15

Analyzing Tenselessness

Hamida Demirdache and Hongyuan Sun

15.1 Introduction: Is Tense Universal?

This chapter focuses on the core fundamental issue concerning linguistic variation in the expression of temporality across languages: Is tense a universal semantic and/or syntactic category? Obviously, if there are languages that lack tense, then tense is not universal. And clearly, there is a wide diversity of languages that lack overt morphological tense, as illustrated in (1a) from St'át'imcets Salish (adapted from Demirdache 1997) and (1b) from Mandarin.[1]

(1) a. Nilh s-Biden [ti kel7áqsten-s-a ti UaS-a]
FOC NOM-Biden DET chief-3SG.POSS-DET DET USA-DET
'Biden is the chief of the United States.'
(or 'It is Biden who is the chief of the USA.')

b. Bàidēng shì měiguó zǒngtǒng.
Biden be United.States president
'Biden is the president of the United States'

The sentences in (1) are well formed although their main predicate lacks any **overt** temporal – be it tense or aspect – marking (we henceforth refer to such predicates/sentences as bare predicates/sentences). It could well be, however, that the syntax of the above sentences integrates a Tense Phrase (TP) headed by an unpronounced temporal head projected under T°. On this analysis, the syntax of (1a/b) would involve syntactic and semantic tense and it would merely be that tense receives no dedicated phonological realization in these

We are indebted to Jinhong Liu, Yiqin Qiu, Yijun Fang, Paul Law, and Lisa Cheng for their judgments on Cantonese and Mandarin. Special thanks to Rint Sybesma and reviewers of this volume for their insightful and valuable comments. We thank Brenda Laca, Fabienne Martin, Victor Junnan Pan, Guillaume Thomas, and Myriam Uribe-Etxebarria for comments and discussion. The research reported here was supported by the Laboratoire de Linguistique de Nantes (LLING, UMR 6310) and the Strategic Project of the National Social Science Foundation of China (No. 22&ZD295).

[1] Glosses follow the Leipzig glossing rules; other abbreviations are listed at the end of the chapter.

languages. The issue then is evaluating the arguments for making such a move, given Occam's razor, which dictates that parsimonious accounts are to be preferred. One could thus argue that some temporal parameters must be encoded in the LFs assigned to these sentences in order to determine their truth conditions. Assuming that (1a/b) uttered out of the blue are by default interpreted as holding at the present time of utterance (henceforth UT), the truth of (1a/b) also depends on the time at which they are evaluated: (1a/b) are true at UT (that is, August 2022) but would come out as false had they been uttered, say, anytime time prior to January 20, 2021 (the date of Biden's inauguration). The question is then whether we need to posit syntactic and/or semantic tense to explain such constraints.

As we shall see, ascertaining whether a given language has tense or not is a hard and controversial question. Mandarin is a very good case in point since it has been analyzed as having covert semantic and syntactic tense (Sybesma 2007; Sun 2014; Lin 2015), as lacking semantic and syntactic tense altogether (Li and Thompson 1981; Klein et al. 2000), or as lacking syntactic tense but having semantic tense (Lin 2006).

The source and limits of cross-linguistic variation in temporal systems has been a fundamental research topic in linguistic studies for decades. The issue we tackle here is not whether all natural languages have the capacity to convey how situations are located in time, which we take to be a given on any reasonable theory of language knowledge and use. The issue rather is understanding the mapping between time, a universal ontological concept, fundamental to human cognition and experience, and language, given that languages differ radically in the morphosyntactic means instantiated to express time. This raises the issue of the scope and limits of semantic and morphosyntactic variation in the domain of temporality. Take the two morphosyntactic means essentially used across languages to express temporal reference (see Klein 1994; Bittner 2005): tense and temporal adverbials. While there is no consensus in the literature as to whether all languages have tense, that all languages have temporal adverbials is not a matter of debate:

(2) Time adverbial universal

a. "Some languages lack tense, i.e. do not have grammatical time reference, though probably all languages can lexicalise time reference, i.e. have temporal adverbials that locate situations in time."

(Comrie 1976: 6)

b. "[Temporal adverbials] are by far the richest class of temporal expressions, and in contrast to tense and aspect, they are found in all languages."

(Klein 2009: 2)

Languages analyzed as lacking at least *overt* tense are widespread and typologically very diversified.[2] This chapter seeks to answer the question of the universality of tense by comparing a wide array of theoretically diverging

[2] These include Blackfoot, an Algonquian language (Ritter and Wiltschko 2004, 2014; Reis Silva and Matthewson 2007), Chinese, a Sino-Tibetan language (Klein 1994; Sybesma 1999; Smith and Erbaugh 2005; Lin 2006, 2012; Sun 2014;

analyses of typologically diverse so-called *tenseless* languages – that is, languages without overt morphological tense markers such as in (1) – seeking to understand what these analyses, however divergent, agree on.

Identifying whether so-called tenseless languages have/lack semantic and/or syntactic tense is a controversial and hotly debated issue that has, moreover, been gathering renewed interest in the literature (see the discussions in Matthewson et al. 2022; Pancheva and Zubizarreta 2023; Sun and Demirdache 2022, among others).

There are three intertwined issues at stake here. First, what are the constraints on the temporal interpretation of bare predicates across languages? Typically, for instance, the inherent aspectual class of a bare predicate is one factor constraining its temporal interpretation in out-of-the-blue contexts. This is why stative predicates such as those in (1) are only interpreted as holding at UT in Mandarin, or show a strong preference for a present interpretation in St'át'imcets. Secondly, how do we formally derive their temporal interpretation? Thirdly, is it necessary or more explanatory to posit covert tense in say (1a/b) to achieve a cross-linguistically valid theory of the temporal interpretation of tense(d/less) languages? Importantly, we break down the question of the universality of tense into two correlated albeit independent questions: Is tense a universal semantic category – that is, are there arguments/diagnostics for positing covert lexical[3] tense even in the absence of overt morphological tense? Is tense a universal syntactic category – that is, is T(P) always projected in the syntax even in languages lacking overt morphological tense and independently of whether there are arguments for positing lexical semantic tense in a given language?

This chapter is organized as follows. Section 15.2 is divided into two main subsections. Section 15.2.1 introduces background on tense, spelling out two alternative approaches to the syntax of tense, instantiating different approaches to the semantics of tense: pronominal vs. relational. Section 15.2.2 then provides criteria for determining whether languages have syntactic and/or semantic tense, distinguishing three broad ways in which languages with no overt grammatical tense can be analyzed as tenseless. Languages can lack a syntactic TP projection (*syntactic tenselessness*). Languages can lack tense denotations in their lexicon items, be they pronounced or unpronounced (*genuine/underlying semantic tenselessness*). Languages can lack

He 2020; Lee, Pancheva and Zubizarreta 2022), Gitxsan, a Tsimshian language (Jóhannsdóttir and Matthewson 2007; Aonuki 2021; Matthewson et al. 2022), Guaraní, a Tupi language (Tonhauser 2011; Thomas 2014; Pancheva and Zubizarreta 2020, 2023), Hausa of the Afro-Asiatic family (Mucha 2013; Bochnak et al. 2019), Inuit, an Eskimo-Aleut family (Shaer 2003; Bittner 2005, 2011), Mayan languages (Bohnemeyer 2002, 2009), Northern Paiute (Toosarvandani 2016), an Uto-Aztecan language, Salish languages including St'át'imcets (Matthewson 2003, 2006), Skwxwú7mesh (Bar-el 2005) and Halkomelem (Ritter and Wiltschko 2004, 2014), Samoan (Bochnak et al. 2019; Hohaus 2019), an Austronesian language, Tlingit (Cable 2017) of the Na-Dené language family, Vietnamese (Bui 2018), an Austroasiatic language, Zapotec (Toosarvandani 2021), an Oto-Manguean language, among many others.

[3] The underlying assumption here is that a language L will have semantic tense if there is an entry in the lexicon of L for an item/items with the denotation of tense (cf. (13), §15.2.2).

pronounced lexical items that have the denotation of a tense (*superficial/surface semantic tenselessness*). This typology will yield a four-way classification of the analyses developed in the literature for so-called tenseless languages. Section 15.3 discusses analyses that have in common that they posit syntactic tense, distinguishing two subclasses: positing covert semantic as well as syntactic tense, thus preserving the universality of tense, (§15.3.1) vs. positing covert syntactic tense but not semantic tense, thus preserving the universality of syntactic tense but not that of semantic tense (§15.3.2). Section 15.4 discusses analyses that have in common that they posit no syntactic tense, distinguishing two further subcategories: analyses which posit covert semantic tense, but not syntactic tense (§15.4.1), thus preserving the universality of semantic tense, but not that of syntactic tense, vs. analyses refuting (covert) semantic and syntactic tense and where tense is thus neither a semantic nor a syntactic universal (§4.2). Section 15.5 is devoted to constraints on future time reference in languages without overt grammatical tense since this question is at the heart of many of the core arguments put forth either for or against a tensed/tenseless analysis of these languages. We provide novel arguments for semantic tense in Mandarin and Cantonese based on (absolute) future time reference, and for a relational approach to the syntax of covert tense to capture the distribution of (absolute/relative) future time reference. Section 15.6 closes the chapter by reconsidering the initial question – that of the universality of tense – in light of the arguments put forth in section 15.5, concluding in favor of the universality of both syntactic and semantic tense, and correlating two putative tense universals.

15.2 What Does It Mean (Not) to Have Tense?

Understanding what it means to lack overt tense presumes defining what it means to have tense, which is in and of itself a matter of long-standing debate.

15.2.1 Approaches to Tense

We adopt here what we take to be the most widely accepted (and relatively consensual across both the formal and typological literature) stance: the neo-Reichenbachian approach to tense and aspect, as developed in Klein (1994), where tense encodes temporal relations (precedence, subsequence, coincidence) between times, just like viewpoint aspect does also. Temporal interpretation involves three times: the evaluation-time (EvalT), the reference-time (RT) or *topic-time* (TopT) in Klein's terminology, and the event(uality)-time (ET). The ET is the time of the described eventuality (the time at which the described state/event holds/unfolds). The EvalT is the time relative to which a clause is evaluated, which, as we just saw with the discussion of (1), plays a critical role for evaluating the truth conditions of a sentence. In an independent/root clause, the EvalT by default corresponds to the UT, but it can also correspond to the matrix ET in subordinate contexts, or when

embedded in attitude contexts, to the subjective *now* of the attitude holder. The ET and EvalT have been taken as sufficient to describe the three basic (non-compound) tenses: *past* indicates that the ET precedes the UT/EvalT, future that it follows the UT/EvalT, and *present* that it overlaps the latter. Reichenbach (1947) introduces a third time: the reference-time which provides a temporal perspective from which "the speaker invites his audience to consider the event" (Taylor 1977: 203). Klein (1994) develops the notion of reference-time as the time about which the speaker makes a claim or assertion – that is, the time talked about or TopT, a temporal parameter necessary even with the basic tense forms. Take, for instance, the simple past. If it were merely to encode that the eventuality was over by UT, then a sentence such as *Eva's cat was dead* would be saying something false since obviously Eva's cat is still dead at UT. In Klein's (2009: 46) own words:

> When someone asserts *Eva's cat was dead*, then he asserts something about some time span in the past – the time talked about, the assertion time, or the **topic time**, as I shall say. This time can, but need not, be the time at which the situation obtains or happens. In *Eva's cat was dead*, the topic time is most likely a subinterval of the time of the situation, that is, the time at which the cat is dead.

On Klein's neo-Reichenbachian approach, tense thus always encodes the relation between the UT/EvalT and the TopT – that is, it conveys whether the UT/EvalT precedes the TopT (UT $<$ TopT), follows (TopT $<$ UT), or is simultaneous with the latter (UT $\subseteq$ TopT). And it falls to (viewpoint) aspect to relate in turn the TopT relative to the ET – that is, to convey whether the TopT precedes (TopT $<$ ET), follows (ET $<$ TopT), or is simultaneous with the ET (TopT $\subseteq$ ET). Going back to *Eva's cat was dead*, the past tense on the copula thus tells us that the TopT precedes UT (TopT $<$ UT). In the absence of overt aspectual marking, the past TopT is understood as simultaneous with the ET (TopT $\subseteq$ ET).

