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Toward the tenseless analysis of a tenseless language*

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In this paper, I argue, based on data from West Greenlandic, that languages can be truly tenseless, in the sense that their inflectional systems contain no node dedicated to the encoding of relations between speech time and reference time. My idea is that the burden of encoding temporal information actually falls mostly on the VP rather than on tense; so that true tenselessness entails neither a radical indeterminacy in the temporal interpretation of tenseless sentences nor a radically different description of the linguistic properties of tensed and tenseless languages, as some have claimed.

Inuit languages, including Greenlandic, Inuktitut, and Yup'ik, have been widely described as tenseless — that is, as having no temporal marking directly comparable to the tenses of, say, Germanic and Romance languages and as permitting sentences with no explicit temporal marking whatsoever. Despite this, most theoretical linguists who have investigated such languages have been reluctant to analyse them as truly tenseless, seeing them instead as instantiating some kind of null tense or empty tense structure. The reasons for this reluctance begin with the insight that on any plausible view of linguistic competence, speakers of every language must have commensurate resources with which to locate situations in time. This insight underwrites a key working hypothesis of much theoretical linguistic research: namely, that languages do not differ with respect to the instantiation of a category Tense, which is syntactically and semantically basic to them.

We might wonder, though, if this hypothesis does not reflect a Eurocentric bias, given that on the particular 'universal' picture that it presents, all languages come suspiciously to resemble familiar European languages rather than languages without obligatory temporal marking, as observed the world over (see, e.g., Bybee et al. 1994). So we might wonder in turn whether this hypothesis — which takes Tense to bear the burden of encoding temporal relations even in the latter languages, where such a category would be both phonetically null and morphosyntactically inert — is the only one worth testing. The question to ask, then, is what problems, if any, stand in the way of dispensing with a

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universally instantiated Tense and capturing the ‘deep’ similarity in the temporal properties of sentences across languages by other means. This question is of particular significance to the ‘evolutionary’ investigation of tense systems undertaken by Bybee et al. (1994), among others, which has uncovered lexical sources for an array of tense morphemes across languages and thereby cast doubt on the primacy of the ‘inflectional’ encoding of temporality.

As it happens, at least one key problem has been claimed for ‘truly tenseless’ analyses of tenseless languages. This pertains to the widely held view, defended by Stanley (2000) and others, that ‘all effects of extra-linguistic context on the truth-conditions of an assertion are traceable to logical form’, and, more specifically, that ‘for each alleged unarticulated constituent of an utterance’ — such a constituent being one supplied solely by context — ‘there is an unpronounced pronominal element in the logical form of the sentence uttered, whose value is the alleged unarticulated constituent’ (Stanley 2000: 395, 410). The problem that this view raises for ‘truly tenseless’ analyses of tenseless languages has recently been spelled out by Matthewson (2003: §4). This problem, as Matthewson sees it, is that with no tense morpheme in the syntax, there would be no way for the situation described by a sentence in a tenseless language to be located with respect to a contextually salient reference time. This would lead either to sentences displaying radical temporal indeterminacy or to their being interpreted ‘existentially’ (corresponding to existential closure over times), neither of which possibility is actually borne out by the data. Matthewson takes these considerations to militate against such analyses and in favour of her own alternative. On the latter — which is based on Kratzer (1998) and like it explores the analogy between tenses and pronouns originally drawn by Partee (1973) — null tense morphemes introduce time variables corresponding to reference times, the values of which are determined by context.

Now, it is worth noting that the question of how context figures in an utterance’s meaning remains an open one — as can be seen, in particular, from the energetic responses Stanley’s (2000) paper has prompted from Recanati (2002), Stainton (2003), and others. This suggests that Matthewson’s claims about the possibility of truly tenseless languages will be rejected by those who take the temporal location of situations in tenseless languages to be determined in straightforwardly ‘pragmatic’ terms — involving, for example, an appeal to ‘generalized conversational implicatures’ as the mechanism that relates aspectual information to the temporal ordering of situations (Bohnenmeyer 2002: 18). However, a less radical, but perhaps no less compelling, challenge to Matthewson’s claim can also be mounted, which adopts a view of reference times and the ‘division of temporal labour’ in sentences rather different from the one she espouses. On such a view, reference times do not correspond directly to any ‘piece of syntax’, but are instead one of the contextual parameters with respect to which tensed sentences are interpreted. What then emerges as a key function of tenses, aspects, and VPs alike — the last describing situations with different temporal properties, commonly captured in terms of Vendler’s (1967) distinction between ‘achievements’, ‘accomplishments’, ‘activities’, and ‘states’ — is the imposing of restrictions on the reference time of the utterance. In a nutshell, such an approach envisages the burden of encoding temporal information as falling not so much on tense or other inflectional encoding of temporality as on the VP, with tense and aspect serving as VP operators.

Such a view of temporal composition, which foregrounds the temporal properties of situations rather than of tenses, is admittedly at odds with the ‘representational’ cast of much recent work on tense and aspect. Yet, it has been advocated by Partee (1984: 253)

herself, the source of the tense/pronoun analogy on which much of this work is based. It is also at the heart of research on temporal interpretation which goes back at least to Bach (1980), and which includes Muskens' (1995) 'dynamic' analysis of tenses, aspects, and VPs. The latter analysis appears to have just the right properties to describe tenseless languages without recourse to null tenses, and I shall thus be pressing it into service in outlining a 'truly tenseless' analysis of one such language, West Greenlandic, in the discussion to follow.

