Modality and Future Reference in Masalit

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1. Introduction

The Masalit verbal suffix *-ti* has previously been characterized as a future tense marker (Edgar 1989:24). This paper presents new data which show that *-ti* can also indicate various kinds of possibility, without obligatory future reference. The dual function of *-ti* is accounted for by assigning it the semantics of a *present-perspective possibility modal* which in some cases has a future orientation, following Condoravdi's (2002) analysis of English modal auxiliaries. This natural extension of Condoravdi's approach provides cross-linguistic support for the idea that modals contribute directly to temporal interpretation.

2. Background information on the Masalit language

Masalit (exonym for *Masarak*) is a Nilo-Saharan language of the Maban family. It is spoken primarily in the Darfur region of Sudan[1] and the Ouaddaï prefecture of Chad; Ethnologue estimates a population of 60,900 speakers (in 2006), although the actual number is probably higher (Eunice Kua, p.c.).

Existing descriptive works consist of Edgar 1989, a (mostly morpho-phonological) grammatical sketch; König 2008:60-65, a short book chapter on the case system; some unpublished field notes from a linguist named R. Stevenson; and a Masalit-French dictionary compiled by SIL around 2005.

Masalit is a predominately SOV language, with postnominal determiners and adpositions. Alignment is nominative/accusative, with accusative case marked either by the nominal suffix *-ko* or by a final vowel alternation. Subject/object person and number agreement are realized by cross-reference prefixes on the (inflected) verb (König 2008:60-65). The remainder of this section summarizes specific aspects of the language that are relevant for subsequent discussion.

2.1. Tense and aspect

Like other Maban languages, TAM information in Masalit is encoded by verbal morphology. Present and past tense are marked by the suffixes *-e/i* and *-a*, respectively.[2] Future tense is realized by *-ti*. Edgar (1989:24) refers to *-ti* as a future tense marker. The past/present/future paradigm is illustrated in (1).[3]

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[1]Though recent violence in the Darfur region has caused a massive exile of Masalit people from this region.

[2]The apparent allomorphy between *-e* and *-i* may be a result of phonological environment, but more research is needed.

[3]Unless otherwise noted, all data come from a middle-aged native Masalit speaker who has been living in the United States for several years. Tone is transcribed throughout on the basis of qualitative inspection of f0 contours. Tone is not marked on ungrammatical sentences, or on examples whose original sources did not transcribe tone (i.e. (6)). No complete analysis of the Masalit tonal system exists; unexpected tonal alternations may be due to intonation. See Mathes 2010 for a recent analysis of lexical tone and tone sandhi in Masalit nouns. The following glosses are used in this paper: 1/2/3 = first/second/third person, ACC = accusative, COP = copula, FOC = focus, NEG = negation, PST = past tense, PRS = present tense, sg = singular.

(1) a. háwà tá-r-**à**
        Hawa 3sg-come-PST
        "Hawa came."

      b. háwà tà-r-**é**
        Hawa 3sg-come-PRS
        "Hawa is coming."

      c. háwà tá-r-**tì**
        Hawa 3sg-come-ti
        "Hawa will come."

Most verbs (-*r*- 'come' in (1) being an exception) have two distinct—and sometimes phonologically unrelated—roots. The alternation is particularly clear across tenses: in general, one root is used to form the simple past and future; the other for simple present.

(2) a. ámá háwà-kò á-**kál**-à
        1sg Hawa-ACC 1sg-see-PST
        "I saw Hawa."

      b. ámá háwà-kò á-**sér**-è
        1sg Hawa-ACC 1sg-see-PRS
        "I see Hawa/I'm watching Hawa."

      c. ámá háwà-kò á-**kál**-tì
        1sg Hawa-ACC 1sg-see-ti
        "I will see Hawa."

(3) a. háwà tà-**ríŋ**-à
        Hawa 3sg-run-PST
        "Hawa ran."

      b. háwà tì-**ɲár**-ì
        Hawa 3sg-run-PRS
        "Hawa's running."

      c. háwà tà-**ríŋ**-tì
        Hawa 3sg-run-ti
        "Hawa will run."

