# Temporal reference in the absence of tense in Paraguayan Guaraní [*]

Roumyana Pancheva & Maria Luisa Zubizarreta

University of Southern California

## 1. No overt tense: the phenomenon and three analytic approaches

Paraguayan Guaraní (Tupi-Guaraní, Tupian) has no overt tense morphemes. Verbs obligatorily inflect for person and number, following a direct/inverse pattern, and optionally for aspect. (See Ayala 1996, Tonhauser 2011a,b, Zubizarreta and Pancheva 2017.) In the absence of overt aspectual morphemes on verbs, present or past reference is determined on the basis of aktionsart, modifying temporal adverbials and context, while future reference is not possible, except in a limited set of cases (Tonhauser 2011a,b).[1] Both past and present interpretation is available to aspectually unmarked atelic predicates, whereas in order to be interpreted as present, telic predicates need the progressive morpheme *hína*, otherwise they are interpreted as past. Future reference typically requires the modal prospective morpheme *-ta* (though the picture is more nuanced). Examples (1), (2), and (3), partly based on Tonhauser 2011b, illustrate the effect of aktionsart (atelic *do* and *bathe* vs. telic *go to the market*), progressive and prospective aspect, modification by past-, present- and future-denoting adverbials and context in establishing temporal reference.[2]

(1)  A:  Mba'é-pa re-japo kuehe?      B:  A-jahu.  / A-ho  mercado-pe.
         what-Q   2SG-do yesterday        1SG-bathe / 1SG-go market-LOC
         'What did you do yesterday?        'I bathed.' / 'I went to the market.'

(2)  A:  Mba'é-pa re-japo ko'ãga?      B:  A-jahu.   / A-ho  [#](*hína*) mercado-pe.
         what-Q   2SG-do now             1SG-bathe / 1SG-go  PROG market-LOC
         'What are you doing now?           'I am bathing.' / 'I am going to the market.'

[1]Evidential morphemes also contribute to temporal interpretation, see Pancheva and Zubizarreta 2019.

[2]Not illustrated here are *-ma* and *-pa*, argued by Tonhauser 2011b to mark perfect and completive aspect.

(3)  A:  Mba'é-pa re-japo#(-*ta*)           B:  A-jahu#(-*ta*).    / A-ho#(-*ta*)
         what-Q   2SG-do-PROSP                  1SG-bathe-PROSP / 1SG-go-PROSP
         ko'ẽrõ?                                 mercado-pe.
         tomorrow                                market-LOC
         'What will you do tomorrow?            'I'll bathe.' / 'I'll go to the market.'

Lack of overt tense is found in many language families. The analyses of this phenomenon differ, but those that share our assumptions about temporal interpretation all involve tense. One type of analysis posits covert lexical tense, as a separate morpheme (e.g., Matthewson 2006 on St'át'imcets, Thomas 2014 on Mbyá Guaraní), or bundled into viewpoint aspect (Lin 2006 on Chinese). On this approach, tense is part of the lexical semantics of all languages and variation is restricted to its phonological or morpho-syntactic realization. Tense might not be overtly pronounced or expressed in its own projection, but it is part of the universal inventory of lexical interpretable features. Another type of analysis does not posit lexical tense, and thus sometimes goes by the label of "tenseless", but tense semantics is still supplied via a rule (Tonhauser 2011b on Paraguayan Guaraní). On this approach too tense is a semantic universal, even if not also a lexical and/or a syntactic one.

We illustrate the two approaches as they have been applied to the closely related Mbyá and Paraguayan Guaraní. We offer an alternative that posits no tense, either in the lexical or logical semantics, and we illustrate some of the empirical advantages of this approach with data from Paraguayan Guaraní. On our account tense is not a semantic universal.

## 2.    What do we take tense to be?

A key insight of Reichenbach (1947) is that temporal interpretation relies on the notion of a *reference time*. Both the past in (4a) and the present perfect in (4b) locate an event prior to the speech time, but the past does so from the perspective of a past reference time and the present perfect from the perspective of a present one. The ambiguity in (4c) reflects modification of the event time or the reference time. If the only temporal parameters in the grammar were the event time and speech time, the facts in (4) could not be explained.

(4)  a.  Leo ate.          b.  Leo has eaten.        c.  Leo had eaten at 5.

Neo-Reichenbachian theories (Klein 1994, a.o.) have sharpened this insight, by clarifying that the reference time is contextually salient, and by analyzing tense as only encoding the relation of the reference time to the speech time (in main clauses), leaving other temporal relations to the domain of aspect. Generalizing beyond main clauses, tense concerns relations of precedence or inclusion between a reference time and an evaluation time (a local attitude holder's *now*); in main clauses the default evaluation time is the speech time.

We follow this tradition. We emphasize that we separate tense both from expressions that encode relations involving the event(uality) time, $\tau(e)$ – viewpoint aspects like the perfective, imperfective and progressive (e.g., (5a), Kratzer 1998) – and also from expressions that encode relations between times neither of which is the event time – higher aspects like the prospective and the perfect (e.g., (5b), Pancheva and von Stechow 2004).

(5)   a.   $[\![\, \text{PERFECTIVE} \,]\!]^c = \lambda P_{\langle v,t \rangle} \lambda t \, \exists e \, [P(e) \wedge \tau(e) \subseteq t]$
      b.   $[\![\, \text{PERFECT} \,]\!]^c = \lambda p_{\langle i,t \rangle} \lambda t \, \exists t' \, [t' \leq t \wedge p(t')]$

Tense is commonly analyzed as an existential quantifier restricted to contextually salient times, (6a), or as a pronoun, (6b). It encodes a relation between the evaluation time $t_c$, itself determined by the context of evaluation $c$, and the reference time ($t'$ in (6a), $g(i)$ in (6b)).

