Elicitation and documentation of tense and aspect
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1. Introduction

All languages seem to have provisions for the representation of time in their lexicons and in the practices speakers customarily rely on when structuring discourses. But evidence has been mounting in recent years that the ways in which the representation of time is inscribed into the grammars of different languages varies substantially. The aim of this article is to review this evidence and introduce some empirical and analytical tools that facilitate the study of tense-mood-aspect systems in the field. The article begins by laying out some basics of temporal semantics in §2 (following Klein 1994 and Bohnemeyer 2014) and surveying tools and methods for the study of temporal semantics in the field in §3. It then zeroes in on the topic of tenselessness. After reviewing the empirical case of tenselessness in one language, Yucatec Maya (Bohnemeyer 2002, 2009) in §4, four recent field-based studies of future-time reference (FTR) in (superficially or profoundly) tenseless languages are compared in §5: Yucatec, Kalaallisut (Bittner 2005), St'át'imcets (Matthewson 2006), and Paraguayan Guaraní (Tonhauser 2011). Tenseless languages often grammaticalize a distinction between reference to factual and non-factual situations, treating FTR as non-factual. There appear to be at least two different ways of realizing this. Languages like Yucatec freely allow statements about future topic times unless they involve event realization as at-issue content (i.e., roughly, as being asserted or questioned), in which case they must be flagged by mood or modality. In contrast, languages such as Guaraní and Kalaallisut ban future topic times altogether. Future events are referred to exclusively by relating them to present or past topic times via aspectual, modal, or mood markers. §6 concludes.

2. Basics of temporal semantics
2.1. A framework

Figure 1 provides a non-exhaustive survey of indepth studies of the temporal semantics of non-Indo-European languages. All of these have been carried out in the past quarter century. An important precursor is the pioneering typological work by Dahl 1985 (covering 64 languages based on responses to an extensive questionnaire) and the follow-up studies it spawned.

Based on the evidence available to us today from these and other studies, something approaching a consensus model has arguably emerged regarding some basic properties of the representation of time across human languages. Couched in the terminology of Klein (1994), this model might be described as follows:[1] across languages, interpreting the temporal reference of an utterance involves determining the values of minimally three variables:

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[1] Cf. Kamp & Reyle (1993: 483-690) for an alternatively stated and, unlike Klein's, fully formalized approach, which can be said to nevertheless be to a significant extent equivalent with Klein's in that it assumes a system of variables and relations that maps largely isomorphically into Klein's even as the definitions of the variables differ somewhat. Bohnemeyer (2014: 920-930) offers a brief comparison of the two theories.

- The **situation time** t_{SIT}, i.e., the time of the eventuality described by the utterance – in formal approaches, this is also commonly referred to as the 'event time' (based on Reichenbach's (1947) 'event point') or 'runtime' of the described eventuality, symbolized by $\tau(s)$, where s represents the described situation itself;
- The **utterance time** t_U, which can be understood as the time at which the utterance is made and/or the time at which it is processed (these two may of course diverge significantly in written communication);
- The **topic time** t_{TOP}, i.e., the time of the situation the utterance makes a statement about or asks a question about or issues a command about, etc.

St'át'imcets (Matthewson 2006)

Kalaallisut (Bittner 2005, 2007, 2008; Shaer 2003 *inter alia*)

Inuktitut (Swift 2004)

Mandarin (Klein *et al.* 2000; Li 1990; Smith 1991 *inter alia*)

Belhare (Bickel 1996)

Korean (Lee 2003, 2006, 2010 *inter alia*)

Navajo (Smith *et al.* 2007)

Yucatec (Bohnemeyer 2002, 2009)

Badiaranke (Cover 2010)

Japanese (Ogihara 1996; Nishiyama & Koenig 2010 *inter alia*)
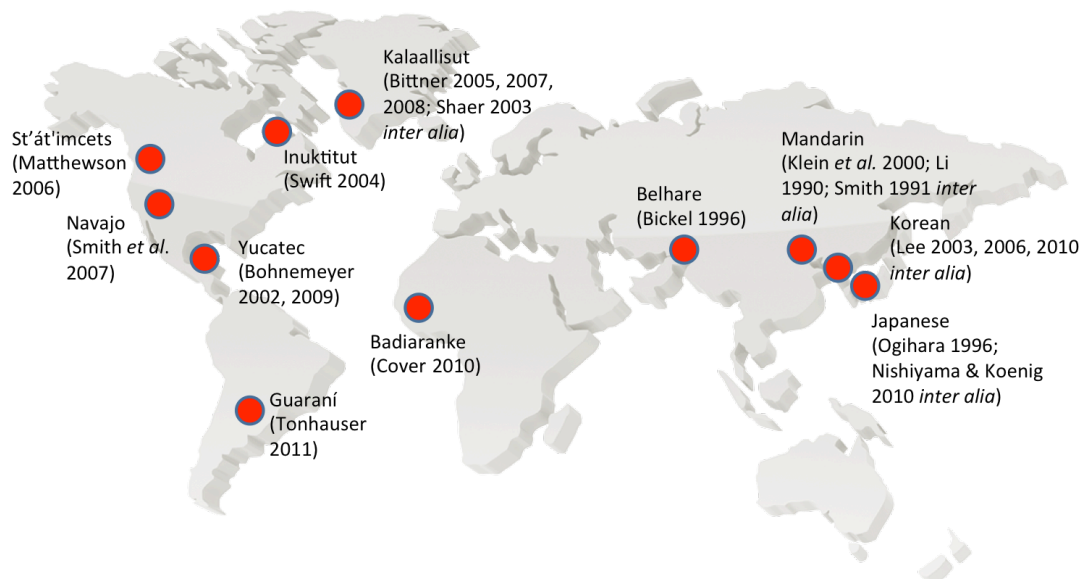
Guaraní (Tonhauser 2011)

Figure 1. *Some in-depth studies of the temporal semantics of non-Indo-European languages*

To understand the difference between situation time and topic time, consider the example in (2.1). Suppose the question in (2.1a), uttered by an investigator, elicits the following utterances as witness testimony.

(2.1) [Context: investigator eliciting witness testimony]
a. *What did you notice when you entered the room?*
b. *A man was lying on the floor.*
c. *He was Chinese or Japanese.*
d. *He did not move.*
e. *A woman was bending over him.*
f. *She was taking a purse from his pocket.*
g. *She turned to me.*　　(Klein 1994: 39-40)

Each of the utterances in (2.1b-g) describes a different eventuality or situation – one of a person lying on the floor in (2.1b), one of the person being Chinese or Japanese in (2.1c),

etc. And each of these different situations has a potentially distinct beginning and end in time. We might visualize the temporal relations among these situations as in Figure 2.

But all of the statements by the witness answer the same question posed in (2.1a). This question introduces the 'topic situation' of the discourse, to use a handy term favored by some authors within the theory of Situation Semantics (e.g., Elbourne 2008; Kratzer 2014).[2] What Klein calls the 'topic time' is the time interval occupied by this topic situation.
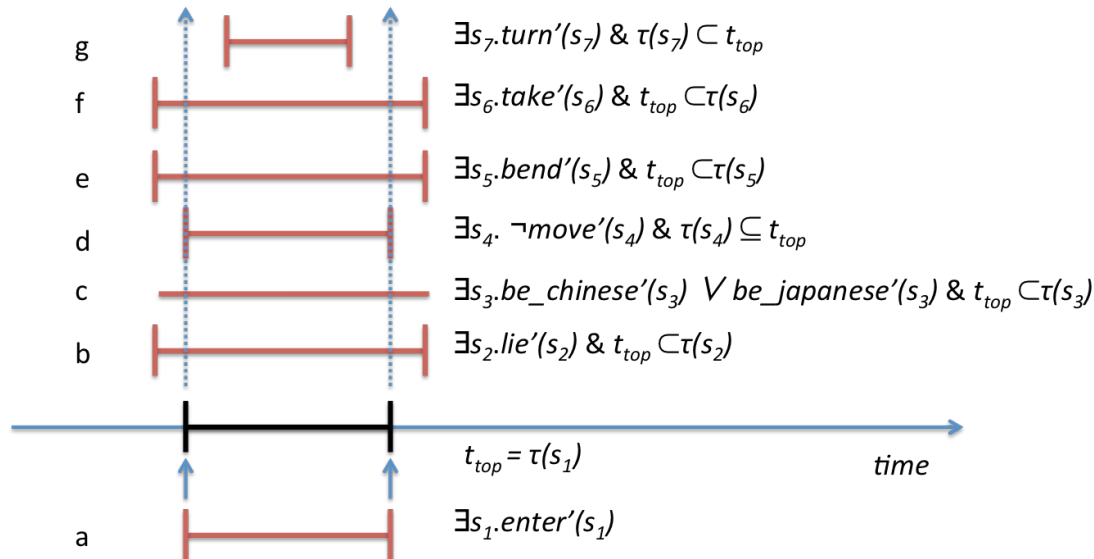

g $\exists s_7.turn'(s_7)$ & $\tau(s_7) \subset t_{top}$

f $\exists s_6.take'(s_6)$ & $t_{top} \subset \tau(s_6)$

e $\exists s_5.bend'(s_5)$ & $t_{top} \subset \tau(s_5)$

d $\exists s_4. \neg move'(s_4)$ & $\tau(s_4) \subseteq t_{top}$

c $\exists s_3.be\_chinese'(s_3) \lor be\_japanese'(s_3)$ & $t_{top} \subset \tau(s_3)$

b $\exists s_2.lie'(s_2)$ & $t_{top} \subset \tau(s_2)$

$t_{top} = \tau(s_1)$ time

$\exists s_1.enter'(s_1)$

a

Figure 2. *Temporal structure of (2.1)*[3]

Notice that the eventualities described in (2b-g) all overlap with the topic situation. Nevertheless, the precise temporal relation between these situations and the topic situation varies. And this variation is reflected in the morphosyntactic form of the clauses. The runtimes of the eventualities described in (2d) and (2g) are included in the topic time and are represented by simple past tense forms. The latter holds true of the state described in (2c) as well, which includes the topic situation. The more dynamic situations described in (2b), (2e), and (2f) likewise include the topic situation; but these are represented by past progressive forms. Setting aside the negation in (2d) for the moment, we can derive the following tentative generalizations:

(2.2)   a.   Progressive verb forms are used for representing dynamic situations with

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[2] The idea that natural language utterances make statements, ask questions, etc., about individual situations is generally attributed to Austin (1950). See Kratzer (2014) on the relation between this view and Davidson's (1967) 'event semantics'.