Significantly, such an analysis does allow reference times to be 'present in the tree' even in the case of sentences with no tense morphemes, inasmuch as they are expressed as part of verb meanings and thus basic to the interpretation of these sentences. This addresses Matthewson's concern that tenseless sentences would receive the wrong interpretations on a 'truly tenseless' analysis. However, reference times do not, on this analysis, correspond to any isolable 'piece of syntax' in the form of tense morphemes, as they do in Matthewson's system. This I take to be a virtue of the analysis, since as such it is able to capture in a very direct fashion the kinds of data that have led researchers to claim that some languages really do not have tense morphemes. Equally important, it is able to do so in a way that avoids attributing any large-scale difference to languages with and without tense morphemes. The result is a description of the two classes of languages that entails no radical indeterminacy in the temporal interpretation of tenseless sentences, no radically different description of the syntactic or semantic properties of tensed and tenseless languages, and no radical learnability problem for the latter languages. While the present study represents no more than the first few steps toward such a description, it will, I hope, at least serve to show that this description is a desirable one.

The rest of this study is organized as follows. In §1, I consider certain key questions that arise in descriptions of tenseless languages — in particular, what tenses are and how they are encoded syntactically. In §2, I turn to West Greenlandic and present evidence (based on Shaer 1992, 1997) that it has no tenses, the tense-like affixes that we do find in the language displaying properties crucially different from those of tenses. I also trace certain consequences of this analysis for issues of learnability, comparing this 'truly tenseless' claim to Matthewson's (2003) 'null tense' alternative. In §3, I sketch Muskens' (1995) analysis of tenses, aspects, and VPs and show how this can be applied to the puzzle of tenseless languages. Finally, in §4, I offer some concluding remarks.

1. Describing tenseless languages

In order to make a case for the existence of tenseless languages, it is, of course, important to be clear on just what it is these languages do not have. Unfortunately, even brief inspection of the work on tenseless languages reveals that significant difficulties remain for determining what counts as a tense and how tenses are represented syntactically, and thus in conceptualizing the difference between tensed and tenseless languages. These difficulties are perhaps not surprising, given that cross-linguistic research has shown that the borders between tenses and other temporal expressions are notoriously difficult to define (see, e.g., Bybee et al. 1994: 37–40). What I shall suggest, though, is that criteria for the identification of tenses are beginning to emerge, based on both empirical and theoretical considerations; and that these criteria may allow us to distinguish tenses from other temporal expressions in a non-question-begging way. What I shall also suggest is that the various representational approaches to the syntax of tenses, though they have been extremely useful in drawing attention to the temporal properties of sentences, still

face enough conceptual and empirical difficulties that we should be wary of extending them to the analysis of tenseless languages.

1.1. *What are tenses?*

If we consider some common strategies in recent linguistic research for describing tenseless languages, we can see that these all take a functional category Tense (T) to be basic to the grammar, playing a necessary rôle in the grammatical encoding of temporality. They do so either by appealing to null tense morphemes with particular temporal properties, as in Matthewson's (2003) study; or, following work by Zagona (1990) and others, by taking verbs to have temporal arguments in much the same way that they have nominal arguments, as in Déchaine and Manfredi (2001).

One question, however, that remains largely unaddressed in this research is what actually counts as a tense and how this notion is related to the syntactic category Tense. One problem that we face here is that researchers have often used 'Tense' as a label for a node encoding various inflectional distinctions, making it equivalent to the older term 'INFL'; and have compounded the problem by giving the node little specific featural content (see, e.g., Chomsky 1995: 240). One simple solution to this problem is to assume that the grammar of even tenseless languages still contains a verbal inflectional head (e.g., Johns 1987). Accordingly, we can take the question of whether every language has a T node not to be about 'T-as-INFL' but rather to be about a node or associated features dedicated to the grammatical encoding of temporal information.

Of course, this still leaves us with the difficult question of which morphemes encoding temporal information are incontrovertibly tenses. As already noted, the criteria for determining tense status are far from clear. This can be seen, for example, in the criteria proposed by Wiltschko (to appear) in her investigation of certain morphemes in Halkomelem Salish, which she argues to 'instantiate the category T'. The criteria in question are reflected in her claim that these morphemes (i) appear on both nouns and verbs; (ii) have lexical content that contributes only the temporal information 'past' or 'future'; and (iii) may create form/meaning mismatches. These three properties are illustrated in 1, 2, and 3, respectively:

- (1) ímex te-l si:lá-lh
 walk DET-1SG.POSS grandfather-PAST
 'My late grandfather walked.' (Burton 1997: 73, in Wiltschko to appear: §2)
- (2) a. í-lh tsel lám
 AUX-PAST 1SG.S go
 'I'm gone.' (Galloway 1993: 319, in Wiltschko to appear: §3.2.1)
- b. te-l má:l-elh
 DET-1SG.POSS father-PAST
 'My late father' (Burton 1997: 67, in Wiltschko to appear: §3.2.1)
- (3) s-lá:t-elh
 NOM-night-PAST
 'morning' (Galloway 1980: 61, in Wiltschko to appear: §3.2.3)

Although these criteria seem reasonable, especially in the light of current claims about tense, it is not obvious that they are decisive in establishing the tense status of these morphemes. The first criterion — which is tied to the hypothesis that T can surface as a feature on determiners (see, e.g., Pesetsky and Torrego 2001; Wiltschko to appear: §2) — seems to be compatible with either a lexical or a functional status for the morphemes in question. Similarly, the second criterion would attribute a T status to temporal adjectives like English *past*, *present*, and *future*, which also contribute ‘bare’ temporal information, while denying such a status to metrical tense systems, such as that of ChiBemba, which encodes notions such as ‘within the last three hours’ (e.g. Chung and Timberlake 1985: 208). Finally, the third criterion is difficult to assess for the ‘past’ morpheme given in 3, since its ability to identify this morpheme as a tense relies on the tendentious gloss of the morpheme as ‘past’. Significantly, all three properties seem consistent with Halkomelem Salish having no T whatsoever.