(6)   a.   $[\![\, \text{PAST} \,]\!]^c = \lambda p_{\langle i,t \rangle} \, \exists t' \, [t' < t_c \wedge t' \subseteq C \wedge p(t')]$
      b.   $[\![\, \text{PAST}_i \,]\!]^{g,c}$ is defined iff $g(i) < t_c$; when defined $[\![\, \text{PAST}_i \,]\!]^{g,c} = g(i)$

A corollary of the tense-aspect distinction is that a language may lack semantic tense but have time-relational aspect. We suggest that Paraguayan Guaraní is such a language.

   In proposing that Paraguayan Guaraní has no tense, we mean that it does not have linguistic devices – lexical items or semantic rules – that invoke a reference time in relation to the evaluation time for the clause. We do not deny that contextually salient times play a role in the temporal interpretation; they do: in (1) the question is about a time in the past of the speech time (restricted by *yesterday*), which becomes contextually salient for the answer. We also do not mean that the language does not encode relations between times; it does, as it has aspectual morphemes with time-relational meaning (Tonhauser 2011b).

   We present our tenseless account in §4, but first, in §3, we illustrate the two types of tense accounts of Guaraní: the covert lexical tense account and the tense-via-a-rule account.

## 3.   Tense semantics in Guaraní languages

### 3.1   Covert lexical tense in Mbyá Guaraní

Thomas (2014) proposes that a null lexical item with non-future tense semantics, RT (for 'reference time'), is obligatory in matrix clauses in Mbyá. Its semantics is pronominal, with a presupposition that its time reference is restricted to non-future times, (7) (op. cit.: (52)). For future reference the prospective *-ta* is needed (as in Paraguayan Guaraní (3)).

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

An illustration with the Mbyá verb *-mba'eapo* 'to work' in a sentence with a 1SG agent (marked by prefix *a-*) is in (8) (op. cit.: (54), (58)). (The representation of aspect has been changed slightly from the original.) AT stands for temporal overlap, perfective, $\tau(e) \subseteq t$, or imperfective, $t \subseteq \tau(e)$. RT saturates the time variable of aspect, (8b). Since $t_{rt}$ is presupposed to be present or past, the sentence can mean 'I am working' or 'I worked'.

(8)   a.   $[\![\, \text{-mba'eapo} \,]\!]^{c,w} = \lambda x \lambda t \, \exists e \, [\text{work}(w)(e)(x) \wedge \tau(e) \text{ AT } t]$
      b.   $[\![\, \text{RT a-mba'eapo} \,]\!]^{c,w} = \exists e \, [\text{work}(w)(e)(speaker_c) \wedge \tau(e) \text{ AT } t_{rt}]$
           defined only if $c$ provides a $t_{rt}$ such that $\neg(t_{rt} > t_c)$

The distribution of RT is constrained: it is obligatory in matrix clauses, optional in relative clauses, and prohibited from complements of attitude verbs and adverbial clauses.

## 3.2 Tense via a rule in Paraguayan Guaraní

Tonhauser (2011b) proposes that Paraguayan Guaraní has no lexical tense (revising Tonhauser (2011a) who posits a covert lexical non-future tense). Yet tense is supplied in the semantic component: the time variable of aspect is interpreted as a reference time anaphor via a semantic rule applying in matrix clauses, as in (9) (op. cit.: (50), slightly modified).

(9)     *Matrix Clause Rule*: The translation of a matrix clause $\phi_{\langle w, \langle i, \langle i, t \rangle \rangle \rangle}$ is $\exists t \, (\phi \, (w_0, t_{rt}, t))$

Consider (10). At the end of the derivation, *a-jahu* '1SG-bathe' has two time variables, (10a): the event time $t$, and $t'$, contributed by the aspectual relation AT, defined above. After the Matrix Clause Rule applies, (10b), the event time variable is existentially closed and, importantly, the variable of aspect is interpreted as referring to the salient reference time, much like a lexical tense pronoun saturating the time variable of aspect would be.

(10)    a.    $[\![ \text{a-jahu} ]\!] = \lambda w \, \lambda t' \, \lambda t \, [ \text{AT} \, (t', \text{bathe}'(speaker, w, t))]$
        b.    $\exists t \, [ \text{AT} \, (t_{rt}, \text{bathe}'(speaker, w_0, t))]$

(10b) is compatible with past, present, and future interpretation. But future reference is not possible without prospective *-ta*, (3). An additional discourse restriction is thus posited, active in matrix clauses, which prohibits future reference times, (11) (op. cit.: 283, 288). This discourse restriction has the same effect as the presupposition of a lexical tense pronoun.

(11)    Absolute future reference times are not contextually available.

Although no lexical tense participates in the syntactic derivation, the account has semantic tense, as it involves reference to the reference time (via the Matrix Clause Rule (9) and a restriction on the reference (via the special discourse restriction for matrix clauses (11).

The rule in (9) is said to not be applicable in complements of attitude verbs, relative clauses and clausal adjuncts. Additionally, the discourse restriction in (11) is suspended in some matrix clauses, such as non-initial conjuncts of coordinations.

