

On The Indexicality of Portuguese Past Tenses*

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Abstract

This paper investigates the semantics of Portuguese past tenses, focusing on their indexical behavior. I show that under certain circumstances, even when they are used anaphorically and refer to a contextually salient interval, these past tense heads can denote intervals that do not precede the speech time. I argue that the best way to capture this behavior is to construe its presupposition as a shiftable indexical (Schlenker 2003; Anand 2006), with a meaning roughly paraphrasable as ‘earlier than $\tau(c)$ ’, with $\tau(c)$ being set to some context (attitude-like) time, not necessarily the speech time. I also argue that non-anaphoric uses of the Portuguese verb form called *Pretérito Perfeito* should be analyzed as present tense + perfect aspect combinations, as was suggested in Giorgi and Pianesi (1998). In particular I show that Portuguese instantiates what is called double access readings in past under past configurations that mimic the more well known cases involving embedded present tenses in attitudinal contexts (Abusch 1997; Ogihara 1996, *inter alia*).

keywords: double-accessibility; indexicality; past tenses; perfect; Portuguese

1 Introduction

Referential theories of tense (Partee 1973; Heim 1994; Abusch 1997; Kratzer 1998, *inter alia*) assume that syntactic T(ense) heads are temporal pro-forms that refer to intervals of time, as shown in the lexical entries below for past and present tenses:

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- (1) a. $[[\text{past}_i]]^{g,c} = \begin{cases} g(i) & \text{if } g(i) < \tau(c) \\ \text{undefined} & \text{otherwise} \end{cases}$
 b. $[[\text{pres}]]^{g,c} = \tau(c)$

Both entries have an indexical component. They make reference to a coordinate of the speech (or utterance) context, namely, the speech time ($\tau(c)$). With the present tense, this is obvious, since it refers to the speech time itself. With the past tense, indexicality comes from a presupposition that limits its reference to intervals that precede the speech time. Not surprisingly, these tense heads, when combined with other temporal operators (aspectual heads, for instance) help locating an eventuality with respect to the speech time, as can be seen in (2):

- (2) a. John has baked a cake.
 b. [On January, 1st,] John baked a cake.

Both sentences locate an event of John baking a cake in the past (prior to the speech time). In (2a), one might say that this is achieved by combining the present tense, which refers to the speech time, and perfect aspect, which introduces a temporal precedence operator. In (2b), we may assume that the past tense (which refers to January, 1st), combines with a perfective head, which introduces temporal inclusion (Klein 1994; Kratzer 1998).

In this paper, I investigate the semantics of Portuguese past tenses, focusing on their indexical behavior. Portuguese is somewhat unique among modern Romance and Germanic languages in having a fully productive simple (synthetic) past tense verb form that is not in competition with any periphrastic present perfect form in the indicative mood. Both English sentences above are translated into the same synthetic form, traditionally referred to as *pretérito perfeito*.

- (3) João assou um bolo.
 John baked a cake

I will show that under certain circumstances, even when they are used anaphorically and refer to a contextually salient interval, Portuguese past tense heads can denote intervals that do not precede the speech time. I will argue that the best way to capture this behavior is to construe its presupposition as a shiftable indexical (Schlenker 2003, Anand 2006), with a meaning roughly paraphrasable as ‘earlier than $\tau(c)$ ’, with $\tau(c)$ being set to some context (attitude-like) time, not necessarily the speech time.

I will also show that non-anaphoric uses of the Portuguese verb form called *Pretérito Perfeito* (one of the verb forms listed as a past tense form in traditional grammars) should be analyzed as present tense + perfect aspect combinations, as was suggested in Giorgi and Pianesi (1998). In these cases, however, present tense denotes either an unshiftable indexical, anchored at the speech time, or a bound variable (zero tense, in the sense of Kratzer 1998). My hope is that the paper can contribute not only to a better description of verbal tenses in Portuguese, but also that it may help us refine our understanding of the dimensions along which natural language tenses can vary.

The paper is organized as follows: section 2 provides a particular implementation of the referential theory of tense, essentially the one in Kratzer (1998), and shows how Portuguese indicative tenses can be encoded in it. Section 3 discusses anaphoric past tenses in more detail, arguing that they are built out of a “pure variable” and a +past feature that introduces a shiftable indexical presupposition. Section 4 discusses non-anaphoric uses and provides evidence from embedded syntactic contexts, extensional and intensional, for the presence of an unshiftable indexical head in its constitution. In particular it is shown that Portuguese instantiates what is called double access readings in past under past configurations that mimic the more well known cases involving embedded present tenses in attitudinal contexts (Abusch 1997, Ogihara 1996, *inter alia*). Section 5 points out some recalcitrant cases, and show how they can be accounted for using Kratzer’s (1998) zero tenses. Section 6 concludes the paper, summarizing the morpho-semantics profile of Portuguese past tenses.

2 Overview of Portuguese Indicative Tenses

Standard Portuguese has three synthetic verb forms in the indicative mood which can be used to express the occurrence of an eventuality located in time with respect to a past (i.e. before the utterance time) reference interval:

- (4) [Ontem,] Maria assou um bolo.
 yesterday Maria baked-pfv a cake
 “Yesterday, Maria baked a cake.”
- (5) [Às 3 horas,] Maria assava um bolo.
 at 3 hours Maria baked-imp a cake
 “At 3 o’clock, Maria was baking a cake.”
- (6) [Quando eu cheguei,] Maria já assara um bolo.
 when I arrived Maria already baked-pperf a cake
 “When I arrived, Maria had already baked a cake.”

The verb in (4) has a past perfective meaning and locates the eventuality within a given past interval (yesterday). The verb in (5) has a past imperfective meaning and conveys that the eventuality was going on at the reference time (3 o’clock).¹ Finally, the verb in (6) has a past perfect meaning and indicates that the eventuality occurred before the past reference time (the time of my arrival).² Thus, what semantically distinguishes these three verb forms among themselves is their aspectual values – perfective, imperfective, and perfect – and what

¹In spoken Brazilian Portuguese, it is almost never used with eventive predicates and has been replaced by a periphrastic past progressive form similar to English be+gerund forms:

- (i) Pedro estava assando um bolo
 Pedro was-imp baking a cake

²In spoken Portuguese, this synthetic form has become obsolete and has been replaced by a periphrastic have+past participle form:

unites them is their indexical temporal value – pastness or anteriority with respect to the utterance time (see Klein 1994).