Before turning to more formal analyses, let's illustrate Klein's proposal with the English sentence in (3). The past tense on the copula *was* orders the EvalT *after* the TopT, thus indicating that the time about which the speaker is making a claim (TopT) is a time in the past of the EvalT (here UT since we are dealing with an independent clause), as depicted in the temporal schema in (4). Progressive aspect on the main verb (*ing*) in turn orders the TopT *within* the ET, thus indicating that the described event is ongoing at the TopT.

(3) Cleo was standing next to Kiya.

(4) $---[_{ET}//////\text{STAND}///[_{TopT}]////////_{ET}]\text{—UT}----->$

Although the assumption that the meaning of tenses involves relations between times is relatively consensual, approaches differ with respect to the formal implementation of this assumption. We contrast below two major approaches to the semantics of tense: pronominal vs. relational. We pay very

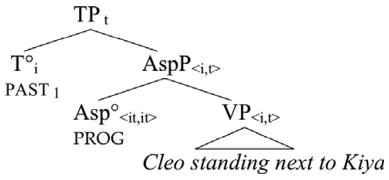
close attention to the syntax–semantics mapping, seeking to explicate the mapping and the issues that different approaches to the semantics of tense – and, thus, of tenselessness – raise in and for the syntax.

15.2.1.1 Pronominal Tense

The pronominal analysis which traces back to the work of Partee (1973), Enç (1986) and Kratzer (1998), among others, views tenses as the temporal analogues of pronouns – that is, as pronouns receiving time intervals (of type *i*) as their semantic value, on a par with regular pronouns receiving persons or objects (of type *e*) as their value. And just like individual-denoting pronouns, time-denoting pronouns can have indexical, anaphoric, or bound variable construals. Heim (1994) and Kratzer (1998) push the analogy further by arguing that, just like phi-features (i.e., [MALE]/[FEMALE]) contribute presuppositions constraining the possible choice of referents for pronouns, [PAST]/[PRES] are temporal features contributing presuppositions constraining the choice of possible referents for time variables. The feature [PRES] on a time variable thus contributes a presupposition restricting its denotation to the EvalT (UT in an independent clause), while [PAST] restricts its denotation to times anterior to the EvalT.

The syntax of pronominal tense is illustrated below. We see the proposal that tenses are the temporal analogue of pronouns is captured syntactically by analyzing the tense morpheme of a given sentence (past tense for the sentence in (3)) as a temporal pronoun hosted by the functional head T° in the syntactic representation associated with the sentence (given in (5) for the sentence in (3)).[4]

(5)



(6) a. $[\![\text{PROG}]\!]^{g,c} = p_{<i,t>}.\lambda t.\exists t'[t \subseteq t' \ \& \ p(t')=1]$

b. $[\![\text{PAST}_1]\!]^{g,c} = g(1)$; defined only if $g(1) < t_c$.

(7) a. $[\![\text{VP}]\!]^{g,c} = \lambda t.$ STAND NEXT TO KIYA (Cleo)$(t)=1$

b. $[\![\text{AspP}]\!]^{g,c} = \lambda t.\ \exists t'[\text{t} \subseteq t' \ \&$ STAND NEXT TO KIYA (Cleo)$(t')=1]$

c. $[\![\text{TP}]\!]^{g,c} = 1$ iff $\exists t'[g(1) \subseteq t' \ \&$ STAND NEXT TO KIYA (Cleo)$(t')=1]$, 0 otherwise; defined only if $g(1) < t_c$

d. Sentence (3) is defined only if the contextually salient time $g(1)$ precedes the EvalT t_c, where defined, (3) is true only if there is a time t' that includes $g(1)$, and that Cleo stands next to Kiya at t'.

[4] We adopt the following notation for types: *i* stands for time interval, *v* for event, *t* for truth-value – ignoring for simplicity worlds of type *s* throughout this chapter. For clarity, we represent referential indices as numerals (to avoid any confusion with semantic types such as *i*).

The lexical entries for past and progressive are given in (6).[5] Past tense in (6a) restricts the denotation of the pronoun under T° to times preceding the EvalT. Importantly, T° here corresponds to Klein's TopT: It denotes a contextually salient past time whose denotation is related to the ET by Asp°. As shown with the derivation in (7), progressive (PROG) requires the TopT, $g(1)$, to be contained within or coincide with the ET of Cleo's standing next to Kiya.

Summarizing in Cable's (2021) words, the idea underlying the pronominal approach to the syntax of tense is that "Tense ([T° in (5)]) denotes the Topic Time of the sentence."

15.2.1.2 Relational Tense

We now turn to an alternative view where tenses do not themselves denote time intervals but rather serve to relate two times. As Ogihara and Kusumoto (2020) point out, as an argument against the pronominal approach, unlike the gender presuppositions of pronouns, the presuppositions contributed by the temporal features associated with tense morphemes are inherently relational and context sensitive.

> The anteriority meaning associated with past-tense sentences is inherently relational in that we regard some time as a past time only with regard to some other time, which we might call an evaluation time. The default 'evaluation time' is of course the utterance time of the sentence under consideration.
>
> *(Ogihara and Kusumoto 2020: 3)*

On the relational approach to tense (e.g., von Stechow 1995; Stowell 1995, Ogihara 1996; Demirdache and Uribe-Etxebarria 1997), tenses serve to order syntactically represented time-denoting arguments and, as such, are akin to dyadic predicates of spatiotemporal ordering (i.e., *after/within/before*).[6] We present here a specific implementation of the syntax of relational tense, developed in Demirdache and Uribe-Etxebarria (1997, 2014 and references therein; henceforth D&UE), which incorporates insights of both referential and relational theories of tense, building on the pioneering proposals of Stowell (1996) and Zagona (1990) to syntactically break down tense into its semantic components.

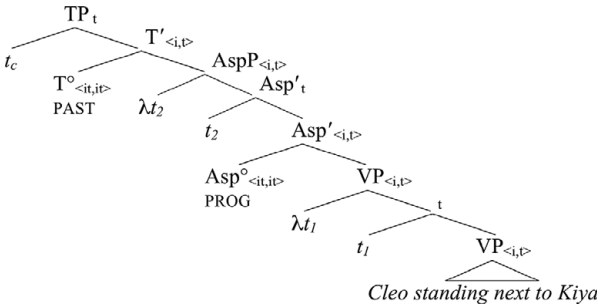
D&UE's approach shares with relational theories the core assumption that tenses have a relational meaning, moreover extending this assumption to aspect. It shares with referential approaches the assumption that the semantics

[5] Denotations throughout this chapter are relativized to a variable assignment (g) and context (c).

[6] For space reasons, we set aside a third approach: the quantificational approach (tracing back to Montague 1973 and Prior 1967), according to which tense always involves existential quantification over times. As Ogihara and Kusumoto 2020 emphasize, what truly distinguishes quantificational from non-quantificational theories is whether tense has quantificational (existential) force on its own. Relational approaches thus count as non-quantificational if quantificational force, if any, never comes from the tense itself (that is, tenses may occur without existential closure, but may also get bound by existential closure, or quantificational elements elsewhere in the sentence). But relational approaches will count as quantificational if tense is inherently existential – that is, if there is no occurrence of tense without existential quantification over times.

of tense involves nominal-like expressions referring to times, projected in the syntax as time-denoting DPs (ZeitPs, for Stowell (2007)), again extending this approach to aspect. Assuming with Klein (1994) that tense does not directly order the ET relative to the EvalT, this relation being mediated by aspect, D&UE analyze *both tense and aspect in relational terms* – that is, as (prepositional like) predicates with a spatiotemporal meaning ordering times. D&UE share with the abovementioned relational approaches the assumption that the two times related by tense (EvalT/TopT in e.g., von Stechow and Beck (2015), or EvalT/ET in e.g., Ogihara and Kusumoto (2020) who set aside the RT and the role of aspect in their discussion) are syntactically represented, extending it to AspP: The times related by aspect, just like those related by tense, are syntactically represented. This yields the temporal phrase structure in (8) for the sentence in (3), where the three temporal parameters involved in the temporal calculus of sentences are syntactically projected. The highest time argument (t_c in (8)) projected in [Spec, TP] corresponds to the EvalT. Moving down the tree, the time argument projected in [Spec, AspP] (t_2) corresponds to the TopT, while the lowest time argument (t_1 projected in the (highest) specifier of VP) corresponds to the ET.[7,8]

(8) Syntax of relational tense and aspect



(9) a. $[\![\text{PROG}]\!]^{g,c} = \lambda p_{<i,t>}.\lambda t.\ \exists t'[t \subseteq t' \ \&\ p(t')=1]$
b. $[\![\text{PAST}]\!]^{g,c} = \lambda p_{<i,t>}.\lambda t.\ \exists t'\ [t' < t \ \&\ p(t')=1]$
c. $[\![t_1]\!]^{g,c} = g(1)$; $[\![t_2]\!]^{g,c} = g(2)$; $[\![t_c]\!]^{g,c} = t_0$ (The time of context t_c is the utterance time t_0 in matrix clauses)

(10) a. $[\![\text{VP}]\!]^{g,c} = \lambda t.$ STAND NEXT TO KIYA (Cleo)(t)=1
b. $[\![\text{Asp}']\!]^{g,c} = \lambda t.\ \exists t'[t \subseteq t' \ \&$ STAND NEXT TO KIYA (Cleo)(t')=1]
c. $[\![\text{T}']\!]^{g,c} = \lambda t.\ \exists t'\exists t''[t' \leq t \ \&\ t' \subseteq t'' \ \&$ STAND NEXT TO KIYA (Cleo)(t'')=1]
d. $[\![\text{TP}]\!]^{g,c} = 1$ iff $\exists t'\exists t''[t' \leq t_0 \ \&\ t' \subseteq t'' \ \&$ STAND NEXT TO KIYA (Cleo)$(t{=}1)$]; 0 otherwise

[7] D&UE assume a phrase structure with multiple specifiers (Chomsky 1995), thus allowing for both time-denoting arguments (ZeitPs) and regular individual-denoting arguments (DPs) to be accommodated in the syntax. Following Stowell 1993, the ET is the "true" highest/external argument of the verb and, as such, is base-generated in the highest specifier (subject) position of VP.

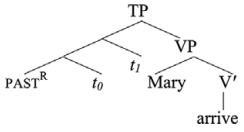
[8] The reader should keep in mind that the topic, eventuality, and evaluation times are merely time-denoting arguments, referred to in the text with the labels TopT, ET, and EvalT purely for convenience, so as to readily keep track of which time(s) we are talking about.

Comparing the phrase structure in (8) with that in (5) for pronominal tense, we see that both phrase markers share in common the assumption that the Tense head takes as sister an aspect projection (AspP) denoting a property of times, <*i*,*t*>. Importantly, however, in (8), T° does not itself denote the TopT. Rather, T° takes AspP, a predicate of times to yield a new predicate of time (type <*it*, *it*>), and Asp° in turn does exactly the same, it takes a predicate of times (the VP *Cleo stand next to Kiya* denoting the set of intervals corresponding to running-times of events of Cleo's standing (10a)) to yield another predicate of times. As we see with the denotations in (9a–b) for the two temporal heads in (8), together with the derivation in (10) of the temporal meaning of (3), Tense (here PAST) and Aspect (here PROG) both relate two time variables by imposing ordering constraints on the latter: Progressive Asp° requires the TopT (t_2) to be contained within/coincide with the ET (t_1), while Past T° requires the EvalT(t_c) to fall after the TopT (t_2).

Summarizing, D&UE's relational approach to both tense and aspect nicely captures Klein's seminal proposal that aspect relates the ET (projected in [Spec, VP]) to the TopT (projected in [Spec, AspP]), which in turn tense relates to the EvalT (projected in [Spec, TP]).