## 4. No tense in the lexical and/or logical semantics in Paraguayan Guaraní

We propose that Paraguayan Guaraní has no semantic tense. Without tense, the time argument of aspect denotes the evaluation time; in §4.3 we discuss how this is implemented. The default evaluation time is the speech time, resulting in present, and with prospective *-ta*, future reference. The challenge is past interpretation. We propose in §4.1 that the evaluation time may shift to a time represented as if it were the speech time, as in the *narrative present* in languages with tense. If the shifted evaluation time is before the speech time, the result is past interpretation. If the shift is forward, a second mechanism for future reference,

without *-ta*, becomes available. In §4.2 we suggest that forward shift is restricted to narratives, unlike backward shift. This is the core proposal: the manipulation of the evaluation time – default or shifted – derives temporal reference without tense. §4.4 is an illustration.

## 4.1    Evaluation time shift

A present tense can reference a past time, in the context of narration. In (12), from Schlenker (2004): (2), the time adverbials are past denoting, while the tenses are present. This use of the present tense is known as the *narrative present* (or *historical present*).

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

The narrative present involves shifting the evaluation time from the actual speech time to another salient time, typically past. This analysis is suggested informally in Hornstein (1990): 11-12, and implemented formally in Schlenker (2004), a.o.. The present tense has its usual semantics: it places the reference time at the evaluation time. If the evaluation time is shifted back, the present tense locates the reference time at a past time. Importantly, evaluation time shift is independent of tense, and so can be expected to apply to languages without tense. This is what we suggest happens in Paraguayan Guaraní.

Schlenker (2004) implements evaluation time shift in the narrative present via the formal mechanism of bi-contextual evaluation. Two evaluation times are provided by two evaluation contexts: the actual speech context, which we mark here as $s$, and the narrative context, which we mark as $n$. In (12) tenses and adverbials are evaluated relative to different evaluation times, $t_n$ and $t_s$, respectively, as illustrated in (13).

(13)    a.    $[\![ \text{PRESENT}_i ]\!]^{g,s,n}$ is defined iff $g(i) = t_n$; if defined $[\![ \text{PRESENT}_i ]\!]^{g,s,n} = g(i)$
        b.    $[\![ \textit{this day} ]\!]^{g,s,n} =$ the day of $t_s$; $[\![ \textit{58 years ago} ]\!]^{g,s,n} = 58$ years before $t_s$

Put in terms of bi-contextual evaluation, temporal interpretation in Paraguayan Guaraní is derived as follows. Present reference obtains relative to the speech time, $t_s$, and past reference obtains relative to a back-shifted time, $t_n$. Future reference is derived in two ways: i) relative to $t_s$, with prospective *-ta*; and ii) relative to a forward-shifted $t_n$, without *-ta*.[3] Forward evaluation time shift, as in ii), is limited to narratives, unlike backward shift.

## 4.2    Restriction of evaluation time shift to narratives

In English, evaluation time shift is only possible in narratives.[4] This generalization, although perhaps widely assumed (given the name *narrative present*), has not been explicitly addressed previously, as far as we know. Consider the contrast between the individual clauses of the question-answer pairs in (14) and the narrative sequences in (15). In (14), the

---

[3]Sentences with and without *-ta* are not semantically equivalent, given that *-ta* contributes prediction/certainty (the modal part of its meaning), which is absent in sentences without *-ta*.

[4]We put aside non-canonical questions like *When is the siege of Leningrad?* asked by a history teacher.

narrative present is not possible; the past tense is needed to describe a past eventuality, and prospective *woll* is needed, together with present tense, to describe a future eventuality. In (15), the narrative present is used felicitously for both past and future reference.

(14)  a.  A: What {#do / did} you do yesterday?  B: We { #go / went} to the market.
      b.  A: What {#do / will} you do tomorrow? B: We #(*will*) go to the market.

(15)  a.  Hear this. Yesterday we go to the market, have lunch, then out of nowhere...
      b.  Imagine our weekend. Tomorrow we go to the market, have lunch, ....

In Paraguayan Guaraní, forward evaluation time shift must be similarly restricted, given that prospective *-ta* is required in single-standing sentences such as the question and answer in (3), just as *woll* is in English, (14b). We expect that forward evaluation time shift should be possible in narratives, again like in English. Thus narratives should allow for the omission of *-ta*. This is indeed the case, as illustrated in (16), which is a novel observation.[5]

(16)  Ko'ẽrõ   ja-páy    la 8, ña-rambosa,      ha upéi ja-há   mercádo-pe.
      tomorrow 1IN-wake the 8  1IN-eat.breakfast and then 1IN-go market-LOC
      'Tomorrow, we wake up at 8, we eat breakfast, and then we go to the market.'

We do not have an explanation for why evaluation time shift is restricted to narratives, but at least we do not have to say anything special about its application in Paraguayan Guaraní, as far as reference to the future is concerned. Where Paraguayan Guaraní differs from English is with respect to backward evaluation time shift: it must apply freely, given the acceptability of the single-clause question and answer in (1). In other words, evaluation time shift in Paraguayan Guaraní is the same as in English – restricted to narratives – when the default evaluation time, $t_s$, together with a prospective marker, can derive the needed temporal reference (the future). The languages diverge only because in the absence of a past tense in Paraguayan Guaraní, evaluation time shift is the only grammatical mechanism for past reference, and so the narrative restriction is relaxed.

## 4.3 Representing temporal context dependency with and without tense

We propose that without tense, the free variable of aspect denotes the evaluation time. We discuss two empirically-equivalent implementations (in main clauses only, for lack of space); a choice between them depends on how one views the syntax-semantics interface.

