Future reference with and without future marking

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Abstract: The nature of future temporal reference has long posed a challenge to linguistic theories of temporal interpretation. On the one hand, the future would seem to be the mirror image of the past on a linear timeline. On the other hand, the future is inherently non-factual, suggesting a modal analysis of the future which is non-symmetrical with the past and present. Cross-linguistic studies of temporal reference have furthermore uncovered much variation in the strategies used to express future interpretation, and this variation cross-cuts the tensed/tenseless language divide. This article focuses on two aspects of future interpretation: (i) the semantics of future markers and the division of labor between the temporal and modal semantics encoded in them; and (ii) the availability of future interpretations without overt future morphology. The cross-linguistic picture suggests that a modal treatment of the future may be a semantic universal, though certain cases that appear to challenge this generalization will be discussed and require future research.

Keywords: aspect, cross-linguistic, future, licensing, modality, prospective, semantics, tense, variation

1 Introduction

The nature of temporal reference has been a major avenue of research for both linguists and philosophers of language. The semantics of future temporal reference in particular has drawn interest due to two competing intuitions regarding the nature of the future. Palmer summarizes these two intuitions thus: "[Statements about the future] can be seen as either realis, as assertions *differing only from statements about the present or past in terms of time*, or they can be seen as irrealis, because, *unlike the present or past, the future is unknown*" (Palmer 2001, p. 190, emphasis mine). Under the first view, there is a single continuous timeline divided into the past and future by the present (the speech time ST, or "now"), as represented in Figure 1. Under the second view, schematized in Figure 2, there is a fundamental asymmetry between the past and future. Whereas the past is settled, the timeline branches off into different possible futures. That is, future time reference involves not only temporal displacement from the utterance situation, but also modal displacement (i.e., reference to possible worlds).

Whether the future should be modeled as in Figure 1 or Figure 2 has been the subject of much debate. Inspecting the English paradigm in (1), we observe a morphological asymmetry between present and past forms on the one hand, and future on the other. Whereas present and past tense
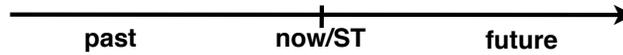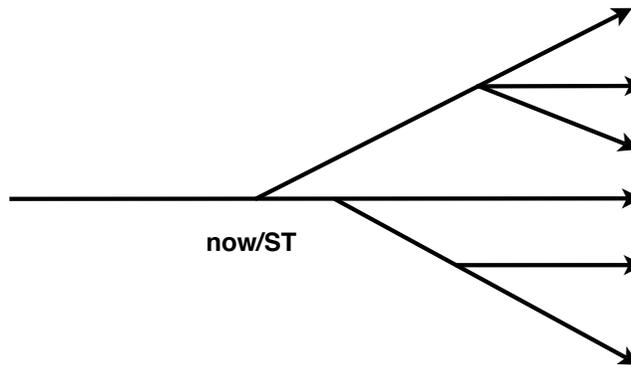
Figure 1: Symmetric past and future model

Figure 2: Branching futures model

forms are expressed morphologically directly on the verb, the future makes use of the modal auxiliary *will*. Although the status of *will* as a tense or a modal is a matter of some debate (see for instance Kissine 2008; Klecha 2014), most semanticists and philosophers agree that reference to the future involves some form of modal component (e.g., Thomason 1970, 1984; Condoravdi 2002; Copley 2002, 2008; Giannakidou & Mari 2018, among many others).

(1) a. Kim dances.   (present)

b. Kim danced.   (past)

c. Kim will dance.   (future)

By contrast, not all languages show this morphological asymmetry between future and non-future. For instance, in Lithuanian, shown in (2), an inflectional future marker affixes to the verb, parallel with the past and present tenses.[1] In a sample of 222 languages, Dahl & Velupillai (2013) show that 110 (49.5%) use such an inflectional future marker. In such languages, the conceptual

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[1]Note that it is rather uncommon to find languages with a neat three-way tense distinction (Chung & Timberlake, 1985). Note also that with the extra future morpheme *-s* in (2), even in a relatively "clean" tripartite system such as Lithuanian, the future is not perfectly symmetric with the past and present.

asymmetry between future and non-future is not morphologically transparent, seemingly in line with Figure 1.

(2)   a. *dirb-au*
          work-1SG.**PAST**
          'I worked/was working.'

      b. *dirb-u*
          work-1SG.**PRES**
          'I work/am working.'

      c. *dirb-s-iu*
          work-**FUT**-1SG
          'I will work/will be working.'   (Lithuanian; Chung & Timberlake 1985)

In this paper, I provide an overview of strategies of future temporal interpretation, with an eye towards the larger theoretical goal of deciding between the two models of future reference in Figures 1 and 2. To that end, I review cross-linguistic data and analyses on two issues related to future temporal reference. First is the status of English *will* and future markers in other languages with respect to the encoding of temporal and modal information, and the division of labor between these two components (section 2). Second is an examination of the environments where tensed and tenseless languages allow future temporal interpretation in the absence of overt future marking (section 3). The data from section 2 overwhelmingly support the view that futurity and modality are tightly linked, suggesting a possible semantic universal. However, section 3 brings to light some strategies for future reference where it is less clear that modality is involved. In section 4, I synthesize the results of the cross-linguistic picture, and formulate two hypotheses regarding the nature of future temporal reference: (a) that there is genuine variation in whether certain strategies for future reference involve a modal component or are truly temporal; (b) that future reference is universally modal, and the apparent non-modal strategies can be subsumed under a modal analysis as well. Deciding between these two hypotheses requires further research, and in this respect an ancillary goal of this paper is to inspire more detailed work on individual languages and constructions in order to address the research questions posed here.[2]

2   Future morphology: tense, modality, or both?

The status of English *will* and other future markers cross-linguistically has been the subject of much debate in the literature. The main contentious issues include: (i) whether future markers are tenses, modals, or some combination thereof; and (ii) whether such markers entail future temporal reference, or whether future is just one reading compatible with the use of such markers. The

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[2]In this paper, I focus mainly on the interpretation of finite matrix clauses, though some subordinate clause types will also be briefly considered. I do not have the space to discuss the temporal interpretation of non-finite clauses; see Stowell (1982); Wurmbrand (2001, 2014) for discussion.

general picture that emerges is one that is consistent with Figure 2 from the introduction, namely that futurity and modality necessarily go hand in hand.