[3] The formulae are to be read as follows: $\exists s_7.turn'(s_7)$ & $\tau(s_7) \subset t_{top}$ means 'There is a situation s_7 which is a turning event and the runtime of which is properly included in the topic time'. The topic time variable is understood to be bound in context, i.e., to be tracked anaphorically from sentence to sentence.

respect to topic times included in the situation time ($t_{top} \subset \tau(s)$).

b. Simple past tense forms are used for representing dynamic situations the runtimes of which fall inside topic time ($\tau(e) \subseteq t_{top}$) and for representing stative situations regardless of the temporal relations between $\tau(e)$ and t_{top}.

These relations between topic time and situation time are called **viewpoint aspects**. $\tau(e) \subseteq t_{top}$ is **perfective** and $t_{top} \subset \tau(s)$ is **imperfective**. Perfective and imperfective viewpoint aspects deal, informally speaking, with whether a representation of a given situation refers to an instance of the lexically described situation in its totality (perfective aspect; this is case with the representation of the act of turning in (2.1g)) or only to a central part, excluding the initial and terminal boundaries (imperfective aspect; this is the case with the act of taking a purse from a pocket in (2.1f)). Other viewpoint aspects may focus on a result state caused by the event or on a pre-state that may causally lead to the described situation; cf. Table 1 below. The term 'viewpoint aspect' was introduced in Smith (1991), where it is contrasted with **situation aspect**. Viewpoint aspect is also known under (less accurate) labels such as 'grammatical aspect' and 'propositional aspect' and situation aspect is often called 'lexical aspect' or '*aktionsart*'. Situation aspect involves a classification of the situation under description in terms of properties such as **dynamicity** (does this situation involve any kind of change?), **durativity** (does the situation unfold over time or happen instantaneously?), and **telicity** (does the description specify an inherent goal or endpoint that must be reached in order for an instance to be realized, or does any temporal subpart of the situation of sufficient size count as an instance of the same kind of situation?). In contrast, viewpoint aspect serves to select a part of an instance of a situation of the described kind, permitting speech acts (assertions, questions, commands, etc.) that concern specifically the containment of a part of this kind in the topic situation of the utterance.

Now, if viewpoint aspect is a semantic relation between situation time and topic time, then what about tense? Consider (2.3):

(2.3) [Context: actor asking for stage directions]
   a. *What will I notice when I enter the room?*
   b. *A man will be lying on the floor.*
   c. *He will be Chinese or Japanese.*
   d. *He will not move.*
   e. *A woman will be bending over him.*
   f. *She will be taking a purse from his pocket.*
   g. *She will turn to you.*

The relations between the topic time set by (2.3a) and the situations times of the responses are point for point identical to the corresponding relations in (2.1). The only difference is that the topic time now lies in the future of utterance time, whereas in (2.1), it lies in the past of utterance time. Thus, tense *constrains* (see below) the topic time of a discourse (fragment) vis-à-vis the utterance time: depending on whether the topic time lies in the future, present, or past of the utterance time, and depending on the particular

tense morphemes of the language at issue, a different tense marker may have to be chosen.

In the process of fully interpreting a natural-language utterance, its topic time must be situated vis-à-vis both situation and utterance time. The function of viewpoint aspect and tense markers is to *constrain* these relations, not to fully specify them. Past tense, for example, stipulates that the topic time of the utterance must be in the past of the utterance time. That is a (literally) infinitely larger search domain than what a time adverbial such as *yesterday* provides. And such a time adverbial in turn still does not narrow down the topic time interval in the way the discourse context may. Consider (2.4):

(2.4)   *Yesterday, Sally bought a bunch of flowers. She put them in a blue vase on her mantle piece.*

We can picture the search domain for the topic time being restricted by concentric circles in this example: the past tense restricts it to the past of the utterance time; *yesterday* restricts it further to the calendar day preceding the day of utterance; and the discourse context, interpreted with a generous helping of world knowledge, places the topic time of the second sentence at a (most likely relatively short) distance after the situation time of the first sentence.

Table 1 illustrates how tense and viewpoint aspect are expressed in English according to this analysis.[4]

Table 1. *Klein's (1994) analysis of the English tense-aspect system (key: t_{top} – topic time (projection range); $\tau(e)$ - situation time (the runtime of the described eventuality); t_u - utterance time)*

Tense Relation Aspect Relation	Past $t_{top} < t_u$	Present $t_u \subset t_{top}$	Future $t_u < t_{top}$
Perfective $\tau(e) \subseteq t_{top}$	Simple Past *I wrote*	Present *I write*	Simple Future *I will write*
Imperfective $t_{top} \subset \tau(e)$	Past Progressive *I was writing*	Present Progressive *I am writing*	Future Progressive *I will be writing*
Perfect $\tau(e) < t_{top}$	Pluperfect *I had written*	Present Perfect *I have written*	Future Perfect *I will have written*
Prospective $t_{top} < \tau(e)$	Past Prospective *I was going to write*	Present Prospective *I am going to write*	Future Prospective *I will be going to write*

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[4] Klein's analysis is often compared to an extremely influential proposal by Reichenbach (1947: 287-298), which likewise invokes three variables in the analysis of the English tense system: the 'point of the event', corresponding to Klein's 'situation time'; the 'point of speech', i.e., 'utterance time', and the 'point of reference'. Reichenbach's reference point is most commonly the time of some other event mentioned in adjacent discourse. This coincides with topic time in the simplest cases. Bohnemeyer (2014) argues that topic time and reference point/time are nevertheless distinct notions and that both are needed for an adequate treatment of the phenomena, especially in crosslinguistic and typological research.

An important feature of the theory as sketched in Table 1 is that tense and viewpoint aspect are independent semantic relations, although their expression is often conflated in natural languages. Tense relates topic time and utterance time, while viewpoint aspect relates topic time and situation time. This implies a significant departure from traditional, simpler-structured approaches, which assume that tense directly relates situation times to utterance times.

In any utterance in connected speech, the values of the variables are determined as follows: the value of t_u is always present as part of the deictic center. All values may in principle be specified or constrained by adverbials, temporal clauses, etc. The situation time t_{sit} a.k.a. $\tau(e)$ may be constrained vis-à-vis topic time t_{top} by aspect markers and pragmatic inferences. In turn, t_{top} may be constrained vis-à-vis t_u or some other reference point by tense markers and pragmatic inferences.

One traditional distinction that Klein (1994) suggests may not be needed in a theoretical treatment of tense and aspect in natural languages is the distinction between viewpoint aspects and so-called anaphoric (or 'relative') tenses. Consider the English pluperfect in examples such as (2.5):

(2.5)   *The audience fell silent. Sally had entered the stage.*

On a traditional view (e.g., Comrie 1976, 1985; Jesperson 1924; Reichenbach 1947), the pluperfect can be understood to express a combination of two tense relations: a deictic relation of anteriority to utterance time – the meaning of the finite past tense component of the pluperfect – and an anaphoric relation of anteriority vis-à-vis a reference time, identified in the context of this particular example as the event time of the preceding sentence, i.e., the time the audience fell silent. Klein argues that this traditional anaphoric tense component can be taken care of by the viewpoint aspect component of his theory. If the *have ...-ed* construction is assumed to express perfect aspect and the latter is analyzed as imposing the constraint $\tau(e) < t_{top}$ per Table 1, we get for the second sentence in (2.5) a topic time that precedes utterance time, but follows the event of Sally entering he stage – and this could well be the time of the audience's falling silent.[5]

Bohnemeyer (2014) provides evidence against the conflation of viewpoint aspect and anaphoric tense. He draws attention to a typological contrast between two types of functional categories. On the one hand, there is a type of operator that is used to express the occurrence, at topic time, of a result state caused by the event described by the lexical content of the clause. This type of operator, which Bohnemeyer identifies as pure perfect aspects, does not combine with event time adverbials. Examples occur in Kalaallisut

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[5] Strictly speaking, Comrie (1976: 56) and Jespersen (1924: 269) view sentences such as (2.5) as ambiguous between a 'perfect-in-the-past' reading and a 'past-in-the-past' one. The first represents a combination of past tense and perfect aspect, the latter a combination of deictic past tense and anaphoric past tense. The truth-conditional difference between these two interpretations would boil down to whether the result state of Sally's entering (i.e., most likely, her being on the stage) is understood to persist at the time of the audience's falling silent. On Klein's analysis, the distinction between these two interpretations is a matter of vagueness rather than ambiguity.