Importantly, this proposal differs in one core respect from other, be it pronominal or relational, approaches in assuming that time arguments, just like regular individual-denoting arguments, are maximal projections projected in true argument positions, the specifier positions of the relevant heads (T°, Asp°, V°). In contrast, on the pronominal approach (5), just like on the relational approaches in for example, Ogihara and Kusumoto (2020) or von Stechow (1995), time-denoting arguments are heads projected either under T° (8) or adjoined to T° (and Asp° in von Stechow and Beck 2015), as illustrated in (11) from Ogihara and Kusumoto (2020: 27), where t_0 stands for UT and t_1 for ET. The assumption that time-denoting arguments occupy regular argument (XP) positions (which we take to be the default assumption) has interesting consequences for adverbial modification, as we shall see in section 15.5.2.

(11)



15.2.2 What Does It Mean Not to Have Tense?

Having outlined two major approaches to the semantics and syntax of tense, we can now tackle the question of what it means not to have (overt morphological) tense. We break this question into two sub-questions: What does it mean to lack (overt morphological) *semantic* tense? What does it mean to lack (overt morphological) *syntactic* tense?

To understand the issues at stake, let's take the St'át'imcets sentence in (12a) from Matthewson (2006), comparing it with its English correspondent in (12b).

(12) a. matq kw-s Mary
walk DET-NOM Mary
b. Mary walk-**ed**.
PST

As stated in the lexical entries given for past tense, be it in (5a) under the pronominal approach, or (8a) under a relational approach, the past-tense morpheme realized as *-ed* in English (12b) imposes constraints on the denotation of the TopT by requiring the latter to be a time that falls in the past of the EvalT (UT in the cases at hand). The question at stake is whether the lexicon of St'át'imcets lacks such a morpheme altogether. Alternatively, it could well be that St'át'imcets has such a morpheme but differs from English only in that the tense morpheme lacks a phonological matrix (remains unpronounced).

We thus take a language to lack semantic tense if it has no grammatical/functional item listed in its lexicon whose denotation imposes a restriction on the relation of the EvalT to the TopT (under a neo-Reichenbachian approach, as assumed here), or of the EvalT directly to the ET (in systems with only two times). This is stated in (13). We take membership in a closed class of items to be the defining property distinguishing functional from lexical categories.[9]

(13) Semantic tenselessness
A given language L lacks semantic tense if there is no functional item in the lexicon of L whose meaning (at least in part) imposes a restriction on the relation of the EvalT relative to the TopT (alternatively the event(uality) time).

Turning now to the criteria for lacking syntactic tense.

(14) Syntactic tenselessness
a. A given language L lacks syntactic tense if independent/root clauses in L lack a T(P) projection.
b. Independent/root clauses lack a T(P) projection if they lack a functional morpheme obligatorily generated under T° and projecting TP – be it a bound morpheme or not, phonologically overt or not.

Importantly, (14a) ensures that lack of tense in embedded contexts alone does not disqualify L from counting as having tense. By the same token, the existence of infinitival clauses, whether or not the latter are analyzed as projecting a TP or less than a TP (i.e., AspP, VP), does not disqualify, say, English from counting as tensed. The criterion in (14b) furthermore captures the traditional idea that tense is a so-called "grammatical category of the verb," since TP is an extended functional projection of the verb (or more precisely of the predicate phrase, whether the main predicate of the clause is VP, AdjP, or NP).[10] This criterion,

[9] The criterion in (13) does not distinguish so-called *absolute* tense (for which the EvalT is always UT and tense thus always encodes the relation of the TopT/ET relative to UT) vs. *relative* tense (which encodes the relation of the TopT/ET relative to the EvalT regardless of the latter's relation to UT).

[10] The issue of whether Tense is a sentential category restricted to extended projections of the VP/main predicate of the clause, or also a *nominal* category that can be part of the extended projection of NPs (carrying information relevant either only for the NP itself, or also for the clause as a whole) is a matter of lively and renewed debate (see Tonhauser 2008; Thomas 2014, and references therein).

however, does not discriminate between bound morphemes (e.g., inflectional) and periphrastic/morphologically independent ones – thus allowing both inflectional items and markers realized as separate words/particles standing on their own, to count as tense markers, while excluding lexical phrasal categories such as temporal adverbials.

Now, although morphological overtness is not a relevant criterion for determining whether L is tensed, obligatoriness is. The assumption here is that tense can be phonologically null cross-linguistically: This can be the case in languages identified as having no overt tense, just as it holds in languages where covert tense often co-exists alongside overt tense (thus many tensed languages such as English have a spelled-out past tense but an unmarked form for the present). Phonological realization is thus a parameter of variation across/within languages. Obligatoriness, on the other hand, is a criterion that must be satisfied: L will be classified as having tense – whether its tense morphemes receive a dedicated phonological realization or not – if such morphemes are necessary to account for the (constraints on the) temporal interpretation of (at least) independent/root clauses.[11]

The challenge then is to find strong arguments, both empirical and theoretical, for positing phonological null tenses to reach descriptive and explanatory adequacy. This is all the more important given that by the principle of Occam's razor, parsimonious accounts positing fewer principles and entities are to be preferred.

15.3 Positing Syntactic Tense

The above criteria yield a four-way classification of the analyses developed for so-called tenseless languages, divided up below into two broad classes according to whether or not they posit syntactic tense. Analyses positing both covert semantic and syntactic tense (§15.3.1) preserve the universality of tense since languages with no overt grammatical tense are only tenseless on the surface. Analyses positing covert syntactic – but not semantic – tense (§15.3.2) preserve the universality of syntactic tense but not that of semantic tense.

15.3.1 Covert Semantic and Syntactic Tense

We present below two alternative instantiations of this line of analysis, together with three empirical and theoretical arguments supporting it.

[11] There are a number of languages discussed in the literature that do not lack tense altogether but have so-called *optional* tense in independent root clauses – that is, that have a morpheme identified as a past-tense morpheme but which is not obligatory in matrix clauses. Such languages include Mbyá Guaraní (Thomas 2014), Washo (Bochnak 2016), Medumba (Mucha 2017), Tlingit (Cable 2017), or Atayal and Javanese (Chen et al. 2020). This is why criterion (14a) is not stated more strongly as requiring that *all* independent/root clauses in L lack a T(P) projection.

15.3.1.1 Covert Tense Agreement Hypothesis

There is a long-standing tradition in the literature where tense marking is taken to merely signal agreement with a temporal adverb. To understand why, take (15), where the temporal adverb locates the TopT in 1998/on the day preceding UT. The past-tense inflection on the verb, though obligatory in English, is semantically superfluous, since the adverb suffices to determine the temporal interpretation of the clause (to locate the eventuality-time of the main predicate).

(15) She lived in Vancouver in 1998/yesterday.

This has led authors in both the semantic (e.g., Vlach 1993; Richards 1982; Cresswell 1973) and the syntactic (e.g., Hornstein 1990) literature to assume that the TopT is always introduced by means of a temporal adverbial, overtly realized as in (15), or implicit (provided by the discourse context). For Vlach, temporal semantics reduces to the semantics of temporal adverbials and "tense is a sort of agreement phenomena" contributing nothing to event representations (only helping to determine which temporal adverbial is to be understood).

This approach allows for languages with vs. without overt grammatical tense: The former would have *morphologically overt* tense agreement, the latter morphologically *null/zero* tense agreement. Importantly, however, on such a proposal, tense counts as universal since all languages have time adverbs (cf. the tense universal in (2)).

This is the position advocated by Sybesma (2007). Mandarin Chinese is a tenseless language on the surface only. Just like Dutch, an overtly tensed language, it has a syntactic T(P) node hosting past/present-tense morphemes which are mere *agreement morphemes* with a time adverbial. The difference is "that in Dutch the agreement features have to be spelled out at PF whereas in Mandarin they do not" (Sybesma 2007: 585).

Sybesma's proposal explains why a past time adverb is required to fix the temporal reference of a Dutch clause in the past. Past tense in Dutch is a mere agreement marker, enforced by the occurrence in (16b) of the past time adverbial. Uttered in isolation, (16a) is odd because the tense-agreement features under T° cannot be checked by an appropriate time adverb provided either in the sentence or by previous discourse context. Now, Mandarin shows exactly the same pattern. Sentences with bare stative predicates uttered out of the blue only allow a present interpretation (17a). To license a past reading, a past time adverb is required (17b). Sybesma thus concludes that Mandarin also has a past tense – that is, a covert tense-agreement morpheme requiring as input to the agreement process a past time adverb (17b).

(16) a. #Ik woonde in Rotterdam.
1SG live.PST in Rotterdam
'I lived in Rotterdam.' (very odd/infelicitous in isolation)

b. Ik woonde in 1989 in Rotterdam.
1SG live.PST in 1989 in Rotterdam
'I lived in Rotterdam in 1989.'

(17) a. Wǒ zhù zài Lùtèdān.
1SG live in Rotterdam
'I live/#lived in Rotterdam.'
b. Wǒ 1989 nián zhù zài Lùtèdān.
1SG 1989 year live in Rotterdam
'I lived in Rotterdam in 1989.'

Sybesma (2007: 582)

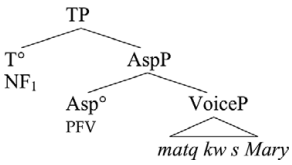
15.3.1.2 Covert Non-Future Tense Hypothesis

Another proposal preserving the universality of both semantic and syntactic tense is that of Matthewson (2006), who argues for covert syntactic tense in St'át'imcets Salish with a non-future (henceforth NF) denotation. NF-tense restricts the TopT to times either preceding or simultaneous with the EvalT (UT by default, in independent clauses). This proposal has received considerable attention in the literature, having been advocated, among others, by Jóhannsdóttir and Matthewson (2007) and Aonuki (2021) for Gitxsan, Reis Silva and Matthewson (2007) for Blackfoot, Sun (2014), Huang (2015), and Chen and Husband (2018) for Mandarin, Cable (2017) for Tlingit, and Bui (2019) for Vietnamese.

The analysis of a superficially tenseless St'át'imcets sentence under Matthewson's NF-tense proposal is illustrated in (19) for the sentence in (12a), repeated below.

(18) matq kw s-Mary
walk DET NOM-Mary
'Mary walked / Mary is walking.'

(19) a. Syntax



b. Non-future tense (slightly adapted from Matthewson 2006: 680–681): $[\![\mathrm{NF}_1]\!]^{g,c} = g(1)$; defined only if $g(1) \leq t_c$.
c. $[\![\mathrm{TP}]\!]^{g,c} = \lambda w.\ \exists e[\mathrm{walk}(e)(w)$ and $\mathrm{agent}(Mary)(e)(w)$ and $\tau(e) \subseteq g(1)]$ (where $g(1) \leq t_c$).
d. There is an event e of Mary walking, whose running time is included in the contextually salient NF-time $g(1)$.

The lexical entry in (19b) restricts the denotation of the pronoun under T° to NF-times (that is, times that do not fall after the EvalT). Recall (from the discussion in §15.2.1.1) that T° on a pronominal analysis corresponds to the TopT: It denotes a contextually salient NF-time whose denotation is related to the ET by Asp°: Perfective (PFV) in (19a) requires the running time ($\tau(e)$) of Mary's walking to be contained within (or equal to) the TopT (that is, $g(1)$).

Matthewson (2006) gives two core arguments for this hypothesis. First, sentences with a bare eventive predicate in St'át'imcets (20a) can receive

either past or present, but not future, readings. Future time reference requires a future marker – even with a future time adverb (20b). Sun (2014) shows that this argument carries over to Mandarin (21).

This asymmetry in the expression of future vs. past and present time reference follows automatically on the proposal that St'át'imcets and Mandarin have a covert NF-tense restricting the TopT to past or present times – that is, times preceding or coinciding with the EvalT (TopT $\leq$ EvlT).