### 4.3.1 No syntactic representation of the evaluation time

The evaluation time $t_c$ is provided by the context of evaluation $c$, to which the interpretation function is relativized, $[\![.]\!]^c$. The lexical semantics of tenses and some time adverbials

---

[5]We elicited (16) in an orally-administered questionnaire. It was selected by 6/8 participants as a possible answer to the question *Mba'epa ja-japo-ta ko'erõ?* 'What will we do tomorrow?'. Participants had three choices, all a sequence of clauses (with or without *-ta*) and could select individual sequences, all, or none.

encodes the context dependency, (6), (13). There is no structural representation of the evaluation time itself. This framework works well for tense languages. As for languages without lexical tense, the (partially-interpreted) LFs of their matrix clauses are as in (17).

(17)      $[_{IP} \; ... \; [_{AspP} \; \exists e\,[P(e) \wedge \tau(e) \; \text{AT} \; t\,]]]$                              *no tense*

Temporal interpretation hinges on the free time variable of aspect, *t*. The tense-via-a-rule theory interprets this variable as denoting the reference time, side-stepping the direct encoding of context dependency. A restriction on the reference time, (11), nevertheless accomplishes what tense does: ordering the reference time relative to the evaluation time. But we set out to develop a theory without semantic tense, so we need a different mechanism.

　　We could appeal to a semantic rule, (18) (Zucchi 2009). Given bi-contextual evaluation, this rule would allow the free variable of aspect to be interpreted as either $t_s$ or $t_n$, mirroring the interpretation of a lexical present tense in canonical and narrative contexts.

(18)      Free time variables at LF refer to the speech time

Notably, the rule in (18) differs from the rule in Tonhauser 2011b in that it may also apply in the presence of tense. In fact, the free variable that is subject to the rule is projected by tense in Zucchi 2009. An adjustment to the semantics of tense is needed, as in (19).[6]

(19)      $[\![\,\text{PAST}\,]\!]^c = \lambda t\,\lambda p_{\langle i,t\rangle}\,\exists t'\,[\,t' < t \wedge t' \subseteq C \wedge p(t')\,]$

Now the LFs of tenseless and tense languages both have a free time variable – introduced by aspect in the former, (17), and by tense in the latter, (20) – that is subject to the rule in (18). The fact that (18) applies to both types of languages addresses a possible objection that such a rule amounts to having a present tense.

(20)      $[_{IP} \; [\text{TENSE}\; t\,] \; [_{AspP} \; \lambda t'\,\exists e\,[P(e) \wedge \tau(e) \; \text{AT} \; t'\,]]]$                    *lexical tense*

### 4.3.2    A syntactic representation of the evaluation time

We make the additional step of representing the evaluation time as a pronoun. Our core idea – that temporal interpretation is derived solely via a default and shifted evaluation time – is not dependent on the presence of such a pronoun. Yet the syntactic account permits compositional interpretation without recourse to a semantic rule like (18). It is more restrictive, as it allows only elements present in the syntax (and the lexicon) to affect meaning.

　　We posit that a null *pro* in the CP-domain of the clause denotes the evaluation time (as in Pancheva and Zubizarreta 2019). Crucially, we propose this for both tenseless and tense languages: *pro* is present whether or not the structure also includes tense, as seen in (21). The evaluation-time-denoting *pro* binds the time variable of aspect in the absence of tense,

---

[6]Example (19) is itself a slight modification of Zucchi 2009: (36). It makes tense context independent, yet tense still differs from higher aspect in logical type, so ordering restrictions are not affected by this change.

(21a). To accommodate *pro* in a language with tense, we need to adopt the view that tense itself introduces a time variable, as in (19); this variable is bound by *pro*, as in (21b).

(21)  a.  $[_{CP}\ pro\quad [_{IP}\quad ...\quad\quad [_{AspP}\ \lambda t\ \exists e\,[P(e) \wedge \tau(e)\ \text{AT}\ t\,]]]]$  *no tense*
      b.  $[_{CP}\ pro\ \lambda t'\ [_{IP}\ [\text{TENSE}\ t']\ [_{AspP}\ \lambda t\ \exists e\,[P(e) \wedge \tau(e)\ \text{AT}\ t\,]]]]$  *lexical tense*

With bi-contextual evaluation, *pro* can denote $t_s$ or $t_n$: the same outcome as in §4.3.1.

### 4.3.3   No tense or present tense?

One could object that having a time variable or pronoun denote the evaluation time is not different from having present tense. We emphasize that the respective mechanisms (rule (18), a *pro* in the CP domain) also apply to languages with tense. We think that it is important to acknowledge the differences in algorithms that our view of temporal interpretation advocates, even if the end result – the interpretation – is indeed the same.

An alternative to our account, within the neo-Reichenbachian tradition, could posit that Paraguayan Guaraní has covert lexical present tense. Past reference would still be achieved through evaluation time shift, so that aspect of our account would stand, but the account would not be tenseless, and therefore tense would be preserved as a lexical semantic universal. We cannot offer empirical arguments against this alternative. Yet we note that if present tense semantics may vary cross-linguistically (Giorgi and Pianesi 1997, a.o.), then this alternative tense account predicts more variation among languages without overt tense inflection than our tenseless account.

## 4.4    Illustration of the proposal for Paraguayan Guaraní

Atelic predicates without overt aspectual markers in Paraguayan Guaraní may be interpreted as present or past, see (22a) and its LF in (22b). With bi-contextual evaluation, *pro* may denote the speech time $t_s$, resulting in a present interpretation, or the shifted time $t_n$, resulting in a past interpretation, if $t_n < t_s$; see (22c). Adverbs are interpreted relative to $t_s$.