2.1 Temporal vs. modal analysis

Following Reichenbach (1947), Klein (1994), and many others, I assume tenses relate the speech time (or another evaluation time in subordinate clauses) and an abstract reference time, the topical time which a clause is "about". A lexical entry for *will* as a tense would look something like in (3).[3] Such an analysis was proposed by Prior (1967), and has been defended by Kissine (2008) and Salkie (2010). By simply shifting to a future reference time, this meaning for *will* is consistent with the symmetric past and future model. By contrast, a modal analysis introduces quantification over possible worlds. A simplified version of such an analysis is given in (4). Both (3) and (4) encode a forward temporal shift, but the modal analysis in (4) additionally includes universal quantification over a set of worlds w' accessible from the actual world w and evaluation time t.[4] A modal analysis was proposed by Thomason (1970), and has been defended by Huddleston (1995), Enç (1996), Condoravdi (2002), Copley (2002), Klecha (2014), among others, and is consistent with the branching futures model.

(3) $[\![will]\!] = \lambda P_{\langle i,st\rangle}\lambda t\lambda w.\exists t'[t' > t \wedge P(t')(w)]$ (*will* as tense)

(4) $[\![will]\!] = \lambda P_{\langle i,st\rangle}\lambda t\lambda w.\forall w' \in \mathrm{Acc}(w,t)[\exists t'[t' > t \,\&\, P(t')(w')]]$ (*will* as modal)

Empirical arguments have been advanced that future markers require a modal analysis. Looking at *will* in particular, it has been shown that like other modal auxiliaries, *will* undergoes modal subordination (Roberts, 1989; Klecha, 2011, 2014). The observation is that *will* in the second sentences in (5a) and (5b) receive an implicit conditional reading. Thus, the second sentence in (5a) can be paraphrased as *If you drink that coffee, you will burn your mouth*; it does not mean that you will burn your mouth regardless. Other modal operators behave in this way, as in (5c), but crucially temporal operators do not. The second sentence in (5d) cannot be paraphrased as *If Alex went to New York, she had fun*.

(5)   a. Don't drink that coffee. You will burn your mouth.

      b. If Alex goes to New York, she will go shopping. She will have fun.

      c. If you drink the coffee, you could burn your mouth. It could be painful.

      d. If Alex went to New York, she went shopping. #She had fun.

The idea is that the domain of quantification of the modals in the second sentences is restricted by an implicit conditional. Under the assumption that *if*-clauses are domain restrictors (Kratzer,

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[3]This lexical entry assumes a quantificational analysis of tense. The debate on whether tenses are quantificational or pronominal is orthogonal to the discussion at hand. See Partee (1973); Kratzer (1998); Kusumoto (2005); Sharvit (2014) for discussion and arguments for one or the other analysis.

[4]Later, we turn to the nature of the accessibility relation Acc, as well as the question of whether the modal analysis requires the temporal component to be directly encoded in its meaning.

1986, 2012a), this test diagnoses the presence of a modal domain that can be so restricted. Thus, the fact that *will* has such a reading in the second sentences of (5a) and (5b) is indicative of the existence of such a modal domain. For a purely temporal operator like the past tense, there is no such modal domain to restrict, and the second sentence in (5d) cannot be interpreted as an implicit conditional. As far as I am aware, this argument has only been made for English *will* (and *gonna*; see Klecha 2011, 2014), but insofar as the pattern in (5) can be replicated in other languages, it provides a useful diagnostic for whether future markers should receive a modal analysis.

Another motivation for treating future markers as modal elements comes from the fact that in many languages they can take on other (non-future) modal meanings (Bybee & Pagliuca, 1987; Bybee et al., 1994; Palmer, 2001). For instance in (6), *will* has a present epistemic interpretation.[5] This pattern is cross-linguistically robust; the examples in (7)-(9) come from French, Greek and Medumba (Grassfields Bantu).[6] Other future markers allowing an epistemic reading include morphological futures in Romance more generally (Catalan: Winans 2016, Italian: Giannakidou & Mari 2018, Spanish: Palmer 2001), the Dutch modal *zullen* (Broekhuis & Verkuyl, 2014), the German modal *werden* (Lederer, 1969), the Hindi future marker *-gaa* (Kush, 2011), and the Turkish future *-acak* (Winans, 2016).

(6)   [Context: The speaker knows that Jamie works from 1pm to 5pm. It is currently 3pm.]
      Jamie will be at work (right now).

(7)   [Context: Where is my watch? I cannot find it.]
      Tu l' aur-as   laissée hier   à l' hôtel.
      you it have-2SG.FUT left   yesterday at the hotel
      'You must have left it at the hotel.'   (French; Mari 2016)

(8)   *I Ariadne **tha** itan   arrosti xthes   (ji'afto dhen irthe).*
      the Ariadne FUT be.PAST.3SG ill   yesterday for-this not   come.PERF.PAST.3SG
      'Ariadne must have been ill yesterday (that's why she didn't come).'