Edgar notes the root alternation, but does not offer an explanation: "That there is a fundamental morphological dichotomy between base 1 and base 2 is clear; however the semantic basis for this dichotomy is as unclear as is the historical phonological relationship between the two." (Edgar (1989:36)). However, Brillman (2011) suggests that verb root alternation corresponds to perfective versus imperfective aspect. Since (2b) and (3b) are compatible with a progressive interpretation, the root that forms the present tense could be the imperfective root (-*ser*- in (3b)). The perfective root would form the basis for past and future (-*kal*- in (3ac)). Further support for this characterization is shown in (4), where combination of the -*ser*- root with -*ti* results in roughly a progressive interpretation, which should not be compatible with the perfective aspect (compare with (2c)).

(4)   ámá háwà-kò á-sér-tì
       1sg Hawa-ACC 1sg-see-ti
       "I will be looking at Hawa."

See Brillman 2011 for additional data on verb roots and verbal morphology in Masalit.

Copular elements also show tense inflection. 3sg copular forms include both *te* and *re*. *te* occurs in clefts and has been speculated to be related to focus by Edgar (1989:24). -*ri* encodes past tense and probably aspectual information, but further research is needed. In future predicative sentences, AGR+-*ti* possibly contains a null verbal root—notice that in (5c), there is no overt copula; the (3sg) agreement marker *tu*- is used instead of the (3sg) copula *re*.

(5)   a.   tí   àmárà **ré-rì**
               3sg lion   3sg.COP-PST
               "It was a lion."

        b.   tí   àmárà **rè**
               3sg lion   3sg.COP
               "It is a lion."

        c.   tí   àmárà **tù-tí**
               3sg lion   3sg-ti
               "It will be a lion."

Various sentences that describe unrealized states or events include a morpheme containing /t/ (segmentation and translation in (6) preserved from Edgar 1989:24).[4]

(6)   (from Edgar 1989:24)

        a.   g-oosiŋ
               2sg-know
               "You know."

        b.   g-oosiŋ-**ti**
               2sg-know-ti
               "You shall know."

        c.   g-oosiŋ-**tei**
               2sg-know-tei
               "That you may/might know" ('subjunctive' used in specific constructions)

        d.   goosiŋ-**to**   g-an-a
               2sg.know-to 2sg-do-PST
               "You tried to know (but failed to)."

(6) shows that many TAM morphemes of the form /*t*V/ are associated with an "irrealis" interpretation, i.e. they describe non-realized states or events. *-ti* is clearly a member of this class phonologically, which may be unexpected if it is assumed that *-ti* is a pure tense morpheme. In §3 I will show that *-ti* is actually associated with a range of irrealis interpretations (specifically, modal), which sheds light on why it shares phonological traits with other clear irrealis morphemes.

2.2. The exclusive particle de 'only'

The particle *de* 'only' follows the element it is associated with. If it is associated with a subject, *de* is often followed by the focus morpheme *lo*.

(7)   a.   háwà **dè**   (ló)   tì-ɲár-ì
               Hawa only FOC 3sg-run-PRS
               "Only HAWA's running."

        b.   * **de**   hawa ti-ɲar-i
               only Hawa 3sg-run-PRS

The interpretation of *de* is exhaustive, as shown in (8). Since the first clause of (8b) asserts that Kaltam is the only person who came, it is contradictory to subsequently assert that Hawa also came (the second clause).

(8)   a.   káltàm tá-r-à   hàwá kòj tá-r-à
               Kaltam 3sg-come-PST Hawa also 3sg-come-PST
               "Kaltam came. Hawa also came."

        b.   # káltàm dè   (ló)   tá-r-à   hàwá kòj tá-r-à
               Kaltam only FOC 3sg-come-PST Hawa also 3sg-come-PST
               "Only KALTAM came. Hawa also came."

The role of *de* in expressing epistemic necessity will be discussed in §3.4.

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[4] *-tei* also described as "optative" in R. Stevenson's field notes.