(20) a. sáy'sez'-lhkan
play-1SG.SBJ
'I played.'/'I am playing.'/*'I will play.'
b. sáy'sez'-lhkan *(*kelh*) natcw.
play-1SG.SBJ MOD one.day.away
'I will play tomorrow.' (Matthewson 2006: 676–678)

(21) a. Zuótiān Lùlu hěn jǔsàng.
yesterday Lulu very frustrated
'Yesterday, Lulu was very frustrated.'
b. Míngtiān Lùlu #(*huì*) hěn jǔsàng.
tomorrow Lulu MOD very frustrated
'Tomorrow, Lulu will be very frustrated.' (Sun 2014: 177)

The second argument provided to support the NF-tense hypothesis comes from sentences such as (22), where the one and only bare predicate of the clause (and, by hypothesis, the one and only syntactic tense (TP) projection) is used to describe simultaneously a past and a present event.

This is also, yet again, the case in Mandarin (23). Uttered in 2022, (23) conveys that Gǔlóng, a novelist who died in 1985, used to smoke, and Mòyán, a writer alive at UT, is a smoker. The smoking habits of these two individuals hold of different past and present times. The sentences in (22)/(23) can only be translated to English as a conjunction of two clauses, because the temporal information encoded in them cannot be conveyed with a single tense in English. The truth conditions of (22)/(23) thus require a tense simultaneously selecting for both past and present intervals, as is precisely the case with NF-tense.

(22) *Context*: At speech time, Theresa has thrown up, and Charlie is throwing up.
wat'k' kw s-Theresa múta7 s-Charlie
vomit DET NOM-Theresa and NOM-Charlie
'Theresa and Charlie threw up/are throwing up.' (Matthewson 2006: 681)

(23) Gǔlóng hé Mòyán dōu chōuyān.
Gulong and Moyan DOU smoke
'Gulong used to smoke and Moyan smokes.'

(24) *Context*: Yesterday, Lùlu asked John for aspirin. Just now, Mòmo also asked John for aspirin. Now, Mary asked John why both Lùlu and Mòmo asked him for aspirin. John could answer:
Tānmen liǎ (dōu) bù shūfu / tóu-téng.
3PL two DOU NEG feel.well / head-pain
'Lùlu didn't feel well [yesterday], and Mòmo doesn't feel well [now].'
'Lùlu had a headache and Mòmo has a headache.'

Example (23) is taken from Sun (2014: 205). We provide the paradigm in (24) with undeniably stage-level predicates (e.g., 'feel ill', 'have a headache') to refute subsequent claims in the literature (He 2020; Cheng 2021; Cheng and Sybesma 2023), according to which only individual-level predicates can be used to describe simultaneously past and present eventualities when predicated of a coordinated or plural subject.

Sun concludes that Mandarin has NF-tense, just like St'át'imcets, while moreover providing a further original argument from semantic compositionality for syntactically projecting tense in Mandarin, to which we now turn.

15.3.1.3 Compositional Arguments for Syntactic Tense

Sun's (2014) argument for covert tense holds irrespectively of the meaning assigned to it: past/present, semantically underspecified, or non-future. Sun shows that while Mandarin root clauses with bare states are well formed and allow stative readings (25), bare eventive predicates do not allow episodic readings, unless aspect is present (26), an observation that traces back to at least Kǒng (1994), Smith and Erbaugh (2005), and Lin (2006).

(25) Yīchén xǐhuān lǚxíng.
Yichen like travel
'Yichen likes traveling.'

(26) Zuótiān/Jīntiān Mòyán *(zài) dú "Sān-Guó Yǎnyì".
yesterday/today Moyan PROG read three-kingdom romance
'Moyan was/is reading *Romance of the Three Kingdoms* (yesterday/today).'
(adapted from Sun 2014: 64–65)

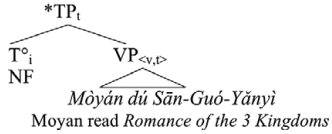
We see that (26), unlike (25), is ungrammatical, be it on past or present construal, without progressive aspect (and even with a past/present time adverbial). This contrast follows from the assumption that stative and eventive predicates have different semantic types (Katz 1995, 2003).[12] Stative predicates being properties of times (type $<i,t>$), true or false of a time interval, can combine directly with a time, while eventive predicates, being properties of events (type $<v,t>$), cannot, requiring the mediation of aspect, which serves to map properties of events to properties of times (type $<<v,t>, <i, t>>$) (Kratzer 1998: 107). Aspect is thus obligatory in eventive root clauses with episodic readings (26), but not in stative root clauses (25). On this proposal, sentences with eventive bare predicates cannot describe episodic events because they are simply uninterpretable, due to type mismatch: The eventive VP being of type $<v,t>$ cannot combine with its sister node T°, the Tense head, the latter being of type i, as shown in (27a). In contrast, sentences with stative bare predicates are well formed and interpretable, because states are properties of intervals (type $<i,t>$) that can combine directly with a sister Tense head. Likewise, sentences with an eventive aspectually marked VP are

[12] For discussion of embedded tense and aspect in Mandarin, see Sun 2015 and Sun and Demirdache 2022.

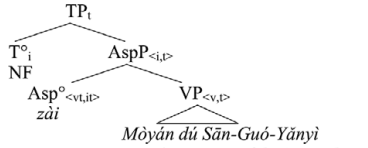
well formed on episodic readings, since in this case T° first combines with AspP, a property of times, as shown in (27b).

(27) Adapted from Sun (2014: 66–69)

a. *TP_t



b. TP_t



Importantly, this account of the contrast between stative and eventive predicates rests on the assumption of a Tense head projected in the syntax in Mandarin, triggering the type mismatch in (27a), ruling out (26) when T° combines with an eventive VP without aspect.[13]

Summarizing. Assuming a pronominal approach, the syntax of a covertly tensed language involves the projection of TP, where the T° node itself denotes the TopT. NF-tense in St'át'imcets (19a) or Mandarin (27b), just like past tense in English (5), contributes a presupposition constraining the choice of possible referents for T°. It differs, however, from the tense morpheme hosted by T° in an overtly tensed language (e.g., English) only in that it has no morphological exponent.[14]

15.3.2 Syntactic Tense without Semantic Tense

Having reviewed the analyses of tenselessness positing both syntactic and semantic (covert) tense, we now turn to a second line of analysis having in common with the previous one that it posits a syntactic T(ense) Projection hosting a covert temporal pronoun, as shown in (28), from Bochnak et al. (2019). The time variable hosted by T° corresponds to the TopT. Crucially, it has no feature lexically restricting its possible values. It thus fails to qualify as

[13] Mandarin bare eventive predicates are felicitous in sentences receiving a generic/habitual interpretation. On Sun's 2014 analysis, the latter contain an underspecified Q(uantificational) operator, matching properties of events to properties of times.

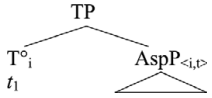
[14] The reader should not hastily conclude that NF-tense has no morphological exponent across languages. Phonologically overt NF-tense is attested in, e.g., Karitiana (i), alongside future tense (ii), from Ferreira and Muller (2019: 1055); see also Storto 1999, 2011.

(i) Sara Ø-na-aka-**t** akan i-aka-t koot/ka'abm.
Sara 3-DECL-COP-**NFUT** village NMLZ-COP-ABS today/yesterday
'Sara is/was in the village today/yesterday.

(ii) Sara Ø-na-aka-**j** akan i-aka-t dibm.
Sara 3-DECL-COP-**FUT** village NMLZ-COP-ABS tomorrow
'Sara will be in the village tomorrow.'

semantic tense by the criterion in (13), section 15.2.2, since its meaning does not impose a restriction on the relation of the TopT relative to the EvalT.

(28) LF structure of a semantically tenseless clause



> [T]emporally unmarked clauses under our approach are **genuinely tenseless** in the sense that temporal reference is not restricted by covert tense … **although the reference-time ([=TopT]) is still represented by a pronominal element in the syntactic structure**.
>
> *(Bochnak et al. 2019: 414; emphasis added)*[15,16]

Note that the pronominal approach is the most commonly adopted analysis of languages argued to have covert syntactic tense – whether these languages are taken to lack semantic tense, as is the case under the analysis in (28), or to have covert semantic tense (§15.3.1). Indeed, the only difference between these two subclasses of languages lies in the features content of T°: In both (19) and (28), the time variable hosted by T° receives its value from the context, though in (28), unlike in (19), T° has no features restricting its denotation.

15.3.3 Recapitulating: Languages with Covert Syntactic Tense

The first class of analyses discussed in section 15.3.1 posits syntactic tense (T (P) is projected in at least independent/matrix clauses) and semantic tense (T° hosts a phonologically unpronounced TopT argument with lexical semantic tense features imposing restrictions on its temporal reference). Such analyses thus preserve the universality of both syntactic and semantic tense. The only parameter of cross-linguistic variation at stake is whether tense is phonologically overt or not: If we do not see tense overtly, it is merely because lexical tense lacks phonological content. The second class of analyses (§15.3.2) also posits covert syntactic tense, thus also preserving the universality of syntactic – but crucially not semantic – tense: Time variables are universal semantic primitives, but tense itself (understood as a feature, a presupposition restricting the denotation of the TopT variable) is not.

[15] This line of analysis traces back to Matthewson 2003, who initially argued for covert syntactic tense in St'át'imcets without any lexical semantic restrictions, before revising her analysis in favor of the covert NF-tense hypothesis which straightforwardly accounts for the absence of future readings of bare sentences (20). It has been defended by Thomas 2012 for Mbyá Guaraní, Mucha 2013 for Hausa, Bochnak 2016 and Hohaus 2019 for Washo, Mucha 2017 for Medumba, Bochnak et al. 2019 for Samoan, among others.

[16] Importantly, the covert TopT merged under T° in (28) should be able to freely refer to future (alongside present/past) times in independent clauses since its reference is unconstrained. This prediction is too strong, as the authors themselves acknowledge. See Sun and Demirdache 2023 for discussion.

15.4 Positing Syntactic Tenselessness

We now turn to syntactically tenseless analyses, starting with analyses which preserve the universality of semantic tense but not of syntactic tense (§15.4.1). We then turn to analyses which refute both (covert) semantic and syntactic tense and for which tense is thus neither a semantic nor a syntactic universal (§15.4.2).

15.4.1 Semantic Tense without Syntactic Tense

Lin (2006) develops an influential syntactically tenseless treatment of Mandarin based roughly on the following assumptions.

i. *There is no TP projection in Mandarin*. See Lin (2010) for syntactic arguments supporting this claim and Law and Ndayiragije (2017) for counter-arguments. The temporal construals of sentences with bare predicates (without aspect or temporal adverbials) follows from the interaction of *Aktionsart*/lexical aspect together with pragmatic reasoning (cf. Bohnemeyer and Swift's (2004) Default Viewpoint Aspect Hypothesis).[17]
ii. *Tense and aspect bundling*. Lin assumes that the Mandarin aspectual markers *guo* and *le* encode in their meaning the relation between the TopT and the EvalT. On the denotation given for *guo* in (29), which incorporates the semantics of past tense by requiring the TopT (t_{Top}) to precede the EvalT (t_0), *guo* is not a purely aspectual head, but rather a morpheme combining past tense and perfective aspect.

(29) $[\![guo]\!] = \lambda P_{<i,t>}\lambda t_{Top}\lambda t_0 \exists t[P(t) \ni \text{IStage}(t,P) \subseteq t_{Top} \ni t_{Top} < t_0]$[18]

On this account, Mandarin is *not* a semantically tenseless language, as it does not meet the criterion in (5) for semantic tenselessness since it counts in its lexicon morphemes whose meaning encodes in part the relation between the EvalT and the TopT. Mandarin, however, is a *syntactically tenseless language since it lacks TP altogether*.

This approach to languages without overt tense thus preserves the universality of semantic tense by encoding tense semantics into the meaning of viewpoint aspect morphemes, but not the universality of syntactic tense.