These general remarks can be formalized as in Kratzer (1998), assuming a clausal skeleton in which verb phrases (VP/vP) are dominated by aspectual phrases (AspPs), which in turn are dominated by tense phrases (TPs):

$$(7) \quad [\text{TP T } [\text{AspP Asp } [\text{VP/vP } \dots \text{ V } \dots]]]$$

Verb phrase projections denote sets of eventualities (events or states). Aspectual heads are operators that existentially bind the event argument and turn sets of events into sets of time intervals. Tense heads host referential, pronominal-like elements denoting intervals, along the lines first suggested by Partee (1973)(see also Heim 1994). Our examples above all instantiate the same T head *past*:

$$(8) \quad \llbracket \text{past}_i \rrbracket^{g,c} = \begin{cases} g(i) & \text{if } g(i) < \tau(c) \\ \text{undefined} & \text{otherwise} \end{cases}$$

The variable-like nature of these morphemes is encoded in the form of assignment dependent denotations. Their indexical (speech time dependent) nature is encoded in the form of pre-conditions on these denotations. Thus, *past* can only denote intervals that precede the utterance time. Which particular interval it denotes depends on other aspects of the utterance context, modeled in (8) with the help of an integer subscript.

As for the aspectual operators in (4)-(6), we also follow Kratzer (1998) in positing three possible Asp heads:

$$(9) \quad \llbracket \text{PERFECTIVE} \rrbracket = \lambda P. \lambda i. \exists e : \tau(e) \subset i \ \& \ P(e)$$

$$(10) \quad \llbracket \text{IMPERFECTIVE} \rrbracket = \lambda P. \lambda i. \exists e : \tau(e) \supseteq i \ \& \ P(e)$$

$$(11) \quad \llbracket \text{PERFECT} \rrbracket = \lambda P. \lambda i. \exists e : \tau(e) < i \ \& \ P(e)$$

The semantic composition can then proceed straightforwardly via functional application. Our three initial examples will receive the following truth-conditions (assuming that $g(1)$ refers to the past interval referred to by the topicalized adverbial in (4)-(6)):

$$(12) \quad \text{Maria assou um bolo.} \\ \exists e : \tau(e) \subset g(1) \ \& \ \text{maria_bake_a_cake}(e)$$

$$(13) \quad \text{Maria assava um bolo.} \\ \exists e : \tau(e) \supseteq g(1) \ \& \ \text{maria_bake_a_cake}(e)$$

$$(14) \quad \text{Maria já assara um bolo.} \\ \exists e : \tau(e) < g(1) \ \& \ \text{maria_bake_a_cake}(e)$$

Aspectual heads can also be employed to locate an eventuality with respect to the speech

(i) Pedro tinha assado um bolo
Pedro had-imp baked a cake

time:

- (15) Maria está assando um bolo.
Maria is baking a cake
“Maria is baking a cake.”
- (16) Talvez, Maria tenha assado um bolo.
perhaps Maria has-sub baked a cake
“Perhaps, Maria has baked a cake.”

(15) conveys that the event is going on at the speech time, and (16) locates the event prior to the speech time. In both cases the auxiliary is in the present tense, which is assumed to refer to the speech time:

$$(17) \quad \llbracket \text{pres} \rrbracket^{g,c} = \tau(c)$$

(15) spells out the combination present + imperfective, and (16) the combination present + perfect.^{3 4}

Finally, Portuguese has two verb forms that locate an eventuality in the future of some other time, roughly equivalent to English *will+verb* and *would+verb* forms:⁵

- (18) Maria assará um bolo.
Maria bake-fut a cake
“Maria will bake a cake.”

³There seems to be no present + perfective combination, which could be used to locate an eventuality within the speech time. This should not come as surprising if we assume that the speech time is conceptualized as an indivisible interval, making no sense to refer to a proper part of it. As Comrie (1976:66ff) points out, present perfectives are semantically anomalous and indeed this combination is cross-linguistically rare, and when attested, it often assumes special meanings.

⁴Notice that the present tense auxiliary in (16) is in the subjunctive mood. For some reason, substituting the indicative present form for the subjunctive in examples like (16) gives rise to iterative, habitual-like readings, in Portuguese:

- (i) Maria tem assado um bolo (toda manhã)
Maria has-ind baked a cake (every morning)
“Maria has been baking a cake (every morning)”

For a proposal about the form and meaning of Portuguese periphrastic indicative present perfect, see Schmitt (2001).

⁵In Brazilian Portuguese, these synthetic verb forms are being replaced by periphrastic forms built with the present/past tense of the auxiliary verb *ir* ‘to go’ plus an infinitive:

- (i) Maria vai assar um bolo
Maria go-pres bake a cake
“Maria will bake a cake”
- (ii) Maria ia assar um bolo
Maria go-imp bake a cake
“Maria would bake a cake”

- (19) Maria assaria um bolo.
 Maria baked-fut a cake
 “Maria would bake a cake.”

We assume that these two future forms encode a forward temporal shift in the evaluation time with respect to the time of utterance, as in (18), or some past interval, as in (19). Following Abusch (1997) on English *will/would*, we take them to encode a future operator FUT dominated by a tense head, PRES or PAST:

$$(20) \quad \llbracket \text{FUT} \rrbracket = \lambda P. \lambda i. \exists i' : i' > i \ \& \ P(i')$$

We can thus view all verbal forms as combinations of a referential element (a tense head), some temporal/aspectual operator(s), and a event/state description.

3 A Shiftable Indexical Past

In the last section, we saw that Portuguese has verbal forms that encode an anaphoric past tense, which refers to a contextually salient interval, and that these forms differ in terms of the aspectual operators they encode.

- (21) [Ontem,] Maria assou um bolo.
 yesterday Maria baked-pfv a cake
 [PAST+PERFECTIVE]
- (22) [Às 3 horas,] Maria estava assando um bolo.
 at 3 hours Maria was-imp baking a cake
 [PAST+IMPERFECTIVE]
- (23) [Quando eu cheguei,] Maria tinha assado um bolo.
 when I arrived Maria had-imp baked-pperf a cake
 [PAST+PERFECT]

This pronominal past tense carries an indexical ingredient construed in the form of a presupposition which limits its denotation to intervals preceding the time of utterance:

$$(24) \quad \llbracket \text{past}_i \rrbracket^{g,c} = \begin{cases} g(i) & \text{if } g(i) < \tau(c) \\ \text{undefined} & \text{otherwise} \end{cases}$$

In this section we review the nature of this presupposition to accommodate the fact that sometimes the past tense refers anaphorically to intervals that do not precede the speech time.⁶