3. Modal statements containing *-ti*

This section shows that the meaning of *-ti* is broader than just future tense: *-ti* is also used to express various kinds of modality. Specifically, I show that *-ti* can be used to express epistemic (relating to knowledge), deontic (relating to permission and obligation), and circumstantial (here, relating to ability) possibility. In the terminology of Condoravdi (2002; 2003), the possibilites that *-ti* describes have a *present perspective* and a *future orientation* (with future orientation being obligatory only in eventive sentences). In other words, a sentence containing *-ti* asserts that it is possible *at the speech time* that some state of affairs obtains at the speech time or *some time subsequent to the speech time*. To take an English example, the future-oriented sentence *John might leave* asserts that it is possible at the time of speech that, at some time at or subsequent to the speech time, John leaves. This is in contrast to a past-oriented sentence like *John might have left*, which asserts that it is possible at the speech time that John left at some point prior to the speech time. In §4 I will show how the plain future use of *-ti* is systematically related to the modal uses.

3.1. Epistemic possibility

Epistemic modality has to do with the linguistic expression of what a speaker knows, has evidence for, believes, etc. A statement of epistemic possibility (e.g. what is expressed by *John might be home*) in Masalit can be formed with the addition of the morpheme *kin* and a sentence-final 3sg copula *te*. *kin* is therefore glossed 'possible'. This is illustrated for past and present tense in (9) and (10) respectively.

(9)   a.   tí   sû   tò-rón-à
         3sg goat.ACC 3sg-buy-PST
         "He bought a goat."

        b.   tí   sû   tò-rón-à   **kìn**   **té**
         3sg goat.ACC 3sg-buy-PST possible 3sg.COP
         "He might have bought a goat." (lit. "That he bought a goat is possible.")

(10) a.   tí   sû   tò-ròk-é
         3sg goat.ACC 3sg-buy-PRS
         "He's buying a goat."

        b.   tí   sû   tò-rók-è   **kìn**   **té**
         3sg goat.ACC 3sg-buy-PRS possible 3sg.COP
         "He might be buying a goat."

If the prejacent verb is inflected with *-ti* as in (11), *kin te* is optional. In other words, *-ti* alone is able to indicate that the described situation is just a possibility, whereas the past and present suffixes are not. (11b) is compatible with interpretations comparable to *He will buy a goat* and *He might buy a goat*. On both readings of (11b), the goat-buying event must take place subsequent to the speech event.

(11) a.   tí   sû   tò-rón-tì   kìn   té
         3sg goat.ACC 3sg-buy-ti possible 3sg.COP
         "He might buy a goat."

        b.   tí   sû   tò-rón-tì
         3sg goat.ACC 3sg-buy-ti
         "**He will buy a goat**." or "**He might buy a goat**."

3.2. Deontic possibility

The main verb in a statement of permission ("deontic possibility") is usually inflected with *-ti* (permission is typically given for future actions, not present or past actions). The *kin te* construction is also used for this kind of possibility. This is illustrated in (12).

(12)   máŋ kómà   gà-∅-tí   kín   tè
         2sg mountain 2sg-go-ti possible 3sg.COP
         "You may go to the mountain."

kin te may be dropped in at least some permission requests containing *-ti*, suggesting that *-ti* is also able to express deontic possibility.

(13)   ámá súmmà á-∅-tì
          1sg market 1sg-go-ti
          "Can I go to the market?"

3.3. Circumstantial possibility

Attributions of ability are expressed with the morpheme *mɛt*, which here is glossed as 'able'.

(14) a.   géndégù ámá **mɛ́t** hábù-tù   á-kà-ndɛ́-rì
            yesterday 1sg able thing-some 1sg-see-NEG-PST
            "Yesterday I couldn't see anything."

       b.   ámá kómò   **mɛ́t** á-kà-ndí
            1sg mountain.ACC able 1sg-see-NEG.ti
            "I can't see the mountain."

Similar to *kin te*, *mɛt* is optional for ability statements when *-ti* occurs on the main verb. (15b) and (16) show that *-ti* is able to attribute abilities that exist *at the speech time* without the use of additional lexical items.

