

The fourth criterion is less familiar as a feature of tense.⁷ Atemporal meanings such as non-actual, conditional, hypothetical, and contrary-to-fact are often associated with the past tense. These atemporal meanings are a key feature of morphological tense, according to Iatridou 2000. We will begin by commenting on English examples, assuming that English has past and present tense; and that *would* is the past form of the future modal *will*.⁸ Thus, for instance, the past tense has atemporal meanings in contexts such as sentences with an *if*-clause, as in (9):

- (9) a If John had come to the party, we would have been pleased.
 b If John came to the party, we would be pleased.

(9a) is usually taken as counterfactual (though see (13) below): the past perfect *had come* appears in the first clause and the past composite *would have been* in the second clause. (9b) is a conditional, with simple past tense in the first clause and *would* in the second. These examples illustrate more than a coincidence between the morphology of past tense and that of counterfactuality, according to Iatridou 2000. Cross-linguistic studies show that in many unrelated languages, 'morphological' tense has temporal and atemporal meanings. The latter contribute to conditionals and counterfactuals in a similar manner.

⁷ Another semantic feature of tense has recently been proposed. Klein, in press, claims that finite forms convey assertion. This interesting suggestion is beyond the scope of the present paper.

⁸ This is not a controversial position: Quirk et al 1985, Comrie 1986, Abusch 1988.

There are differences. She notes that Modern Greek has morphological past tense and an undeclineable future particle, for instance; she does not discuss the status of the particle.

To account for the temporal and atemporal meanings, Iatridou proposes that morphological past tenses have an 'exclusion feature' which operates at both the temporal and atemporal level. At the temporal level the meaning of the past tense excludes the present Reference Time or Topic Time. The term Topic Time, due to Klein (1994), denotes the time talked about in a sentence, the time for which an assertion is made. The notion is close to the Reference Time of Reichenbach (1947), also used in Smith 1991 and Kamp & Reyle 1993.⁹ The atemporal meaning excludes the current reference world, as in the interpretation of both clauses in sentences like (9). A clause with atemporal meaning is not taken as an assertion that a proposition is true in the current world. Iatridou develops an interpretation of counterfactuality based on implicature; for the detailed proposal, see her article.

The fourth criterion for tense given above is based on Iatridou's proposal concerning the atemporal meanings of the past tense. We adopt, as one of the key factors of tense, the notion that it participates in conveying atemporal meanings.

The future mode and temporal particles of Navajo are atemporal in the sense discussed above. This fact has been noted by many scholars, among them Elgin 1973, Steele 1975, Hardy 1979, Young & Morgan 1980, Willie 1996, Krause 2001. However, it has not traditionally been associated with the notion of tense. In conditional and counterfactual contexts the past particles have a non-actual meaning; the combination of past and future conveys a meaning that is hypothetical or contrary-to-fact. We give the basic cases, some of them constructed according to the examples given by Iatridou. The examples come from the literature and from our informants. The simplest case is the future conditional, illustrated in (10):

- (10) Béeso nee'ásdiidáá' la' na'deeshnil
 money 3p-perf-become-nothing-to-you +PPrt some 2p-1p-Fut-give-you
 If you run out of money, I'll lend you some (Y&M p 307)

The enclitic Past Particle *dáá'* appears in the first clause, conveying a hypothetical meaning in this context; the second clause has the Future mode.

Counterfactuals are expressed in Navajo with a combination of forms that convey Past and Future in their temporal uses. The first examples are single-clause past counterfactual sentences (not discussed by Iatridou). Here and in other counterfactual cases, the combination of Past and Future (the latter conveyed by mode or particle) has non-actual meaning. The sentences convey that the event described did not take place.

- (11) a Tl'ízi náhiideesh'naal nt'éé'
 goat 1p-again-Fut-revive PPrt
 I should have revived the goat (Willie 1996)

⁹ For Reichenbach, tense expresses two relations: the relation between Speech Time and Reference Time, and the relation between Reference Time and Event Time. For simple tenses Reference Time = Event Time.

- b Baa ni'áá doo nt'ée'
to-him 1p-perf-handle Fprt Pprt
I should have given it to him (Hardy 1979)

The second example has the perfective viewpoint; examples of the same type are also given in Hardy 1979 with the imperfective viewpoint. We have not yet investigated fully the question of how freely the different aspectual viewpoints appear in counter-factuals of this type.