⁶Our examples in this section will focus on verbal forms such as the ones in (22) and (23), since these forms are always interpreted anaphorically, requiring a contextually salient interval which they can refer to, and never giving rise to indefinite (perfect-like) interpretations (the only exceptions to this anaphoricity are the so-called sequence of tense phenomena, which will be discussed in section 5). For instance, both examples below sound odd if uttered out of the blue:

Consider, for instance, the following dialog happening on a Thursday and in which A and B are talking about the coming weekend:

- (25) A: Saturday at noon Peter will come to my house to fix the garage door.
 B: Peter is such a lazy guy! I bet he won't show up. Then, he will call you on Monday and ...
- (26) Ele vai dizer que ele estava passando mal (e teve que ficar em casa)
 He will say that he was feeling sick (and had to stay at home)

Here the embedded past tense is anaphoric on a future (after the speech time) interval that was made salient in the preceding discourse. The aspectual value of this embedded verb form is imperfective, and the “feeling sick” state is understood as holding at Saturday at noon.⁷This is unexpected given the lexical entry in (24), and should have resulted in a presupposition failure.

Let us see how one could fix (24), and still preserve the basic architecture of the referential theory of tense. One way of proceeding would be to minimally revise the presupposition in (24), replacing the speech time by some contextually salient time interval. This would eliminate the indexical character of (24) and would allow a past pronominal tense to refer anaphorically to any interval (past, present or future) if this interval precedes another contextually salient interval. (27) formalizes the idea marking the pronoun with a double index:

$$(27) \quad \llbracket \text{past}_{i,j} \rrbracket^{g,c} = \begin{cases} g(i) & \text{if } g(i) < g(j) \\ \text{undefined} & \text{otherwise} \end{cases}$$

The presupposition now reads as “earlier than $g(j)$ ” instead of “earlier than *the speech time*”. The speech time, of course, remains one of the possible values for $g(j)$, but it is not the only one. However, this more relaxed version is problematic since it will rule in a lot of anaphoric uses that are intuitively bad. Consider, for instance, the following dialog taking place on a given Friday:

- (28) A: Sunday will be a nice sunny day!

-
- (i) Maria estava doente.
 Maria was-imp sick
- (ii) Maria tinha estado doente.
 Maria had-imp been sick

On the other hand, as will be discussed in great detail in sections 4 and 5, the form in (21), known as *pretérito perfeito*, can also be interpreted non-anaphorically, and therefore will be avoided for the moment.

⁷Other aspectual values would also be possible. (i), for instance, has an embedded past perfect form that could also be used in the same kind of scenario. In this case, the phone call is understood as having happened before Saturday noon:

- (i) Ele vai dizer que ele tinha recebido uma ligação (e teve que ficar em casa)
 He will say that he had received a phone_call (and had to stay at home)

B: But what about Saturday?

A: # *Estava chovendo, infelizmente.* [It was raining, unfortunately]

Here, A’s reply to B sounds really odd, and the reason is clear: A should have used a future instead of a past tense (“it will be raining”). However, A’s reply should be fine according to (27). The past pronoun refers to Saturday which is an interval that precedes another interval that had also been made salient in the discourse, namely, Sunday. Thus, setting $g(1)$ to Saturday and $g(j)$ to Sunday should not have caused a presupposition failure.

A different solution might be to replace the speech time in (24) by an interval introduced by a time-shifting operator, such as a future tense or auxiliary. In this case, the presupposition would read as “earlier than t ” with t being either the speech time or a variable bound by a superordinate time-shifter. Formally, we could maintain the lexical entry in (27), but impose a syntactic condition on the index j , requiring it to be bound by a lambda operator *à la* Heim and Kratzer (1998), as shown in (29), or to be mapped to the speech time by the assignment function:

(29)

$$\llbracket [j \text{ XP }] \rrbracket^g = \lambda t : g(i) < t. \llbracket \dots \text{ PAST}_{i,j} \dots \rrbracket^{g[j \rightarrow t]}$$

A solution along these lines would be problematic too, because the future operator *per se* does not seem to license a past tense that is anaphoric on a future interval. This is illustrated in (30):

- (30) A: I am looking for a new secretary.
 B: Well, tomorrow I will have lunch with a friend of mine who is an experienced secretary and is currently unemployed.
 A: Great! I will talk to my assistant and on Monday, ...

- (31) #Ela vai telefonar para essa amiga com quem você estava almoçando.
 she will call to this friend with whom you were having lunch
 “She will call this friend of yours who you were having lunch with.”

A’s reply sounds odd and once again this is due to her use of the past tense in the subordinate clause. Here too, she should have used the future (“... who you will be having lunch with”). According to our revised entry for PAST, the reply should be fine, since the past tense refers to a contextually salient time interval (tomorrow’s lunch meeting between B and her friend), and this interval precedes the “local evaluation” time (the calling on Monday).

A salient difference between (26) and (31) is that the anaphoric past tense is embedded within the complement of an attitude verb in the former, whereas it is within an adjunct, relative clause in the latter. It seems then that when a referential past tense is embedded under an attitude verb in Portuguese, it can refer to any contextually salient time interval

that precedes the attitude time. When it is embedded within a relative clause, the referent of the past tense has to precede the speech time. This past tense would thus qualify as a sort of restricted relative tense. It would differ from English which has been claimed to instantiate a *bona fide* relative past, allowing an embedded past tense to indicate anteriority with respect to the matrix time, not with respect to the speech time (examples below from Heim 1994:158):⁸

- (32) a. He will think that he was sick.
 b. I will charge you whatever time it took.

It should be noted that temporal dependencies across a relative clause boundary are not in general banned in Portuguese. They are allowed, for instance, in present under future interpretations that we will discuss later:

- (33) Ao final do processo, nós contrataremos o candidato que tenha dado
 at.the end of.the process we hire-fut the candidate that has-subj given
 a melhor palestra.
 the best talk.
 “At the end of the job search, we will hire the candidate who has given the best talk.”

In this example we have a present perfect that backshifts from the matrix event time, which itself follows the speech time. As a result, the embedded event time can either precede or follow the speech time. Moreover, this example also shows that the future tense is a temporal shifter in Portuguese.