(22)  a.  Kalo o-purahéi {(kuehe)     / (ko'ãga)}.
          Kalo 3-sing       yesterday    now
          'Kalo sang (yesterday).' / 'Kalo is singing (now).'

      b.  $[_{CP}\ pro\ ...\ \lambda t\ \exists e\,[\,\text{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t\,(\wedge t \subseteq \{now/yesterday\})\,]]$
      c.  $[\![\,pro\,]\!]^{s,n} = t_s$ or $t_n$; $[\![\,(22\text{b})\,]\!]^{s,n} = 1$ iff
          $\exists e\,[\,\text{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t_s\,(\wedge t_s \subseteq t_s)\,]$ or
          $\exists e\,[\,\text{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t_n\,(\wedge t_n \subseteq$ the day before the day of $t_s)\,]$

Future reference obtains with modal prospective *-ta*. The prospective part of its meaning, putting the modal part aside, is in (23b). The LF in (23c) yields the interpretation in (23d). Here, unlike in (22c), *pro* may only denote the speech time $t_s$. This is so because, unlike the past, evaluation time shift is restricted to narrative contexts in the case of the future.

(23)    a.    Kalo o-purahéi-*ta*   (ko'ẽrõ).
                 Kalo 3-sing-PROSP  tomorrow
                 'Kalo will sing (tomorrow).'

        b.    $[\![$ *-ta* $]\!]^{s,n} = \lambda p_{\langle i,t \rangle} \lambda t \, \exists t' \, [\, t < t' \wedge p(t') \,]$
        c.    $[_{CP} \, pro \, ... \, \lambda t \, \exists t' \, \exists e \, [\, \text{sing}(e)(kalo) \wedge \tau(e) \text{ AT } t' \wedge t < t' \, (\wedge \, t' \subseteq tomorrow) \,]]$
        d.    $[\![$ *pro* $]\!]^{s,n} = t_s$; $[\![$ (23c) $]\!]^{s,n} = 1$ iff
                 $\exists t' \exists e \, [\, \text{sing}(e)(kalo) \wedge \tau(e) \text{ AT } t' \wedge t_s < t' \, (\wedge \, t' \subseteq \text{the day after the day of } t_s) \,]$

In narratives, *pro* may denote $t_n$, where $t_n > t_s$, and then *-ta* does not need to appear. The LF and interpretation of the first clause in the narrative in (16) is illustrated in (24).

(24)    a.    $[_{CP} \, pro \, ... \, \lambda t \, \exists e \, [\, \text{wake up } (e)(we) \wedge \tau(e) \text{ AT } t \wedge t \subseteq \textit{8am} \wedge t \subseteq tomorrow \,]]$
        b.    $[\![$ *pro* $]\!]^{s,n} = t_n$; $[\![$ (24a) $]\!]^{s,n} = 1$ iff
                 $\exists e \, [\, \text{wake up } (e)(we) \wedge \tau(e) \text{ AT } t_n \wedge t_n \subseteq \textit{8am} \text{ of the day after the day of } t_s \,]$

## 5.    Constraints on evaluation time shift

Temporal interpretation in narratives offers further evidence about the role of evaluation time shift. We show that Paraguayan Guaraní and English again behave alike: in narratives, they both allow backtracking for events in clauses that do not involve evaluation time shift, but prohibit backtracking in clauses that do, with the provision that narratives about the past in Paraguayan Guaraní are not subject to this further restriction on temporal order, given that evaluation time shift in such cases is already free from the restriction to narratives.

    We adopt the working definition in (25), which is sufficient for our purpose here.

(25)    *Narrative:* A sequence of main clauses $\sigma_1...\sigma_n$ linked by a coherence relation.

Several discourse coherence relations have been identified; two are listed in (26) (from Lascarides and Asher 1993: (2)). Importantly, the coherence relations are associated with different temporal orders for the events in the two clauses: *narration* involves temporal progression, $\tau(e_1) < \tau(e_2)$, and *explanation* backtracking, $\tau(e_1) > \tau(e_2)$. As (26) shows, past-tense narratives may exhibit both temporal orders. But the narrative present does not allow temporal backtracking, as discovered by Anand and Toosarvandani (2018), see (27).

(26)    {*explanation* / *narration*}: Max fell. John pushed him.        $\tau(e_1) \, \{ > \, / \, < \} \, \tau(e_2)$

(27)    {#*explanation* / *narration*}: Max falls. John pushes him.        $\tau(e_1) < \tau(e_2)$

We make the additional observation that backtracking is allowed in English narratives with the canonical present tense and prospective *woll*. Both event orders are possible in (28). The narrative present in (27) does not allow backtracking if concerned with future reference.

(28)    {*explanation* / *narration*}: Max will fall. John will push him. $\tau(e_1) \, \{ > \, / \, < \} \, \tau(e_2)$

Thus, both the past tense and present-tense *woll* in English narratives allow backtracking, while the narrative present doesn't. The former two do not have to involve evaluation time shift, and we propose that they do not, while the latter does. We suggest that this is not co-incidental: evaluation time shift is restricted in ways which make backtracking impossible.