(15) a.   ámá kómò   mɛ́t á-kál-tì
            1sg mountain.ACC able 1sg-see-ti
            "I can see the mountain." (e.g. from where I'm standing)

       b.   ámá kómò   á-kál-tì
            1sg mountain.ACC 1sg-see-ti
            "**I will see the mountain**." (e.g. tomorrow) or "**I can see the mountain**." (e.g. from where I'm standing)

(16)   ájè   kàŋgí té-n-tì
          every person 3sg-do-ti
          "Everyone can do it." (e.g. because it's so easy)

3.4. Epistemic necessity

Some statements of certainty ("epistemic necessity") are formed with *-ti* and *de*. For example, (17d) would be uttered in a situation where we see an unfamiliar man speaking the Masalit language—which would be unexpected for a non-Masalit person. (17b) or (17c) would be used if we are not so sure whether the person in question is Masalit (i.e. it is just a possibility that he is Masalit). Crucially, notice that (17c) and (17d) assert something about a *present state*, despite containing *-ti*. An important difference between the sentences in (17) and the sentences in (9-11) is that the predicates of the former are stative, but the predicates of the latter are eventive.

(17) a.   tí   màsàrá rè
            3sg Masalit 3sg.COP
            "He is Masalit."

       b.   tí   màsàrá rè   kìn   té
            3sg Masalit 3sg.COP possible 3sg.COP
            "He might be Masalit."

       c.   tí   màsàrá tú-**tì**
            3sg Masalit 3sg-ti
            "He might be Masalit."

       d.   tí   màsàrá **dè**   tú-**tì**
            3sg Masalit only 3sg-ti
            "He must be Masalit." (lit. "He could only be Masalit.")

The syntactic position of *de* is relevant for interpretation. For example, (18) would be uttered in a situation where the person in question is trying to communicate with other people by speaking in the Masalit language, but no one around understands.

(18) tí dè màsàrá tú-tì
      3sg only Masalit 3sg-ti
      "Only he could be Masalit."

One infers from (18) that the referent of *ti* is in fact Masalit (if he's the only possible Masalit person, and we know someone is Masalit, it follows that it must be him).

The data in (17d) and (18) resemble the situation in English, where epistemic *can/could*+*only* results in something similar to a statement of certainty (subject to syntactic and contextual constraints).

(19) a. He can/could only be Masalit.

      b. ≈ He must be Masalit.

A parallel also exists in Hungarian, where simultaneous presence of exhaustive focus and the verbal possibility suffix *-het/-hat* 'may' (on an epistemic reading) results in a statement with universal force (according to Kiefer (1986)).[5] Sentence (20a) asserts that it is possible that Péter is a linguist. The minimally different sentence (20b), in which *nyelvész* 'linguist' is raised to the preverbal exhaustive focus position, asserts that it is necessary that Péter is a linguist. This difference in interpretation is due to the exhaustive intepretation of *nyelvész* 'linguist'; exhaustive interpretation in English and Masalit can be encoded by *only* and *de*, respectively.

(20) a. Péter lehet   nyelvész
          Peter be.may linguist
          "Peter may be a linguist."

      b. Péter [**nyelvész**]$_F$ lehet
          Peter linguist   be.may
          "Peter must be a linguist."
          (=Kiefer 1986 (15ba))

The *de+-ti* construction is not used for all necessity statements—mutual exclusivity of alternatives may be required (though more research is needed). (21), for example, is contradictory because the first clause asserts that the speaker is only permitted to cook, but the second clause asserts that the speaker is also permitted to sweep.

(21) # ámá ɲúgúrù dè á-n-tì   bíl kòj á-n-tì
      1sg food.ACC only 1sg-do-ti broom also 1sg-do-ti
      "I may only cook food. I may also sweep."

3.5. Summary of data

In this section, I have shown that *-ti* can be used to indicate various kinds of possibility, in addition to its use as a future tense marker. For eventive sentences (e.g. (11b), (13)), *-ti* has an obligatory *future orientation* in the sense that in a sentence *-tiφ*, φ must be temporally located subsequent to speech time. For stative sentences (e.g. (17c)), φ may also be temporally located at the speech time. Co-occurrence of *de* and (epistemic) *-ti* can result in a statement of epistemic necessity (subject to syntactic and contextual constraints).