If-clause Past counterfactuals are illustrated in (12). The first clause is marked by *-go*, a subordinator; the main clause has the Past particle and a Future marker (either the particle FPrT or the Future mode morpheme).

- (12) Past Counterfactual
a Shiye' azee' baah ílééhgo ch'i'dooljiił nt'ée'
my-son medicine on-it 3p-impf-make -GO, he-survive-FutM PPrT
If my son had put medicine on it (wound), he would have survived (Krause)
b Siláo 'idliíjí hazhó'ó bihool'áágo shíj t'ahdii siláo nishlíi dooleel nt'ée'
policeman to-be-one carefully 1p-perf-learn-it+GO,probably still policeman I-am(neut) FPrT PPrT
If I had taken police training more carefully, I'd probably still be a policeman (YM p 678)

The subordinate *-go* clause may have the perfective or imperfective viewpoint, as the examples illustrate. In (12) neither main clause has an overt viewpoint morpheme: (12a) has the Future mode and (12b) is neuter. If the main clause has an overt aspectual viewpoint, it must be perfective, we believe. This is our conclusion from preliminary work with informants, but we need to investigate further to be absolutely certain.

The atemporal past meaning of the examples above may be hypothetical rather than contrary-to-fact. This interpretation is pragmatically natural when the speaker does not know whether an event has occurred or not. In one type of case the speaker wants to find out what happened, and constructs a possible scenario or chain of events. For instance, assume that you are a doctor in the hospital where Mary is a patient. She exhibits disturbing symptoms, and you wonder whether the nurse has given her the medicine she needed during the night. You say:

- (13) Azee' neikáhi neinii'go naaltsoos yikáá' áyiilaa doo nt'ée'
medicine giver to him-3p-impf-give-GO paper on-it 3p-perf-make FPrT PPrT
If the nurse gave it (the medicine), she would have made a note. (So, let's look at the notebook...)

Other natural scenarios for hypothetical interpretation are a criminal investigation and an attempted reconstruction of historical events. The counterfactual interpretation is often preferred because people usually know whether an event they are taking about has taken place.¹⁰

The Present Counterfactual also has past and future temporal forms and a counterfactual interpretation. It is taken as a statement about the present rather than the past. The adverb *k'ad* (now) ensures the Present interpretation.

¹⁰ The term 'contrary-to-fact' is not exactly right, since conditionals are ambiguous between a counterfactual and a non-counterfactual interpretation. The counterfactual interpretation is most common, however.

- (14) Ánists'óozidáá'go k'ad ashyééh doo nt'ée'
1p-thin(neut) PPrT+GO now 1p-bemarrried(neut) FPrT PPrT
If I were thin I would be married now

The English translation of the first clause has the subjunctive; in Navajo, the same forms are used as in contrary-to-fact sentences. The clauses are stative here; as Iatridou points out, this is typical of present counterfactuals. Since in Navajo statives are of the neuter class, they do not have an overt aspectual viewpoint.

Temporal adverbials do not contribute to atemporal meanings in conditionals and counterfactuals. This differentiates them very clearly from the other direct temporal forms in the language.

We have shown that the Future mode and temporal particles of Navajo contribute to conditional and contrary-to-fact meanings in appropriate contexts. Iatridou notes that aspectual viewpoints play a role in the atemporal interpretation of conditionals and counter-factuals. This does not seem to be true for Navajo for most cases we have examined. Rather, aspectual viewpoints vary in the usual way; Krause 2001 shows that viewpoints in these contexts have the usual aspectual co-occurrence properties. In single-clause counterfactuals the aspectual viewpoint may be perfective or imperfective. For the first clause of conditionals and two-clause counterfactuals, the viewpoint may also be perfective or imperfective. There is one case that may have aspectual restrictions: the second clause of a conditional or counterfactual may be imperfective.¹¹ We are still not sure about the strength of this finding, or what it means in a systematic account. We do know that languages differ somewhat in how they convey hypothetical, contrary-to-fact, and conditional meanings.¹²

We conclude that both the Future mode and the temporal particles meet some or all of the criteria for tense. Features (i), (iii) and (iv) hold of the future Mode, so that it is almost a full-fledged tense. It departs from the criteria above only in that it does not alternate with other tense morphemes (recall that the other modes do not express temporal location). Features (iii) and (iv) hold of the temporal particles; we shall say that they are tense-like. Both the Future mode and the particles have primarily temporal meanings; together they convey non-actual meanings in conditional, hypothetical and counter-factual contexts.