Before we make the restrictions explicit, we turn to Paraguayan Guaraní. We make three predictions. If future narratives involve evaluation time shift, that is, if they lack *-ta*, they should prohibit backtracking, for the same reason that the narrative present in (27) does. Future narratives with *-ta* should allow backtracking, just like the English canonical present plus *woll* in (28). Narratives about the past should also allow backtracking, even though they all involve evaluation time shift. This is because backward evaluation time shift in Paraguayan Guaraní is not restricted and may apply to each clause in a narrative freely as if it were an independent clause. We find support for these predictions.

We asked native speakers whether sequences of sentences are appropriate in context.[7] In contexts that strongly favor temporal backtracking, none of our consultants selected (29a) (a future narrative without *-ta*), yet all but one selected (29b) (a future narrative with *-ta*) and half selected (30), (a past narrative). This is in line with expectations.[8]

(29)     *Context: This morning we went to visit a fortune teller. She told us: 'Now Kalo is fine. However, ...'*

   a.     ... ko'ẽrõ     Kalo o-mano.   O-hasa hi'ári  camión.
          tomorrow Kalo 3-die       3-pass  on-top truck
          '... tomorrow Kalo dies. A truck runs him over.'          *selected by 0/9*

   b.     ... ko'ẽrõ     Kalo o-manó-*ta*.   O-hasá-*ta*     hi'ári  camión.
          tomorrow Kalo 3-die-PROSP   3-pass-PROSP on-top truck
          '... tomorrow Kalo will die. A truck will run him over.'          *selected by 8/9*

(30)     *Context: Juan likes to bother his sister Maria at school. The teacher explains why she had to punish him.*

          Kuehe,     Maria ho-'a kyhágui.          Juan o-myaña chupe.
          yesterday Maria 3-fall from-hammock  Juan 3-push   3SG.PRON
          'Yesterday Maria fell from the hammock. Juan pushed her.'          *selected by 5/10*

We propose the following constraints on evaluation time shift, in English and in Paraguayan Guaraní, amended from Anand and Toosarvandani 2018: (24), (21).[9] We generalize (31a)

---

[7]Responses were elicited in written form. For each item (context), there were two or more options. Participants could chose any number of these options. One participant did not respond to the item in (29).

[8]A selection rate of 5/10 for (30) may appear low, yet this is also how many consultants selected a past narrative in another context favoring narrative progression. The addition of indirect evidential *ra'e* to the second clause of a sequence similar to the one in (30), in the same context, resulted in a selection rate of 8/10. The use of *ra'e* indicates that the event in $\sigma_2$ has not been directly perceived by the speaker, but has been reported or inferred (Pancheva and Zubizarreta 2019), thus facilitating its ordering prior to the event in $\sigma_1$.

[9]We do not have space to justify the changes we have made to the constraints. The complexities of narratives longer than two clauses may require even further changes, but since we do not treat such cases here, the formulation of the constraints as in (31a-b) is sufficient for our present purposes.

beyond discourse-initial clauses in English narratives; here it covers two more cases. One is free-standing clauses. This extension is relevant only for Paraguayan Guaraní clauses with past reference, for instance (1), because only they are exempt from the general restriction of evaluation time shift to narratives. The second case is non-initial clauses in narratives where evaluation time shift applies for the first time.[10] Importantly, this extension allows us to formulate a generalization that there is a one-to-one correspondence between evaluation time shift and the impossibility of backtracking, as will become clear shortly.

(31)     *Evaluation time shift ($t_n \neq t_s$) in free-standing clauses $\sigma_0$ and narratives $\sigma_1$ $\sigma_2$:*
   a.    Initial evaluation time shift in $\sigma$ (whether $\sigma_0$, $\sigma_1$, or $\sigma_2$ when the evaluation time in $\sigma_1$ is $t_s$) may not precede the time of $\sigma$'s event: $t_n \not< \tau(e)$.
   b.    Evaluation time shift in $\sigma_2$ may not precede the time of $\sigma_1$'s event: $t_{n2} \not< \tau(e_1)$.

We illustrate first how the constraints apply to English (28) and to Paraguayan Guaraní (29b), where backtracking is allowed. (31a) dictates that initial evaluation time shift may not happen in the presence of *woll/-ta*, as these aspectual markers would locate $\tau(e)$ after $t_n$. Given that *woll/-ta* is present in $\sigma_1$ in (28) and (29b), their evaluation time is the default $t_s$. Consequently, (31a) becomes applicable also to $\sigma_2$, and because these clauses too have *woll/-ta*, their evaluation time must also be $t_s$ rather than shifted. Including such $\sigma_2$ cases under the purview of (31a) allows us to maintain the strong generalization that evaluation time shift blocks backtracking. In the absence of evaluation time shift, backtracking is possible, accomplished through the location of the prospective interval, introduced by *woll/-ta* in $\sigma_2$, prior to $\tau(e_1)$. Locating that interval after $\tau(e_1)$ allows narrative progression.

We can preserve the correspondence between evaluation time shift and the impossibility of backtracking if we posit that (26) does not involve evaluation time shift. Consequently, backtracking is possible, and is accomplished through the location of the reference time in $\sigma_2$ prior to $\tau(e_1)$; if the reference time is after $\tau(e_1)$ the result is narrative progression.[11]

We turn next to Paraguayan Guaraní (30). Evaluation time shift applies in both clauses, but in isolation, as if the clauses were each a free-standing $\sigma_0$, subject only to (31a). Given the absence of aspectual morphemes that would place $t_n$ before $\tau(e)$, (31a) is satisfied. Free from the restrictions of (31b), $t_{n2}$ can be shifted prior to $\tau(e_1)$, allowing for backtracking. Narrative progression is also possible since $t_{n2}$ may also be shifted to be after $\tau(e_1)$.