This, of course, puts us back where we started: namely, without a reliable way of distinguishing tense morphemes from other devices that languages exploit in permitting reference to times. There are, however, a number of criteria that have been put forward in the literature, which provide a solid foundation for our investigation. Several, in fact, are encapsulated in Comrie’s (1985: 9–10) characterization of tense as ‘grammaticalised expression of location in time’. The basic semantic criterion for identifying tenses, as indicated in Comrie’s description, is that they serve to locate situations in time, and as such are distinguished, for example, from aspects, which describe the ‘internal temporal constituency’ of a situation (Comrie 1985: 6). One way that the temporal contribution of tense has been clarified and distinguished (at least as a first approximation)¹ from that of aspect is in terms of the three intervals that are the constituents of tense meanings on Reichenbach’s influential (1947) analysis: ‘speech time’ (S); ‘reference time’ (R), the time that the sentence is ‘about’; and ‘event time’ (E), the time that a situation holds or occurs. Accordingly, tense specifies the relation between R and S, whereas aspect specifies that between R and E.

This semantic criterion turns out, however, to be of limited use in distinguishing tenses from various temporal morphemes acknowledged by researchers to be rather different from tenses. This means that any semantic criteria for identifying tenses must be supplemented by morphosyntactic criteria. The criterion indicated in Comrie’s description is that tense morphemes are integrated into the grammar of the language, representing ‘closed class’ or ‘grammatical’ elements rather than ‘open class’ or ‘lexical’ ones (see, e.g., Bybee et al. 1994: 37). In addition, since one of the effects of grammaticalization is the loss of the ‘very rich and specific meanings’ originally associated with the lexical morphemes subject to this process, another criterion for identifying tense morphemes (notwithstanding the difficulties mentioned above) is that their meanings are ‘very general and [...] often characterized as abstract or relational’ (Bybee et al. 1994: 5).

Other criteria related to the grammaticalized nature of tenses are morphological ones. Among these is that tenses are typically morphologically bound and are taken to be inflectional rather than derivational in character, given, for example, their category-preserving character and their occurrence ‘outside’ of derivational morphemes (see, e.g., Spencer 1991: 9–12). The inflectional character of tenses also means that they have a ‘fixed position in relation to the verb’ (Bybee et al. 1994: 38), at the edge of words.

¹ The limitations of this approach to aspect have been discussed in, e.g., Naumann (1998).

Another criterion associated with the inflectional character of tense morphemes is that they are obligatory. This requires some qualification, though, since tensed verb forms are commonly part of paradigms in which they contrast with verb forms that have no tense marking (see, e.g., Bybee et al. 1994: 294–295). Granting this difficulty, we can still recognize that tenses are morphemes that the grammar forces a sentence to instantiate, whether or not these are strictly necessary for interpretation. This point emerges from consideration of the sentences in 4a and 4b:

- (4) a. John left today.
b. John left yesterday.

While the expression of tense in 4a provides information that the leaving was before now, its expression in 4b provides no more information than that already provided by the temporal adverbial. In other words, the past tense morpheme in these sentences ‘is used not only where it is supplying [...] new information’, but also ‘where this information has already been supplied, either explicitly or by the context’ (Bybee et al. 1994: 8). Thus, the tensed language of which they are a part leaves a speaker ‘no choice’ about whether to ‘communicate the information that an event is present or past’ (Pinker 1984: 168).

The criteria for identifying tense morphemes that we have just enumerated offer some hope that a distinction between tensed and tenseless languages can be given some empirical content. We shall thus be putting these criteria to use in our investigation of West Greenlandic in §2.

1.2. How are tenses represented syntactically?

Before we do so, however, it is necessary to address a distinct but related question about the analysis of tenses and temporal relations. This is how temporal relations are encoded syntactically — more specifically, whether times are encoded in the grammar simply as tense features or as ‘syntactic constituents of some type’ (Zagona 2002: 141). As noted above, many researchers — including Zagona (1990, 2002); Giorgi and Pianesi (1997), and Stowell (1993) — have argued that the intervals identified by Reichenbach (1947) as constituents of tense meaning correspond directly to syntactic constituents. For example, in the version of this approach that Zagona (2002) presents, ‘[t]he head of the Tense Phrase is analyzed as a transitive predicate whose external argument is the evaluation time (speech-time) and internal argument is the event-time.’ These claims are based, for example, on the observation that ‘the occurrence of referential dependencies between times [...] in complex sentences is sensitive to structural information’ (Zagona 2002: 141). The pattern most cited in this context is the following one, where the difference in the interpretations of complement and relative clauses is attributed to the structural difference between them:

- (5) a. She heard that Mary was pregnant.
b. Mary met the child who was crying. (Zagona 2002: 145, exx. 7, 10)

As Zagona (2002: 145) and others observe, the sentence in 5a ‘cannot mean that Mary would be pregnant at a future time’, whereas that in 5b is compatible with a greater range of temporal interpretations, the situation described by the relative clause being ‘unrestricted in its temporal relation’ to that described by the main clause.