Restrictive types of relative tenses have been attested and discussed in other languages as well. Hebrew and Russian, for instance, are said to have a type of relative present that bears resemblance with the Portuguese past tense that we are investigating here. When embedded under a matrix past tense verb, this present tense can indicate simultaneity with respect to the matrix time when located within the complement of an attitude verb, but not when located within a relative clause, in which case it receives a deictic interpretation:⁹

- (34) *Hebrew* [from Ogihara and Sharvit (2012:642,644)]
 a. lifney alpayim šana, Yosef gila še Miriam ohevet oto
 Before two-thousand year Yosef find-out-past that Miriam love-pres him
 (Yosef said to himself, two thousand years ago: “Miriam loves me”)

⁸Nathan Klinedinst pointed out to me that to his ear, the English gloss of (31) is also bad: one should rather use the future tense. This is an indication that there might be additional constraints at work with respect to English relative past. A Portuguese translation of (32b), on the other hand, sounds degraded to me with a simple past (*pretérito perfeito*) in the embedded clause. See, however, sections 4 and 5, in which non-anaphoric uses of *pretérito perfeito* are discussed, and which may be relevant in this case.

⁹For recent crosslinguistic discussion about tenses in embedded clauses, see Ogihara and Sharvit 2012; Grønn and von Stechow 2010, 2011; von Stechow and Grønn 2013; Schlenker 2011; Sharvit 2003, 2014, *inter alia*.

- b. be-yalduto, pagaš Yosef iša še ohevet letayel
 in-childhood-his meet-past Yosef woman Comp love-pres traveling
 (Loving time (may overlap meeting time but) must overlap utterance time)
- (35) *Russian* [from Schlenker (2011)]
- a. petja skazal, čto on plačet
 Petja said that he is_crying
 “Petja said that he was crying (at the time of his utterance)”
- b. petja vstretil človeka kotoryj plačet
 Petja met person who is_crying
 “Petja met a person who is crying.”
 NOT “Petja met a person who was crying (at the time of the meeting).”

These cases contrast with the relative present found in Japanese, which can be used in both configurations and indicate simultaneity with respect to the embedding time:

- (36) *Japanese* [from Ogihara and Sharvit (2012:642,644)]
- a. Taroo-wa [Hanako-ga byooki-da]-to it-ta
 Taro-top Hanako-nom be-sick-pres say-past
 “Taro said: ‘Hanako is sick’ ”
- b. Kodomo-no koro, Joseph-wa [ryokoo-o aisuru zyosei]-ni at-ta
 child-gen time, Joseph-top [travelling-acc love-pres woman]-dat meet-past
 (Loving overlaps meeting time, but not necessarily the utterance time.)

In their discussion of this contrast between Hebrew and Japanese, Ogihara and Sharvit (2012) claim that whereas Japanese has quantificational as well as referential tenses, Hebrew only has referential ones. According to them, when embedded within a relative clause, a relative present needs to be bound by the matrix tense, and only quantificational tenses (the matrix past in these cases) can be quantifier-raised and give rise to a licit binding configuration. As a result, the Hebrew example in (34b) only allows for a deictic reading for the embedded present tense.

Schlenker (2003, 2011), on the other hand, sees the Russian facts in (35) as evidence for the shiftable indexicality of the Russian present tense. Shiftable indexicals are expressions interpreted relative to some speech/thought context: either the matrix, utterance context or the context introduced by an attitude predicate. Un-shiftable indexicals, on the other hand, can only be interpreted relative to the matrix, utterance context. According to Schlenker, the shiftable nature of the Russian present tense is what allows it to give rise to simultaneous, *de nunc* interpretations in past under present configurations, such as (35a), but not in (35b), where there is no attitudinal context, and only the utterance time is available to serve as its reference.

Back to Portuguese and the contrast between (26) and (31), I will assume an analysis similar to Schlenker’s view on Russian present tense, which, I believe, provides an elegant explanation that can be couched within a referential theory of tense, which I am assuming in this paper. In a nutshell, the idea is to treat the presupposition attached to the past tense

as a shiftable indexical element. In rather informal terms, it should read as “earlier than $\tau(c)$ ”, with c referring to a context.

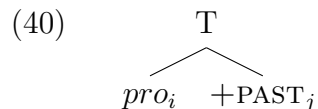
Formalizing the proposal requires a brief excursus into some of Schlenker’s ideas on indexicality, which we exemplify here with his analysis of Amharic’s first person pronoun. When embedded under an attitude verb, this pronoun can refer to the speaker or it can be interpreted *de se* with respect to the attitude holder:

- (37) *Amharic* [from Schlenker (2003:68)]
 John jiāgna n-ññ yil-all
 John hero BE.PRES-1S says-3SM
 ‘John says that {I am, he is} a hero.’

One way of accounting for this ambiguity in an extensionalized system (see Schlenker 2003, 2011) is to assume that attitude verbs quantify over contexts (construed as triples formed by an individual, a time, and a world) and that their complementizers act as lambda abstractors binding context-denoting variables. Indexical pronouns refer to coordinates of a context. First person pronouns, for instance, refer to the author coordinate, which stands for the attitude holder’s self. Un-shiftable indexicals, such as English *I*, can only refer to the speaker, the author of the matrix speech act. Shiftable indexicals, such as Amharic *I*, can be bound by the embedded complementizer of an attitude verb and therefore be interpreted with respect to the attitude context. The two interpretations of (37) go as follows:¹⁰

- (38) *Shifted reading of (37)*
 John says λc_0 . be-a-hero $_{\omega(c_0)}$ ($\alpha(c_0)$)
 For every context c' compatible with what John said the author of c' is a hero in the world of c'
- (39) *Unshifted reading of (37)*
 John says λc_0 . be-a-hero $_{\omega(c_0)}$ ($\alpha(c^*)$)
 For every context c' compatible with what John said, the author of c^* is a hero in the world of c'

With this much as background, we can return to the details of our proposal for the Portuguese referential past tense. It goes along the following lines: first, we syntactically decompose the past tense head into a “pure” pronominal element and a presupposition trigger (as in Heim 1994:160-161):



(41) a. $[[\text{pro}_i]]^g = g_I(i)$

¹⁰In the examples below, α , ω , and τ are context coordinates. If c_i is a context, then $\alpha(c_i)$ refers to the author of c_i , $\omega(c_i)$ refers to the world of c_i , and $\tau(c_i)$ refers to the time of c_i . Moreover, c^* always refer to the matrix, speech context.

$$\text{b. } \llbracket +\text{PAST}_j \rrbracket^g = \lambda i : i < \tau(g_C(j)). i$$

As indicated by the subscripts on g , $g_I(i)$ is an interval, and $g_C(j)$ is a context.¹¹ Thus, pro_i refers to a time interval. $+PAST$ is an identity function mapping an interval to itself, but a partial one. It introduces a constraint on the value of its argument: it has to precede the temporal coordinate of $g_C(j)$. What is the value of $g_C(j)$? The idea is to treat the index j as a shiftable indexical element. The analogy here is between j and Amharic’s first person pronoun. In our case, we want j , when embedded under an attitude verb, to be assigned by g either to the attitude holder’s subjective now or to the speech time.¹²