Finally, we consider English (27) and Paraguayan Guaraní (29a), which involve evaluation time shift and prohibit backtracking. The internal temporal makeup of $\sigma_1$ in both examples satisfies (31a), $t_{n1} \not< \tau(e_1)$. $\sigma_2$ in both examples is subject to (31b), so $t_{n2}$ may not precede $\tau(e_1)$. A present tense / no tense in $\sigma_2$ and the lack of aspectual markers dissociating $t_{n2}$ and $\tau(e_2)$ results in the two overlapping, so ultimately $\tau(e_2) \geq \tau(e_1)$. The impossibility of backtracking and the possibility of narrative progression follows.

To sum up, we argued earlier that evaluation time shift is restricted to narratives in English, and that Paraguayan Guaraní shares this restriction, except for past reference,

---

[10]Such cases are common in conversational narratives. An example would be: *Max fell. Then, all of a sudden, John pushes him...* Their $\sigma_2$ is subject to (31b) (as well as (31a)) and so they prohibit backtracking.

[11]In contrast, Anand and Toosarvandani (2018) analyze $\sigma_2$ in (26) as involving evaluation time shift.

where evaluation time shift may apply outside of narratives. In this section we demonstrated that evaluation time shift is additionally subject to the constraints in (31). Importantly, we showed that these constraints manifest in identical ways, precluding backtracking, in English and Paraguayan Guaraní. This result gives support to our proposal that evaluation time shift is an important component of deriving temporal reference in Paraguayan Guaraní.

The advances to our understanding of temporality in Paraguayan Guaraní, gained from narratives, nevertheless do not distinguish our account from the alternatives empirically. If the tense accounts are supplemented with an independent theory of evaluation time shift in the narrative mode, they could derive the facts of temporal sequencing (provided the tense-via-a-rule account also suspends the discourse restriction in (11) in the narrative mode).

## 6. Future-in-the-past interpretation

We present an empirical argument in favor of our account, to supplement the conceptual argument from §5. If Paraguayan Guaraní had tense, (32a) would be acceptable, with the event placed in the future of a past reference time, and the adverbial *kuehe* 'yesterday' modifying either the event time or the reference time, as (33) illustrates. Yet (32a) is not acceptable without *kuri* (cf. (32b)) as noted by Tonhauser (2011a,b).

(32)    a.   # Kuehe    Kalo o-purahéi-*ta*.    b.    Kuehe    Kalo o-purahéi-*ta kuri*.
            yesterday Kalo 3-sing-PROSP            yesterday Kalo 3-sing-PROSP
            'Kalo was going to sing yesterday.'        'Kalo was going to sing yesterday.'

(33)    $[\![(32a)]\!]^{g,s}$ is defined iff $t_{rt} \leq t_s$, when defined $[\![(32a)]\!]^{g,s} =$

    a.    $\exists t\, \exists e\,[\,\mathrm{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t \wedge t > t_{rt} \wedge t \subseteq yesterday]$, or
    b.    $\exists t\, \exists e\,[\,\mathrm{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t \wedge t > t_{rt} \wedge t_{rt} \subseteq yesterday]$

Tonhauser (2011b): 290 analyzes *kuri* as a past adverbial 'back then'. By stipulation, the reference time in (32a) must be present, $t_{rt} = t_s$, in the absence of *kuri*. The addition of *kuri* allows $t_{rt} < t_s$, with *kuri* modifying the past refence time. Clearly, an explanation is missing. There is no reason why *-ta* should restrict the reference time to present, nor why one past adverbial, *kuri* 'back then', but not another, *kuehe* 'yesterday', should 'restore' the availability of a past reference time, which the non-future semantics of tense allows.

Our account can explain what the tense-via-a-rule account needs to stipulate: (32a) cannot receive past interpretation, and this clashes with the meaning of *kuehe* 'yesterday'. Past reference obtains with backward evaluation time shift, which is subject to the constraint in (31a) even outside of narratives. A shifted $t_n$ in $\sigma$ may not precede the time of the event described in $\sigma$. But in (32a) *-ta* makes that impossible, as it places the event time to the future of $t_n$; therefore, the evaluation time can only be the default $t_s$. And once (32a) is evaluated relative to $t_s$, modication by *kuehe* 'yesterday' becomes contradictory, see (34).

(34)    a.    $[\,pro \ldots \lambda t\, \exists t'\, \exists e\,[\,\mathrm{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t' \wedge t' > t \wedge \{t/t'\} \subseteq yesterday\,]\,]$
    b.    $[\![pro]\!]^{s,n} = t_s$; $[\![(34a)]\!]^{s,n} = 1$ iff
        $\exists t'\, \exists e\,[\,\mathrm{sing}(e)(kalo) \wedge \tau(e)\ \text{AT}\ t' \wedge t' > t_s \wedge \{t_s/t'\} \subseteq yesterday\,]$

We suggest that *kuri* is a retrospective aspectual marker, (35b). Like prospective *-ta* and progressive *hína*, *kuri* also has a modal component (a flavor of certainty); we put this aside. *kuri* scopes above *-ta*, (35a); note that the meaning of (32b) is future in the past and not retrospective future. Importantly, the evaluation time in (32b) is the default $t_s$; it cannot be backshifted in the presence of *-ta* as that would violate the constraint in (31a).