4. Analysis

In this section I offer an analysis of *-ti* as a *present-perspective possibility modal*, which in some contexts has an obligatory future orientation. This is a natural extension of Condoravdi's (2002; 2003) analysis of the English modals *might* and *will*. The modal approach derives the use of *-ti* as a future tense marker and an indicator of possibility with a unitary semantics.

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[5]In Hungarian, elements raised to the preverbal position, such as *nyelvész* 'linguist' in (20b), are interpreted as exhaustive foci.

4.1. Temporal contribution of modals: Condoravdi (2002; 2003)

Condoravdi (2002) has claimed that modal expressions contribute directly to temporal interpretation. In particular, she has argued that modal expressions like *might* and *must* in English have a present perspective, but a future orientation (optional in stative predicates, obligatory in eventive predicates); these temporal properties are encoded lexically. Condoravdi (2003) extends this approach to *will*, which has an epistemic interpretation in certain contexts, as illustrated in (22b).

(22) a. John will be in his room tonight, since he'll be exhausted when he gets home.

b. John will be in his room right now, since he just got home from school.

Condoravdi argues that epistemic *will* (as in (22b)) quantifies universally over an epistemic modal base, whereas plain future *will* (as in (22a)) quantifies universally over a "metaphysical" modal base. In other words, on the plain future reading, *will*φ asserts that in every world with the same past as the evaluation world, φ is true.[6] Conceptual support for this kind of analysis comes from the fact that in many languages, future tense patterns morphosyntactically like a modal element.

Condoravdi's theory is formalized as follows: (contextually fixed) modal bases are functions from world-time pairs to sets of worlds. Sentences are evaluated with respect to worlds and times (here represented in the object language). The *AT* relation specifies conditions under which an eventuality[7] property (untensed sentence) holds at a time interval and world. $\tau(e, w)$ denotes the interval at which eventuality *e* takes place in world *w*. $\subseteq$ is the subinterval relation; $\circ$ is temporal overlap.

(23) (slightly modified from) Condoravdi 2002:70

$$AT(t, w, P) = \begin{cases} \exists e[P(w)(e) \wedge \tau(e, w) \subseteq t] & \text{if } P \text{ is eventive} \\ \exists e[P(w)(e) \wedge \tau(e, w) \circ t] & \text{if } P \text{ is stative} \end{cases}$$

The semantics for *might* and *woll* (untensed *will*) can then be stated in terms of *AT*. Quantificational force is specified in their lexical entries, as in standard possible-worlds based approaches to modality (e.g. Kratzer 1981). Temporal reference is also encoded lexically.[8]

(24) Condoravdi (2002:71)

a. $\text{might}_{MB} : \lambda P \lambda w \lambda t \exists w'[w' \in MB(w, t) \wedge AT([t, \infty), w', P)]$

b. $\text{woll}_{MB} : \lambda P \lambda w \lambda t \forall w'[w' \in MB(w, t) \rightarrow AT([t, \infty), w', P)]$

Note that future-orientation is obligatory when *P* is eventive but optional when *P* is stative. This is a direct consequence of (23) and (24).

The epistemic and plain future uses of *will* can both be accounted for given (24b): epistemic *will* is evaluated with respect to an epistemic modal base (which gives the set of epistemically accessible worlds); plain future *will* is evaluated with respect to a "metaphysical" modal base, which gives the set of historical alternatives, i.e. worlds whose pasts are identical to world of evaluation.[9] The ability of *will* to quantify over (the range of) different kinds of modal bases is what allows it to contribute either future reference or modal reference.

4.2. A modal semantics for -ti

The plain future and modal uses of *-ti* can be straightforwardly derived in Condoravdi's framework for modal semantics. However, there is a difference in quantificational force between epistemic *will* and epistemic *-ti*, which prevents her analysis of *will* from extending directly to *-ti*. As shown in §3, *-ti* asserts events or states to be *possible*. This is in contrast to epistemic *will*, whose quantificational force is stronger, roughly resembling that of *must*:

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[6]See e.g. Kaufmann 2005 for more information regarding various kinds of modal bases that make reference to time.

[7]An eventuality is either an event or a state.