(West-Greenlandic; Fortescue 1984) and Yucatec Maya (Bohnemeyer 2002, 2009). As aspect markers, true perfects do not combine with other aspect markers in the same clause or verbal projection. On the other hand, there are what Bohnemeyer treats as pure anterior tenses, which combine with event time adverbials and aspect markers. This is illustrated for Japanese in §2.2; another example Bohnemeyer cites occurs in Kituba (Bantu; Democratic Republic of Congo; Mufwene 1990). Based on this evidence, Bohnemeyer argues that anaphoric tense should be treated as constraining the temporal relation between topic time and some contextual reference time, rather than the relation between topic time and the runtime of the described event as viewpoint aspects do. This means that reference times other than utterance time are added to the theory as one of its primitive notions and cognitive building blocks.[6]

Languages vary in the grammaticalization of tenses and viewpoint aspect markers. This variation, along with its sources and implications, are the central topic of the remainder of this article. Other loci of crosslinguistic variation in the representation of time in language include the conflation of non-tense/aspect meanings in the expression of tense and aspect (e.g., mood, modality, and evidentiality) and the grammaticalization of constructions of adverbial or adsentential modification and clause combination that express temporal relations. In addition, languages vary in the lexicalization of eventuality descriptors. For example, variation has been attested in whether descriptors of certain kinds of situation are telic (involve a set terminal point that must be reached as a constrained on realization) or not.[7]

What the available evidence suggests is universal about the representation of time in natural languages is the concept of time itself and the nature of the pragmatic inferences involved in determining the values of the three variables t_u, t_{top}, and $\tau(e)$ in any given utterance. These pragmatic inferences are discussed in §2.2. The universality of the concept of time might be doubted on the basis of two separate lines of research. First, a variety of studies suggest that spatial metaphors for time are language-specific and may influence reasoning about time (e.g., Bohnemeyer 2010; Boroditsky, Fuhrman, & McCormick 2011; Boroditsky & Gaby 2010; and references therein). However, such differences do not seem to affect the concept of time *per se*, but merely the reasoning about time and its representation in language and gesture. And secondly, one occasionally encounters claims to the effect that certain cultures entertain cyclical notions of time (e.g., Farriss 1987, León-Portilla 1988 about Mayan culture in this regard). Such assertions seem to be rooted in misconceptions, however. All cultures seem to recognize cyclical recurrences in nature and society, and calendar systems often refer to such recurrences, exploiting them as the basis for conventionally labeling time intervals. It is however events and situations that are recurrent – e.g., night, day, the seasons and the movements of celestial bodies responsible for them – rather than time itself. A person with a truly cyclical concept of time would consider any two events that do not occur contemporaneously to *both* precede *and* follow one another in time. Such a person would thus presumably be unable to attribute causality to any pair of situations. Not only has a population with such a view of time never been documented, but it seems very difficult

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[6] Cf. Klein (2014) for Klein's response.
[7] There are languages in which the equivalent of 'Sally killed Floyd, but he didn't die' is not considered contradictory. See Tatevosov & Ivanov 2009 for a recent survey.

indeed to imagine the kind of culture such a conceptualization of nature would be able to sustain.

The strengths of the approach to temporal semantics sketched above lies above all in two features: first, it offers a parsimonious account of both tense and viewpoint aspect based on the same small set of semantic primitives. And secondly, it describes the meanings of tense and aspect markers in semantic terms that support equally well descriptions of languages in which these categories are grammaticalized and descriptions of languages in which they are not. This aspect is discussed in §2.2, which provides some examples illustrating the application of the framework to phenomena in various languages.

2.2. Crosslinguistic variation

One source of significant crosslinguistic variation in the representation of time in language is the grammaticalization of functional categories. Functional categories of deictic (or 'absolute') tense, anaphoric (or 'relative' tense), and viewpoint aspect impose explicit (coded) constraints on the relation between t_u and t_{top} (deictic tense), t_{top} and t_r (anaphoric tense), and $\tau(e)$ and t_{top} (viewpoint aspect). The operators in question constrain these relations in terms of a small set of coarse-grained distinctions of inclusion and anteriority. If the functional category in question is obligatory, speakers are forced to decide which of the relevant options the sentence they are planning to produce instantiates. If the category is optional, it is the speaker's choice whether to express the relevant constraint or not. But if the category in question is not grammaticalized in a given language, then the grammar of that language leaves the particular relation completely unconstrained.

The three relations $R(t_u, t_{top})$ (deictic tense), $R(t_{top}, \tau(e))$ (viewpoint aspect), and $R(t_{top}, t_r)$ (anaphoric tense) are not all independent of one another. For example, it has often been noted that sentences with perfective viewpoint aspect ($\tau(e) \subseteq t_{top}$) are incompatible with present tense ($t_u \subset t_{top}$).[8] They could have future time reference, but many languages require future time reference - especially perfective future time reference - to be treated under irrealis/subjunctive mood and restrict perfective aspect marking to realis/indicative mood (cf. §5). Otherwise, perfective aspect most commonly occurs with past time reference. Conversely, present time reference occurs most commonly with imperfective ($t_{top} \subset \tau(e)$) and with habitual reference.[9] This complementarity makes it

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[8] A possible exception is the so-called sportscaster present (e.g., *Louise gets the pass, she dribbles past a defender, she kicks the ball ... gooooal!*; http://www.slate.com/blogs/lexicon_valley/2014/07/01/historical_present_the_tense_sho ws_up_in_jokes_dramatic_anecdotes_sportscasting.html), which is however commonly treated as a type of historical present, i.e., as actually involving past time reference rather than true present time reference. Whether this is accurate is unclear. For instance, in the above example, Louise's dribbling may well still be going on at the time it is being reported.

[9] Generic reference occurs in statements and questions about kinds, such as *Goats browse on vines and weeds*. Habitual reference presents the involvement of a certain individual in a particular kind of state of affairs (or the occurrence of a particular kind of state of affairs in a certain place; e.g., *The rain in Spain stays mainly on the plane*) as

possible for some languages to grammaticalize one type of category more heavily and rely on pragmatic inferences regarding the other, and for other languages to have a roughly inverse distribution of coded and implicated information. As a result, some languages can be characterized as 'tense-prominent', others as 'aspect-prominent', and yet others as 'mood-prominent' (Bhat 1999).

The following examples are meant to illustrate the interplay of coded information and conversational implicatures and the partial complementarity of the notional categories of viewpoint aspect and tense. In Standard German, the relation between topic time and utterance time is constrained by an obligatorily expressed past-non-past contrast and an optionally (in first approximation) expressed future tense. The relation between situation time and topic time is constrained by obligatory marking of perfect aspect in non-narrative discourse. That is to say, if the speaker wishes to place the topic time in the 'post-time' (in Klein's (1994) terms; i.e., $\tau(e) < t_{top}$) of the event under description, she must use a perfect aspect form, since the competing simple tense forms are incompatible with perfect aspect interpretations. However, the distinction between perfective ($\tau(e) \subseteq t_{top}$) and imperfective ($t_{top} \subset \tau(e)$) viewpoint is not fully grammaticalized in Standard German. As a result, examples such as (2.6) are aspectually vague in Standard German:[10]

(2.6)

Als	ich	Wolfgang-s	Büro	betrat,
when	I(NOM)	Wolfgang-GEN.SG	office(ACC.SG)	enter:PST3SG
schrieb	er	einen	Brief	
wrote:PST3SG	he(NOM)	INDEF:SG.ACC.M	letter(ACC.SG)	

characteristic of the individual or place, or as characteristic for a certain stage of the individual's existence; e.g., *Floyd smokes*. Neither type of statement is restricted to present tense; cf. *Dinosaurs ate kelp* and *Floyd used to smoke*.

[10] Abbreviations in morpheme glosses: 1 - 1st person; 2 - 2nd person; 3 - 3rd person; A - Cross-reference Set-A (ergative/possessor); ACC - Accusative; ALT - Alternative (disjunction, conditional protasis. interrogative focus); ANT - Anterior tense; APP - Applicative; ASS - Assurative; ATP - Antipassive; B - Cross-reference Set-B (absolutive); CAUSE - Causal preposition; CL - Classifier; CMP - Completive status; CON - Converb; CONJ - Conjunctive subject; D1 - Proximal deictic clause-boundary particle; D2 - Distal/anaphoric clause-boundary particle; D3 - Text-deictic clause-boundary particle; D4 - Negative/place-focal clause-boundary particle; DAT - Dative; DEF - Definite; DES - Desiderative modal; DET - Determiner; DIR - 'Directive' transitivizer; ERG - Ergative; FUT - Future tense; GEN - Genitive; HYP - Hypothetical; IMPF - Imperfective; IN - Inanimate; INC - Incomplete status; INCH - Inchoative INDEF - Indefinite; INF - Infinitive; IRR - Irrealis mood; LOC - Locative; M - Masculine; MIGHT - Possibility modal; MUST - Necessity modal; NEG - Negation; NMLZR - Nominalizer; NOM - Nominative; NONPST - Nonpast; OBL - Obligative; PCON - Perfective connective; PL - Plural; POSS - Possessive; PREP - (Semantically empty) preposition; PROG - Progressive; PROSP - Prospective aspect; PRSV - Presentative; PRV - Perfective; PST - Past tense; REC - Recent past; REMF - Remote future; REP - Repetitive; SG - Singular; SR - Subordinator; SUB - Indicative subject; SUBJ - Subjunctive status; TERM - Terminative (perfect) aspect; TOP – Topic.

'When I entered Wolfgang's office, he wrote / was writing a letter'

This sentence can be used both in reference to a scenario in which the letter writing was already going on at the time of the speaker's entry and in reference to one in which the letter was written after (and possibly in response to) the speaker entry. One way to optionally express imperfective aspect ($t_{top} \subset \tau(e)$) is the biclausal progressive construction in (2.7):

(2.7) Als   ich   Wolfgang-s   Büro   betrat,
      when   I(NOM)   Wolfgang-GEN.SG   office(ACC.SG)   enter:PST3SG
      war   er   da+bei,   einen   Brief
      be:PST3SG   he(NOM)   there+at   INDEF:SG.ACC.M   letter(ACC.SG)
      zu schreib-en
      to write-INF
      'When I entered Wolfgang's office, he was (lit. at) writing a letter'

The aspectual interpretation of the unmarked simple-tense forms (the past tense or 'preterite' and non-past tense or 'present'), and also that of the optional future tense,[11] interact with the telicity of the verb phrase, in that telic verb phrases are by default interpreted perfectively and atelic verb phrases imperfectively. Bohnemeyer & Swift (2004) attribute the former to stereotype implicatures based on Grice's second Maxim of Quantity ('Do not make your contribution more informative than is required'; this is assumed to make speakers use a simple garden-variety form when they intend a stereotypical interpretation (Atlas & Levinson 1981)); and the latter to scalar implicatures based on the first Maxim of Quantity ('Make your contribution as informative as is required (for the purposes of the exchange); this is commonly taken to license inferences to the non-applicability of more informative alternatives in situations a speaker chooses their less informative counterparts to describe). For telic descriptions, perfective reference is stereotypical, because imperfective reference involves only partial realization of the inherent endpoint of the event, and incomplete realization of an endpoint requires more information to characterize or represent it than complete realization. In contrast, with atelic event descriptions, imperfective reference reveals *less* information about the event – and therefore event descriptions that are not explicitly perfective tend to be interpreted to the effect that the explicit alternative does not apply, i.e., to the effect of imperfective reference. This is illustrated by the examples in (2.8) (atelic, imperfective) and (2.9) (telic, perfective):

(2.8)   Es   schnei-t-e
         it(NOM)   snow-PST-3SG

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[11] The auxiliary *werden* 'become' expresses inchoative aktionsart in combination with nominal and adjectival predicates, inferential evidentiality and future tense in combination with bare infinitives, and passive voice in combination with participles. The choice between the non-past 'present' tense and the marked future tense for future time reference depends on both pragmatics and register or style, with more formal registers unsurprisingly favoring the use of *werden*.