The pure variable pro_i could in principle be interpreted *in situ*. Our original example would then have the following structure:

$$(42) \quad \begin{array}{l} \text{Ele vai dizer que ele estava passando mal.} \\ \text{He will say that he was feeling sick} \\ \exists t' > t^* : \text{he-say}(t') \lambda c_0. [[_{\text{T}} pro_i + \text{PAST}_0] \lambda t. \text{he-be-feeling-sick}(t)] \end{array}$$

Here the presupposition constraining pro_i ’s denotation would be that John’s subjective now at t' follows $g(i)$. But that means that John would be locating himself in the future of a particular time interval, namely $g(i)$. This is quite likely too strong a requirement, since John may be mistaken or ignorant about his own temporal location, and that does not affect the truthfulness of (42). All we should require in this case is that in John’s mind at t' , the interval corresponding to the *be-feeling-sick* situation be represented by a suitable past-oriented description such as “at noon last Saturday”, whatever particular interval that refers to. The idea is that this interval description corresponds to the way John represents in his mind the actual interval that pro_i refers to. As we already know, Portuguese allows this interval to be located after the utterance time. What we need then is a way to interpret our example as a temporal *de re* report (Abusch 1997), the *res* here being the time interval denoted by pro_i . How can that be achieved?

Notice that being an independent syntactic unit, pro_i can be targeted by whatever interpretive mechanism is responsible for generating *de re* readings, leaving its (shiftable) indexical presupposition intact. Designing a compositional implementation for these *de re* interpretations has been proved to be notoriously difficult. For instance, *res-* movement approaches (see Heim 1994 and Abusch 1997) assume that the pro-variable can move out of the embedded clause and be interpreted as an argument of the matrix verb. Its trace is then replaced by an interval concept, mapping the attitude holder’s now to an interval related to the way (s)he mentally represents the *res*, some particular interval (s)he is “acquainted with”, as informally described above, and sketched below. (Schlenker (2011) calls it the *de re* transformation):¹³

¹¹I assume here that the assignment g maps integers to entities of different types, including individuals, intervals, and contexts.

¹²It is important to keep in mind that the parallel I am trying to establish is not between the tense head T and the Amharic’s first person pronoun, but rather between the j index of the presupposition trigger $+PAST$ and the Amharic’s pronoun.

¹³For simplicity, I represent the world argument of the interval concept (F) as a subscript, although F is

- (43) a. Ele vai dizer^{DE RE} que ele estava passando mal.
 He will say that he was feeling sick
- FUT $\lambda t'. \text{he_say}_{w^*}(t') \lambda c_0. [[_{\text{T}} \mathbf{pro}_i + \text{PAST}_0] \lambda t. \text{he_be_feeling_sick}(t)] \xrightarrow{\text{de re}}$
 FUT $\lambda t'. \mathbf{pro}_i\text{-he_say}_{w^*}(t') \lambda c_0. [[_{\text{T}} \mathbf{F}_{\omega(c_0)}(\tau(\mathbf{c}_0)) + \text{PAST}_0] \lambda t. \text{he_be_feeling_sick}(t)]$
- b. $\llbracket F \rrbracket(w^*)(t') = g(i)$
- c. In our scenario:
 $\llbracket F \rrbracket = \lambda w. \lambda i. \text{noon of the Saturday preceding } i \text{ in } w$
 w^* is the actual world
 t' is the (future) time of the saying event

F is a variable ranging over functions from world-interval pairs to intervals. When applied to the world and the time of the attitude, F should yield the *res* ($\llbracket pro_i \rrbracket$). In the embedded clause, under the scope of the attitude verb, c_0 is a locally bound context variable, and $F_{\omega(c_0)}(\tau(c_0))$ combines with the stranded presupposition-triggering feature $+\text{PAST}$. Notice that the presupposition triggered by $+\text{PAST}$ is that its sister node should refer to an interval that precedes the attitude holder's now.¹⁴ The embedded clause will then denote the (characteristic function of) the set S of contexts c_0 such that the author of c_0 is feeling sick at the interval yielded by F applied to the world and the time of c_0 . The matrix sentence will be true if every context compatible with what the subject says at some future time t' is a member of S . In our scenario, the subject's words will mean that his *nunc* is in the future of a be-feeling-sick interval that overlaps the noon of the preceding Saturday. More succinctly:

- (44) $\llbracket \text{that he was feeling sick} \rrbracket =$
 $\lambda c_0. \alpha(c_0) \text{ is feeling sick in } \omega(c_0) \text{ at the noon of the Saturday preceding } \tau(c_0)$
- (45) $\llbracket \text{he will say}^{\text{DE RE}} \text{ that he was feeling sick} \rrbracket =$
 There is a time $t' > t^*$ such that every context c compatible with his utterance at t' is such that $\alpha(c_0)$ is feeling sick in $\omega(c_0)$ at the noon of the Saturday preceding $\tau(c_0)$

Summing up, we have proposed that Portuguese has a referential Tense head that is composed of a time variable that refers anaphorically to contextually salient intervals and a shiftable indexical presupposition encoding anteriority with respect to some context time. When generated under the scope of an attitude verb, the pro-variable would be able to refer not only to past (with respect to the speech time), but also to present or future time intervals. As the data discussed above suggests, this is a welcome result.

a function from intervals to intervals, instead of a function from worlds and intervals to intervals

¹⁴As a consequence, *pro_i* cannot be interpreted *de nunc*, since we would end up with the contradictory requirement that an interval precedes itself. Analogously, a matrix past tense can never be interpreted as the speech time.

4 An Indexical Present Perfect

In the previous sections, we discussed uses of past tense verbs in which a pro-form T head referred anaphorically to a contextually salient interval. In particular, we discussed the synthetic verbal form traditionally referred to as *pretérito perfeito*, which we analyzed semantically as a past tense + perfective aspect combination. In this section, we turn our attention to uses of this form that are not anaphoric on any interval and that requires a different analysis. We argue that these uses instantiate an indexical *present* tense T head on top of a *perfect* Aspectual head.