                                                      (Greek; Giannakidou & Mari 2018)

(9)   [Context: You want to visit your friend Elodie. When you arrive at her house, you see that the lights are on, so you say:]

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[5]Winans (2016) shows that epistemic *will* in English cannot always be used in the same contexts as epistemic *must*. In particular, *will* is infelicitous in cases of abductive reasoning, i.e., when the speaker infers from a result state to its cause.

[6]A point of interest is the fact that the French and Greek examples in (7)-(8) have a past temporal orientation (in the sense of Condoravdi 2002). English *will* can also have a past-oriented epistemic interpretation when it co-occurs with *have*:

(1)   [Context: Charlie's train was scheduled to arrive at 2pm. It is now 3pm.]
      Charlie will have arrived by now.

*Elodie **á'** mbɨ cum ntu' ndá*
Elodie FUT be in piece house
'Elodie will/must be in her room.' (Medumbda; Mucha 2015, 2016)

Beyond epistemic interpretations, future markers may also be compatible with other modal flavors. English *will* for instance, is compatible with a fairly wide range of modal interpretations, as shown in (10):[7]

(10)   a. Oil will float on water. (generic)
       b. In winter, Mary will always wear a green coat. (habitual/dispositional/volitional)
       c. You will leave tomorrow by the first train. (deontic)

In sum, putative future markers in many languages are compatible with a variety of interpretations other than future. Within a Kratzerian theory of modality (Kratzer, 1981, 2012a), this behavior can be analyzed by underspecifying the conversational background within the lexical entry of future markers, cf. the semantics for *will* in (4) where the set of accessible worlds $\text{Acc}(w, t)$ is left unspecified. Under this view, an appropriate conversational background is contextually supplied.[8]

To be sure, not all future markers in all languages are compatible with non-future readings. In Paraguayan Guaraní (Tupí-Guaraní), the future marker *-ta* entails future temporal reference in all its uses (Tonhauser, 2011a). For instance, it is unacceptable in epistemic contexts; compare (11)-(12).

(11)   *Ko'ẽro a-purahéi-**ta**.*
       tomorrow A1SG-sing-FUT

       'I will sing tomorrow.' (Paraguayan Guaraní; Tonhauser 2011a)

(12)   [Context: I try to soothe a friend whose child hasn't come home from school yet.]
       # *Oi-mé-**ta** iñ-angirû-ndive.*
       A3-be-FUT B3-friend-with
       Intended: 'He will be with his friend.' (Paraguayan Guaraní; Tonhauser 2011a)

We therefore find cross-linguistic variation in whether putative future markers entail future temporal reference in all their uses, and whether they can take on other modal meanings. Nevertheless, the fact that future markers across many languages – and language families – are compatible with a variety of modal meanings strongly suggests that modality is a crucial ingredient for future temporal reference in general, in line with the branching futures model.

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[7]The examples and labels for modality type are from Kissine (2008).

[8]On the theory of Hacquard (2010), the type of conversational background depends on the syntactic position of the modal within the clause.

2.2 Decomposing modality and future shifting

Since a future shifting interpretation is not present in all uses of future markers in many languages, it has been argued that the future shifting component in (4) should not be hardwired in, but should come from somewhere else. The idea is that *will* and similar future markers are simply modal quantifiers with an underspecified modal base, as in (13). The future shifting then is contributed by a (covert) prospective aspect, as in (14).[9] Under such a view, *will* scopes above the prospective aspect, as sketched in (15). The future shifting semantics is thus outsourced to the covert prospective, which is hypothesized to be absent when future markers are used in contexts that don't involve future time reference (e.g., epistemic interpretations like (6)-(9)).

(13) $[\![will]\!] = \lambda P_{\langle i,st \rangle} \lambda t \lambda w. \forall w' \in \mathrm{Acc}(w,t)[P(t')(w')]$

(14) $[\![\mathrm{PROSP}]\!] = \lambda Q_{\langle v,st \rangle} \lambda t \lambda w. \exists e[\tau(e) > t \,\&\, Q(e)(w)]$

(15) $[\ will\ [\ \mathrm{PROSP}\ [\ \mathrm{VP}\ ]\ ]\ ]$

Two empirical arguments have been put forward in favor of this view. First, other modals in English also oscillate between future and non-future interpretations. Kratzer (2012b) argues that contrasts like in (16) with the modal *can* can be analyzed by appealing to an optional covert prospective aspect.

(16) a. Kim can do 50 push-ups. (present orientation; no PROSP)

    b. Kim can go to the party tomorrow. (future orientation; ✓PROSP)

Second, there are languages where it is claimed that such a decomposition is overt. For instance in Gitksan, the prospective marker *dim* is required for a future-oriented reading of modals generally in the language (Matthewson, 2012, 2013). Without *dim*, only a present or past-oriented reading is possible. This is shown in (17) for the epistemic modal *ima'*. Meanwhile in Hausa (Chadic), the modal *zā*[10] obligatorily co-occurs with a low-tone weak subject pronoun, which is analyzed as a prospective aspect, shown in (18) (Mucha, 2013, 2016). In Washo (Hokan/isolate), the graded future markers *-tiʔ* 'intermediate future' and *-gab* 'distant future' co-occur with the general modal *-eʔ*, which is otherwise underspecified for modal flavor (Bochnak, 2015a,b). An example with the distant future *-gab* is shown in (19). Finally, in Greek, the future marker *tha* is analyzed by Giannakidou & Mari (2018) as an epistemic modal, which only receives a future interpretation when it co-occurs with the perfective-non-past tense form, as in (20).