15.4.2 Neither Syntactic nor Semantic Tense

We now turn to approaches refuting not only syntactic tense (there is no Tense/TP node in the syntax), but also semantic tense (there is no functional

[17] For a critical evaluation of this hypothesis and discussion of the shortcomings in its predictions for Mandarin, see Sun 2014, Lin 2015, Sybesma 2017, He 2020, and references therein.

[18] 'IStage' stands for 'inner stage'. (29) says that *guo* requires that an inner stage of a P-event be included within the TopT, itself constrained to precede the ET.

item in the lexicon whose meaning encodes the relation between the TopT and the EvalT), as universal primitives.[19] In most part, these analyses take the temporal reference of bare sentences to be recoverable via the interaction of the following parameters:

i. *Aktionsart* (whether the main predicate is stative or eventive and if so, telic or atelic, along the lines of Bohnemeyer and Swift (2004));
ii. Grammatical aspect (perfective/imperfective viewpoint) which, as we shall see below, is itself built directly into the meaning of the verb itself, or contributed by the meaning of phonologically silent morphemes heading AspP in the syntax;
iii. Mechanisms of temporal anaphora and pragmatic reasoning (see e.g., Bittner's (2005, 2008) theory of aspect-based temporal anaphora, Bohnemeyer's (2002, 2009) theory of TopT resolution, or Smith and Erbaugh (2005) and Smith (2008), who derive the deictic temporal interpretation of bare sentences from the telicity of the predicate and invariant pragmatic principles).

We present three alternative views of syntactic and semantic tenselessness in Tupí-Guaraní languages, dividing these approaches into two broad subclasses, depending on whether the analysis relies solely on a time variable corresponding to the TopT, or solely on a time variable corresponding to the EvalT.

15.4.2.1 Topic-Time Only

We start with analyses relying on time variables corresponding to the TopT – but crucially not syntactically represented – to compute the temporal reference of sentences.

No (Topic-)Time Argument in the Syntax or the Lexicon

Tonhauser (2011) develops a highly influential tenseless analysis of Paraguayan Guaraní, without any time variable represented syntactically. Bare sentences thus have no temporal argument: rather the RT (=TopT) variable – corresponding to t' in (30) – is encoded into the meaning of the verb itself, as shown below with "the sample lexical entry for *a-jahu* (A1SG-bathe)" from Tonhauser (2011: 288):

(30) $\lambda w \lambda t' \lambda t[(_{AT}(t', bathe'(sp, w, t))]$

(Im)Perfective viewpoint aspect is directly built into the meaning of the verb in (30) via the relation $_{AT}$ which constrains t' to overlap the verb's ET

[19] Here again, we cannot do justice to the diversity of analyses advocating semantic and syntactic tenselessness, merely referring the reader to Shaer 2003, Lin 2003, 2006, Ritter and Wiltschko 2004, 2014, Smith and Erbaugh 2005, Bittner 2005, 2011, Bohnemeyer 2009, among many others.

argument.[20] Consequently, in the absence of aspectual, mood, or mode markers, bare sentences are bare VPs denoting predicates of times (<*i*,*t*>). A special pragmatic rule is then required to apply to convert (30) into (31), by existentially binding the ET (*t* in (30)/(31)) and identifying *t′* as the reference-time/TopT of the utterance (t_{rt} in (31)). The matrix rule in (31) thus ensures that the property of times denoted by a root clause in Guaraní (30) is predicated of a contextually salient interval to yield a truth-value and, consequently, that root clauses in Guaraní denote truth-values, just as in English, not properties of times.

(31) Final translation of the matrix clause *a-jahu*:
$\exists t(\text{AT}(t_{rt}, bathe'(sp, w, t)))$ (Tonhauser 2011: 288)

The TopT is a temporal anaphor that must be pragmatically identified with an antecedent in the discourse. Since there is no (covert) tense in Guaraní (and in the absence of any temporal adverbial), the antecedent of the TopT can in principle be any contextually given past, present, or future time. This proposal, however, overgenerates: There are restrictions on future time reference in Guaraní, just as there were in the other putatively tenseless languages discussed previously (§15.3.1.2), since bare sentences can describe past and present eventualities, but not future ones. Tonhauser takes this restriction to follow from the generalization that future time reference in Guaraní is always achieved by locating the ET in the future of a **present** TopT (in other words, the TopT never ranges over future times in Guaraní). As a consequence, "**absolute** future times, in contrast to past and present ones, are not contextually available in Guaraní" (Tonhauser 2011: 283) to serve as accessible antecedents for the TopT. This begs the question, however, of what in this system derives the empirical generalization that Guaraní is "a language where temporal reference is contextually restricted to non-future times" (Tonhauser 2011: 285) in the first place. We take up the issue of future TopTs in section 15.5, providing arguments for absolute future time reference in Chinese.

Topic-Time as a Temporal Adverbial in the Syntax

We now turn to an interesting alternative put forth by Thomas (2014) for Mbyá (Guaraní). In line with Tonhauser, Mbyá is analyzed as syntactically and semantically tenseless in the sense of the diagnostics given in (13)–(14): no TP projection, no functional item in the lexicon encoding restrictions on the relation to the EvalT.

Thomas' analysis differs, however, not only from Tonhauser's tenseless analysis of Guaraní, but from all analyses positing a TopT variable, since the TopT is not a time variable but a covert temporal adverb merged in the

[20] The relation *AT* allows the temporal overlap relation between the topic (*t*) and eventuality (*t′*) times to be compatible with either stative or habitual ($t \circ t'$), progressive ($t \subset t'$), or perfective ($t' \subseteq t$) viewpoints, depending on the lexical aspect of the verb and context.

highest specifier position of the extended projection of the VP. The TopT adverbial denotes a contextually salient time saturating the time argument position of the predicate that it combines with in matrix clauses. Importantly, the reference of this temporal adverbial is not unrestricted, since it can only denote non-future times, as stated in the lexical entry in (32a).

(32) Reference-time adverb (Thomas 2014: 371)

a. $[\![\text{RT}]\!]^{c,w}$ is defined only if c makes available an interval t_{rt} such that $\neg(t_{rt} > t_c)$. If defined, $[\![\text{RT}]\!]^{c,w} = t_{rt}$.

b. "RT is not a functional tense head, but rather a temporal adverbial that is realized in the specifier of the highest phrase in the extended projection of the verb. Since RT is not a functional head, BVCs ([Bare Verb Clauses]) are syntactically tenseless."

As Thomas (2014: 372) points out, the obligatory use of a TopT adverb in matrix clauses must be stipulated, or alternatively could be seen as "a reflection of the act of assertion."

In sum, Tonhauser (2007) and Thomas (2014) converge on the view that Guaraní matrix VPs always denote properties of times predicated of a contextually salient TopT, but on Thomas' proposal, the TopT is syntactically instantiated (albeit not as Tense head), and encodes in its meaning the same restrictions as does the NF-tense hypothesis.

15.4.2.2 Evaluation-Time Only

Pancheva and Zubizarreta (2020, 2023, henceforth P&Z) offer a novel and original take on tenselessness by developing an analysis for Paraguayan Guaraní where the only time variable needed to derive temporal reference is not the TopT, but the EvalT – an analysis extended to Cantonese in Lee, Pancheva, and Zubizarreta (2022, henceforth LP&Z). At the center of their proposal is a parallel drawn between the temporal constraints holding of bare sentences in Guaraní – namely, that they can describe ongoing or past, but not future, eventualities – and the so-called historical present, used to narrate past events:

(33) Narrative/historical present
Fifty eight years ago to this day, on January 22, 1944, just as the Americans **are** about to invade Europe, the Germans **attack** Vercors.

(P&Z 2023: 8)

Recall that present tense constrains the choice of possible values for the TopT to times that overlap/coincide with the EvalT. The use of the present in examples such as (33) to describe events unfolding in the past of the EvalT/UT is explained by assuming a mechanism shifting the EvalT backwards into the past (34), thus allowing for the ordinary meaning of the present to be maintained (cf. Schlenker 2004, among others).

P&Z share with the pronominal approaches the assumption that there is only one temporal coordinate represented in the syntax as a temporal pronoun, but this pronoun is *not* the TopT, but rather the EvalT. As such, it is not projected in the syntax as a Tense head, but rather, further up in the CP domain, presumably Spec CP. P&Z thus adopt a pronominal/referential

approach to temporal interpretation in Guaraní, though crucially not to Tense per se, since there is no tense on their analysis: no Tense projection in the syntax, no TopT variable, be it in the syntax or introduced solely in the semantics (via a special postsyntactic/post-LF semantic rule, as in Tonhauser (2011), see (31)).

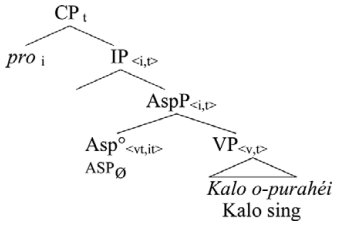
The analysis makes use of two contexts: speech context (s) and narrative context (n). The temporal pronoun standing for the EvalT can thus denote speech time (t_s, (34a)), or be shifted backwards from the actual speech time to a salient past time, henceforth the narrative time (t_n, (34b)).

(34) a. $[\![pro]\!]^{g,s,n} = t_s$
b. $[\![pro]\!]^{g,s,n} = t_n$ (narrative present mode) (P&Z 2023: 9)

How P&Z derive the temporal reference of Guaraní bare sentences is illustrated in (35)–(37). Similar to the previous tenseless analyses of Guaraní (§15.4.2.1), bare sentences are AspPs headed by a phonologically null (im) perfective aspectual head[21] and, as such, denote predicates of times (<*i,t*>). The phonologically silent $\text{Asp}_{\emptyset}$ in (37a) takes two arguments: a VP denoting a property of events and a time t. $\text{Asp}_{\emptyset}$ maps the VP onto a predicate of times by constraining the event's run time ($\tau(e)$ in (37a)) to overlap t,[22] which gets saturated by the EvalT pronoun (t_n in (37b)), yielding (37d).[23]

(35) Kalo o-purahéi {(kuehe) / (ko'ãga)/(#ko'ẽrõ)}.
Kalo 3-sing yesterday/now/tomorrow
a. 'Kalo sang (yesterday).'
b. 'Kalo is singing (now).' [But not 'Kalo will sing tomorrow.']
(P&Z 2023: 9)

(36)



(37) a. $[\![\text{ASP}_{\emptyset}]\!] = \lambda P_{<v,t>}\lambda t\ \exists e[P(e) \wedge \tau(e)\ \text{AT}\ t]$ ($t\ \text{AT}\ t'$ iff $t \subseteq t' \vee t' \subset t$)
b. $[\![pro]\!]^{s,n} = t_n\ ,\ t_n < t_s$
c. $[\![\text{AspP/IP}]\!]^{s,n} = \lambda t\ \exists e[\text{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t]$
d. $[\![\text{CP (35a)}]\!]^{s,n} = 1$ iff $\exists e[\text{sing}\ (e)(kalo) \wedge \tau(e)\ \text{AT}\ t_n\ (\wedge t_n \subseteq$ the day before the day of $t_s)]$
(P&Z 2023: 6–9)

[21] One might wonder why analyses that are parsimonious about positing silent tenses are not so about positing silent aspects.

[22] As discussed in footnote 20, AT allows for imperfective, as well as perfective, viewpoints.

[23] P&Z do not give lexical entries for time adverbs, their syntactic position in sentences like (35) is thus not explicit. We assume here for concreteness that 'yesterday' denotes a set of subintervals of the day before the day of the UT, combining with AspP in (36) via 'Predicate Modification' (Heim and Kratzer 1998). Alternative analyses of 'yesterday' are possible, but its syntactic position appears to be no lower than AspP and no higher than IP.