Summarizing, tense is available for event verb words, though it is not the only way of conveying Future time. Tense-like morphemes are available for all verb words, although they are not obligatory.

¹¹ The following sentence, for instance, is rejected as ungrammatical.

* Shiye" azee" yaiiah a'yiilaago ch"i!i!idiíiih dooleel
my son medicine on-it make^{Perf}-go, survive^{Impf} FPrT

¹² Iatridou 2000 argues that perfective and imperfective in some languages systematically require exclusion features. The exclusion features are similar to those proposed for tense. Krause 2001 gives evidence that this may not be true for the aspectual viewpoints of Navajo, which differs in other ways from the languages Iatridou examines. There are other differences: Navajo lacks the Future Less Vivid form discussed by Iatridou (*If John took the medicine, he would get better*), perhaps because it lacks the morphological resources that distinguish *would* from *would have*. Languages with dedicated irrealis morphemes (Burmese, discussed in Nichols 2003); or other forms, also have different patterns of expression.

III – Temporal interpretation and aspectual information

Many Navajo sentences appear without direct temporal information: sentences without a temporal particle or adverb, and without the Future mode morpheme. For such sentences we suggest that the aspectual system gives temporal information indirectly, through pragmatically based principles. We assume that the two components of aspect are situation type and viewpoint (Smith 1991). We also assume that orientation to Speech Time, or deixis, is central to temporal interpretation.

Situations are located according to their relation to Speech Time. Present situations are simultaneous with Speech Time, Past situations are located before Speech Time; Future situations are located after Speech Time.¹³

All Navajo verb words convey aspectual information. Verb bases are distinguishable as expressing an event or state on morphological, distributional, and semantic grounds (Smith 1991, 1995). As we have seen, event verb words may have an overt aspectual viewpoint. Recall that the perfective, imperfective, and progressive viewpoint are conveyed by modes. If an event verb word has the Future or another mode, there is no overt viewpoint; they are 'zero-marked' (Klein et al. 2000). State verb words do not express modes, and thus are always zero-marked.

There is a well-known pattern of temporal interpretation that is used for those Navajo sentences that do not give temporal information directly. The key factor is aspectual information. Verb words with the perfective viewpoint are taken as located in the Past; verb words with imperfectives or progressive viewpoint are taken as Present. Zero-marked verb words are interpreted according to their situation type, in a manner explained below. We state the general pattern in (15).

- (15) How Navajo temporally locates events or states
- Verb words taken as located in the Present
- (i) Zero-marked state verb word (pragmatic default)
 - (ii) Event verb word, imperfective or progressive viewpoint (pragmatic default)
- Verb words taken as located in the Past
- (i) Event verb word, perfective viewpoint (pragmatic default)
 - (ii) Zero-marked event verb word
 - (iii) Contextual Past information
- Verb words taken as located in the Future
- (i) Event verb word, Future mode¹⁴
 - (ii) Contextual Future information

The pattern of interpretation is not unique to Navajo. It has been documented for another language in which temporal information is not obligatory (e.g. Chinese, Smith & Erbaugh 2001, 2002). The common identification of perfective viewpoint with past tense, and imperfective viewpoint with present tense, is due primarily to this pattern.

¹³ This over-simplifies, leaving out the key notions of Topic Time-Reference Time; mentioned above in connection with Iatridou's exclusion feature for past tense.

¹⁴ The Optative mode also locates situations in the future, or as non-actual: the Optative expresses wishes or desires.

There is a single and reasonably simple factor that underlies the deictic pattern: whether a situation is bounded or unbounded. The term 'bounded' refers to an aspectual property of the situations expressed in sentences. Situations - events and states - may have bounds, implicit or explicit; or they may be unbounded, open. Boundedness depends on both aspectual viewpoint and situation type. Aspectual viewpoints contribute information about boundedness: the perfective presents events as bounded, the imperfective and progressive present them as unbounded.¹⁵ In zero-marked clauses, the type of situation expressed in a verb word determines the boundedness of the clause. Telic events have intrinsic bounds which are essential to the event; atelic events have implicit bounds (Smith 1999). States are unbounded - the coming about or ending of a state is an event in itself. Bounds may be also explicit and independent, e.g. with adverbial or other information (Depraetere 1995).