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[9]The semantics for PROSP given in (14) is aspectual in the sense of Reichenbach (1947), Klein (1994) and Kratzer (1998), since it relates the eventuality time and the reference time of the clause. That is, it is a function from properties of events to properties of times, type $\langle \langle v, st \rangle, \langle i, st \rangle \rangle$. Certain authors (e.g., Matthewson, 2012; Mucha, 2016) treat the prospective as a modifier of times (type $\langle \langle i, st \rangle, \langle i, st \rangle \rangle$), since it can co-occur in some languages with other aspects, e.g., imperfective or perfective, which by hypothesis already yield a property of times as their output. These authors nevertheless still refer to the prospective as an aspect, as a mirror image of the perfect, which is also traditionally labeled as an aspect, and which places the eventuality time prior to the reference time.

[10]Mucha (2013) analyzes *zā* as a modal that presupposes a realistic modal base with an inertial or bouletic ordering source, but no temporal shift. Following Mucha (2016), I gloss *zā* as 'MOD'.

(17)   a. *yugw=ima'=hl wis*
          IMPF=EPIS=CN rain

          'It might have rained.' / 'It might be raining.' / ≠ 'It might rain (in the future).'
          ✓Context: You see the flowers looking fresh and damp, and puddles.
          ✓Context: You hear pattering on the roof.
          #Context: You hear thunder, so you think it might rain soon.

     b. *yugw=ima'=hl* **dim** *wis*
          IMPF=EPIS=CN PROSP rain

          ≠ 'It might have rained.' / ≠ 'It might be raining.' / 'It might rain (in the future).'
          #Context: You see the flowers looking fresh and damp, and puddles.
          #Context: You hear pattering on the roof.
          ✓Context: You hear thunder, so you think it might rain soon.

                                                (Gitksan; Matthewson 2012)

(18)   **Zā tà**   *wằsā gòbe.*
      MOD 3SG.F-PROSP play tomorrow
      "She will play tomorrow.'   (Hausa; Mucha 2013, 2016)

(19)   [Context: I ask you where you will spend the day tomorrow. You say:]

      wát   *wútpɨd-a*   *l-éʔ-**gab**-i-gi*   ***L-éʔ-i***
      tomorrow Woodfords-LOC 1-be-DIST.FUT-IND-REL 1-MOD-IND

      'I will be in Woodfords tomorrow.'   (Washo; Bochnak 2015a)

(20)   *O Janis* **tha pandrefti**   *tin Mary kapja mera.*
      the John FUT marry-PERF.NONPAST.3SG the Mary some day
      'John will marry Mary someday.'   (Greek; Giannakidou & Mari 2018)

In a modest cross-linguistic sample, Mucha (2016) shows that there is variation in the licensing environments of overt and covert prospective aspects. Assuming English has a covert prospective, it must be licensed by an overt modal such as *will* or *can*. Likewise, the overt prospective in Hausa must be licensed either by *zā* or another modal. Meanwhile, other languages have a wider range of licensors. For instance, Mucha (2016) argues that the covert prospective aspect in Medumba can be licensed by any non-veridical environment,[11] including modals, negation, questions, and conditional antecedents.[12] For Washo, the licensing environments for the graded future markers are an overt modal, conditional antecedents, attitude verbs, and questions; unlike in Medumba, negation does not license these future markers in Washo. As for Greek, Giannakidou (2009) and Giannakidou & Mari (2018) argue that the perfective non-past tense form must be licensed by

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[11]A non-veridical operator F is one such that the entailment $F(p) \rightarrow p$ is not licensed, i.e., the truth of p cannot be inferred from $F(p)$ (e.g., Giannakidou 1998, 2011).

[12]Mucha analyzes the element in Medumba labeled FUT in (9) as an underspecified modal, with future shifting contributed by a covert prospective aspect restricted to non-veridical environments.

a non-veridical operator. The Gitksan prospective *dim* in (17b) is apparently not subject to any licensing conditions (Matthewson, 2012, 2013), though Matthewson (2012) suggests that a covert modal operator may be present sentences with future temporal reference, since she does not assign any modal semantics to *dim* itself. The upshot of this discussion is that even if the future shifting is outsourced to a (c)overt prospective aspect, future interpretation is still modal insofar as the prospective must co-occur with a modal or other licensing operator.[13]

2.3   Interim summary and further issues

Summing up what we have seen so far, the cross-linguistic evidence surveyed in this section supports a model of future temporal reference that crucially involves both temporal and modal components. Investigating the licensing requirements for future time shifters cross-linguistically also gives us the opportunity to find out more about the semantic core of futurity. As we have seen, it is not only modality, but rather the broader notion of non-veridicality that seems to be at issue, at least in some languages.

There are several questions related to future markers cross-linguistically that were not raised in this section. In particular, many languages have multiple future markers, which may each lexicalize slightly different shades of meaning. A common contrast has to do with whether a plan for a future event already exists at the speech time. Glougie (2008) argues that this is precisely the difference between St'át'imcets future markers *kelh* and *cuz'*, with the former being unacceptable when a plan already exists at the utterance time, as shown in (21).

(21)   Context: You are going to D'Arcy for the weekend. You have already purchased your bus ticket, and you leave tomorrow morning at 8:00am. I ask you what your plans are for the weekend. How do you respond?

    a.   ***cuz'**=lhkan   nas áku7 nk'wwátqwa7 natcw*
        PROSP=1SG.SBJ go.to DEIC D'Arcy   tomorrow

        'I am going to D'Arcy tomorrow.'

    b.   # *nás=kan=**kelh**   áku7 nk'wwátqwa7 natcw*
        go.to=1SG.SUBJ=FUT DEIC D'Arcy   tomorrow

        'I might go to D'Arcy tomorrow.'