P&Z argue that their analysis is truly tenseless since it presumes neither syntactic tense (no T(P) projection) nor lexical tense (no entry in the lexicon for a covert item encoding the relation between TopT/ET and EvalT), nor either lexically unrestricted semantic tense (no featureless TopT, be it in the syntax, as in Bochnak et al. (2019) (§3.2), or introduced by a semantic rule applying after the syntax/LF, as in Tonhauser (2011) (§4.2.1.1). In their own words:

> The broader consequence of our proposal is that tense is not a linguistic universal. . . . On the account we advance here, tense is not a linguistic universal: it is possible for a language to not have lexical tense and no tense at the level of syntax or the post-syntactic semantic component either.
>
> *(P&Z 2023: 1, 14)*

P&Z's analysis is indeed tenseless in the sense of the criteria defined in (13)–(14). Importantly, however, it shares core assumptions with pronominal tense analyses. Both approaches project a single temporal coordinate in the syntax as a temporal pronoun – the EvalT for P&Z, the TopT under the pronominal tense hypothesis – that ends up saturating the time introduced by aspect and, moreover, referring to either UT or a contextually salient time, just as was the case with the semantically tenseless version of the pronominal tense hypothesis (§15.3.2). The question then boils down to an empirical issue: Can we indeed do without the TopT, positing only the EvalT, to account for time reference in (superficially) tenseless languages? It is beyond the scope of this chapter to assess the predictions of (L)P&Z's analysis – but see Sun and Demirdache (2023) and Toosarvandani (2021) for discussion. We offer, however, below, an argument from Chinese, not only against a TopT-free analysis, but as we shall see, more radically, for a TopT with absolute future time reference.

15.5 On Future Time Reference in 'Tenseless' Languages

Future time reference in "tenseless" languages is at the heart of many core arguments for/against tensed/tenseless analyses.

Recall indeed that it is the generalization that future time adverbs fail to shift the time reference of bare root clauses to future times (38) that led to positing the NF-tense hypothesis in the first place (§15.3.1.2).

(38) Tingjat, Laulau *(wui) sei. (Cantonese)
Tomorrow Laulau will die
'Tomorrow Laulau will die.'

However, as P&Z argue, the NF-tense hypothesis predicts the availability of future-in-the-past readings – a prediction not borne out, as shown by the incompatibility of *camjat* 'yesterday' with the modal future marker *wui* in Cantonese (39a). Out of the blue, a sentence with *wui* can be used to report an eventuality in the future of the UT but not a future-in-the-past (i.e., a future relative to some past time). The same contrast holds in Mandarin (40a).

(39) a. Aaming tingjat/??camjat wui coenggo
Aaming tomorrow/yesterday will sing
'Aaming will sing tomorrow.'
?? 'Aaming was going to sing yesterday.' (Adapted from LP&Z 2022)
b. Soengjatzau Laulau gong gwo camjat wui hou dung
last.week Laulau say PRF yesterday will very cold
'Last week, Laulau said that it would be very cold yesterday.'

(40) a. Lǐsì míngtiān/#zuótiān huì chànggē
Lǐsì tomorrow/yesterday will sing
'Lǐsì will sing tomorrow.'
But not 'Lǐsì was going to sing yesterday.'
b. Shàngzhōu, Lùlu shuō zuótiān huì hěn lěng.
last.week Lùlu say yesterday will very cold
'Last week, Lùlu said that it would be very cold yesterday.'

Suppose (39a) contains a covert NF-tense picking out as TopT a time preceding the day before UT. The futurity marker *wui* could then order Aaming's singing in the future of this past TopT, but in the past of UT – that is, on the day before UT, thus yielding the unavailable future-in-the-past reading. This incorrect prediction is one of the reasons that leads LP&Z to argue against the covert NF hypothesis for Cantonese. Importantly, however, it's not that future-in-the-past readings are ruled out altogether: they become available in embedded contexts in Cantonese (39b) and Mandarin (40b). (L)P&Z take the distribution of future-in-the-past readings (excluded in root contexts, but in neither embedded nor narrative contexts) as an argument/diagnostic for a narrative time shift over a tensed analysis (be it of Chinese or Guaraní). We offer here an alternative account for why *wui*/*huì* is compatible with a past time adverbial in subordinate contexts to describe future-in-the-past reported beliefs (39b)/(40b), but not in matrix ones (39a)/(40a).

Consider the paradigms in (41) and (42) from Cantonese and Mandarin, which show that combining *wui*/*huì* 'will', be it with a present or past time adverb, leads to ill-formedness.[24]

[24] Importantly, *huì* in Mandarin can have alongside its modal/future meaning (i), a lexical meaning, roughly 'be good at' (ii), which we can control for with main verbs clearly disambiguating these meanings. The paradigm below shows that *huì* is ungrammatical, be it with present or past time adverbs, solely on its modal future meaning: compare (iib), which is fine, with (ib), which is out.

(i) a. Míngtiān Lǐsì huì dào Běijīng (modal future *huì*)
Tomorrow Lǐsì will arrive Beijing
'Lisi will arrive in Beijing.'
b. #Xiànzài/Zuótiān Lǐsì huì dào Běijīng.
now/yesterday Lǐsì will arrive Beijing
Intended: 'Now, Lisi is/Yesterday, Lisi was going to arrive in Beijing.'

(ii) a. Xiànzài Lǐsì huì chànggē. (lexical *huì*)
now Lǐsì be.good.at sing
'Now, Lisi is good at singing.'
b. Xiǎoshíhou/dāngshí Lǐsì huì chànggē.
childhood/that.time Lǐsì be.good.at sing
'When he was young/At that time, Lisi was good at singing.'

(41) ***Jigaa**/*Camjat wui loyu
now/yesterday will rain
Intended: 'Now it will rain.'/'Yesterday it was going to rain.'

(42) ***Xiànzài**/*Zuótiān huì xiàyǔ
now/yesterday will rain
Intended: 'Now, it will rain.'/'Yesterday it was going to rain.'

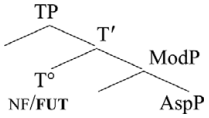
We argue below that *wui*/*huì* is a modal encoding absolute (as opposed to relative[25]) future tense as part of its meaning, showing how this proposal uniformly derives the above three-way contrast: *wui*/*huì*'s **compatibility** with clausemate **future** time adverbials (38)/(21b) vs. its **incompatibility** with either **past or present** adverbials in main clauses (41)/(42), and the striking contrast between **matrix** clauses, which disallow (39a)/(40a) vs. **embedded** clauses, which allow (39b)/(40b) future-in-the-past readings.

15.5.1 Future Topic-Times

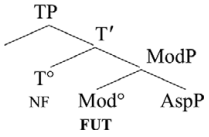
Let's go back to the arguments supporting covert NF-tense: Bare sentences with a future time adverb are ungrammatical. A futurity marker (*kelh* in St'át'imcets (20b), *huì/wui* in Mandarin/Cantonese (21b)/(38) is required to express future time reference even in the presence of a future adverb. On Matthewson's/Sun's analysis (§15.3.1.2), this asymmetry in the expression of future vs. past/present time reference follows automatically because there is a covert NF-tense restricting the TopT to times that precede/coincide with the EvalT (UT in matrix clauses). Now, by the very same token, the asymmetry in the expression of past/present vs. future time reference in (41)/(42) follows automatically if *wui*/*huì* encodes as part of its meaning a semantic future restricting the TopT to times that follow the EvalT (UT in matrix clauses).

Crucially, putting together the proposal that *wui/huì* encodes futurity with Sun's (2014) NF-tense hypothesis for Chinese provides an original argument from a superficially tenseless language for a two-way distinction between future and non-future where, importantly, both future and non-future are tenses (see also Huang (2015) for a similar conclusion on independent grounds), as made explicit in (43a), to be contrasted with (43b), where there is only one tense: NF generated under T°.

(43) a. Non-Future & Future TopT



b. Non-Future TopT



[25] See §15.2.2 (footnote 9) for discussion of *absolute*/*relative* tenses.

On our proposal, Chinese has absolute future time reference in independent/main clauses, contra Tonhauser (2011), who puts forth the specific discourse restriction in (44) (quoted from P&Z (2020: 268)) prohibiting TopTs from having absolute (i.e., relative to UT) future reference. Our proposal also goes against the non-future analyses of Matthewson (2006), Jóhannsdóttir and Matthewson (2007), and Aonuki (2021) for St'át'imcets/Gitksan, where futurity markers are forward-shifting modal operators ordering the ET in the future of a non-future TopT (43b), as would relative future tense. In other words, the NF pronominal analysis in (43b) makes the prediction in (44) since, even though it allows for a two-way future/non-future distinction, every tensed sentence always has NF-tense, futurity arising via a modal with a *relative* future tense meaning component.

(44) Absolute future reference times ([= TopT]) are not contextually available.

As a consequence, the pronominal analysis incorrectly predicts the availability of future-in-the-past readings, as pointed out by (L)P&Z: Since the non-future TopT under T° in (43b) can denote a past time (relative to UT), FUT under Mod° constrains the ET to fall in the future of this past TopT (not of UT), thus allowing for a future-in-the-past construal (TopT < ET < UT), illicit in matrix (40a) but not embedded (40b) clauses. If we assume, however, that Mandarin has a two-way future vs. non-future tense distinction (43a), thus allowing for absolute future TopTs in main clauses, future-in-the-past readings will automatically be banned in (and only in) matrix contexts, as we shall now show, couching our analysis in the relational approach to tense presented in section 15.2.1.2.

15.5.2 Back to the Syntax of Tense

We close this chapter with syntax–semantics mapping considerations, highlighting two conceptual advantages of our relational approach to tense to account for the distribution of temporal adverbials and future-in-the-past readings with *wui*/*huì*.

Recall that on the pronominal approach (§15.2.1.1), "'Tense denotes the Topic Time' argument of the sentence" (Cable 2021). In contrast, on D&UE's approach, time arguments are, just like regular individual-denoting arguments, maximal projections projected in argument positions – that is, in the specifier positions of the relevant heads (T°, Asp°, or V°). Their approach thus differs not only from pronominal ones that treat time arguments as heads projected under T°, but also from relational ones that treat time arguments as heads adjoined to T° (11) (and Asp°, e.g., von Stechow and Beck 2015).

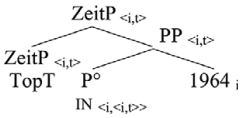
D&UE's proposal allows for an analysis of time-locating adverbials (e.g., 'yesterday', 'on/before/after June 11th/2005', 'when/before/after Lisi left)' that captures an insight going back to Reichenbach (1947).

> As noted by Kamp (1999/2013), work on the semantics of temporal locating adverbs goes back to (at least) Reichenbach (1947), who proposed that they should be treated as predicates of the reference time needed in the interpretation of the tensed clause that they occur in.
>
> *(Altshuler 2014: 58)*

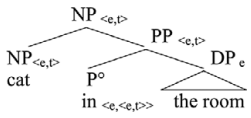
Since the TopT is a time-denoting XP (*ZeitP*, Stowell 1993) projected as a maximal projection in A(rgument)-positions, temporal adverbials can be analyzed as temporal modifiers of the TopT. This yields the parallel between temporal and nominal modification below in (45).

(45) Temporal/nominal modification

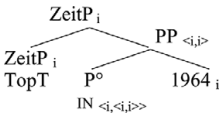
a.



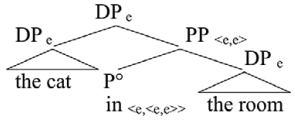
a′.



b.



b′.



The time-locating adverbial 'in 1964' is projected/base-generated as a temporal modifier adjoined to the TopT. In (45a–a′), the TopT is the temporal equivalent of an NP: It denotes a property of times (on a par with an NP denoting a property of entities). The PP adjoined to it combines with this property-denoting category via the rule of 'Predicate Modification' (Heim and Kratzer 1998), thus serving to restrict the reference of the TopT to times within 1964. In (45b–b′), the PP is adjoined to an entity-denoting category, and the P° head thus serves to relate/locate two individual-denoting arguments (times in (45b), entities in (45b′)).[26,27]

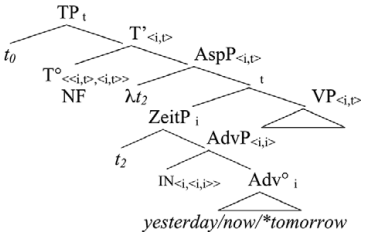
The distribution of temporal locating adverbs with(out) *wui*/*huì* in (38)–(40) now automatically follows. In matrix/independent clauses (46), the EvalT (generated in the (highest) specifier of T°) is the UT. In the absence of *wui*/*huì* (46a), T° is headed by a silent predicate (NF) ordering the TopT (here t_2) either in the past or the present relative to UT (here t_0). The reference of this

[26] Note that bare time adverbs cannot be analyzed as lexicalizing the TopT: In e.g., *Noël was happy yesterday*, the past TopT at which Noël's happiness holds is not the day before UT, but any subinterval of this day. D&UE 2004 analyze bare time adverbs as concealed PPs, headed by a silent preposition expressing central coincidence (see also Jespersen 1931; Kamp and Reyle 1993).