'It was snowing'

(2.9) Der   Zug   fuhr   ab
       DEF3SG.M.NOM train(NOM.SG) drive:PST3SG off
       'The train departed'

Note that this telicity-driven pattern of aspectual interpretation is language-specific. Many languages – including English – show an alternative pattern, which is governed by dynamicity rather than telicity. In such a system, all dynamic verb phrases are by default interpreted perfectively regardless of their telicity, and only stative VPs implicate imperfective reference. This is the result of English and languages with a similar pattern having fully grammaticalized progressive aspect marking, the use of which is mandatory for expressing imperfectivity with dynamic VPs, but which is excluded with stative VPs (cf. Bohnemeyer & Swift 2004 for examples).

Telicity-based viewpoint assignment interacts with the interpretation of the non-past 'present' tense form, creating the pattern in (2.10)-(2.11) (Ehrich 1992; Leiss 1992):

(2.10) Es   schnei-t
        it(NOM)   snow-NONPST3SG
        'It is snowing'
(2.11) Der   Zug   fährt   ab
        DEF3SG.M.NOM train(NOM.SG) drive:NONPST3SG off
        'The train is departing/is going to depart/will depart'

The imperfective default interpretation of (2.10) is at odds with future time reference unless the context provides for it. An example in which context forces a futurate interpretation is (2.12):

(2.12) Laut   Wetterbericht   schnei-t   es morgen
        according.to weather.forecast(DAT.SG) snow-NONPST3SG it tomorrow
        'According to the weather forecast, it will/is going to snow tomorrow'

However, (2.12) must also be interpreted perfectively (snowfall is predicted to occur at some point during the day, rather than to be going on at any particular topic time), further underscoring the nexus between imperfectivity and present time reference.

In (2.11), two interpretations are available: a futurate imperfective interpretation, under which the departure is in progress at the time of utterance, and a futurate perfective interpretation, under which the departure has not yet begun at utterance time, but is predicted to happen at some point in the future.

We now turn to a language that, unlike German, has a fully grammaticalized viewpoint aspect category, albeit one the architecture of which is quite different from that of its English counterpart. Moreover, this language – Japanese – has grammaticalized anaphoric tense instead of deictic tense.

In Japanese, the morphosyntactically unmarked perfective aspect ($\tau(e) \subseteq t_{top}$) form of the verb contrasts with the *te iru* construction, which expresses both imperfective ($t_{top} \subset \tau(e)$), perfect ($\tau(e) < t_{top}$), and habitual aspect; cf. (2.15) below. The three viewpoint types

occur with all lexical aspectual classes except for imperfective aspect, which is excluded with achievements (instantaneous state changes such as 'burst'); cf. Nishiyama & Koenig 2010 for a recent treatment. On the tense side, whereas topic time is obligatorily constrained in relation to some reference time in terms of a distinction between anterior ($t_{top} < t_r$) and non-anterior reference, the grammar of tense marking is not sensitive to whether the reference time is the utterance time t_u or some other time determined in context – in other words, to the distinction between deictic and anaphoric tense. The anterior tense marker *–ta* is illustrated with absolute future time reference in (2.13). Example (2.14) shows that *–ta* does not express perfect aspect: the reading that Taroo was at topic time (yesterday) in the state of having read the book is unavailable. In order to express perfect aspect, the *–te iru* construction is used, as illustrated in (2.15). This example also shows that *–ta* and *–te iru* combine, further bolstering the case against an aspectual analysis of *–ta*.

(2.13) Taroo-wa [terebi-o mi-**ta** ato-de] benkyoo-suru
        Taro-TOP TV-ACC watch-ANT after-LOC study-NONPST
        'Taro will study after watching TV' (Ogihara 1999: 329)

(2.14) Taroo-wa kinoo hon-o yon-**da**
        Taro-TOP yesterday book-ACC read-ANT
        'Taro (had) read the book yesterday'
        NOT: 'As of yesterday, Taro had read the book' (Ogihara 1999: 330)

(2.15) Taro-wa kinoo-no jiten-de sudeni
        Taro-TOP yesterday-GEN timepoint-LOC already
        sono hon-o yon-**de** **ita**.
        that book-ACC read-CON be:ANT
        'As of yesterday, Taro had already read the book / was already reading the book' (Sotaro Kita, p. c.; Mitsuaki Shimojo, p. c.)

Note that (2.14) can be interpreted as expressing anteriority with respect to utterance time and with respect to some reference time determined in context. This choice is governed by pragmatics: especially in conversational discourses, utterance time becomes the default reference point in the absence of a salient alternative.

Let us finally consider a tenseless language, Yucatec Maya (cf. Bohnemeyer 2002, 2009). Viewpoint aspect is heavily grammaticalized in Yucatec. There are separate expressions for each of the relations $\tau(e) < t_{top}$ (perfect), $t_{top} < \tau(e)$ (prospective), $\tau(e) \subseteq t_{top}$ (perfective), and $t_{top} \subset \tau(e)$ (imperfective). However, the relation between utterance time and topic time is not directly constrained by the grammar of the language at all. To get a first flavour for this, consider (2.16) and (2.17):

(2.16) **Ts'o'k** in=mèet-ik le=nah=o'
        TERM A1SG=do:APP-INC(B3SG) DEF=house=D2
        'I (will) have/had built the house'

(2.17)   **Táan**   in=mèet-ik   le=nah=o'
          PROG   A1SG=do:APP-INC(B3SG)   DEF=house=D2
          'I am/was/will be building the house'

These examples illustrate the so-called 'terminative' aspect marker *ts'o'k*, which expresses perfect aspect ($\tau(e) < t_{top}$), and the progressive aspect marker *táan*, which expresses imperfective aspect ($t_{top} \subset \tau(e)$). Neither operator imposes any restriction on the relation between utterance time and topic time. *Ts'o'k* translates the English present perfect, pluperfect, and future perfect, and *táan* translates the English present progressive, past progressive, and future progressive. The same holds for all matrix clause aspect markers, with one exception: the perfective aspect marker does not occur with future time reference in matrix clauses. Tenselessness in Yucatec and elsewhere is discussed in more detail in §§4-5. §5 specifically deals with the subject of future time reference in tenseless languages.

While Yucatec grammar does not in first approximation impose any constraints on the topic time of utterances, pragmatics does. For example, the default topic time of conversational discourses is either utterance time or a larger time interval understood to include utterance time. In contrast, in narratives, topic time is typically inferred to be the time of some event presented in context. Compare (2.17), where topic time is understood to be utterance time, to (2.18), where the very same clause is interpreted vis-à-vis a topic time set to the event time of the previous clause, the time of the addressee's previous visit.

(2.18)   Káa=h-tàal-ech   way h-ts'o'k   ka'=p'éel ha'b=e',
          PCON=PRV-come-B2SGhere PRV-end(B3SG) two=CL.IN year=D3
          táan   in=mèet-ik   le=nah=o'.
          PROG A1SG=do:APP-INC(B3SG) DEF=house=D2
          'When you came here two years ago, I was building the house'

This phenomenon of topic time in narratives being anchored to the times of the reported events is known as 'temporal anaphora'. The term 'temporal anaphora' was introduced in Partee (1973, 1984). Partee originally viewed the effect as the result of an anaphoric meaning component of tenses. However, as (2.18) illustrates, the phenomenon occurs in tensed and tenseless languages alike, suggesting that it is independent of tense marking (Bittner 2008; Bohnemeyer 2009). That temporal anaphora – or at any rate inferences of the same kind – is/are also driving the anchoring of topic time to utterance time in tenseless sentences such as (2.16) and (2.17) was first suggested in Bohnemeyer (1998) and Smith, Perkins & Fernald (2007). Bohnemeyer (2009) presents a slightly modified version of the account in Bohnemeyer (1998).

These remarks conclude the introduction of the framework within which the documentation of tense and aspect can proceed. The following section is dedicated to an overview of methods of data collection and analysis that may be suitable for this purpose.

3. Studying temporal semantics in the field
3.1. Methods of data collection

The study of tense-aspect systems involves the investigation of both morphosyntactic and semantic properties. The present chapter focuses on the latter. A very general question at the outset is under what conditions and to what extent it is possible at all to study the semantics of a language for which the researcher lacks native speaker intuitions. This question is addressed in detail in Bohnemeyer (2015), Bohnemeyer & Wilkins (ms.), and Matthewson 2004. The position advocated in Bohnemeyer (2015) and Bohnemeyer & Wilkins (ms.) views the empirical study of linguistic meaning – in field research and elsewhere – from a social/behavioral-science perspective. On this view, studying semantic behavior is no different from studying any other aspect of human behavior. There are no epistemological differences between studying meaning in the researcher's native language and in any other language. The researcher's own intuitions are never sufficient evidence in support of any semantic analysis that is supposed to generalize to the speech community.