                               (St'át'imcets; Glougie 2008, cited by Davis & Matthewson 2016)

A similar contrast holds in other languages, whereby one future marker is felicitous for making an offer, while another is not (Copley, 2002, 2010). In English, *will* can be used felicitously to make an offer, whereas *be going to* cannot. (22b) suggests that the plan for the speaker to make coffee is already in place, and thus seems a bit odd in the given context. This contrast has been replicated in Indonesian (Austronesian) with future markers *akan* and *mau* (Copley, 2010, see (23)), whereas Toews (2015) argues for a three-way distinction in Siamou (Kru) between "reluctant", "regular" and "pushy" offers.

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[13]Also see Todorović 2016 for a recent analysis of modal licensing of futures in Serbian and other languages.

(22) Context: The linguistics department is going to hold a colloquium, and the students need to find someone to make coffee for it. The colloquium organizer stands up at the student meeting and asks for a volunteer. A student responds: (adapted from Copley 2010)

    a. I'll do it.   ✓offer

    b. I'm going to do it.   #offer

(23) Context: same as (22)

    a. *Saya **akan** membuat kopi.*
       I   AKAN make   coffee
       'I (future) make coffee.'   ✓offer

    b. *Saya **mau** membuat kopi.*
       I   MAU make   coffee
       'I (future) make coffee.'   #offer

(Indonesian; Copley 2010)

Meanwhile, many languages have future markers that lexicalize distinctions in temporal distance from the utterance time (Comrie, 1985; Botne, 2012). Bamileke-Dschang (Grassfields Bantu; Hyman 1980) has five graded futures, a rather large inventory, as shown in (24).

(24)   a. *àꞋá táŋ* 'he is about to bargain'

     b. *àà ꞋpìŋꞋ� táŋ* 'he will bargain [later today]'

     c. *àà { ꞋlùꞋú / ꞋšꚰʔꞋé} táŋ* 'he will bargain [tomorrow]'

     d. *àꞋá láʔé Ꞌtáŋ* 'he will bargain [after tomorrow; some days from now]'

     e. *àꞋá fú Ꞌtáŋ* 'he will bargain [a long time, e.g., a year or more from now]'

(Bamileke-Dschang; Hyman 1980)

Finally, a detailed semantic study of future markers also needs to investigate their behavior in embedded contexts. For instance, Abusch (1985) analyzes English *would* as a past tense version of *will*. Her analysis accounts for future-in-the-past uses of *would* such as in (25), where the event of becoming king lies in the relative future of the time of being born.

(25) A child was born who would become king.   (Abusch, 1985)

3 Future readings without future marking

The other side of the coin with respect to future temporal reference has to do with cases where a future interpretation can be obtained in the absence of an overt future shifting operator. Let us distinguish two cases: first, those where a putative present tense in a tensed language gives rise to a future reading, and second, those where a morphologically tenseless clause in "tenseless" or "optional tense" languages give rise to a future reading. On the one hand, we see that the

contexts that license future readings for these cases are subject to cross-linguistic variation. On the other hand, certain licensing contexts are independent of the tensed/tenseless divide. While some licensing conditions are clearly modal, lending support to the view that future reference is necessarily modal, other strategies seemingly require no special licensors, or involve licensors whose status as modal is less clear.

3.1 Future readings with present tense

It is well known that the present tense in English can be used for future reference (often called "futurate" readings) in a narrow range of contexts. In (26), the present tense in English can be used to talk about a planned or scheduled event in the future (Lakoff, 1971; Leech, 1971; McCawley, 1971; Comrie, 1985; Quirk et al., 1985; Copley, 2002, 2008). These facts hold for both the progressive and non-progressive forms. Note that sentences describing an event that cannot be planned resist futurate readings of the present tense. Thus, (27a) is odd, whereas (27b) suggests that the game is fixed.

(26) a. The plane {departs/is departing} next Wednesday at 11:45.

     b. The Red Sox {play/are playing} the Yankees tomorrow.

(27) a. #It {rains/is raining} tomorrow.

     b. The Red Sox {defeat/are defeating} the Yankees tomorrow.

To analyze these facts, Copley (2002, 2008) posits a covert metaphysical modal operator PLAN that contributes the futurate readings in these contexts (see also Thomas 2015). PLAN presupposes that a director (agent) d directs the embedded proposition in a world w at the reference time t, and asserts that d is committed to bringing about the proposition at a future time t'. Informally, this means that d has the ability and a commitment to bring about the proposition; in other words, PLAN has a modal component. For a sentence like (26b), the director would be the executives of Major League Baseball, who have the ability and are committed to bringing about that the Red Sox play the Yankees tomorrow. By contrast, for a sentence like (27a), there is no agent who can direct whether it rains (unless we are talking about the gods), resulting in a presupposition failure. Putting these pieces together, the modal PLAN operator can be defined as in (28), where it quantifies over the best[14] worlds in the metaphysical modal base MB according to the bouletic ordering source OS_d, i.e., the set of propositions compatible with d's desires in w at t.

(28) $[\![\text{PLAN}]\!] = \lambda P_{\langle i, \langle s, t \rangle \rangle} \lambda t \lambda w . \forall w' [w' \in \text{BEST}(\text{MB}, \text{OS}_d, t, w)] \rightarrow \exists t' [t' > t \wedge P(t')(w')]$; defined only if d directs P in w at t

The consequence of this analysis is that these planning futurate sentences have a modal component and temporal forward-shifting component, both of which come from the covert operator. Thus, this analysis retains the core of the analyses highlighted in the previous section, insofar as it

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[14]The notion of best worlds comes from Portner (1998).

still involves both modality and a forward temporal shift.The presupposition encoded in PLAN as well as the lexical restriction for the modal base and ordering source make sure that the distribution of the covert operator is restricted to those contexts involving a plan or schedule.[15]

There are furthermore several classes of subordinate clauses where present tense in English (and other languages) can receive a future interpretation. For example, in temporal adjunct clauses in English, a present-tensed clause can receive future temporal reference if there is a future marker (e.g., *will*) in the main clause, as shown in (29). This is also the case for Japanese *before* clauses, where the non-past form is used, though not for *after* clauses, where the past form is used as shown in (30) (Arregui & Kusumoto, 1998; Kubota et al., 2012; Sharvit, 2014).[16]

(29)   I will shovel the snow {before/after/while} you take out the trash.