[8]Here I do not consider graded modality, as it is not of immediate relevance to the present analysis. Therefore the potential role of the ordering source parameter (see Kratzer 1981) in the semantics is not discussed.

[9]For background on tense-modal logics, see Kaufmann 2005 and references cited therein.

(25) a.   John will be in his room right now.
  b. ≈ John must be in his room right now.
  c. ≉ John might be in his room right now.

Because the quantificational force of epistemic *will* is stronger than the force of epistemic *-ti*, Condoravdi's (2003) analysis of *will* cannot directly extend to *-ti*. Instead, I suggest that *-ti* has the semantics of a *possibility* modal, as in (24a). This means that the plain future sense of *-ti* cannot arise when it is evaluated against a metaphysical modal base. Instead, the plain future interpretation of *-ti* will arise when *MB* associates (w_0, t_0)[10] with the set of worlds whose *futures* are identical to w_0's—in such a case, call *MB* a "temporal base."[11] If -tiφ is evaluated against a temporal base, its truth conditions will correspond roughly to those of willφ when evaluated against a metaphysical modal base on Condoravdi's analysis. The epistemic interpretation of *-ti* arises when the modal base is epistemic.

(26)   -ti: $\lambda P \lambda w \lambda t \exists w'[w' \in MB(w,t) \wedge AT([t,\infty), w', P)]$

As in most standard theories of modality (e.g. Kratzer 1981), context fixes *MB* (e.g. as epistemic, deontic, etc.). The fact that *-ti* can quantify over deontically, epistemically, etc. accessible worlds is parallel to English modal auxiliaries. In addition, *-ti* can quantify over worlds with identical futures ("plain future" *-ti*). This is essentially the same as asserting that something will obtain in the (future of the) evaluation world.

   The entry for *-ti* in (26) is applied in (27). Since *sû ron* "buy a goat" in (27a) is eventive, the entire goat-buying must take place at a subinterval of $[t_0, \infty)$, i.e. in the future (see the definition of the *AT* relation in (23)). Thus (27a) is correctly predicted to not have the present or past readings "He might be buying a goat" or "He might have bought a goat."

(27) a.   tí   sû   tò-rón-tì
       3sg goat.ACC 3sg-buy-ti
       "He might buy a goat."
  b. $\exists w'[w' \in MB(w_0, t_0) \wedge \exists e[(\text{buy}(\text{goat})(\text{him}))(w')(e) \wedge \tau(e, w') \subseteq [t_0, \infty)]$

Depending on whether *MB* in (27b) is modal or temporal, *-ti* in (27a) can semantically function as a future-oriented epistemic modal or a plain future tense marker. In the latter case, the plain future interpretation arises because $MB(w_0, t_0)$ consists of only one world, namely w_0.

   This approach extends to the following stative sentence (repeated from (17c)). Since tribal identity is a permanent property, the default interpretation of *-ti* is epistemic. *masara re* 'be Masalit' is stative, so the predicate need not hold of the subject exclusively in the future (cf. (23)). This is desirable, since (28) asserts the possibility of a present state.

(28) a.   tí   màsàrá tú-tì
       3sg Masalit 3sg-ti
       "He might be Masalit."
  b. $\exists w'[w' \in MB(w_0, t_0) \wedge \exists e[(\text{masalit}(\text{him}))(w')(e) \wedge \tau(e, w') \circ [t_0, \infty)]$

4.3. *Back to* de

   The above analysis of *-ti* also explains why some sentences containing *de* and *-ti* have a universal modal reading (the interaction of a weak epistemic modal and an exclusive morpheme in English also has an interpretation that approximates a statement of epistemic necessity, e.g. *He can only be Masalit*). Recall (17c), repeated as (29):

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[10]w_0 and t_0 are the world and time of utterance throughout

[11]It should be noted that quantifying worlds with the same future as the evaluation world is logically no different than just asserting that something will hold in the future of the evaluation world. Still, this analysis has the conceptual advantage of providing a unitary semantics for *-ti*. von Stechow (1995:28) writes "Obviously, this universal quantification over worlds with the same future as the evaluation world w is nothing but a tortuous way of speaking about the future of w...Nevertheless, the rule might grasp a conceptual reality." And Condoravdi (2003:6) writes "[E]ven if you assume that future *will* is a necessity modal, it is a modal with a singleton domain, consisting of the world of evaluation, hence the modality is trivialized."