Comparing Portuguese with other Romance languages, Giorgi and Pianesi (1998) proposed that its simple past is reminiscent of Latin synthetic present perfect, and claimed that it is indeed a present perfect. In support of their claim, they noticed that this past verb form is compatible with adverbs such as *agora* ('now'), something that is not the case in Italian or English, for instance (examples from Giorgi and Pianesi 1998:47-48):

(46) *Portuguese*¹⁵

Agora já comi o bastante.
now already ate the enough
'Now I have eaten enough'

(47) *Italian*

- a. Adesso ho mangiato abbastanza.
now I have eaten enough
'Now I have eaten enough.'
- b. *Adesso mangiai abbastanza
now I ate enough

(48) *English*

- a. Now I have eaten enough.
- b. *Now I ate enough.

Giorgi and Pianesi (1998:109-110) also pointed out that even when there is no adverbial expression in the sentence one can still detect a difference between the present perfect and the simple past in Italian, suggesting the presence of an indexical element on the former.

(49) Ho letto un articolo di Chomsky.
I have read an article by Chomsky
'I have read an article by Chomsky'

(50) Lessi un articolo di Chomsky.
I read an article by Chomsky
'I read an article by Chomsky.'

They comment that (49) "does not mean that there is a generic past tense in which I read a

¹⁵The word *já* in this example is common in this type of sentence, but it is not necessary.

paper by Chomsky, or that once in my life I did it. In the absence of any context, this sentence means that *recently* – that is, in a (short) interval which includes the present moment – I read a paper by Chomsky.” In contrast, they say that (50) “is not acceptable if there is no temporal specification available in linguistic or extra-linguistic context, such as *nel 1963* (in 1963).” Here too Portuguese *pretérito perfeito* can behave like a present perfect. (51), if uttered out of the blue, must be interpreted as (49):

- (51) Eu li um artigo do Chomsky.
 I read an article by the Chomsky
 ‘I read an article by Chomsky.’

In a similar vein, in her analysis of the English simple past, Kratzer (1998) notices that there are uses of this verb form that do not seem to encode an indexical past tense. She proposes an ambiguity for the simple past between a past perfective combination and a perfect interpretation. In support of her claim, she contrasts English and German simple pasts used out of the blue, as in the examples below uttered while the speakers are looking at churches in Italy:

- (52) a. Who built this Church? Borromini built this church.
 b. *Wer baute diese Kirche? Borromini baute diese Kirche.
 Who built this church? Borromini built this church.
 c. Wer hat diese Kirche gebaut? Borromini hat diese Kirche gebaut.
 Who has this church built? Borromini has this church built.

The relevant point here is that in this scenario there seems to be no contextually salient past interval, and yet the English past tense sounds fine. In German, however, the present perfect has to be used. Portuguese behaves like English in this respect, and the use of *pretérito perfeito* is perfectly natural in this scenario:

- (53) A: Quem construiu essa igreja?
 who built this church
 B: Borromini construiu essa igreja.
 Borromini built this church

I will take these facts as evidence that Portuguese *pretérito perfeito* can be the spell out of a present perfect. In the rest of this section, I provide additional evidence for this claim based on embedded uses of *pretérito perfeito*, all of which shows “present-like” indexical temporal behavior.

I start with some non-anaphoric uses which express something akin to an indefinite past, more or less similar in meaning to the expression ‘some time (or another) in the past’. The clearest cases involves the adverbial particle *já*, whose meaning can be roughly paraphrased in English by *already*, and cardinal adverbials of the type *n times*. Consider, for instance, (54) below:

- (54) Susana já casou três vezes.
 Susana already married three times
 “Susana already married three times.”

This sentence locates in the past three events of Susana getting married. What is interesting for us about *já* is that it is not compatible with past perfective readings, in which an event is located within a topic-like interval:

- (55) Na década de 70, Susana (*já) casou três vezes.
 in decade of 70 Susana already married three times

It seems then that the *pretérito perfeito* in (54) does not have a past perfective meaning. Compare, now (54) with (56):

- (56) Quando ela completou 30 anos, Susana já tinha casado três vezes.
 when she turned 30 years Susana already had married three times

The meaning of (56) is very much like the meaning of (54), except that the wedding events are located prior to a past interval in (56), rather than prior to the speech time, as in (54). I take these facts as additional evidence that the *pretérito perfeito* in (54) is the spell-out of a present tense + perfect aspect combination, and that (54) and (56) form a minimal pair differing only in terms of tense (present versus past).

4.1 Relative Clauses

Let us now turn to the behavior of these non-anaphoric uses of *pretérito perfeito* in embedded clauses. First, however, consider, (57), in which a present tense appears in a relative clause under the scope of a matrix past tense:

- (57) Pedro se casou com uma astronauta que está no espaço.
 Pedro self married with an astronaut that is on the space
 “Pedro married an astronaut who is on the outer space”

What is relevant here is that the present tense is interpreted indexically and necessarily refers to the utterance time. With this in mind, consider now the following sentence about Pedro and his astronaut wife, Susana:

- (58) Pedro se casou com uma astronauta que já viajou pro espaço.
 Pedro self married with an astronaut that already traveled to space
 “Pedro married an astronaut who traveled to the outer space”

In this sentence, the *pretérito perfeito* in the embedded clause locates Susana’s travel in the past, but does not order it with respect to the time when she and Pedro got married. This contrasts with (59) below in which the use of a past perfect in the embedded clause forces an interpretation according to which Susana’s travel happened before she and Pedro got married (assuming the sentence is uttered out of the blue).

- (59) Pedro se casou com uma astronauta que já tinha viajado pro espaço.
 Pedro self married with an astronaut that already had traveled to space
 “Pedro married an astronaut who had already traveled to the outer space”

The contrast above shows that an embedded *pretérito perfeito* is anchored at (and backshifts from) the utterance time. To strengthen this point and show that backshifting is always from the utterance time and never from the the event time of a superordinate clause, let us consider a different scenario, still about Pedro and Susana. In this new scenario, Susana has traveled five times to the outer space. The first three travels happened before she and Pedro got married, and the last two happened after that. Consider then (60) below:

- (60) Pedro se casou com uma astronauta que já viajou pro espaço
 Pedro self married with an astronaut that already traveled to space
 três/cinco vezes.
 three/five times
 “Pedro married an astronaut who traveled to the outer space three/five times”

In this example we have *pretérito perfeito* in the embedded clause and truth-value judgments are very clear: the version with numeral *three* is false and the one with *five* is true in the scenario we described above. We conclude that the cardinal adverbial *three/five times* counts the number of traveling events that occurred prior to the speech time, not to the wedding time. As one might expect at this point, judgments reverse when the *pretérito perfeito* is replaced by the past perfect (*pretérito mais que perfeito*):

- (61) Pedro se casou com uma astronauta que já tinha viajado pro espaço
 Pedro self married with an astronaut that already had traveled to space
 três/cinco vezes.
 three/five times
 “Pedro married an astronaut who had traveled to the outer space three/five times”

Indeed, (61) is true with numeral *three* and false with numeral *five*, indicating that what is being counted this time is the number of traveling events that occurred prior to the wedding time. This reversal in judgments tells us that although embedded under another past tense, *pretérito perfeito* cannot take this embedding tense as its anchor. Rather it can only be anchored in the utterance time, backshifting from there.