Bohnemeyer (2015) and Bohnemeyer & Wilkins (ms.) compare the process of studying the semantics of a non-natively-spoken language to that of children acquiring the semantic systems of their languages. In both cases, the observer – the child/researcher – studies verbal responses to particular verbal and nonverbal stimuli (other utterances and possible referents), attempting to induce the semantic representation of the stimuli conveyed by the utterance and from there to isolate the meanings of the words and constructions it is composed of. This process involves testing hypotheses about these meanings. Such hypotheses can be tested by actively manipulating the stimuli – semantic elicitation – or by comparing the observed utterance to utterances encountered in the past that responded to similar stimuli. Brown (1958) dubbed this process 'the original word game'. However, it is not restricted to the learning of word meanings, and it applies in principle both to acquisition and the scientific study of semantics.

Bohnemeyer (2015) develops a classification of linguistic data collection methods that involves three components: a stimulus, a task, and a response, or simply an observed utterance. The role of the third element – the response – can also be occupied by observations of the simplest kind of linguistic data: utterances that occur spontaneously, rather than in response to any kind of stimulus or task. Another classic type of linguistic data is constituted by utterances that are produced in response to a prompt by the researcher – a task – but without their referential content being controlled by any stimuli. Himmelmann's (1998) 'staged discourses' fall into this category: descriptive or narrative discourses produced by a speaker because a researcher asked them to tell a folk tale, talk about local history or the agricultural cycle, and so on.

In contrast to the recording of spontaneous and staged discourses, elicitation involves a stimulus that serves as input to the observed productions or comprehensions, which are further constrained by a task defined with respect to the stimulus. A classification of possible elicitation tasks can be obtained by defining each task as a mapping from particular stimulus type to a particular response type. The possible stimulus types are target language utterances, contact language utterances, verbal representations, and nonverbal representations. The distinction between (target or contact language) utterances and mere verbal representations as stimuli is understood to the effect that in the former case, the morphosyntactic and phonological form of the utterance is treated as part of the stimulus along with its meaning, whereas in the latter, the verbal representation merely serves as a vehicle for a particular meaning that is being controlled

or manipulated. Possible response types are target and contact language utterances, judgments, and linguistic and nonlinguistic representations of stimulus contents. The distinction between utterances and verbal representations is analogous to the corresponding one on the stimulus side. Mapping the four stimulus types into the five response types, a total of seven possible primitive types of elicitation tasks can be distinguished:

- Type I: Target language utterance to target language utterance: utterance completion and word association tasks;
- Type II: Contact language utterance to target language utterance: translation tasks;
- Type III: Linguistic representation to target language utterance: production in a controlled context;
- Type IV: Nonverbal representation to target language utterance: description;
- Type V: Target language utterance to judgment: judgment tasks (of wellformedness, truth, felicity);
- Type VI: Target language utterance to linguistic representation: semantic explication by paraphrase or description of a scenario for suitable use;
- Type VII: Target language utterance to nonverbal representation: semantic explication by demonstration of possible referents or acting out of examples.

All of these involve a target language utterance as stimulus, response, or both. Combinations that do not have this property do not define elicitation techniques for L1 studies. For example, techniques that take a contact language utterance as stimulus and produce a judgment or linguistic representation as response might be used in L2 research, but not in L1 studies.

Actual studies often involve hybrid tasks that combine multiple of the primitive task types. Consider, for illustration, one of the most widely used instruments for the study of temporal semantics, the Tense-Aspect-Mood Questionnaire of Dahl (1985). This task involves a combination of Types II and III. The questionnaire items have a bipartite structure, combining a target sentence and a context. Both are meant to be presented to the speakers in a contact language. The target sentence should be translated in such a manner that the speaker would actually utter it in the given context. (The questionnaire is not suitable for monolingual fieldwork, but can be adapted for it. The content of the target sentences would then have to be conveyed by paraphrase and/or nonverbally.) The purpose of the stipulated context is to clarify the intended meaning of the target sentence. In the case of the TAM Questionnaire, the context specifically determined the topic time of the target utterance. Questionnaire item A16 illustrates:

(3.1)   TMA Questionnaire item (example):
         A 16   [Q: What your brother DO when we arrive, do you think? (= What activity will he be engaged in?)]
                 He WRITE letters.

The context is represented as a question in square brackets. The target sentence is intended to answer this question. The context defines a topic time in the future of utterance time ($t_u < t_{top}$; future time reference) which is embedded in the run time of the

addressee's brother's activity ($t_{top} \subset \tau(e)$; an imperfective viewpoint). The appropriate finite tense-aspect forms of the verb are replaced by infinitives (alternatively, other suitable citation forms) to minimize interference effects. This can create confusion on the part of the speakers, especially when the task is administered orally.

Each of the two components of the questionnaire items controls a key property of the semantics of the target sentence: the representation of the sentence itself defines the lexical content of the sentence – especially the type of state of affairs it describes. This includes the determination of lexical aspectual properties. The context defines the topic time, both in relation to utterance time and in relation to the situation described by the target sentence. In addition, the contextualization also serves another function: it safeguards against the two principal pitfalls of translation-based elicitation. The first of these is uncertainty regarding the speaker's understanding of the translation stimulus, which may be influenced by incomplete competence in the contact language or by competence in a variety of the contact language different from the variety the researcher controls. The second challenge is the possibility of interference effects, such as attempts to translate not only the meaning of the stimulus, but also some of its morphosyntactic properties.

3.2. Methods of analysis

Let us assume a researcher interested in the semantics of a putative tense-aspect-mood marker of the morphological form X_{TAM}. The database the analysis draws on consists of utterances that contain X_{TAM} and utterances that do not contain X_{TAM}. For each of these utterances, the researcher potentially has information of the following two types:

- Co-occurring expressions in the same clause/sentence that constrain the temporal reference of the clause/sentence (e.g., adverbials);
- Contextual information that constrains the temporal reference of the sentence/clause (such as the question that provides the context for (3.1)).

The extensional meaning of X_{TAM} can be characterized in terms of the set of situations or possible worlds X_{TAM} is compatible with. In the theoretical framework introduced in the in §2, these are in particular the **topic situations**, i.e., the situations the utterance may be about. From this characterization of the semantic extension of X_{TAM}, its intensional or sense meaning[12] can be inferred as a shared property of those situations or worlds.

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[12] The extension of an expression is the set of possible referents of the expression in a given possible world. For example, the extension of *dragon* will differ drastically between the world of a fantasy novel and that of contemporary Western zoological studies. We can understand the sense meaning of a linguistic expression in first approximation as the nonverbal cognitive representation speakers and hearers activate to interpret it (Frege 1892). The intension is a formal construct designed to bypass the question of conceptual content. It is a mapping from possible worlds to extensions, assigning to each possible world the extension the expression would have in that world (Carnap 1947).

Some simple examples will illustrate. A future tense marker ought to be compatible only with situations in the future of utterance time (if it is a deictic tense marker) or in the future of some reference time (if it expresses anaphoric tense). Consequently, (3.2) is semantically anomalous and the response in (3.3) is infelicitous (or discourse-semantically anomalous, i.e., incoherent):

(3.2)   #*Yesterday, Floyd will give a lecture*
(3.3)   *What did Floyd do yesterday? – #He will give a lecture*

If such incompatibilities are observed, the analysis of the marker in question as a future tense marker would be supported. To the contrary, elicited or spontaneous data that features co-occurrences such as those in (3.2) and (3.3) would discourage a future tense analysis.

Perfect and perfective aspect markers occur with situations in which an event of the kind described by the verb is complete. Consequently, the response to the question in (3.4) is contradictory:

(3.4)   *Had Sally finished the report when you arrived?*
          – #Yes, she was working on it.

A putative perfect or perfective aspect marker should not occur in environments such as that of the simple past tense in the first clause of (3.4). If it does, this occurrence would constitute counterevidence against the perfect(ive) analysis. Again, the researcher may search a corpus for such contexts or may create them in elicitation.

The process of isolating intensions or sense meanings from extensional data faces two challenges: polysemy and pragmatic meaning components. Regarding polysemy, a given TAM marker may have multiple related senses. For example, the [*will* + INF] construction of English has an inferential evidential interpretation under which it is compatible with non-future adverbials:

(3.5)   *Right now, Floyd will be teaching Semantics*

Pragmatic meaning components include implicatures and presuppositions. These may render the appearance of the extension of an expression in discourse narrower than it would be on semantic grounds alone. For illustration, the simple past tense form of dynamic VPs in English usually appears to convey perfective aspect – but is this merely an implicature? Examples such as (3.6) and (3.7) suggest it might be:

(3.6)   *As a number of you may know, Dad wrote but never fully finished a book*
          when he retired.
          (http://files.www.rhodesscholarshiptrust.com/page/deaths/Dads_Eulogy_e
          dited.pdf)

(3.7)   *I ate a sandwich the other day, but I didn't finish it.*
          (https://twitter.com/kelsie_megann/status/524544571758628864)

The key question with regard to these examples is whether *write a book* and *eat a sandwich* are strictly telic or whether they have atelic senses. Perfective aspect entails the realization of the inherent endpoint of events described by telic VPs. Since the realization of this endpoint is explicitly denied in (3.6) and (3.7), the two VPs either have atelic senses or the English simple past does not actually encode perfective aspect, but merely implicates it.[13]

As these few examples illustrate, weeding out pragmatically generated meaning components and isolating sense meanings is a non-trivial process. It is discussed extensively in Bohnemeyer & Wilkins (ms.).

4. Tenselessness

This section zeroes in on the topic of tenselessness by taking a more detailed look at Yucatec Maya, picking up from §2. Yucatec is spoken by 759,000 people age five and older in the Mexican states of Campeche, Quintana Roo, and Yucatán[14] and approximately 2,520 people in the Cayo District of Belize (2014 UNSD according to Lewis et al 2016). It can be characterized as a polysynthetic language, i.e., a language in which syntactic relations tend to have morphological reflexes and in which a single content word may – and frequently does – constitute a clause in combination with the necessary function words and inflections. Yucatec is mostly head-initial, and in particular verb-initial. This fact is obscured by the pervasiveness of topicalizations and focus constructions, which are extremely prominent in discourse.