We can now state the pattern in general terms that are not limited to any particular language. We use the term 'deictic' since the simplest interpretations are deictic, that is, oriented to Speech Time, the present.¹⁶

- (16) The default deictic pattern of temporal interpretation
- a Unbounded events are located in the Present
 - b Bounded events are located in the Past
 - c States (unbounded) are located in the Present

or, more compactly:

- (16)' The default deictic pattern of temporal interpretation
- a Unbounded situations are located in the Present
 - b Bounded events are located in the Past

The pattern has often been noticed; this formulation of it enables an explanation on the basis of general pragmatic principles.

We now offer three pragmatic principles that underlie temporal interpretation when no explicit temporal forms appear in a sentence. The principles allow temporal location to be inferred from aspectual information. Aspectual viewpoint may be marked overtly; if there is no overt viewpoint, it is zero-marked. We assume that a temporal schema with the essential temporal properties is associated with each situation type in the grammar of a language. In Navajo, the verb base realizes situation type. Explicit temporal information can override the default, of course. The principles are stated as constraints on interpretation. We think that they hold for languages quite generally; see Smith & Erbaugh 2001, 2002 for a detailed account of the constraints and their application in Mandarin Chinese.

¹⁵ These generalizations hold quite well across languages. There are differences across languages in whether the perfective viewpoint is available for states; and if so, how it applies to them (Smith 1991).

¹⁶ The default pattern holds for absolute, not relative tense; there may be other, non-deictic uses of tense.

The first constraint is specifically linguistic, and quite well-known. It concerns the way that the factor of boundedness limits temporal interpretation. We adapt the formulation of Kamp & Reyle 1993:

(17) Bounded Event Constraint

Bounded events are not located in the Present. Speakers follow a tacit convention that communication is instantaneous. The present perspective is incompatible with the report of a bounded event, because the bounds would go beyond the moment.

There are some exceptions to the constraint, also well-known. One apparent exception is the performative. But performatives actually fit the constraint: a performative is just that, a performance rather than a report (Austin 1961). Other exceptions, such as sports announcer accounts, stage directions, and literary commentary, telescope time. The Bounded Event Constraint, together with the Simplicity Constraint that follows, accounts for the default pattern of temporal interpretation of sentences with overt aspectual viewpoint.

The second constraint is a very general one, not limited to language. This constraint deals with how people make interpretations that go beyond the information given. In language, what is said often underdetermines the way a sentence is understood. One makes inferences that are based on general principles of different kinds. In doing so, we suggest that people limit inferences to include as little as possible:

(18) Simplicity Constraint on Interpretation

Choose the interpretation that requires the least information added or inferred.

Kanisza 1976 discusses visual perception in similar terms, giving examples of how complex figures are perceived as simple gestalts. In a very different vein, similar principles are used to constrain computational procedures.

The Simplicity Constraint explains why bounded events are taken as Past rather than Future. The reason is that Past is simpler than the Future: it lacks the element of uncertainty, the modal factor that is always present in expressions of futurity. The first two constraints account for the default interpretation in Navajo of event verb words with overt aspectual viewpoints. Verb words with the Imperfective and Progressive viewpoints express events that are unbounded. They are located in the Present by default. This is the simplest interpretation since it requires no additional information. Verb words with the Perfective viewpoint express bounded events. Due to the Bounded Event Constraint, they are not located in the Present. Due to the Simplicity Constraint, they are located in the Past rather than the Future.¹⁷

The third constraint accounts for how zero-marked clauses are interpreted. It provides that a zero-marked verb word is taken as bounded or unbounded, depending on the situation type that it expresses. This constraint is Gricean in nature: it follows the Maxim of Quantity, Say no more than is needed (Grice 1975, Levinson 1983):

¹⁷ Two examples of the Simplicity Constraint from English: sentences in the present tense are taken as Present rather than Future; and, as Steve Crain pointed out to me, reduced relative clauses are taken as having a deleted Past rather than a deleted Future. For instance, the well-known example *The horse raced past the barn fell* is interpreted as a deleted past. The full version is always given as *The horse that was raced past the barn fell*. This is a default interpretation. If the context has *will* and a Future adverb, interpretation of the missing form may be Future.

(19) Temporal Schema Constraint

Interpret zero-marked clauses according to the temporal schema of the situation expressed.