Such analyses are consistent with a tendency that Partee (2000: 490) has observed in generative semantics as well as syntax: namely, ‘to assume that any linguistically significant syntactic or semantic property has to be overtly represented as some element in a representation.’ The question here is whether there is good semantic or syntactic motivation for such ‘temporal structure’. What Partee’s remarks suggest is that the temporal properties of sentences simply do not require analysis in terms of ‘visible propert[ies] of “logical form”’; and, in fact, such properties have commonly been treated without recourse to the explicit expression of times in the logical language (Partee 2000: 490, 486). Partee’s own work on tenses makes it clear that a representational approach to the analysis of temporal relations is neither necessary nor obviously even desirable. As she points out, the context-dependence of tenses does not require a treatment of ‘the tense morpheme itself as a pronoun-like variable over times’, as her own (1973) study proposes, but can instead receive a treatment on which the reference time is ‘more like a part of the necessary context for interpreting tensed sentences’ (Partee 1984: 264–265).

As regards the syntactic motivation for such temporal structure, this is difficult to assess. While it is clear that complement clause constructions are more restricted in their temporal interpretations than relative clause constructions, as shown in 5, it is less clear that this difference should be attributed to a difference in syntactic structure, rather than to the difference in the semantic relation holding between an attitude verb and its complement clause, on the one hand, and a noun and the relative clause associated with it, on the other. Certainly the structure of a complement clause construction alone does not rule out the possibility of a complement clause situation being located at a time after that of the matrix clause situation, as the sentences in 6 suggest:

- (6) a. Joe hoped that the bullet hit the target.
 b. Chester prayed that he passed his driving test. (Shaer in preparation)

Moreover, as Zagana (2002: 162–168) herself points out, many generalizations about the temporal relations holding between the situations described by matrix clauses and those described by complement phrases and clauses are not amenable to a structural explanation in any case, but instead require an appeal to the particular types of situations that complements describe. As it happens, such properties have been recognized as basic to an account of interclausal temporal dependencies generally (e.g., Gennari 2003), casting doubt on the utility of temporal structure in accounting for such facts. Thus, while conclusions about the general explanatory utility of positing such structure remain premature, such structure has not yet shown itself to be necessary for describing the temporal properties of sentences. Moreover, because such a structural approach takes the temporal relations encoded by tenses to be essentially ‘built into the tree’, it does not provide the right sort of tools for exploring the possibility that these temporal relations are not encoded directly in the sentences of tenseless languages after all. These considerations warrant the rejection of such an approach for our present purposes and the assumption, instead, of a ‘minimal’ clause structure, in which tenses correspond simply to features that are ultimately associated with T-as-INFL (leaving aside the question of how this association is effected).

Similar remarks apply to Matthewson’s approach to tenseless languages, which follows from her claim that the temporal interpretations of descriptively tenseless sentences require recourse to null tense morphemes that introduce variables over times. Although Matthewson does not argue for the kind of temporal structures in which each

constituent of temporal meaning corresponds to a constituent of syntactic structure, her claim that reference times necessarily correspond to a ‘piece of syntax’ is no less immune to the doubts that Partee raises for representational approaches to meaning. The question that remains, then, is whether Matthewson’s approach receives any independent support from the morphosyntactic patterns that tenseless languages display. What we shall find in the following section, where we turn to an investigation of temporal reference in West Greenlandic, is that it does not.

2. Tenselessness in WG: Some data

In the previous section, we assembled various criteria for identifying tense morphemes and distinguishing them from other temporal morphemes. Here we shall be applying these criteria to certain temporal morphemes in West Greenlandic, to see whether these can be plausibly analysed as tenses. As we shall see, these criteria provide compelling evidence that these morphemes are not tenses and thus that West Greenlandic should be considered a truly tenseless language.

In fact, there is also more basic evidence that West Greenlandic is tenseless. This includes the presence in the language of sentences with no temporal marking whatsoever, which may have either past or present readings, ‘depending on the stem and the context’ (Fortescue 1984: 272):²

- (7) a. *aggirpuq.*
 aggir-puq
 come.IND-3SG
 ‘He is/was coming.’ (Fortescue 1984: 272)
- b. *tikippuq.*
 tikit-puq
 have-arrived.IND-3SG
 ‘He has come/came.’ (Fortescue 1984: 272, 278)

What we see in these examples is that it is the stem itself that provides the information necessary to determine whether the situations described by the VP are or are not occurring at the time of speech. It is also worth noting that the verbal inflection encoding mood, person, and number is obligatory, but does not obviously encode any temporal information.³

² I use the following glosses in examples (based mostly on Fortescue 1980, 1984 and Bittner 2002): AP = antipassive; CON = conjunctive; COND = conditional; CS = causative; ELA = elaboration of subject; EQU = equalis; ERG = ergative; EXP = firm expectation; FUT = future (or EXP); GRD↑ = gradual progress up a scale; HAB = habitual; INCH = inchoative; IND = indicative; IND.IV/TV = indicative intransitive/transitive; INT = intentional; ITER = iterative; IV\RN = intransitive verb to relational noun; MOD = modalis; NOM = nominative; LOC = locative; PASS = passive; PERF = perfective; PL = plural; POSS = possessive; PR = present; R = remote; REL = relative (or ergative); RN = relational noun; SG = singular; ST = state; V\N: verb to noun. I have made some modifications to the examples from Bittner (2002) given as (8c), (11a), and (11b) in the text, following the suggestions of Jerrold Sadock (personal communication).