Aspect and mood are expressed in two positions in matrix clauses: a preverbal auxiliary-like marker[15] and a verb suffix. The selection of the latter depends on the identity of the former in finite clauses, which are in this language arguably only matrix clauses and relative clauses. Embedded complements are non-finite and carry the suffix, but not the preverbal marker. There are five subcategories distinguished in the suffix position; cf. Table 2 for an overview:

Table 2. *The architecture of the status category in Yucatec*

Subcategory	Allomorphs[16]	Syntactic distribution	Aspectual value	Mood value
Completive	*-ah, -nah, -∅, -chah, -lah*	Finite projections	Perfective	Realis /indicative

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[13] Both analyses are consistent with the known facts. They are also not mutually incompatible. What is needed to adjudicate between them is a more comprehensive analysis of end state cancellation in the English simple past.

[14] http://www.inegi.gob.mx/est/contenidos/espanol/rutinas/ept.asp?t=mlen10&c=3337

[15] The preverbal markers are not auxiliaries in the traditional sense of that term in that they are not themselves morphological verbs, but rather stative predicates.

[16] The allomorphs distinguish five basic conjugational classes: transitive, active, inactive, inchoative, and dispositional. Cf. Bohnemeyer 2004 and references therein on the semantics of these classes. Transitive status suffixes also encode voice; only the active voice allomorphs are included in Table 2. Inchoatives share the incomplete suffix *–tal* of dispositionals and do not occur in the imperative.

Incompletive	*-ik, -∅, -Vl, -tal*	Finite and non-finite projections	Imperfective	Neutral
Subjunctive	*-eh/-∅, -nak, -chahak, -l(ah)ak*	Non-finite projections	Perfective	Irrealis /subjunctive
Extrafocal	*-nahil, -nahik, -ik, -chahik, -lahik*	Manner focus constructions	Perfective	Realis /indicative
Imperative	*-eh/-∅, -nen, -en, -len*	Matrix clauses	Perfective	Imperative

Every finite or non-finite verb form in Yucatec is marked for exactly one of these five mutually exclusive subcategories in any syntactic environment it occurs in. In this way, the expressed meanings of viewpoint aspect and mood are tightly intertwined in this inflectional category. Other Mayan languages express aspect and mood in a similarly conflated package, although the precise architecture of the system varies greatly from language to language. Kaufman (1990) calls this language-specific inflectional category of the Mayan verb 'status'.

There are at least 15 preverbal 'aspect-mood (AM) markers'. The precise number varies by dialect. Table 3 lists the AM markers described in Bohnemeyer (2002, 2009). For a first illustration, consider again (2.15) and (2.16), repeated here for convenience.

Table 3. *The preverbal 'aspect-mood markers' of Yucatec as described in Bohnemeyer 2009*

Subset	Marker	Category label in Bohnemeyer 2009	Meaning	Status category governed
Aspectual	*t-/h-*	Perfective	Perfective aspect	CMP
	k-	Imperfective	Imperfective aspect; habitual/generic reference	INC
	táan	Progressive	Imperfective aspect	
	ts'o'k	Terminative	Perfect aspect	
	mukah/mikah /bikah	Prospective	Prospective aspect	INC /SUBJ
Modal	*yan*	Obligative	Social obligations; plans; scheduled events; future time reference to naturally occurring events	INC
	k'a'náan /k'abéet	Necessitive	Deontic necessity	
	táak	Desiderative	Desires and bodily needs	
	he' … =e'	Assurative	Commitments, promises, agreement, assurances	
	óolak	Penative	Proximity of realization in counterfactual worlds	SUBJ

Degree of remoteness	*bíin*	Remote future	Presupposition: $t_{top} < \tau(e)$; at-issue content: $D(t_{top}, \tau(e))$[17] is great by contextual standards	
	ta'itak	Proximate future	Presupposition: $t_{top} < \tau(e)$; at-issue content: $D(t_{top}, \tau(e))$ is small by contextual standards	INC
	táantik …=e'	Immediate past	Presupposition: $\tau(e) < t_{top}$; at-issue content: $D(t_{top}, \tau(e))$ is very small by contextual standards	
	sáam	Recent past	Presupposition: $\tau(e) < t_{top}$; at-issue content: $D(t_{top}, \tau(e))$ is small by contextual standards	SUBJ
	úuch	Remote past	Presupposition: $\tau(e) < t_{top}$; at-issue content: $D(t_{top}, \tau(e))$ is large by contextual standards	

(4.1)   **Ts'o'k**   in=mèet-**ik**   le=nah=o'
        TERM   A1SG=do:APP-INC(B3SG)   DEF=house=D2
        'I (will) have/had built the house'

(4.2)   **Táan**   in=mèet-**ik**   le=nah=o'
        PROG   A1SG=do:APP-INC(B3SG)   DEF=house=D2
        'I am/was/will be building the house'

These examples feature the perfect 'terminative' aspect marker *ts'o'k* (4.1) and the progressive aspect marker *táan*. Both trigger incompletive status marking on the verb (INC).

Other loci of the expression of temporal information beside the preverbal AM markers and the status suffixes include the following:

- Special AM systems with fewer distinctions and distinct morphological patterns under negation and in constructions involving extraction (focus, relativization, polar questions; cf. §5);
- Subordinators and connectives; e.g., the irrealis subordinator *keen* (cf. §5); the perfective connective *káa*;
- Adverbials and particles.

Nothing in the morphosyntactic form of a Yucatec clause restricts its topic time t_{TOP} vis-à-vis utterance time t_u. This is true with one exception: matrix clauses formed with the perfective aspect marker cannot have future time reference. This issue is addressed in §5. The following examples illustrate the absence of deictic tense distinctions. Example (4.3) features the 'terminative' (perfect) aspect *ts'o'k* with past time reference and (4.4) shows the same marker with future time reference.

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[17] $D(t_{top}, \tau(e))$ denotes the distance between topic time and event time. The semantics of the degree of remoteness markers is sketched below.

(4.3)   K-u=k'uch-ul-o'b=e',
IMPF-A3=arrive-INC=TOP
ts'o'k   u=kim-il   le=chàampal=e'.
TERM   A3=die-INC   DEF=small:child=D3
'(By the time) they arrived, the baby had already died.'

(4.4)   Sáamal   óok-a'n+k'ìin=e'
tomorrow   enter-RES+sun=TOP
ts'o'k   u=bèet-ik   le=túus+bèel=o'.
TERM   A.3=do-INC(B3S)   DEF=send+way:REL=D2
'By tomorrow at dusk (the boy) will have done the errand.' (Andrade 1955: 135-136)

Absence of restrictions on the relation between t_{TOP} and t_u applies even to the markers expressing temporal 'degrees of remoteness' (Comrie 1985: 83-102). These markers cardinally quantify over the temporal distance b/w topic time and event time. Example (4.5) illustrates the remote future marker *bíin* with deictic past time reference:

(4.4)   Káa=h-tàal-ech   way
PCON=PRV-come-B2SG   here
h-ts'o'k   ka'=p'éel   ha'b=e',
PRV-end(B3SG)   two=CL.IN   year=D3
bíin   in=mèet-∅   le=nah=o'
REMF A1SG=do:APP-SUBJ(B3SG)   DEF=house=D2
'When you came here two years ago, it was going to be a long time before I would build the house'

The absence of deictic tense marking leaves open the possibility of anaphoric (or 'relative') tense marking. Anaphoric tense analyses are defeated by demonstrating non-tense-like behavior. There are in principle two sources of evidence the researcher can draw on for this purpose. First, tenses should combine with viewpoint aspects and modal markers – if the grammar of the language provides for such combinations. This was illustrated for anaphoric tenses with Japanese data in §2.2. Incompatibility of a given expression with viewpoint aspects or modal expressions suggests that the marker in question expresses itself viewpoint aspect or modality. However, applicability of this diagnostic depends on whether the grammar of the language allows syntagmatic combinations of tense markers and viewpoint aspect or modal markers at all.

      Secondly, when a researcher is attempting to adjudicate between an anaphoric tense analysis and an aspectual or modal analysis of the same marker, the competing semantic representations are unlikely to *both* apply to the marker. For example, a perfect aspect marker is unlikely to also encode anterior (i.e., anaphoric past) tense, because that would mean it constrains topic time to posteriority vis-à-vis the event (or overlap with a result state of the event) and simultaneously anteriority with respect to some reference point. Such complex tenses are unattested in the typological literature. To my knowledge,

all attested complex tenses are analyzable either as conflating deictic tense meanings and aspectual or modal meanings or as conflating deictic and anaphoric tense meanings. Consequently, any semantic property that is predicted on an aspectual or modal analysis, but not on a tense analysis, discourages a tense analysis of the expression in question.

Consider for illustration the remote future marker *bíin*. Example (4.5) shows that assertion of a remote future clause does not commit the speaker to predicting realization of the described eventuality. This behavior is unexpected from (deictic or anaphoric) future tenses.

(4.5)   **Bíin**   in=mèet-∅   le=nah=o',
          REMF A1SG=do:APP-SUBJ(B3SG)   DEF=house=D2
          ba'x=e',   ma'   inw=ohel
          what=TOP   NEG   A1SG=knowledge(B3SG)
          wáah   yan   u=bèey-tal
          ALT   OBL   A3=thus-INCH.INC
          'It will be a long time before I build the house, but I don't know whether it will be possible.'