The temporal schema associated with a situation provides that it is bounded or unbounded. Events are bounded: their temporal schemas have endpoints - a single point in the case of instantaneous events. States are unbounded, since they do not include endpoints.¹⁸

Together, the three constraints account for the temporal interpretation of zero-marked clauses. In Navajo, zero-marking occurs with two types of verb words: state verb words, and event verb words with the Future mode - or other non-viewpoint mode. By the Bounded Event Constraint and the Simplicity Constraint on Interpretation, boundedness determines the default temporal location of a situation. By the Temporal Schema constraint, state verb words are taken as located in the Present and event verb words are taken as located in the Past. This is a default only. The three constraints have wide application in languages such as Chinese, where zero-marked clauses occur frequently.

We now illustrate the default temporal interpretation of aspectual information in verb words. Pragmatic interpretation is needed for sentences without direct temporal information. We begin with verb words that have the perfective and imperfective viewpoints. For verb words with the perfective, the default is Past, as in the two clauses of the following sentence:

(20) Shimá sání chizh la' bá nánijaa' dóo bá didííljéé'

My grandmother firewood some for-her 1p-perf-bring and for-her 1p-perf-build fire
I bought back some firewood for my grandmother and built a fire for her (YM p 564)

We give only one example, since the Past interpretation of the perfective viewpoint is not problematic.

However, the default does not exhaust the possibilities. The perfective viewpoint can appear in sentences in the Future as well as the Past. Such sentences often have a future perfect meaning:

(21) a Yiskáago Mary altsó 'íilta' doo

tomorrow Mary complete 3p-perf-read FPrt
Tomorrow Mary graduates from school

b Yiskáago nihaa yíníyágo t'áá iidáá doleel

tomorrow us-to 2p-3p-perf+GO already 1pl-perf-eat FPrt
Tomorrow when you come to see us we will have already eaten

¹⁸ A somewhat similar notion, 'event realization', is proposed for zero-marked sentences in Bohnemeyer & Swift 2003. They apply it to Inuktitut, German, and other languages. See also their article from the SULA conference in this volume. In Lin 2003, an extensive discussion of temporal interpretation in Chinese, the treatment of zero-marked sentences is similar to our proposals.

The perfective viewpoint also appears in 'unless' sentences about the Future. Here the first clause suggests that the speaker doesn't expect it to rain:

- (22) T'ádoo nahóóltáágoogo shinaadáá' altso dadoogáá'
 Unless 3p-perf-rain+GO my -corn prt 3p-Fut-dry up
 Unless it rains my corn will dry up

These examples show that the perfective has a consistent viewpoint interpretation in sentences about the Past and Future.

When the imperfective and progressive viewpoints appear in a verb word, the default interpretation is Present, as in the following examples:

- (23) a John Tségháhoodzánígóo naaghá
 John Window Rock 3p-impf- go around
 John is in Window Rock (e.g., 'hanging out')
- b Nléi dziłbaąhgóo hooltíł
 that-one-over-there mountainside-along 3p-prog-rain
 It's raining there along the mountainside (YM p 461)

Here as in the other sentences with aspectual viewpoint information, the examples give default cases only. If a sentence has explicit temporal information, or is in a context with such information, the default can be over-ridden.

We now consider verb-words that are zero-marked for viewpoint. The prediction made by the constraints taken together - the Bounded Event Constraint, the Simplicity Constraint, and the Temporal Schema Constraint - is that zero-marked verb words are taken as expressing situations located in the past or present, depending on whether their temporal schemas have bounds or not. States are unbounded, events have intrinsic or implicit bounds. The prediction is that state verb words are located in the Present. Event verb words are predicted to be located in the Past.¹⁹

We deal only with state verb words here. We intend to test the prediction for event verb words, and will report the results. States are taken as Present in the default interpretation:

- (24) a Díí tsé doo ndaaz da
 this stone neg 3p-heavy(neut) neg
 This stone is not heavy (YM p 654)
- b Sitsilí chidí biyi' góne' sidá
 my-little-brother car inside 3p-sit (neut)
 My little brother sits/is sitting in the car (YM p 204)

The predictions given above are borne out, for verb words with aspectual viewpoints and for zero-marked state (neuter) verb words. These are defaults only: in sentences that have explicit temporal forms, the information they convey overrides the default.