³ Note, however, that ‘causative’ and ‘contemporative’ moods, associated with verbs in subordinate clauses, do encode temporal information. Nevertheless, since such information is associated only with these two mood forms, and in particular not with any matrix clause moods, the claim that the system of verbal inflection in West Greenlandic constitutes a tense system is rather implausible. For further discussion, see Shaer (1992: §3.2.2).

Also consistent with the absence of tense in the language is the possibility of situations having their temporal locations specified by means of independent adverbials, again with no temporal marking appearing on the verb:

- (8) a. pakasa-anna-rukku pissanganar-niru-vuq.
surprise.just.COND-2SG.3SG be-exciting.more.IND-3SG
'If you just surprise him it will be more exciting.' (Fortescue 1984: 66)
- b. juuli-up aappa-a-ni Nuum-miip-punga.
July.ERG second.its.LOC Nuuk.be-in.IND-1SG
'I was in Nuuk on the second of July.' (Fortescue 1984: 273)
- c. Qaanga=gooq anguti-qar-pu-q Aataarsuar-mik
Long.ago=report man-have-IND.IV-3SG Aataarsuaq-MOD
ati-lim-mik.
name-with-SG.MOD
'Once upon a time, it is said, there was a man named Aataarsuaq.'
Taama-ni inu-it inu-qati-min-nik tuqut-si-sar-pu-t,
Then/there-loc person-PL person-fellow-3PL.PL-MOD kill-AP-HAB-IND.IV-3PL
'At that time (and place?) people used to kill their fellow men.'
Aataarsuaq aamma akira-qar-pu-q,
Aataarsuaq also enemy-have-IND.IV-3SG
'Aataarsuaq also had enemies'
akiqqa-ni=li tuqun-niq sapir-pa-i.
enemy-3SG.PL=but kill-V/N unable-IND.TV-3SG.3PL
'but he was unable to kill them.' (Bittner 2002: 1, §1, exx. 1–3)

The adverbials in these examples, as we can see from 8c especially, have an essentially frame-setting function, providing the temporal context within which the discourse is interpreted and thus occurring only in the clauses associated with this function.

The kinds of sentences just illustrated, in which we observe no temporal morphemes with the verb, are consistent with the absence of tenses in the language. Of course, they are also consistent with the presence of null tenses, as Matthewson (2003) suggests for St'át'imcets. Consideration, however, of the temporal affixes that appear in West Greenlandic provides strong evidence against this possibility and in favour of a tenseless analysis of the language.

The temporal affixes in question include past-time-locating affixes like *-sima-* and future-time-locating affixes like *-ssa-*, as illustrated in the following sentences:

- (9) a. Nuum-miis-sima-vunga.
Nuuk.be-in.PERF.IND-1SG
'I have seen Nuuk.' (Fortescue 1984: 272)
- b. tuqu-ssa-atit.
die.FUT.IND-2SG
'You will die (e.g., if you drink the poison).' (Fortescue 1984: 274)

These affixes might be considered — again in accordance with Matthewson's (2003: §5) analysis — as overt counterparts of a null tense morpheme, which indicate specific

reference times. However, various sorts of evidence point away from such a conclusion. First, past-time-locating affixes like *-sima-* are optional and have a primarily aspectual rather than time-locating function (Fortescue 1984: 276). As such, there is little reason to treat them as tenses. The status of future-time-locating affixes is rather less obvious, since — according to at least some authors (see Fortescue 1984: 272) — their primary function is indeed to locate a situation at a future time, and they are understood to be obligatory in this function.

However, there appear to be at least some cases of sentences describing future situations which do not display these affixes, such as the second sentence in 10 (which, notwithstanding the translation given for it, contains a finite verb form):

- (10) Ami-a avata-ssa-tut suliar-ssa-va-t,
 skin-3SG hunting.bladder-EXP-EQU process-EXP-IND.TV-2SG.3SG
 ‘You will process the skin as for a hunting bladder,
 taliru-i siqqu-i=lu ata-til-lu-git.
 front.flipper-3SG.PL hind.flipper-3SG.PL=and attached-CS-ELA.S-3PL
 leaving the front flippers and the hind flippers attached.’
 (Bittner 2002: 3, §1, ex. 3)

Moreover, it turns out to be unclear whether *-ssa-* always serves a future-time-locating function in the first place. Bittner (2002: e.g. 3, §1), for example, glosses this morpheme as indicating ‘firm expectation... usually future-oriented’, and offers examples like the following ones, in which *-ssa-* is not obviously functioning as a future tense:⁴

- (11) a. anguta-a-ta qaan-ni urnip-p-a-a
 father-3SG-RN.ERG kayak-3SG go.toward-IND.TV-3SG.3SG
 ‘The father headed for his kayak,
 irn-i=lu ala-ssa-na-gu
 son-3SG=and take.eyes.off-EXP-NEG.S-3SG
 determined not to take his eyes off his son.’ (Bittner 2002: 4, §1a, ex. 5)⁵
- b. irn-i ipi-ssa-sura-lu-gu
 son-3SG drown-EXP-think-ELA.S-3SG
 ‘Thinking that his son would drown,
 anguta-a annilaa-nga-lir-pu-q
 father-3SG get.frightened-ST-INCH-IND.IV-3SG
 the father began to feel frightened.’ (Bittner 2002: 4, §1a, ex. 11)

⁴ Note that the occurrence of *-ssa-* in 11c may actually represent a distinct nominal affix meaning ‘a potential N’ (Jerrold Sadock, personal communication). Unfortunately, I shall have to leave this matter for future research.