Moreover, the degree-of-remoteness markers are incompatible with event time adverbials. This behavior is again atypical and difficult to explain under a tense analysis. The following example illustrates again for the remote future marker:

(4.6)   #**Bíi**n   in=mèet-∅   le=nah
          REMF A1SG=do:APP-SUBJ(B3SG)   DEF=house
          te=àanyo   k-u=tàal=o'
          PREP=year   IMPF-A3=come=D2
          intended: 'I will build the house next year'

Bohnemeyer (1998, 2002, 2009) argues that the Yucatec degrees-of-remoteness markers express predicates such as 'be a long time'. These measure the distance between topic time and event time without encoding the ordering relation between them. As such, their semantics is radically different from that of tenses, which relate topic time to utterance time or some reference time, but leave the time of the event to be constrained by the aspectual component of the utterance.[18]

Furthermore, the ordering relation between event time and topic time is presupposed or backgrounded, rather than to be encoded as at-issue (i.e., roughly, asserted or questioned) content, as (4.7) illustrates:

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[18] Cable (2013) has recently proposed a much more detailed and formal analysis of the remoteness system in Gĩkũyũ (Northeastern Bantu, Kenya) following the same basic idea. However, there are very significant differences between the Gĩkũyũ and Yucatec systems in several other respects. Thus, the Gĩkũyũ system is deictic, i.e., restricts topic time to utterance time, and the use of the remoteness markers appears to be obligatory in Gĩkũyũ event descriptions (at least in matrix clauses). Another example of anaphoric remoteness markers appears to be found in another Bantu language, Luganda (Uganda), according to Klecha & Bochnak (2015).

(4.7)　　Ma'　sáam　sùunak　　　　　　le=kòombi=o';...
　　　　　NEG　REC　turn\ATP:SUBJ(B3SG)　DEF=van=D2
　　　　　'It's not a while ago that the bus returned;…'

　　a.　…inw=a'l-ik=e',　　　　　　h-ts'o'k　　　mèedya　òora.
　　　　　A1SG=say-INC(B3SG)=TOP　PRV-end(B3SG)　half　　　hour
　　　　　'…I think it was half an hour ago.'

　　b.　??...tuméen　ma'　sùunak=i'.
　　　　　CAUSE　　　NEG　turn\ATP:SUBJ(B3SG)=D4
　　　　　'…because it hasn't returned yet.'

Posteriority of topic time – which in (4.7) is understood to be, or overlap with, utterance time – vis-à-vis the event time is presupposed in (4.7). Therefore, speakers consider continuation (4.7b), which clashes with this presupposition, to be infelicitous.

　　　　Why would the ordering relation between topic time and event time be presupposed or background rather than to be at-issue content? Bohnemeyer (2002: 328-342) argues that the remoteness markers are stative predicates with meanings such 'be a short/long time'. These do not as morphemes encode ordering relations at all. The ordering relations are instead contributed by the construction, which is to say by the form of the dependent lexical verb. The ordering relations are thus background because they are expressed in an embedded position.

　　　　Degree-of-remoteness markers have only quite recently become the subject of in-depth semantic studies. So far, there appears to be a surprising amount of variation in even the most basic semantic properties of these systems.

5. Tenselessness and the future

It is a fundamental property of human cognition (and perhaps indirectly a property of the universe itself) that our representations of the future are non-factual. Tensed and tenseless languages alike have lexical and grammatical devices that overtly flag this nonfactual status by treating future situations as desired, feared, planned, hypothesized, and so on. In addition, tense marking gives the non-factual future a grammatical treatment that is different from that of the factual past. The question thus arises whether there is an analogous grammatical distinction in tenseless languages that flags representations of future situations for their non-factuality. The answer appears to be affirmative, as many tenseless languages show some form of grammatical realis-irrealis mood distinction, within which future time reference can or must be subsumed under irrealis mood, as first observed by Comrie (1985: 39-53). However, such realis-irrealis distinctions may be only the tip of the typological iceberg, so to speak. In this section, four languages are examined all of which show evidence of what appear to be semantic constraints against the extension of forms used for factual reference to the future: Yucatec (Bohnemeyer 1998, 2002, 2009); St'át'imcets (or Lillooet; Northern Interior Salish; British Columbia; Matthewson 2006); Paraguayan Guaraní (Tupí-Guaraní; Paraguay; Tonhauser 2011); and Kalaallisut (Greenlandic; Bittner 2005). Three of the four have been described as tenseless. The fourth, St'át'imcets, has an optional anaphoric future tense. It is included

in the discussion because it has a restriction against uses of verb forms without over tense marking with future time reference similar to what is the case in the other three languages.

As seen above, in Yucatec, the relation between topic time and utterance time is not constrained by function functional categories – with one exception: perfective aspect marking is incompatible with future time reference in matrix clauses, as illustrated in (5.1):

(5.1)   #**T**-in=ts'on-ah   le=kèeh   **sáamal**=o'
          PRV-A1SG=shoot-CMP(B3SG)   DEF=deer   tomorrow=D2
          intended: 'I will shoot the deer tomorrow'

However, perfective marking does occur with future time reference in conditional antecedents:

(5.2)   Wáah   **t**-in=ts'on-ah   le=kèeh   **sáamal**=o',
          ALT   PRV-A1SG=shoot-CMP(B3SG)   DEF=deer   tomorrow=D2

          he'   in=tàas-ik=e'!
          ASS   A1SG=come:CAUS-INC(B3SG)=D3
          'If I shoot the deer tomorrow, I'll bring it (i.e., we have a deal)!'

Bohnemeyer (1998, 2002, 2009) argues that the occurrence of the perfective marker with future time reference in this context suggests that the perfective marker is not incompatible with future time reference *per se* – that is, it does not encode a past (or non-future) tense. Rather, what accounts for the semantic anomaly of (5.1) is that the perfective clause presents the action of shooting the deer as a fact (a *fait accompli*), and this is conceptually incoherent in combination with future time reference. Bohnemeyer proposes the **Modal Commitment Constraint** to capture this principle:

(5.3)   **Modal Commitment Constraint (MCC)**: The realization of events in the (deictic or anaphoric) future cannot be asserted, denied, questioned, or presupposed as fact. Assertions and questions regarding the future realization of events require specification of a modal attitude on the part of the speaker. (Bohnemeyer 2009: 109)

For an attempt at a formal definition of the notion of 'event realization' see Bohnemeyer & Swift 2004. Independent evidence in support of the formulation in (5.3) is somewhat mixed. The key issue is that all aspect-mood markers aside from the perfective and all stative predications are freely compatible with future topic times. Example (5.4) features a stative non-verbal predication with future time reference:

(5.4)   Chéen   ka'=sùunak-ech   t-u=láak'   ha'b=e',
          SR:IRR   REP=turn\ATP:SUBJ-B2SG   PREP-A3=other   year=TOP
          túumben   le=nah=o'
          new(B3SG)   DEF=house=D2

'(When you return next (lit. the other) year,) the house will be new'

This distribution supports (5.3) as far as constructions that do not entail event realization go, such as the progressive AM marker (cf. (4.2) above).[19] But what about the terminative aspect marker, which does entail realization and likewise occurs with future time reference (cf. (4.4))? For that matter, why are stative predications not subject to the MCC? It is easy enough to define the notion of 'realization' in such a manner that it only applies to event descriptions in the narrow sense, excluding state descriptions. This would then also account for the occurrence of the terminative with future time reference, as the terminative is arguably used to predicate the inclusion of topic time in a result state of the eventuality described by the lexical content of the clause (Bohnemeyer 2002: 279-289). But this solution remains ad hoc unless an explanation can be found for the differential treatment of states and events with regard to the factuality of their realization – and so far, such an explanation is lacking. Another conceivable solution is to narrow down the statement of the MCC so that it only applies in case completion of the event falls inside the future topic time. But again, without an independent theoretical motivation, such a move would remain ad hoc and stipulative.

Speakers choose from among numerous options for future time reference that satisfy the MCC. In matrix clauses, the prospective, obligative, desiderative, necessitive, immediate, and remote future markers are used. None of these entail event realization, so all of them are compatible with future time reference according to (5.3). In subordinate clauses, irrealis marking is used for future time reference (cf. (5.5)), but also for habitual and generic reference (cf. (5.6)).

(5.5)   Future-time reference
         Le=kàarta   **kéen**   a=ts'íib-t-Ø   bèey=o',
         DEF=letter   [SR.IRR   A2=write-APP-SUBJ(B3SG) thus]=D2
         hay-p'éel   tyèempo   k-a=tukul-ik
         how.many-CL.IN time   IMPF-A2=think-INC(B3SG)
         u=xàan-tal?
         A3=take.time-INCH.INC
         'The letter you are going to write thus, how much time do you think it
         will take?'

(5.6)   Habitual/generic reference
         Le=**kéen**   k=ts'a'-Ø   túun   he'l=a',
         DEF=[SR.IRR   A1PL=put-SUBJ(B3SG) so.then PRSV]=D1
         u=k'àaba'=e',   ka'nal+pàach+nah.
         A3=name=TOP   high+back+house

---

[19] Strictly speaking, the progressive is likewise not unproblematic. It does not entail realization with telic predicates, but it may entail realization with at least some atelic predicates. Thus, for the entire time that somebody *is drawing a circle*, they cannot be said to *have drawn the circle*, but as soon as somebody can be said to *be pushing a cart*, they can also be said to already *have pushed the cart*. This inference pattern is known as the 'Imperfective Paradox' (Dowty 1979: 133).

'So then the (one) we put here, as for its name, (it is) ka'nal pàach nah'

In both examples, *kéen* marks the left edge of a subordinate clause that occurs itself on the left edge of the sentence it is subordinate to. In (5.5), the *kéen* clause is a relative clause that modifies a noun phrase that is itself left-dislocated. In (5.6), the RC is headless, nominalized, and likewise left-dislocated. (And (5.4) above features a topicalized headless RC with the allomorph *chéen,* acting as a kind of irrealis temporal clause.) The motivation behind calling *kéen* an 'irrealis' subordinator is that it occurs with future time reference, but also with habitual and generic reference, and that it does not commit the speaker to realization of the event described by the clause it occurs in, unlike a future tense.

      Why would a language mark irrealis mood in certain subordinate clauses, but not in matrix clauses? The simplest possible answer to this question appears to be that grammatical distinctions tend to be more differentiated in matrix clauses, per Ross' (1973) 'Penthouse Principle'. As mentioned, matrix clauses offer a wealth of functional categories that can be used for future time reference and habitual/generic reference. These operators occur rarely, if ever, in subordinate clauses.

      Turning now to St'át'imcets, in this Salish language, matrix clauses that contain no overt tense marker are incompatible with future time reference.