The judgments above would follow naturally if we assumed that *pretérito perfeito* is interpreted as an indexical present perfect, instantiating a present Tense head that refers to the speech time, and a Perfect aspectual head that back-shifts from there.¹⁶

¹⁶Could this type of judgment result from some sort of pragmatic blocking due to a competition between *pretérito perfeito* and past perfect forms? One might maintain, for instance, that an embedded *pretérito perfeito* can in principle encode anteriority either with respect to the speech time or the embedding event time, whereas a past perfect can only be interpreted as back-shifting from the embedding event time. As such, a speaker who uses the past perfect instead of *pretérito perfeito* would just be following a general cooperative strategy of avoiding ambiguity. However, if this were the case, one would expect *pretérito perfeito* to be possible whenever contextual clues neutralized any potential communicative damage arising from ambiguity.

4.2 Double-Access Readings

Let us now examine another embedded context in which the “present-like” indexicality of *pretérito perfeito* shows up. As a preliminary step, we start discussing cases with an embedded overt present tense. These involve embedded Ts within the complement of attitude verbs, which give rise to the so-called double access readings (see Abusch (1997) and Ogihara (1996), *inter alia*):

(62) John said that Mary is pregnant.

This sentence conveys that according to John, Mary was pregnant (then), and would still be at the utterance time. Providing a compositional account for this double accessibility is a complex and still debatable issue. Here I sketch a formal account along the lines of Abusch (1997), which analyses double access readings as cases of temporal *de re* interpretations. Recall from what we saw in section 3 about the *res* movement approach to *de re* interpretations that the embedded tense (whose reference corresponds to the *res* towards which the attitude is related) moves to the matrix clause and its trace is replaced by an interval concept (F) corresponding to the way the attitude holder represents to himself the time of the embedded predication.

(63) a. John said that Mary is pregnant.
 John $[_T \text{ PAST}_1]$ say $\lambda c_0. [_T \text{ PRES}] \lambda t. \text{be-pregnant}(t)$ $\xrightarrow{\text{de re}}$

As the following example shows, such rescue is not available to save a relative past interpretation for the *pretérito perfeito* in past-under-past configurations:

(i) #Em 1980, o bebê da Maria foi operado por um médico que nunca operou uma criança.
 in 1980 the baby of_the Maria was operated by a doctor who never operated a child
 “In 1980, Mary’s baby was operated by a doctor who never operated a child”

In this case, although the only sensible interpretation is the one according to which the doctor had never operated a child before Mary’s son surgery, *pretérito perfeito* only conveys the inconsistent interpretation that even now (the speech time), the doctor has never operated a child. Notice also that a question such as (ii) cannot be answered as in (iii):

(ii) É verdade que você namorou um astronauta que nunca viajou pro espaço?
 is true that you dated an astronaut that never traveled to_the space
 “Is it true that you dated an astronaut that never traveled to the space?”

(iii) #Yes! Although he has traveled to the space several times since we broke up.

The answer sounds contradictory suggesting that a relative past (pluperfect) interpretation for the embedded *pretérito perfeito* in (ii) is not an option at all.

An anonymous reviewer suggested that it would be more convincing to show that even when a Past Perfect is ungrammatical for some reason, there is no relative reading for a *pretérito perfeito* sentence. Unfortunately, I could not find a construction that would allow us to test this prediction. Notice though that in addition to account for the embedded uses of *pretérito perfeito* we have just discussed without the need to postulate any form of competition, the analysis developed here receives independent motivation from the Giorgi and Pianesi matrix facts presented in the beginning of this section.

- John $[_T \text{ PAST}_1]$ PRES-say $\lambda c_0. [_T F_{\omega(c_0)}(\tau(c_0))] \lambda t. \text{be-pregnant}(t)$]
 b. $F_{\omega(c^*)}(g(1)) = \llbracket \text{PRES} \rrbracket$

Suppose, for instance, that what John said to himself about Mary’s pregnancy was something like ‘Mary is not more than 8 months pregnant’. In this case, the interval concept F could correspond to a function that maps a time t (and a world w) to the interval corresponding to the month that includes t . According to condition (63b), F should map the time of John’s statement about Mary’s pregnancy to the interval denoted by PRES. Since the indexicality of PRES requires its denotation to overlap the utterance time, (63a) could be felicitously uttered in the days following John’s statement which are located within the same month. After that, (63a) would not be appropriate. All this sounds correct about the interpretation of (63a) and similar sentences, and seem to capture the main ingredients of double-accessibility.^{17 18}

What is relevant for this paper is that the embedded present tense is what triggers double-accessibility, most likely due to its indexical nature. Replacing it with a past tense makes the double-access reading disappear, and in the absence of any other contextually salient interval what remains is a simultaneous, *de nunc* interpretation:

- (64) John said that Mary was pregnant.

Double-access readings also exist in Portuguese, and the contrast between (63) and (64) can be replicated with the embedded clauses containing the simple present and the past imperfect, respectively:

- (65) Pedro disse que Maria está grávida.
 Pedro said that Maria is pregnant
 [*double-access*]
 (66) Pedro disse que Maria estava grávida.
 Pedro said that Maria was-imp pregnant
 [*simultaneous*]

With this much in mind, let us see how a non-anaphoric *pretérito perfeito* behaves in this configuration. Consider, (67), for instance:

- (67) Pedro me disse que Susana já viajou (exatamente) três vezes pro espaço.
 Pedro me told that Susana already traveled (exactly) three times to space
 “Pedro told me that Susana traveled (exactly) three times to the outer space.”

The embedded tense receives a backshifted interpretation and Susana’s three trips to the outer space are located prior to the matrix event. In this regard, that is not different from

¹⁷Notice that the denotation of the present tense is being relaxed to allow intervals that overlap the speech time, which includes – but is not restricted to – the speech time itself.

¹⁸I should say that I am ignoring here another constraint proposed by Abusch – the Upper Limit Constraint – which does not allow for future oriented time concepts (such as *next saturday*) within the complement of an attitude verb. This is necessary to avoid assigning to (63a) a reading equivalent to ‘John said Mary would be pregnant’. For extensive discussion about the characterization and the role of the ULC, see Abusch (1997).

what happens with an embedded past perfect:

- (68) Pedro me disse que Susana já tinha viajado (exatamente) três vezes pro espaço.
Pedro me told that Susana already had traveled (exactly) three times to space
“Pedro told me that Susana had traveled three times to the outer space.”