⁵ Because the literal meaning that Bittner attributes to the second clause of (11a) — ‘not having any expectation of taking his eyes off his son’ — cannot be considered uncontroversial (Jerrold Sadock, personal communication), I have not included it in the text.

- c. *panir-sir-vi-ssa-a-nul=lu* *qullar-lu-gu.*
 dry-GRD↑-IV\RN-EXP-3SG-DAT=and hang.up-ELA.S-3SG
 ‘... and hung it [the seal] up in a suitable place to dry.’

(Bittner 2002: 3, §2, ex. 2)

Of course, we might still wonder why *-ssa-* appears to be (virtually) obligatory in sentences that refer to the future. One possibility is that this obligatoriness has more to do with appropriate ways of making statements about the future — which must be signalled explicitly — than with the grammatical function of the affixes themselves. In other words, it may be the case for speakers of West Greenlandic — as it appears to be for those of Yukatek Maya and other languages — that ‘events in the future cannot simply be treated as facts, [so that] the speaker is expected to indicate his or her modal commitment towards the future event’ (Bohnemeyer 2002: 10). This seems consistent with Bittner’s gloss of *-ssa-* given above; with Fortescue’s (1980: 267) remark, similar in spirit, that *-ssa-* ‘tends to express not just relative futurity but also some degree of certainty on the part of the speaker’; and with Nowak’s (1994: 301) conclusion that ‘the difference between “intentional”, “experienced”, “known”, and “unintentional”, “not experienced”, “unknown” is a general characteristic’ of temporal affixes in Inuit languages [translation mine].

The foregoing considerations about *-sima-* and *-ssa-* give us some reason to doubt that these are tense morphemes in the sense defined in §1, since both emerge as grammatically optional, in contrast to mood, person, and number marking; and both are derivational rather than inflectional, being readily distinguishable from the inflectional morphology that follows them. Closer inspection of the distribution of these affixes reveals still more evidence that they are not tenses. The examples in 12–13 provide even clearer evidence that these affixes are not part of verbal inflection, since they may be separated from this inflection by intervening affixes and do not occupy a fixed position in the verbal complex:

- (12) a. *tuqu-ssa-atit.*
 die.FUT.IND2SG
 ‘You will die (e.g., if you drink the poison).’ (= 9b)
- b. *ungasinnirulaatsiassaquuqaaq*
ungasiq-niru-laar-tsiar-ssa-qquur-qi-vuq
 be-far.more.a-little.somewhat.FUT.undoubtedly!.IND3SG
 ‘It will undoubtedly be somewhat further off.’ (Fortescue 1980: 259–260)
- (13) a. *Nuum-miis-sima-vunga.*
 Nuuk.be-in.PERF.IND1SG
 ‘I have seen Nuuk.’ (= 9a)
- b. *allattu-i-vvi-ssaaliqi-sar-sima-qa-anga*
 write-down.1/2-TRANS.place.lack.ITER.PERF.very.IND1SG
 ‘I was really short of note-books.’ (Fortescue 1984: 316)

In addition, as 14 shows, past and future affixes may occur on the same verb, in which case they receive different interpretations in their different relative positions — just as we would expect if they were lexical rather than functional elements:

- (14) a. atursimassavaa
 atur-sima-ssa-vaa
 use.PERF.FUT.IND-3SG.3SG
 ‘He must have used it.’
- b. atussasimavaa
 atur-ssa-sima-vaa
 use.FUT.PERF.IND-3SG.3SG
 ‘He presumably will have used it.’ (Fortescue 1980: 267–268)

Finally, neither *-sima-* nor *-ssa-* — nor any other affixes in West Greenlandic — can be seen as the basic marker of past or future. Instead, these are simply two of many affixes with time-locating functions, each with the sorts of specific lexical properties more commonly associated with lexical than with grammatical elements. Two common future-time-locating affixes that Fortescue (1984: 274–275) identifies in addition to *-ssa-* are *-niar-*, which is ‘used especially in an intended or inevitable sense’ and has a conative sense as ‘a verb-extending affix’; and *-jumaar-*, which ‘indicates a vague indefinite future’. The three past-time-locating affixes that he identifies in addition to *-sima-* are *-nikuu-*, a ‘perfect or sometimes even simple past’; *-qqami-*, ‘[a] more recent past’, and *-riikatag-*, ‘a more distant one’ (Fortescue 1984: 272–273).

Together, the evidence just assembled presents a rather compelling case for treating West Greenlandic temporal affixes as lexical rather than grammatical elements. If we accept this conclusion, we might still wonder what sorts of lexical elements they are. One good possibility is that they are bound adverbs, which encode temporal, aspectual, and modal information, consistent with the adverbial status claimed for temporal markers in various other languages (see, e.g., Chung and Timberlake 1986: 206).