(5.7)   **Táyt-kan**   lhkúnsa / # natcw   / # zánucwem
          hungry-1SG.SUB now   one.day.away   next.year
          'I am hungry now'; not 'I will be hungry tomorrow/next year'

(5.8)   **K'ác-an'-lhkan**   i-nátcw-as
          dry-DIR-1SG.SUB   when.PST-one.day.away-3CONJ
          / # natcw   / # zánucwem
          one.day.away   next.year
          'I dried it yesterday'; not 'I will dry it tomorrow/next year'
          (Matthewson 2006: 677)

However, just like perfective clauses in Yucatec and simple present tense clauses in English, zero-marked verb forms are compatible with future time reference in conditional antecedents:

(5.9)   **Lh-7áts'x-en-acw**   s-Laura,   tsun   xwem-ás   kw
          HYP-see-DIR-2SGCONJ NMLZR-Laura   say(DIR)   fast-3CONJ   DET
          s-nas-ts   úxwal'
          NMLZR-go-3POSS   go.home
          'If you see Laura, tell her to hurry up and go home' (Matthewson 2006: 678)

There are a variety of options for expressing future time reference, including the prospective aspect marker *cuz'*:

(5.10)   **Cuz'**   qwatsáts   ta   naplít-a
          PROSP   leave   DET   priest-DET

'The priest is going to leave' (Matthewson 2006: 678)

The most common option is the marker *kelh*, which Matthewson analyzes as an optional anaphoric future tense marker:

(5.11)   Táyt-kan   **kelh**
          hungry-1SG.SUB FUT
          'I will be hungry' (not: 'I am/was hungry') (Matthewson 2006: 677)

Kelh does not offer strong support for an irrealis analysis, since it does not occur with habitual or generic reference. The following example illustrates the use of *kelh* with respect to a reference time distinct from utterance time:

(5.12)   [Context: Mike Leech is currently Chief of T'ít'q'et. His (deceased) mother
          was called Julianne.]
          Zwát-en-as   s-Julianne   [k-wa-s   kúkwpi7 **kelh**
          know-DIR-3ERG NOM-Julianne   DET-IMPF-3POSS   chief   FUT
          ta skúza7-s-a]   i   kwís-as.
          DET child-3POSS-DET   when.PAST   fall-3CONJ
          'Julianne knew when he was born that her child would become chief.'
          (Matthewson 2006: 689)

    Matthewson (2006) proposes the following explanation for the incompatibility of zero-marked forms with future time reference: St'át'imcets has a phonologically empty non-future tense. In matrix clauses, *kelh* picks up either a present or a past reference time from this non-future marker, returning an absolute future interpretation in the former case and a future-in-the-past in the latter. One challenge for this analysis is that it seems odd to have a zero-marked expression that contrasts with a marked expression (*kelh*) and yet combines with the latter rather than to receive its interpretation pragmatically through the contrast. A possible alternative to this analysis would invoke a Modal Commitment Constraint for St'át'imcets, as the zero-marked verb form appears to entail event realization.
    Let us consider Paraguaian Guaraní next. In this language as well, morphologically zero-marked forms are incompatible with future time referenc in matrix clauses:

(5.13) 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.'
             (Tonhauser 2011: 260)

A variety of future-oriented aspectual and modal markers is used for future time reference. The examples in (5.14) illustrate prospective aspect -*ta*, desiderative modality -*se*, possibility modal –*ne*, and necessity modal -*va'erã*:

(5.14)   Ko'ẽro   a-jahú-**ta**   / a-jahu-**se**
          tomorrow   A1SG-bathe-PROSP   A1SG-bathe-DES
          / a-jahú-**ne**   / a-jahú-**va'erã**.
          A1SG-bathe-MIGHT   A1SG-bathe-MUST
          'Tomorrow I am going to / want to / might / must bathe.'
          (Tonhauser 2011: 265)

Tonhauser rejects a Matthewson-style analysis of the zero-marked forms *are* compatible with future time reference in certain embedded contexts:

(5.15)   [Context: Malena's wedding is tomorrow. She invited Paloma to sing at the wedding but doesn't know whether she'll come. Juan says:]
          I-katu   o-**purahei**   **ko'ẽro**
          B3-possible   A3-sing   tomorrow
          'It's possible that she will sing tomorrow.' (Tonhauser 2011: 275)

(As shown in (5.9) above, this is at least to a limited extent true in St'át'imcets as well.)
    Tonhauser instead opts for a tenseless analysis of Guaraní. But why do zero-marked forms in matrix clauses exclude future time reference? To account for this, Tonhauser adopts a version of the 'Prospectivity Thesis' Bittner (2005) formulated for Kalaallisut:

(5.16)   **Prospectivity Thesis**: Kalaallisut translations of future auxiliaries comprise three related classes:
          A. Prospective statives evoking (current) attitude states to *de se* prospects;
          B. Prospective inchoatives evoking (realized) starts of expected processes;
          C. Prospective matrix moods marking the speech act as a request or wish."
          (Bittner 2005: 354)

In other words, on Bittner's account, all future time reference involves present or past topic times in Kalaallisut – there *are no* future topic times in this language according to Bittner. Tonhauser advances the same claim for Guaraní. According to these scholars, speakers of these languages strictly talk about future events only by expressing some kind of state that connects the anticipated future situation to a present or past situation – an aspectual or modal pre-state or some kind of mental attitude.
    The Prospectivity Thesis and the Modal Commitment Constraint express closely related constraints on future time reference. But whereas speakers of Guaraní and Kalaallisut exclusively use aspectual or modal markers or attitude predicates in combination with present or past topic times to talk about future events, for Yucatec speakers, this is only one of four approaches their native language offers. However, the choice among the four strategies is not entirely free:

- Lexical state descriptions freely combine with future topic times.
- The same goes for subordinate clauses that are irrealis-marked.
- Dynamic matrix clauses formed with any of the morphologically unbound aspect-mood markers (cf. Table 3) likewise accept future topic times.
- It appears to be only the realization of a dynamic event inside a future topic time that is barred by the MCC. If this is to be encoded in a matrix clause, the strategy of choice is to use a future-oriented modal AM marker or temporal remoteness marker with a present or past topic time.

A lexical state description with a future topic time was illustrated in (5.4) above, repeated here for convenience:

(5.17) Chéen   ka'=sùunak-ech   t-u=láak'   ha'b=e',
        SR:IRR   REP=turn\ATP:SUBJ-B2SG   PREP-A3=other   year=TOP
        túumben   le=nah=o'
        new(B3SG)   DEF=house=D2
        '(When you return next (lit. the other) year,) the house will be new'

The following example illustrates an irrealis clause with a future topic time (the first clause of (5.17) is in fact also a case in point):

(5.18) Ha'w=u'y-ik-e'x
        ASS:A2=perceive-INC(B3SG)-2PL
        le=ba'x   **kéen**   inw=a'l=e'?
        DEF=what   [SR.IRR   A1SG=say(B3SG)]=D3
        'Will you all listen to what I am going to say?'

While the reality of tenselessness as a typological phenomenon is increasingly accepted, we still struggle to understand the consequences and implications of tenselessness. In this section, we examined seen some potential material for a typological account of the how tenseless languages deal with future time reference.

6. Summary

We started out with Klein's (1994) unified theory of tense and viewpoint aspect. According to this theory, natural-language utterances make claims, ask questions, etc., about topic times. Tenses constrain the topic time of the utterance vis-à-vis its utterance time, while viewpoint aspects constrain the topic time vis-à-vis the runtime of the described eventuality. Bohnemeyer (2014) added to this framework a distinction between viewpoint aspect and anaphoric tense. These two types of functional categories are distinct in that anaphoric tenses constrain topic time vis-à-vis a reference time, which may or may not be utterance time, rather than to relate topic time to the runtime of the situation, as viewpoint aspects do.

    Field semantics is the elicitation of semantic data from native speaker consultants and the semantic analysis of these data based on the consultants' intuitions for entailments/contradictions and pragmatic felicity. Linguistic data collection techniques can be classified in terms of three components: an utterance or utterances and optionally a task and a stimulus in response to which the utterance(s) is/are produced. As a premier

example of a powerful tool for the rapid elicitation of rich data on the semantics of tense-aspect systems, we discussed Dahl's (1985) Tense-Aspect-Mood Questionnaire.

Field semanticists have to infer senses/intensions from observed extensions since they are not mind readers. To achieve this, they manipulate real or imagined situations and observe how this affects native speakers' intuitions about the applicability of certain expressions in reference to these situations. The core phenomena of semantics and pragmatics – in particular, entailment, contradiction, ambiguity, anomaly, implicature, presupposition, and speech act meanings - can be explored in the field directly or indirectly on the basis of native speaker intuitions for conditions of successful reference – or truth conditions. Recorded utterances – elicited or not - featuring a given tense-aspect marker instantiate the extensional meaning of the marker (at least as long as they can be assumed to be accurate representations of the stimuli). The intensional/sense meaning can be inferred from the extensional data as features shared by all elements once possible effects of semantic transfer (polysemy) and pragmatic meaning components are accounted for.

We then turned to the subject of tenselessness. In tenseless languages, the topic time of an utterance is not constrained vis-à-vis its utterance time by any aspect of its morphosyntactic form, i.e., in particular, not by inflection/functional categories. Among fieldworking semanticists, the existence of profoundly tenseless languages is now uncontroversial. This holds even for researchers working in mainstream Generative Grammar.

Tenseless languages often grammaticalize a distinction between reference to factual and non-factual situations. Future time reference will be treated wholly or in part as non-factual in such languages. There appear to be at least two different strategies of achieving this. One approach is exemplified in Yucatec. This language freely allow statements about future topic times unless they involve event realization as at-issue content, in which case they must be flagged using expressions of modality or irrealis mood. The second strategy is manifest in Guaraní and Kalaallisut. These languages appear to disuse future topic times altogether. Instead, speakers talk about future events exclusively by relating them to present or past topic times via aspectual, modal, or mood markers.

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