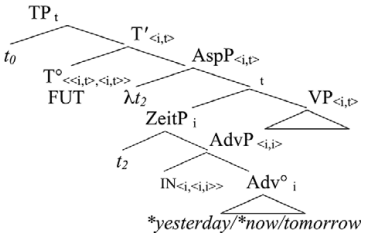
[27] As discussed in D&UE 2004, arguments for analyzing time adverbials as (non-)restrictive modifiers come from temporal adverbial clauses where, going back to Geis 1970, Larson 1990, island effects constraining the distribution of long-distance/embedded vs. short-distance/matrix temporal construals, have been taken as evidence for a derivation involving temporal operator movement.

past/present TopT can thus be further restricted to fall within the interval denoted by the deictic adverbs *yesterday* or *now*, but not *tomorrow*. Conversely, in the presence of *wui*/*huì* (46b), future tense (FUT) orders the TopT (t_2) in the future relative to UT (t_0). The reference of this future TopT can thus be further restricted to fall within the interval denoted by the deictic adverb *tomorrow*, but not *yesterday* or *now*.

(46) a. Matrix NF + *future adverb



b. Matrix FUT + *past/present adverb

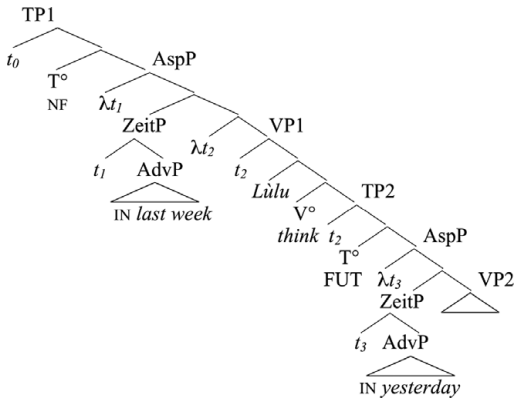


The idea that time-denoting XPs are modifiers of the RT/TopT, and possibly also of the ET, cannot be captured within a framework where time-denoting arguments are projected in the syntax as (T°) heads or adjoined to heads (T°/Asp°) for the simple reason that XPs cannot be adjoined to X°s.

Recall furthermore that D&UE's relational approach makes syntactically visible the three temporal coordinates involved in the temporal calculus – unlike the pronominal approach, which only projects the TopT, or relational approaches, which do not assume an ET argument.[28] We can then straightforwardly account for the availability of future-in-the-past readings in complement clauses on the standard assumption that the EvalT in subordinate (complement/relative) clauses can shift into the past when it is syntactically c-commanded (and thus syntactically and semantically bound) by the matrix past ET (Enç 1987; Stowell 1993; Ogihara 1996), as shown in (47).

[28] See, for instance, von Stechow and Beck 2015, who also integrate aspect as a head in their temporal architecture, but existentially close off the event variable in the lexical entry of the relevant aspectual head.

(47) Embedded future + past adverb



In (47), the embedded EvalT in Spec TP2 is bound by the matrix past ET in Spec VP1, thus denoting a past time (here t_2). The futurity operator *wui*/*huì* then merely constrains the embedded TopT (t_3) to fall in the future relative to the embedded past EvalT (t_2) – but crucially not in the future relative to UT (t_0). This allows for a future-in-the-past temporal ordering (e.g., Re). This is why, in embedded contexts, the TopT can denote a future-in-the-past time (here t_3) and, as such, be further restricted to fall within the interval denoted by the deictic past temporal adverb *yesterday*.

Recapitulating. The hypothesis that Mandarin and Cantonese show a two-way NF/FUT tense contrast, together with the assumption that not only the TopT, but also the ET and EvalT, are projected in the syntax explains why, in matrix/independent contexts, *wui*/*huì* can co-occur with clausemate future – but neither past nor present – time adverbials, thus prohibiting future-in-the-past construals. This prohibition is suspended in embedded contexts where the EvalT shifts into the past via binding by a c-commanding past matrix ET.

15.6 Conclusion: On the Universality of Tense

We conclude by going back to the initial question, whether tense is universal. We focused on tenseless languages to probe this issue, since there are constraints at play on temporal interpretation even in superficially tenseless languages – in particular, on future time reference. We classified the analyses of "tenseless" languages according to whether or not they posit (neither) syntactic (n)or semantic tense, to account for such constraints. Accounts which refute the universality of syntactic and semantic tense (positing neither, à la Tonhauser 2011) do so at the cost of encoding aspect (the relation between TopT and ET) directly into the meaning of bare predicates ((30), §15.4.2.1), and stipulating a special semantic rule to ensure that bare sentences denote truth-values (31). This rule guarantees that the property of times

denoted by a root clause in Guaraní is predicated of a contextually provided reference-time (t_{rt}), corresponding to our TopT. (L)P&Z also contest the universality of both syntactic and semantic tense but with a very different (indeed opposite) stance, since what they contest is precisely the universality of the RT/TopT, contending that we can do without the latter: All we need is the EvalT (together with an EvalT-shift mechanism) to analyze (superficial) "tenselessness" in Guaraní or Cantonese.

We have offered here an argument from Chinese that we cannot do without the TopT, a conclusion that Toosarvandani (2021: 21)[29] also reaches in his analysis of another language – namely, Zapotec, putting forth the putative universal stated below in (48). This chapter converges with Toosarvandani, providing evidence from two other tenseless languages – Mandarin and Cantonese – for the TopT Universal.

With the analysis suggested in sections 15.5.1–2, we have, moreover, gone further than arguing against a TopT-free analysis, by arguing for TopTs in Mandarin and Cantonese with absolute future reference in independent/main clauses (thus going against the prohibition in (41)) and, consequently, for a two-way NF/FUT tense contrast in superficially tenseless languages (thus going against the classic pronominal NF-tense analyses in (43b)).

(48) TopT Universal

In all languages, finite sentences are interpreted relative to a TopT.

(49) Time adverbials are universal.

We close this chapter with the two putative tense universals put forth, the TopT universal and the time adverbial universal justified in (2). If time adverbs are modifiers of the TopT, as argued in section 15.5.2, then these two universals should go hand in hand. That they both thus hold is not accidental, but correlated.

Abbreviations (outside of the Leipzig Glossing Rules)

Asp	aspect
AspP	aspect phrase
DP	determiner phrase
ET	event(uality) time
EvalT	evaluation time
LF	logic form
MOD	modal
NF(UT)	non-future
PF	phonological form

[29] On P&Z's tenseless ("TopT-less") analysis, restrictions on future reference follow from the impossibility of backshifting, a diagnostic for narrative-time shift – which Toosarvandani 2021 refutes on the basis of Zapotec, where backshifting is shown to be possible. See Sun and Demirdache 2023 for exhaustive discussion.

RT	reference time
Spec	specifier
TopT	topic time
TP	tense phrase
UT	utterance time

References

Altshuler, D. 2014. Discourse transparency and the meaning of temporal locating adverbs. *Natural Language Semantics* 22(1): 55–88.

Aonuki, Y. 2021. *Relative Pronominal Tense: Evidence from Gitksan, Japanese, and English*. MA thesis, University of British Columbia.

Bar-El, L. A. 2005. *Aspectual Distinctions in Skwxwú7mesh.* PhD dissertation, University of British Columbia.

Bittner, M. 2005. Future discourse in a tenseless language. *Journal of Semantics* 22: 339–387.

Bittner, M. 2008. Aspectual universals of temporal anaphora. In S. Rothstein (ed.), *Theoretical and Crosslinguistic Approaches to the Semantics of Aspect*, 349–385. Amsterdam: John Benjamins.

Bittner, M. 2011. Time and modality without tenses or modals. In R. Musan and M. Rathert (eds.), *Tense across Languages*, 147–188. Berlin: De Gruyter.

Bochnak, R. 2016. Past time reference in a language with optional tense. *Linguistics and Philosophy* 39(4): 1–48.

Bochnak, M. R., V. Hohaus, and A. Mucha. 2019. Variation in Tense and Aspect, and the temporal interpretation of complement clauses. *Journal of Semantics* 36 (3): 407–452.

Bohnemeyer, J. 2002. *The Grammar of Time Reference in Yukatek Maya.* Munich: Lincom Europa.

Bohnemeyer, J. 2009. Temporal anaphora in a tenseless language. In W. Klein and P. Li (eds.), *The Expression of Time in Language*, 83–128. Berlin: Mouton de Gruyter.

Bohnemeyer, J., and M. Swift. 2004. Event realization and default aspect. *Linguistics and Philosophy* 27(3): 263–296.

Bui, T. 2018. The Vietnamese perfect. *Proceedings of Sinn und Bedeutung* 21(1): 249–266.

Bui, T. 2019. Temporal reference in Vietnamese. In N. Duffield, T. Phan, and T. Trinh (eds.), *Interdisciplinary Perspectives on Vietnamese Linguistics*, 115–140. Amsterdam: John Benjamins.

Cable, S. 2017. The implicatures of optional past tense in Tlingit and its implications for "discontinuous past." *Natural Language & Linguistic Theory* 35(3): 635–681.

Cable, S. 2021. *Semantics of Tense and Aspect Across Languages – Proseminar on Semantic Theory.* Ms., University of Massachusetts Amherst.

Chen, S. Y., and E. M. Husband. 2018. Contradictory (forward) lifetime effects and the non-future tense in Mandarin Chinese. *Proceedings of the LSA Annual Meeting* 3(6): 1–14.

Chen, S., J. Vander Klok, L. Matthewson, and H. Rullmann. 2020. The "experiential" as an existential past: Evidence from Javanese and Atayal. *Natural Language & Linguistic Theory* 39: 709–758.

Cheng, H. 2021. *All Structures Great and Small: On Copular Sentences with Shì in Mandarin.* The Netherlands: LOT Publications.

Cheng, H., and R. Sybesma. 2023. *On the Tenselessness of Individual Level Predicate sentences*. Ms., Leiden University.

Chomsky, N. 1995. *The Minimalist Program.* Cambridge: MIT Press.

Comrie, B. 1976. *Aspect* [Cambridge Textbooks in Linguistics]. Cambridge: Cambridge University Press.

Cresswell, M. J. 1973. *Logics and Languages.* London: Methuen.

Demirdache, H. 1997. Predication times in St'át'imcets Salish. *Texas Linguistics Society Forum* 38.

Demirdache, H., and M. Uribe-Etxebarria. 1997. The syntax of temporal relations: A uniform approach to tense and aspect. In E. Curtis, J. Lyle, and G. Webster (eds.), *Proceedings of the Sixteenth West Coast Conference on Formal Linguistics*, 145–159. Stanford, CA: CSLI Publications.

Demirdache, H., and M. Uribe-Etxebarria. 2004. The syntax of time adverbs. In J. Guéron and J. Lecarme (eds.), *The Syntax of Time*, 143–179. Cambridge, MA: MIT Press.

Demirdache, H., and M. Uribe-Etxebarria. 2014. Aspect and temporal anaphora. *Natural Language & Linguistic Theory* 32(3): 855–895.

Enç, M. 1986. Towards a referential analysis of temporal expressions. *Linguistics and Philosophy* 9 (4): 405–426.

Enç, M. 1987. Anchoring conditions for tense. *Linguistic Inquiry* 18: 633–657.