Of course, the conclusion that past- and future-time-locating affixes in West Greenlandic are not tenses is still consistent with the possibility that the language contains a null tense morpheme with the underspecified temporal properties that Matthewson (2003) ascribes to such a morpheme. While it is difficult to discount this possibility, there are certain reasons for seeing it as unlikely. One is the absence of internal evidence from West Greenlandic for null morphemes more generally. Given that the language has a vast array of verbal affixes and demands the explicit signalling by affixal means of properties of situations that could readily be inferred from context — such as the repetitive nature of the actions described in 15 (Fortescue 1984: 284; Jerrold Sadock, personal communication) — it seems implausible to posit alongside such affixes those that are both phonetically null and highly underspecified semantically.

- (15) a. nalunaaqutta-p akunnir-a-ni quirsur-tar-puq
 clock.REL (space-)between.its.LOC cough.ITER.IND-3SG
 ‘He coughed (repeatedly) for an hour.’
- b. aasa-p ingirlanir-a-ni inuusuttu-t
 summer.REL course.its.LOC young-person.PL
 aavar-tar-puq
 go-caribou-hunting.ITER.IND-3SG

underspecified null tense claim, according to which the null tense does not contrast with overt tense morphemes, is that it is just the opposite of what is observed across languages. As Bybee et al. (1994: 90–91, 294) note, zero forms emerge precisely in contrast to overt forms, and ‘are attributed the same meanings as overt [forms] would have if they were available’ (Bybee et al. 1994: 91). This finding appears to pose a real difficulty for Matthewson’s analysis. If the null tense did contrast with the past tense, as suggested by the cross-linguistic considerations just mentioned, it would be inconsistent with the attested interpretations of St’át’imcets sentences that lack temporal marking. However, if it did not contrast with the overt tense, it would represent a significant anomaly from a cross-linguistic perspective. The most straightforward solution to this problem, then, would be to analyse the language as truly tenseless after all, which would sidestep the learnability problems that Matthewson has sought to address, since there would be no null tense to learn.

Of course, one crucial issue remains to determine whether a null tense analysis of tenseless languages should still be maintained. This concerns the possibility of its being better able to capture the interpretations of sentences in tenseless languages than other available (or conceivable) analyses. Although the null tense analysis does provide a straightforward way of capturing the interpretations in question, what I shall be suggesting below is that it is not the only one that can do so, another likely candidate being an analysis based on Muskens’ (1995) approach to tenses, aspects, and VPs, to which we now turn.

3. Toward a tenseless analysis of WG sentences

In the previous section, we examined various sorts of data that favoured an analysis of West Greenlandic as tenseless, with the temporal affixes in the language being seen as bound temporal adverbs. Yet we have still not considered the crucial question of how sentences in truly tenseless languages would receive appropriate temporal interpretations. In this section, we shall take a first step toward addressing this question, by considering a possibility based on the insight that the VP already contains the sentence’s basic temporal information, as determined by temporal properties of the verb. As such, the VP provides the ‘temporal contour’ of the situation designated by the sentence, which can be described in terms of the event time, E, and the reference time, R.

Such a view of the VP has been developed most notably by Muskens (1995), who, following many researchers, takes it to introduce a basic relation between R and E and to manipulate the position of R. This results in a characterization of Vendler’s (1967) four classes of situations according to which verbs that designate accomplishments and achievements, as ‘kinesis verbs’ (that is, ‘verbs of motion’), push R forward, whereas those that designate states and activities leave it ‘as it is’. In addition, states are seen as including the current R, whereas the events designated by kinesis verbs are either included in or equal to R (Muskens 1995: 172).

Muskens formalizes these claims in dynamic semantic terms, according to which a discourse acts upon a hearer or a reader in much the same way ‘as a computer program acts upon the machine that it runs on, bringing him from one state to another and changing the values of certain variables he is keeping track of’ (Muskens 1995: 148). In these terms, the hearer or reader of a discourse may ‘be thought [of as being] in a certain contextual *state*’ at each point in this discourse, where ‘items like *reference time*, *speaker*, *addressee*, various referents and so on have certain values’. These items (or ‘stores’) are ‘functions that take states as their arguments and assign values of an

appropriate kind to them' (where the values to be stored are individuals, periods of time, eventualities, and possible worlds) (Muskens 1995: 150–151). Stores are thus of type $\langle s, a \rangle$, where s is the type of states (taken to be primitive) and ' a is the type of the values to be stored' (Muskens 1995: 151). On this picture, the meaning of a discourse involves a hearer's or reader's transition from one state i to a later state j , and can thus be characterized formally as 'the binary relation consisting of all tuples $\langle i, j \rangle$ such that starting from state i after interpreting the text the reader may be in state j ' (Muskens 1995: 151).

An important part of this system is the description of how one state differs from another with respect to the values of the stores that the hearer or reader is keeping track of. Muskens introduces the description ' $i[v]j$ ' to indicate that 'states i and j agree in all stores of type $[\langle s, a \rangle]$ except possibly in v [...] and i and j agree in all stores of all other types' (Muskens 1995: 152). This permits him to characterize the differences between a kinesis verb like *yawn* and a stative expression like *be drunk* as follows:⁷

- (18) a. *yawn*: $\lambda x \lambda i j (yawn\ x(R_i) \wedge i[R]j \wedge R_i \leq R_j)$
 b. *be drunk*: $\lambda x \lambda i j \exists e (i = j \wedge drunk\ x e \wedge R_i \subseteq e)$

What these translations indicate is that the verb *yawn*, in virtue of being a kinesis verb, tests whether the yawner yawns at the current R , 'and then assigns a new value' to R , 'setting it just after its old value'. In contrast, a stative expression like *be drunk* does not shift R , but simply 'tests whether the current reference point is included in an event' — in this case, 'of the subject's being drunk' (Muskens 1995: 172).