(30)   a. *Ken-ga   #ki-ta/ku-ru   mae-ni Anna-ga   kae-ru.*
          Ken-NOM arrive-PAST/arrive-NPAST before-at Anna-NOM leave-NPAST

          'Anna will leave before Ken arrives.'   (Japanese; Kubota et al. 2012)

       b. *Ken-ga   ki-ta/#ku-ru   mae-ni Anna-ga   kae-ru.*
          Ken-NOM arrive-PAST/arrive-NPAST before-at Anna-NOM leave-NPAST

          'Anna will leave after Ken arrives.'   (Japanese; Kubota et al. 2012)

Another type of subordinate clause where the English present tense can have future temporal reference is in the antecedent of conditionals (the *if*-clause). In (31), *will* occurs in the main clause, similar to the cases in (29). However, the conditional sentences in (32) and (33) receive a future interpretation without any *will* in the antecedent. Furthermore, in (33), the antecedent time is in the future of the consequent time.

(31)   If it snows next Friday, we will go tobogganing.

(32)   If the test comes back positive, Jones must have been the murderer.

(33)   If I come out smiling, the interview went well.   (Crouch, 1993; Kaufmann, 2005)

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[15]It has been pointed out that the notion of a director committed to bringing about a proposition is not enough to license all uses of the futurate present tense in English; for instance (1) from Goodman (1973) do not seem to involve a director.

(1)   a. The sun sets at 7:19 tomorrow.

      b. High tide is at 8:55 tomorrow.

Kaufmann (2005) subsumes all of the planning/scheduling futurate readings together under the more general notion of "settledness" or certainty to account for cases like (1); see also Copley (2018) for a recent analysis of these cases that crucially invokes the notion of dispositional causation.

[16]Note that the Japanese present tense form is glossed as NPAST 'non-past', and is claimed to be generally acceptable in matrix clauses in discourses about the future (Arregui & Kusumoto, 1998; Kubota et al., 2012). Later on in this section, we briefly consider languages that "freely" allow present tenses to take on future reference. Interestingly in (30b), the past tense in the temporal adjunct clause receives an absolute future reading.

It is of course well known that conditionals are modal constructions. Recall from section 2.1 that under a Kratzerian view of conditionals (Kratzer, 1986, 2012a), the antecedent clause serves as a restrictor for a (possibly covert) modal in the consequent clause. So even for conditionals without *will*, the inherent modality of conditionals could still be argued to be compatible with the view from the previous section that modality is a crucial component for the licensing of future reference.

The problem of tense in conditionals is a difficult one, and I do not discuss the literature in great detail here (within the linguistics literature, see Iatridou, 2000; Arregui, 2007; Ippolito, 2002, 2013; Kaufmann, 2005; Romero, 2014; Schulz, 2008, 2014, among many others).[17] At least two classes of analyses have emerged to deal with the kind of data found in (31)-(33). Certain authors argue that the present tense in conditional antecedents like (31) either has a different meaning than in regular matrix assertions or is simply absent, i.e., the antecedent is not really a tensed clause, despite the presence of overt tense morphology (Crouch, 1993; Dudman, 1984, 1989). Others argue for a generalized non-past or future semantics of the present tense for all its uses (Gennari, 2003; Kaufmann, 2005; Quirk et al., 1985). Under this view, the present tense does not restrict the reference time to be strictly equal to the utterance time; rather, the reference time can be any time that is not before the utterance time, i.e., in the present or the future. Such an analysis is also claimed to account for futurate readings of the present tense in (26) without recourse to a covert PLAN operator. A challenge for such analyses, however, is the fact that the English present tense cannot refer to the future in the general case. Rather, as we have seen, future uses of present tense are restricted to intensional contexts, including planning/scheduling contexts. Furthermore, such an analysis for English fails to account for the differences between English and languages where the present tense can be used freely for future reference, which we turn to presently.

In German, present tense forms can be used in a much wider range of contexts to talk about the future compared to their English counterparts, such as in (34b) (where the morphological future form with modal *werden* is also available, as in (34c)). The fact that (34b) is acceptable shows that future readings of the present tense in German matrix clauses are not restricted to planning/scheduling contexts (see Hilpert 2008 for many more examples that support this claim). In Finnish, the present tense form is also claimed to freely allow future temporal reference (Comrie, 1985; Dahl & Velupillai, 2013).

(34) a. #It rains tomorrow. / ✓It will rain tomorrow.

b. *Es regnet   morgen.*
it   rain.PRES tomorrow
'It will rain tomorrow.'   (German)

---

[17]Much of this work has been devoted to the analysis of the past tense in counterfactual or subjunctive conditionals, in which the past shows unexpected behavior compared to matrix occurrences. For instance, the past tense occurs in the antecedent of (1) below, even though the whole sentence is seemingly about the present, given the presence of the adverbial *right now*.

(1)   If I was in Paris right now, I would be eating a croissant.

c. *Es wird morgen regnen.*
   it will tomorrow rain

   'It will rain tomorrow.'   (German)

(35) *Huomenna on kylmää.*
      tomorrow is cold.PART

      'It will be cold tomorrow.'   (Finnish; Dahl & Velupillai 2013)

Given this generality of future readings, an attractive analysis would be to give the present tense a semantics of non-past in these languages. That is, the reference time of the clause can be any time equal to or after the utterance time, as modeled in (36).