(29) tí màsàrá **dè** tú-**tì**
      3sg Masalit only 3sg-ti
      "He must be Masalit."

If we view *-ti* as a possibility modal, and *de* as contributing additional quantificational force, the universal reading of (29) can be accounted for by assigning *de* a semantics à la Rooth's (1985) for *only*.[12]

(30) de : $\lambda p \lambda w \lambda t \forall q [C(q) \wedge q(w)(t) \rightarrow q = p] \wedge p(w)(t)$

Given the lexical entry in (30), a sentence deφ asserts that φ is true (the second conjunct) and that no alternative to φ (other than itself) is true (the first conjunct). Following Rooth, the alternative set C is determined by the focus of the sentence. Since in (29), *de* associates with *masara* (pragmatically understood as focused), the alternatives in (29) will be to *masara*, yielding an alternative set of the form $\{-\text{ti}(\text{masalit}(\text{him})), -\text{ti}(\text{zaghawa}(\text{him})), \ldots\}$.[13]

(29) then receives the truth conditions given in (31). *MB* in this case will be epistemic. Since *masara re* is stative, the object language formula 'masalit(him)' is only required to be true of an interval that overlaps with $[t_0, \infty)$. This is compatible with present reference, as desired.

(31) $\forall q [(C(q) \wedge q(w_0)(t_0)) \rightarrow$
      $q = \lambda w \lambda t \exists w' (w' \in MB(w,t) \wedge \exists e [(\text{masalit}(\text{him}))(w')(e) \wedge \tau(e,w') \circ [t, \infty)])] \wedge$
      $\exists w' (w' \in MB(w_0, t_0) \wedge \exists e [(\text{masalit}(\text{him}))(w')(e) \wedge \tau(e,w') \circ [t_0, \infty)])$
      "The only true proposition of the form 'he is possibly P' is 'he is possibly Masalit'."

More perspicuously (and ignoring tense), an intensional version of (31) is given in (32).

(32) $\forall p [[C(p) \wedge^\vee p] \rightarrow p =^\wedge \Diamond \text{masalit}(\text{him})] \wedge \Diamond \text{masalit}(\text{him})$
      "The only true proposition of the form 'he is possibly P' is 'he is possibly Masalit'."

The inference that the subject is in fact Masalit can be accounted for as follows: since everyone has some ethnicity/tribal identity, and the subject's only *possible* identity is Masalit, it follows that it is in fact Masalit.

4.4. Summary of analysis

To summarize, assigning *-ti* the semantics of a present-perspective possibility modal, along with the assumption that *-ti* can be evaluated with respect to a "temporal base," results in a uniform analysis of the plain future and modal uses of *-ti*. Assuming a Rooth-style semantics for *de*, the universal force of sentences such as (29) is also accounted for.

The analysis of *-ti* also supports the theoretical idea that future tense is in fact a modality type. In many languages, a single element is used for future reference and for certain kinds of modal reference (see, e.g. Tonhauser to appear for discussion). This typological trend suggests that reference to the future and reference to other non-realized states should receive a uniform semantic analysis.

5. Conclusion

In this paper I have provided new Masalit data about modal uses of the verbal suffix *-ti*. I have argued that *-ti* has the semantics of a possibility modal. Non-past temporal orientation is encoded in its lexical entry. The plain future use of *-ti* arises when the modal base delivers the singleton set consisting of the evaluation world. The Masalit data presented here provide additional support for Condoravdi's (2002) claim that modals contribute directly to temporal interpretation. The data also document yet another example of a language in which future tense and modals pattern together morphosyntactically.

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[12](30) is an extensionalized version of Rooth's (1985:120) lexical entry, adapted to the present formalism
[13]The alternative set will contain sentences with the focused material replaced by expressions of the same type. For ease of exposition, I do not discuss the focal presupposition or the position of Rooth's squiggle operator.

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