(35)  a.  [ *pro* ... [ *kuri* [ *-ta* [ Kalo sing ] yesterday ]]]
  b.  $[\![\,kuri\,]\!]^{s,n} = \lambda p_{\langle i,t\rangle}\,\lambda t\,\exists t'\,[t' < t \wedge p(t')]$
  c.  $[\![\,pro\,]\!]^{s,n} = t_s$ ; $[\![\,(35a)\,]\!]^{s,n} = 1$ iff
    $\exists t'\,\exists t''\,\exists e\,[\mathrm{sing}(e)(kalo) \wedge t' < t_s \wedge t'' > t' \wedge \tau(e)\;\mathrm{AT}\;t'' \wedge \{t'/t''\} \subseteq yesterday\,]$

Our account predicts that a future-in-the-past interpretation would be available with *-ta*, even without *kuri*, in non-initial clauses in narratives. (31a) holds only for initial evaluation time shift. Once the evaluation time is shifted in $\sigma_1$ in a narrative, its update in $\sigma_2$ does not need to be restricted relative to $\sigma_2$'s event. This prediction is met, as seen in (36), where ii. was selected in the context of i. by all but one of the participants in our orally-administered questionnaire. (See Pancheva and Zubizarreta 2019 for more examples.)

(36)  i. Kuehe,  a-ha  Elsa róga-pe  ha  nd-a-ikatú-i  a-ñe'ẽ  hendive.
    yesterday 1SG-go Elsa house-loc and NEG-1SG-can-NEG 1SG-talk with-her
  ii. O-sẽ-*ta*;  o-japurái  etereí.
    3SG-go-PROSP 3SG-hurry SUPERLATIVE

  'Yesterday, I went to Elsa's house and I was not able to talk with her.
  She was about to leave; she was very much in a hurry.'  *selected by 7/8*

The tense accounts would have to add (36) as a case where a past reference time becomes available for a main clause with *-ta*, despite the absence of *kuri*, proliferating the stipulations. On our approach, (36) is accounted for solely by the constraints on evaluation time shift that also account for (32a) and (32b).[12]

## 7.  Conclusion

We offer an account of temporal interpretation without positing tense in the lexical and/or logical semantics. Such an alternative has not been previously explored in the formal semantic literature on tenseless languages. The account relies on the independently motivated mechanism of evaluation time shift. Unsurprisingly, constraints on evaluation time shift found in the narrative present in English are applicable to temporal reference in Paraguayan Guaraní as well. Differences obtain in reference to past events, where Paraguayan Guaraní applies the mechanism of evaluation time shift more broadly, beyond narratives.

---

[12]There are still questions concerning the future-in-the-past interpretation that we cannot resolve here. Among them is the immediacy reading rendered as *was about to* in the translation of (36), which is also the reason why modification by *kuehe* 'yesterday' in (32b) does not result in ambiguity, unlike what (35c) suggests. And particularly importantly, we do not have space to show that *kuri* is not an optional past tense.

# References

Anand, Pranav, and Maziar Toosarvandani. 2018. No explanation for the historical present: Temporal sequencing and discourse. In *Proceedings of Sinn und Bedeutung 22*, ed. Uli Sauerland and Stephanie Solt, 73–90. Berlin: Leibniz-Centre General Linguistics.

Ayala, José Valentín. 1996. *Gramática Guaraní*. Republica Argentina: Edición del Ministerio de Educación de la Nación.

Giorgi, Alessandra, and Fabio Pianesi. 1997. *Tense and aspect: From semantics to morphosyntax*. New York and Oxford: Oxford University Press.

Hornstein, Norbert. 1990. *As time goes by*. Cambridge, MA: MIT Press.

Klein, Wolfgang. 1994. *Time in lanuage*. London and New York: Routledge.

Kratzer, Angelika. 1998. More structural analogies between pronouns and tense. In *Proceedings of Semantics and Linguistic Theory VIII*, ed. Devon Strolovitch and Aaron Lawson, 92–110.

Lascarides, Alex, and Nicholas Asher. 1993. Temporal interpretation, discourse relations and commonsense entailment. *Linguistics and Philosophy* 16:437–494.

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

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

Pancheva, Roumyana, and Arnim von Stechow. 2004. On the present perfect puzzle. In *Proceedings of North East Linguistic Society 34*, ed. Kier Moulton and Matthew Wolf, 469–484. Amherst: University of Massachusetts, GLSA.

Pancheva, Roumyana, and Maria Luisa Zubizarreta. 2019. On the role of person features in the evidential-temporal connection. *Canadian Journal of Linguistics* 64:673–708.

Reichenbach, Hans. 1947. *Elements of symbolic logic*. New York: Macmillan Co.

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

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

Tonhauser, Judith. 2011a. The Paraguayan Guaraní future marker *–ta*: Formal semantics and cross-linguistic comparison. In *Tense across languages*, ed. Renate Musan and Monika Rathert, 207–232. Berlin and Boston: de Gruyter.

Tonhauser, Judith. 2011b. Temporal reference in Paraguayan Guaraní, a tenseless language. *Linguistics and Philosophy* 34:257–303.

Zubizarreta, Maria Luisa, and Roumyana Pancheva. 2017. A formal characterization of person-based alignment: The case of Paraguayan Guaraní. *Natural Language and Linguistic Theory* 35:1161–1204.

Zucchi, Sandro. 2009. Along the time line: Tense and time adverbs in Italian Sign Language. *Natural Language Semantics* 17:99–139.

Roumyana Pancheva, Maria Luisa Zubizarreta
pancheva@usc.edu, zubizarr@usc.edu