(36) $[\![\text{NONPAST}]\!] = \lambda P_{\langle i,st \rangle} \lambda t \lambda w. \exists t'[t' \geq t \wedge P(t')(w)]$

A consequence of this analysis is that it achieves future reference purely via tense, without any modal component. Since the non-past forms in German and Finnish are not subject to any licensing conditions, either by modals or any other non-veridical operators, it would seem that future reference in these languages can be achieved purely within the temporal dimension. We thus have the first suggestive evidence that purely temporal future reference is an option for at least some languages.[18]

It would of course be a stronger hypothesis to maintain that future reference universally involves a modal component, in line with the evidence from the previous section that modality is implicated in future reference in many languages. A proponent of this view would have to posit covert modality for future uses of the present (non-past) tense in languages like German and Finnish. Whether this move would be justified is a question for future research.

In sum, there are several environments and contexts that license future readings of present-tense-marked sentences, both in matrix and subordinate clauses, and we furthermore find cross-linguistic variation in what those environments are.[19] In the next subsection we turn to languages that do not obligatorily mark finite clauses with tense, and here too we observe variation across languages in the environments that license future readings of morphologically tenseless clauses. However, we will also observe that there are languages where future reference seems to require no licensing at all.

3.2 Future readings of morphologically tenseless clauses

In many so-called tenseless languages, finite clauses without any overt temporal marking are restricted to having non-future temporal reference. In St'át'imcets (Salish), unmarked clauses are compatible with present or past reference, but future reference must be marked with a future marker

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[18]Note that the modal option is also available for German, given (34c).

[19]I have not discussed future readings of imperfectives in some Romance and Slavic languages (Arregui et al., 2014). In Arregui et al.'s analysis, the imperfective in these languages has a modal component built in, so this would fall under a modal strategy for future reference.

such as *kelh*, as shown in (37). Matthewson (2006) proposes that every finite clause in the language contains a covert non-future tense. Likewise in Paraguayan Guaraní (Tonhauser, 2011b), morphologically tenseless clauses can typically only have present or past temporal reference, as shown in (38). Future time reference in this language is typically expressed by the prospective modal marker *-ta* (Tonhauser, 2011a,b). See also Bittner 2005 on future reference in Kalaallisut (Eskimo-Aleut), which is achieved through non-factual or prospective moods, and a series of prospective verbs.

(37) a. *táyt-kan*   *(*nátcw)*
hungry-1SG.SUBJ (one.day.away)
'I am hungry.' / 'I was hungry.'
Not possible: 'I will be hungry (tomorrow).'   (St'át'imcets; Matthewson 2006)

b. *táyt-kan*   *kelh*
hungry-1SG.SUBJ MOD
'I am hungry.'/'I was hungry.'/'I will be hungry.'   (St'át'imcets; Matthewson 2006)

(38) a. *Kuehe*   *a-jahu.*
yesterday A1sg-bathe
'Yesterday I bathed/was bathing.'

b. *Ko'ãga a-jahu.*
now   A1sg-bathe
'I am bathing right now.'

c. # *Ko'ẽro*   *a-jahu.*
tomorrow A1sg-bathe
Intended: 'Tomorrow I am going to bathe.' (Paraguayan Guaraní; Tonhauser 2011b)

This is likewise so for morphologically tenseless clauses in many optional tense languages. For instance in Tlingit (Na-Dene; Cable 2017), temporally unmarked clauses can have past or present reference, but the future mode must be used for future temporal reference; see (39). A similar pattern holds for Washo (Bochnak, 2016).

(39) a. *K̲uwak'éi.*
IPFV.weather.be.nice
'The weather is/was nice.'

b. *Kei k̲uk̲gwak'éi.*
FUT.weather.be.nice
'The weather will be nice.'   (Tlingit; Cable 2017)

However, we also find cross-linguistic variation in the environments that license future readings of morphologically tenseless clauses. For instance, planning/scheduling contexts can license future readings of tenseless clauses in Washo (Bochnak 2016; see (40)). In other languages, however, such readings still require an overt future marker, for instance St'át'imcets (Lisa Matthewson, p.c.).

(40)   [Context: What will you make for dinner tonight?]

      šú:p-k'eŋ   *lí:*   *di-dó:daʔ-i*
      soup-RESTR PRT 1-make-IND

      'I'll just make soup.'   (Washo; adapted from Bochnak 2016)

As far as I know, the temporal interpretation of temporal adjunct clauses in tenseless and optional tense languages has not been systematically explored. However, it has been noted that in some languages there are cases of temporal conjunction, where only one conjunct is marked for the future, and the other conjuncts are morphologically tenseless but still receive a future interpretation. The example in (41) is from Paraguayan Guaraní, where only the first clause is marked with the prospective marker *-ta* (Tonhauser, 2011b). A similar pattern holds in Washo for clauses marked with the temporal conjunction marker *-ud* (Bochnak, 2016).

(41)   Context: Friends are waiting for me in the next city over. I'm running late and call them:

      A-jahú-ta   *ha (upéi) a-jupi*   *kolektívo-pe.*
      A1sg-bath-PROSP and then A1sg-get.on bus-at

      I'm going to shower and then I'll get on the bus.'   (Paraguayan Guaraní; Tonhauser 2011b)

Turning to conditionals, even the most restrictive of languages when it comes to future interpretations of tenseless clauses allow future readings in antecedent clauses. This is shown in (42) for St'át'imcets (Matthewson, 2006), and similar facts hold for Paraguayan Guaraní (Tonhauser, 2011b), Washo (Bochnak, 2016), and Yukatek Maya (Bohnemeyer, 2009).[20]

(42)   *lh-7áts'x-en-acw*   *s-Laura,* *tsun* *xwem-ás* *kw* *s-nat-ts*   *úxwal'*
      HYP-see-DIR-2SG.CONJ NOM-Laura say(DIR) fast-3CONJ DET NOM-go-3POSS go.home

      'If you see Laura, tell her to hurry up and go home.'   (St'át'imcets; Matthewson 2006)

In Medumba, future interpretations are possible without overt future morphology in non-veridical environments (Mucha, 2016). For instance, a sentential negation can license a future interpretation of a morphologically tenseless clause, as in (43).[21]

(43)   [Context: Marie has had a hard time lately. She worked a lot and did not sleep very much. How will she be doing when I visit her tomorrow?]