The descriptions of aspect morphemes that emerge on this account are likewise ones whereby these morphemes impose conditions on the R-E relation, as shown in the translations in 19:

- (19) a. *PERF*: $\lambda P \lambda x \lambda i j \exists k l (i[R]k \wedge R_k < R_i \wedge P x k l \wedge l[R]j \wedge R_i = R_j)$
 b. *PROG*: $\lambda P \lambda x \lambda i j \exists k l (i[R]k \wedge R_k \subseteq R_i \wedge P x k l \wedge l[R]j \wedge R_i = R_j)$

Muskens (1995: 173) describes the effects of these operators as follows. With the *PERF* operator, R is first 'set to an event that completely precedes' the input R ; next 'the [untensed] verb is evaluated'; and finally R 'is reset to its old value'. With the *PROG* operator, similarly, R is 'set to an event that includes' the input R ; the verb is again evaluated; and R is again reset to its old value.

Finally, the descriptions of tense morphemes that this account offers are ones on which they impose conditions on the relation between R and the speech time, S . As the following translations show, the past tense imposes the condition that the current R be before S , the present tense the condition that R be at S , and the future tense the condition that R be after S :

⁷ These and following translations make use of the following abbreviations: R = 'point of reference'; S = 'speech time'; W = 'current world'; v_0, v_1, v_2 (various discourse markers) = store names, 'special constants [...] that refer to stores'; x, y = variables over individuals; i, j, k, l = variables over states; e = a variable over events; \subseteq = temporal inclusion; and \leq = ' t_1 is before t_2 and there is no t_3 between them'.

- (20) a. PAST: $\lambda P\lambda x\lambda ij (Pxij \wedge Ri < Si \wedge Ri \text{ in } Wi)$
 b. PRES: $\lambda P\lambda x\lambda ij (Pxij \wedge Ri \text{ at } Si \wedge Ri \text{ in } Wi)$
 c. FUT: $\lambda P\lambda x\lambda ij (Pxij \wedge Si < Ri \wedge Ri \text{ in } Wi)$

According to this picture, then, verbs already ‘include’ reference times in their meanings, so that tenses do not introduce these times but instead add conditions on them, which serve to establish a particular relation between R and S (Muskens 1995: 170).

It is worth noting that S plays no direct role in verb or aspect meanings, since neither verbs nor aspects impose conditions that are related to S: this, as already noted, is the job of tense morphemes. In an important sense, however, S is not absent from verb and aspect meanings so much as not directly relevant to their characterization. This is because R does figure explicitly in their meanings, and the whole idea of R as one element of the context that readers keep track of is that R can be such an element only relative to the time of speech. In other words, S is not treated here as an explicit ‘piece of the meaning’ of verbs, as it is on some representational approaches, but simply as part of the context against which sentences are interpreted. What is also worth emphasizing here is that, given Muskens’ set-up, tenses play no necessary rôle in the composition of a sentence’s meaning, and are simply functions from predicates to predicates (Muskens 1995: 170). We can see this, for example, in the application of the translation of the past tense to that of the untensed VP *yawn*, where the temporal information provided by the tense is basically just conjoined to that provided by the VP (Muskens 1995: 173):

- (21) yawned: $\lambda x\lambda ij (\text{yawn } x(Ri) \wedge i[R]j \wedge Ri \leq Rj \wedge Ri < Si \wedge Ri \text{ in } Wi)$

If we consider the implications of this approach to the analysis of tenseless languages like West Greenlandic, what we find is that such an approach offers a straightforward way of capturing the patterns that we have observed. The meanings of verbs themselves indicate relations between R and E, and the value of the former is one of the key elements of the context that the hearer or reader keeps track of — this possibility eliminating the threat of radical temporal indeterminacy or otherwise inappropriate temporal interpretations. Of course, temporal affixes and other temporal adverbials can still provide additional temporal information, imposing constraints on the R-S relation just as tenses do in languages that have them.

The analysis just sketched thus gives us a way of describing the ability of sentences in West Greenlandic and other languages to bear past-time or present-time interpretations. It does this by appealing to the temporal contribution of the verb and by taking reference times to be a basic element of the context, which interpreters of discourses can and do keep track of. Moreover, such an analysis offers this description without positing null tenses — the empirical motivation for which, as we saw in §3, is rather weak — and without conceiving of the difference between tensed and tenseless languages as a radical one.

4. Conclusion

In this study, we investigated one language — namely, West Greenlandic — that has commonly been described as tenseless, and considered the evidence and implications for the claim that it has no tense morphemes or analogous inflectional encoding of a relation between reference time and speech time. What we found was that good evidence existed for this claim, much of it related to certain temporal morphemes in the language, which

looked like tenses but turned out to be more plausibly treated as lexical elements — more specifically, as bound temporal adverbs. What we also found was that sentences truly lacking tenses could receive an adequate semantic characterization once we recognized the crucial role of the VP in providing information used by the hearer or reader in locating situations in time. All of this has suggested that the conceptual and empirical case for recognizing truly tenseless languages is a strong one and, in particular, that doing so creates no special difficulties for analysing the structure, meaning, or acquisition of sentences without tense morphemes.

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