¹⁹ Activities are variable in behavior, often allowing either Present or past interpretation. The variability is due to the implied nature of Activity endpoints (Smith 1999, Smith & Erbaugh 2002).

In the final section of this paper we comment briefly on the syntax of the temporal morphemes of Navajo, and how they relate to interpretation.

IV – Syntax

The syntax of the temporal forms we have discussed does not always mirror their semantics. We consider modes, particles, adverbs; for discussion of how situation type is expressed in Navajo see Smith 1996.

The modes are inflectional morphemes in the verb word, known as 'conjugational' morphemes. The conjugational morphemes belong in Position VII in the traditional template of verb prefix positions in Navajo; in morphological form they combine the conjugation prefixes and subject prefixes. McDonough argues for a bipartite model of the verb word (2003, and other publications) rather than a template. The bipartite model posits two phonological and syntactic units, an Auxiliary and a Verb, for the Navajo verb word. The conjugational morpheme constitutes the head, the rightmost constituent in the Auxiliary unit of the core verb (2003:24).

In a syntactically-based account of the Navajo verb, Hale presents a structure which the modes function as the spine of a sentence, one of the highest projections in the syntactic tree (Hale 2000). It is compatible with McDonough's model. This structure is just what one would expect if the Future mode is a tense morpheme, as we have argued above. The other modes do not directly convey temporal information, however. Three modes mark aspectual viewpoint, the others mark optative, habitual and repetitive. Semantically, the optative clearly belongs in a high projection; the others are less clear.²⁰ It's not unusual for aspectual viewpoint and mode to be marked in a high inflectional constituent; indeed, the close connection between tense, mode and aspectual viewpoint has often been recognized and is part of the reason for the proposal to treat them as a unit in Dahl & Velupillai (in press b).

The forms and interpretations of event and state verb words differ, as we have noted. Event verb words appear with all mode morphemes. Aspectual viewpoint modes determine whether the event is expressed as bounded or unbounded. The other modes affect interpretation in different ways, beyond the scope of this discussion.

The stative verb words, or neuters, do not allow for contrasting modes. They do have mode morphemes. Each neuter verb appears with the conjugational morpheme pattern of one aspectual viewpoint. There are three classes, according to whether the morphemes are perfective, imperfective, or progressive. The classes have some semantic unity, according to Young & Morgan 1987 and others. The conjugational morpheme is invariant with a given neuter verb word and is not interpreted aspectually. That is, neuter verb bases can be interpreted variously, depending on the contexts in which they appear (YM, Smith 1991): they are zero-marked for aspectual viewpoint.²¹

²⁰ The semantic information that these modes contribute to a verb word belongs to the situation type rather than the viewpoint component of the aspectual system. There may be morphological reasons as well for treating the Iterative and Customary not as modes but as 'super-aspects' following a proposal for Ahtna, another Athabaskan language, in Kari 1979. We hope to address this topic in future work.

²¹ The term 'neutral aspect' is used in Smith 1991 for verb words with no overt aspectual viewpoint. The flexibility of neuter verb words in Navajo is demonstrated there. In addition to the default zero-marking explored in this paper, neuter verb words appear in contexts which suggest a perfective or imperfective interpretation.

In the syntax, then, all verb words have mode morphemes. Semantically neuter verb bases are zero-marked and are interpreted by the pragmatic principles given above. Event verb words with non-viewpoint modes are also zero-marked for aspect and interpreted by the principles.

The temporal particles appear to the right of the verb word, as adjuncts we assume. Only a few other forms appear in this position, e.g. *jini* (it is said), *dooldah* (negation), *laanaa* (one wishes), *leh* (usually).

Temporal adverbials usually appear to the left in a Navajo sentence; they are not part of the verb word.

V – Conclusion

We have shown that Navajo has a temporal system with tense-like morphemes of two types: the Future mode, a conjugational morpheme that is essentially a tense, and the past and future particles, which have some tense properties. The language also has temporal adverbials. All of these forms appear optionally in Navajo sentences and determine the temporal location of the event or state expressed. The possibilities are somewhat different for events and states.

In sentences without direct temporal information, aspect conveys information about temporal location. We have stated a general pattern of default temporal interpretation based on boundedness, and three pragmatic principles that go from the information in particular sentences to the pattern.

We argue for a multi-featured approach to tense and suggest that an important feature of tense is its contribution to atemporal meanings in conditionals and counterfactuals.

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