Ferreira, L. F., and A. Müller. 2019. The relevance of future vs. non-future languages for the understanding of the role of tense in counterfactuals sentences. *Revista de Estudos da Linguagem* 27(2): 1051–1099.

Geis, M. L. 1970. *Adverbial Subordinate Clauses in English*. PhD dissertation, MIT.

He, Y. 2020. *Time in Mandarin: The Fingerprints of Tense and Finiteness.* PhD thesis, Harvard University.

Heim, I. 1994. Comments on Abusch's Theory of Tense. In H. Kamp, H. F. Sem, & Institute for Logic, Language and Computation. *Ellipsis, Tense and Questions*, 143–170. Amsterdam: University of Amsterdam Press.

Heim, I., and A. Kratzer. 1998. *Semantics in Generative Grammar.* Oxford: Blackwell.

Hohaus, V. 2019. The temporal interpretation of complement and relative clauses: Contrasting English and Samoan. *Journal of Southeast Asian Linguistics Society* 12(3): 42–60.

Hornstein, N. 1990. *As Time Goes By: Tense and Universal Grammar.* Cambridge, MA: MIT Press.

Huang, N. 2015. On syntactic tense in Mandarin Chinese. In H. Tao (ed.), *Proceedings of the 27th North American Conference on Chinese Linguistics*, 406–423. Los Angeles: UCLA.

Jespersen, O. 1931. *A Modern English Grammar on Historical Principles*, Book IV, *Syntax*. London: G. Allen & Unwin.

Jóhannsdóttir, K., and L. Matthewson. 2007. Zero-marked tense: The case of Gitxsan. *Proceedings of NELS*, 37: 37–51.

Kamp, H. 2013. Deixis in discourse: Reichenbach on temporal reference. In K. von Heusiger and A. ter Meulen (eds.), *Meaning and the Dynamics of Interpretation: Selected Papers of Hans Kamp*, 105–159. Leiden: Brill.

Kamp, H., and U. Reyle. 1993. *From Discourse to Logic.* Dordrecht: Kluwer Academic Press.

Katz, G. 1995. *Stativity, Genericity and Temporal Reference.* PhD dissertation, University of Rochester, New York.

Katz, G. 2003. Event arguments, adverb selection and the Stative Adverb Gap. In E. Lang, C. Maienborn, and C. Fabricius-Hansen (eds.), *Modifying Adjuncts*, 455–474. Berlin: Mouton de Gruyter.

Klein, W. 1994. *Time in Language.* London: Routledge.

Klein, W. 2009. How time is encoded. In W. Klein and P. Li (eds.), *The Expression of Time*, 39–82. Berlin: Mouton de Gruyter.

Klein, W., P. Li, and H. Hendriks. 2000. Aspect and assertion in Mandarin Chinese. *Natural Language & Linguistic Theory* 18: 723–770.

Kǒng, L. 1994. Yǐngxiǎng hànyǔ jùzi zìzú de yǔyán xíngshì [Linguistic forms that affect sentence completeness in Chinese]. *Zhōngguó Yǔwén* 6: 434–440.

Kratzer, A. 1998. More structural analogies between pronouns and tenses. In D. Strolovitch and A. Lawson (eds.), *Proceedings from Semantics and Linguistic Theory VIII (SALT 8)*, 92–109. Ithaca, NY: Cornell University Press.

Larson, R. K. 1990. Extraction and multiple selection in PP. *The Linguistic Review* 7: 169–182.

Law, P., and J. Ndayiragije. 2017. Syntactic tense from a comparative syntax perspective. *Linguistic Inquiry* 48(4): 679–696.

Lee, T. T.-M., R. Pancheva, and M. L. Zubizarreta. 2022. Genuinely tenseless: Encoding time in Cantonese. *Proceedings of SALT* 32: 144–164.

Li, C. N., and S. A. Thompson. 1981. *Mandarin Chinese: A Functional Reference Grammar.* Berkeley, CA: University of California Press.

Lin, J.-W. 2003. Temporal reference in Chinese. *Journal of East Asian Linguistics* 12: 259–311.

Lin, J.-W. 2006. Time in a language without tense: The case of Chinese. *Journal of Semantics* 23: 1–53.

Lin, J.-W. 2010. A tenseless analysis of Mandarin Chinese revisited: A response to Sybesma 2007. *Linguistic Inquiry* 41(2): 305–329.

Lin, J.-W. 2012. Tenselessness. In R. Binnick (ed.), *The Oxford Handbook of Tense and Aspect*, 669–695. Oxford: Oxford University Press.

Lin, T.-H. J. 2015. Tense in Mandarin Chinese sentences. *Syntax* 18(3): 320–342.

Matthewson, L. 2003. An underspecified tense in St'át'imcets. In *Proceedings of Wecol 2002*, 161–172. Vancouver: University of British Columbia.

Matthewson, L. 2006. Temporal semantics in a superficially tenseless language. *Linguistics and Philosophy* 29(6): 673–713.

Matthewson, L., N. Todorovic, and M. D. Schwan. 2022. Future time reference and viewpoint aspect: Evidence from Gitksan. *Glossa: A Journal of General Linguistics* 7(1). https://doi.org/10.16995/glossa.6341.

Montague, R. 1973. The proper treatment of quantification in ordinary English. In J. Moravcsik, J. Hintikka, and P. Suppes (eds.), *Approaches to Natural Language*, 221–242. Dordrecht: Reidel.

Mucha, A. 2013. Temporal interpretation in Hausa. *Linguistics and Philosophy* 36(5): 371–415.

Mucha, A. 2017. Past interpretation and graded tense in Medumba. *Natural Language Semantics* 25: 1–52.

Ogihara, T. 1996. *Tense Attitudes and Scope.* Dordrecht: Kluwer Academic.

Ogihara, T., and K. Kusumoto. 2020. The interpretation of tense: "I didn't turn off the stove". In D. Gutzmann, L. Matthewson, C. Meier, H. Rullmann, and T. E. Zimmerman (eds.), *The Wiley-Blackwell Companion to Semantics*, 1463–1486. Hoboken, NJ: John Wiley & Sons.

Pancheva, R., and M. L. Zubizarreta. 2020. Temporal reference in the absence of tense in Paraguayan Guaraní. In M. Asatryan, Y. Song, and A. Whitmal (eds.), *North East Linguistic Society (NELS) 50*, vol. 2: 265–278. Amherst MA: GLSA, University of Massachusetts.

Pancheva, R., and M. L. Zubizarreta. 2023. No tense: Temporality in the grammar of Paraguayan Guaraní. *Linguistics and Philosophy* 46(6): 1329–1391.

Partee, B. 1973. Some structural analogies between tenses and pronouns in English. *Journal of Philosophy* 70: 601–609.

Prior, A. 1967. *Past, Present and Future*. Oxford: Oxford University Press.

Reichenbach, H. 1947. *Elements of Symbolic Logic.* New York: Free Press.

Reis Silva, A., and L. Matthewson. 2007. An instantaneous present tense in Blackfoot. In *Proceedings of Semantics of Under-Represented Languages in the Americas 4.* Amherst, MA: GLSA.

Richards, B. 1982. Tense, aspect and time adverbials: Part I. *Linguistics and Philosophy* 5(1): 59–107.

Ritter, E., and M. Wiltschko. 2004. The lack of tense as a syntactic category: evidence from Blackfoot and Halkomelem. *Papers for the 39th International Conference on Salish and Neighbouring Languages*, 341–370.

Ritter, E., and M. Wiltschko. 2014. The composition of INFL: An exploration of tense, tenseless languages, and tenseless constructions. *Natural Language & Linguistic Theory* 32(4): 1331–1386.

Schlenker, P. 2004. Context of thought and context of utterance: A note on free indirect discourse and the historical present. *Mind and Language* 19: 279–304.

Shaer, B. 2003. Towards the tenseless analysis of a tenseless language. In J. Anderssen, P. Menéndez-Benito, and A. Werle (eds.), *Proceedings of SULA. 2*, 139–156. Amherst: University of Massachusetts.

Smith, C. S. 2008. Reference time without tense. In L. D. Saussure, J. Moeschler, and G. Puskás (eds.), *Recent Advances in the Syntax and Semantics of Tense, Aspect and Modality*, 229–250. Berlin: De Gruyter Mouton.

Smith, C. S., and M. Erbaugh. 2005. Temporal interpretation in Mandarin. *Linguistics* 43(3): 713–756.

von Stechow, A. 1995. On the proper treatment of tense. In M. Simons and T. Galloway (eds.), *Proceedings of SALT V*, 362–386. Ithaca, NY: CLC Publications.

von Stechow, A., and S. Beck. 2015. Events, times and worlds: An LF architecture. In C. Fortmann, A. Lübbe, and I. Rapp (eds.), *Situationsargumente im Nominalbereich*, 13–46. Berlin: De Gruyter.

Storto, L. 1999. *Aspects of a Karitiana Grammar*. PhD dissertation, MIT.

Storto, L. 2011. Subordination in Karitiana. *Ameríndia: La structure des langues Amazoniennes* 35: 219–236.

Stowell, T. 1993. *Syntax of Tense.* Los Angeles, CA: University of California Press.

Stowell, T. 1995. What do the present and past tenses mean. *Temporal Reference, Aspect, and Actionality* 1: 381–396.

Stowell, T. 1996. The phrase structure of tense. In J. Z. Rooryck (ed.), *Phrase Structure and the Lexicon* [Studies in Natural Language and Linguistic Theory 33]. Dordrecht: Springer.

Stowell, T. 2007. The syntactic expression of tense. *Lingua* 117: 437–463.

Sun, H. 2014. *Temporal Construals of Bare Predicates in Mandarin Chinese.* Utrecht: LOT.

Sun, H. 2015. Evidence against a scope analysis of temporally free readings of relative clauses in Mandarin. In E. Labeau and Q. Zhang (eds.), *Cahier Chronos: Taming the TAME systems*, 59–77. Amsterdam: Rodopi.

Sun, H., and H. Demirdache. 2022. Time reference in Mandarin relative clauses. *Languages* 7(3): 170. https://doi.org/10.3390/languages7030170.

Sun, H., and H. Demirdache. 2023. *Futurity in (Superficially) Tenseless Languages: Evidence for (Non-)Future Tense in Mandarin / Cantonese.* Ms., University of Nantes.

Sybesma, R. 1999. *The Mandarin VP.* Dordrecht: Kluwer.

Sybesma, R. 2007. Whether we Tense-agree overtly or not. *Linguistic Inquiry* 38: 580–587.

Sybesma, R. 2017. Tense. In R. Sybesma, W. Behr, Y. Gu, Z. Handel, C.-T. J. Huang, and J. Myers (eds.), *Encyclopedia of Chinese Language and Linguistics*, vol. 4, 281–290. Leiden: Brill.

Taylor, B. 1977. Tense and continuity. *Linguistics and Philosophy* 1(2): 199–220.

Thomas, G. 2012. *Temporal Implicatures.* PhD thesis, MIT.

Thomas, G. 2014. Nominal tense and temporal implicatures: Evidence from Mbyá. *Natural Language Semantics* 22(4): 357–412.

Tonhauser, J. 2008. Nominal tense? The meaning of Guaraní nominal temporal markers. *Language* 84: 332–342.

Tonhauser, J. 2011. Temporal reference in Paraguayan Guaraní, a tenseless language. *Linguistics and Philosophy* 34(3): 257–303.

Toosarvandani, M. 2016. The temporal interpretation of clause chaining in Northern Paiute. *Language* 92(4): 850–889.

Toosarvandani, M. 2021. Encoding time in tenseless languages: The view from Zapotec. *West Coast Conference on Formal Linguistics (WCCFL)*, 37: 21–41.
Vlach, F. 1993. Temporal adverbials, tenses and the perfect. *Linguistics and Philosophy* 16(3): 231–283.
Zagona, K. 1990. Times as temporal argument structure. Talk given at the *Time in Language Conference*. Cambridge, MA.