      Marie kә̀   *mbʉ mәbwô*
      Marie NEG be   good

      'Marie will not be well.'   (Medumba; Mucha 2016)

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[20]In Yukatek Maya, perfective-marked tenseless verb forms are generally only compatible with past temporal reference, but can have future reference in conditional antecedents (Bohnemeyer, 2009).

[21]Recall from section 2.2 that Mucha accounts for this pattern by appealing to a null prospective aspect that is licensed by non-veridical operators.

For some languages it is reported that there are few to no restrictions on future reference. Languages of this category include Hausa, as in (44) (Mucha, 2013), Mandarin, as in (45) (Smith & Erbaugh, 2005; Lin, 2006),[22] and Northern Paiute (Uto-Aztecan) as in (46) (Toosarvandani, 2016). Not all the environments and contexts discussed in this paper have been explicitly tested in these languages (e.g., contexts that explicitly involve planning or not), but it nevertheless seems clear that there exist morphologically tenseless clauses where future reference does not require special licensing conditions.

(44) *Ta=nà   wàsā.*
    3SG.F-CONT play
    'She is/was/will be playing.'   (Hausa; Mucha 2013)

(45) *Deng ni   nadao-le boshi   xuewei, wo jiu   mai xin   che gei ni*
    wait   you get-Asp doctor degree I   then buy new car for you
    'After you have got your doctor degree, I will buy a new car for you.'   (Mandarin; Lin 2006)

(46) a. *Idzi'i   ti=kaadzi madabbui-winni.*
       yesterday REFL=car fix-PROG

       'He was fixing his car yesterday.'

    b. *Mu'a   ti=kaadzi madabbui-winni.*
       tomorrow REFL=car fix-PROG

       'He will be fixing his car tomorrow.'   (Northern Paiute; Toosarvandani 2016)

Summarizing, we observe cross-linguistic variation in the environments where future temporal reference is licensed in clauses without future temporal markers. The different strategies for achieving futurity without overt future morphology cross-cut the distinction between tensed, tenseless and optional tense languages. On the one hand, there are languages where future reference of tenseless clauses is restricted, and only licensed in certain environments. On the other hand, there are languages where future readings appear to not require any licensing whatsoever, just as German non-past forms can freely have future reference.

4 Two hypotheses for the nature of future reference

Let us take a step back and think about how the data reviewed in this paper can inform the question of the general nature of future reference, i.e., whether future reference can be purely temporal or is necessarily modal. The data in section 2 overwhelmingly support the view schematized in Figure

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[22]The situation in Mandarin appears to be more complicated than a blanket statement about free temporal reference would suggest, and it is clear that grammatical aspect plays a very large role in temporal interpretation in this language. The interested reader is referred to Smith & Erbaugh 2005; Lin 2006; Ren 2008; Sun 2014, and references therein.

2 that future reference is modal. Meanwhile, in section 3 we saw that certain grammatical constructions can be used for future reference apparently without any modal component or licensors, which would be consistent with the purely temporal view in Figure 1. Let us consider two hypotheses. Hypothesis A: There is genuine variation across constructions in the way future reference is achieved: some require modality, while others are purely modal.[23] Hypothesis B: Future reference is universally modal, even in constructions where modality has not been detected.

Hypothesis B is stronger since it posits a semantic universal, but faces potential challenges from constructions where no modal component appears to be present (e.g., the German present/non-past tense, and morphologically tenseless clauses in Hausa and other languages). A proponent of such a view would have to posit some form of covert modality for future reference in such constructions. Whether such a move is empirically motivated is an important avenue for future research, making use of diagnostics for modality (e.g., modal subordination from section 2) in order to detect covert modality. This applies not only to cases where a tensed or tenseless form can have future reference without a licensor, but also to other licensing environments that are not obviously modal in nature (e.g., temporal conjunction constructions).

Under either hypothesis, we still need to account for the wide range of variation across languages and constructions. These parameters of variation are generally lexical in nature, and fall broadly into two categories: (i) the existence and inventory of certain operators (e.g., PLAN operator, overt or covert prospective aspect), and (ii) their licensing conditions (e.g., the presuppositions of PLAN, or the logical profile of licensing operators). With respect to this second point, we have seen that not just modality, but the broader notion of non-veridicality seems to be responsible for future licensing. Although non-veridicality and modality are closely linked (Giannakidou, 1998, 2009, 2014), it is not clear that negation and questions can or should be subsumed under a modal analysis. If these environments involve no modality, then the question arises as to what ingredients are actually necessary for future reference in natural language. In any case, the hypothesis of a cross-linguistic semantic universal that the future is not purely temporal, and therefore asymmetrical with respect to the present and past, constitutes as useful and promising research agenda for future work in this area.

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[23]Note here we talk about construction types and not language types. Even languages like German and Hausa which allow free future temporal reference without overt modality still have modal constructions for future reference, e.g., German *werden* and Hausa *zā*.

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[Figure 1: Symmetric past and future model]
[Figure 2: Branching futures model]