However, there is a clear contrast between (67) and (68): the first conveys that according to what Pedro said Susana has not traveled to the outer space since then. In other words, (67) conveys that according to him the embedded clause would still be true at the utterance time. It would be unacceptable to utter (67) if Pedro made it clear that Susana would travel again right after the matrix saying event took place. No such constrain is imposed on (68), which is silent about whether or not Susana traveled within the interval between the matrix event and the utterance time. Other temporally oriented adverbs produce similar effects:

- (69) Pedro me disse que Susana nunca viajou pro espaço.
Pedro me told that Susana never traveled to space
“Pedro told me that Susana never traveled to the outer space.”
- (70) Pedro me disse que Susana só viajou pro espaço uma única vez.
Pedro me told that Susana only traveled to space one unique time
“Pedro told me that Susana only traveled once to the outer space.”

(69) indicates that Susana has never traveled to the outer space in her entire life and (70) that she has only been there once in her life, according to Pedro.¹⁹

The picture that emerges is that embedding a non-anaphoric *pretérito perfeito* under an attitude verb also marked for past tense requires that the embedded clause be evaluated with respect both to the attitude time and the utterance time. If we compare (65) and (66) to (67) and (68) the semantic parallel is evident, and if we assume that the *pretérito perfeito* in (67) is indeed a present perfect, we could attribute the origin of the double accessibility to a single source, namely the presence of an indexical present tense embedded under a past attitude verb.

The crucial difference between (65) (and other well-known cases of double-access readings) and (67) (and similar examples in (69)-(70)) is that the interval that is required

¹⁹These interpretations persist even when the context is strongly biased towards a past-of-a-past interpretation. For instance, imagine that it is a well-known fact that my friend Mary is now an experienced public speaker. However, I still remember when we first met ten years ago and ...

- (i) #Ela mesma me disse que nunca falou em público.
she herself me told that never spoke in public
“She herself told me that she never spoke in public.”

The sentence sounds odd conveying that Mary remains an unexperienced speaker, an information inconsistent with the shared knowledge that she isn't. It seems that no amount of pragmatic rescuing can enable a past-of-a-past (pluperfect) interpretation for the *pretérito perfeito*.

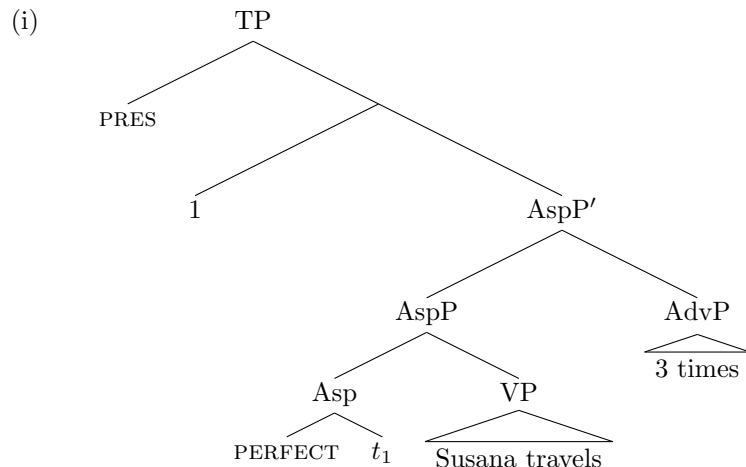
to stretch from the attitude time up to the speech time is related to the VP predicate “Mary_be_pregnant” in the former, but to the post-interval introduced by the perfect in the latter. As a result, for (67) to be true, both the attitude time and the speech time (as well as any interval in-between) should have the property of being an interval t such that there are exactly three events of Susana traveling to the space that precede t . This correctly captures the intuition that according to Pedro, Susana has not traveled to the space again since his past report described in the matrix clause. A similar reasoning applies to (69) and (70):²⁰

(71) *Temporal interpretation of the embedded clause in (65)*
 $\llbracket \text{que Maria está grávida} \rrbracket =$
 PRES λt . maria_be_pregnant(t)

(72) *Temporal interpretation of the embedded clause in (67)*
 $\llbracket \text{que Suzana já viajou 3 vezes pro espaço} \rrbracket =$
 PRES λt . $\exists!3 t' : t' < t \ \& \ \text{susana_travels}(t')$

Extending to (72) the *de re* account presented above for (71), we have:

²⁰For concreteness and in order to compositionally derive the denotation in (72), I will split the interpretation of the PERFECT aspectual head we presented in section 2, and assume that it introduces a temporal precedence relation in the semantic derivation, but does not existentially bind any time variable. \exists -closure comes from outside, either by a time adverbial such as x times or by a default \exists -closure mechanism at the AspP level. Moreover, I assume that the T head is base generated as the complement of the Asp head and is raised to its surface position, leaving a trace and providing a λ -abstract over intervals which will bind it. A schematic structure and a step-by-step derivation for the relevant portion of (67) is provided below:



(ii) $\llbracket \text{VP} \rrbracket = \lambda t$. Susana travels at t
 $\llbracket \text{PERFECT} \rrbracket = \lambda t'$. λt . $t < t'$
 $\llbracket \text{AspP} \rrbracket = \lambda t$. $t < g(1) \ \& \ \text{Susana travels at } t$
 $\llbracket \text{exactly 3 times} \rrbracket = \lambda P$. $\exists!3t' : P(t')$
 $\llbracket \text{AspP}' \rrbracket = \exists 3t' : t' < g(1) \ \& \ \text{Susana travels at } t'$
 $\llbracket 1 \text{ AspP}' \rrbracket = \lambda t$. $\exists!3t' : t' < t \ \& \ \text{Susana travels at } t'$

- (73) Pedro disse que Susana já viajou três vezes pro espaço.
 Pedro said that Susana already traveled three times to space
- Pedro $[_T \text{ PAST}_1]$ say $\lambda c_0. [_T \text{ PRES}] \lambda t. \exists!3 t' : t' < t \ \& \ \text{susana_travels}(t')$ $\xrightarrow{\text{de re}}$
 Pedro $[_T \text{ PAST}_1]$ PRES-say $\lambda c_0. [_T F_{\omega(c_0)}(\tau(c_0))] \lambda t. \exists!3 t' : t' < t \ \& \ \text{susana_travels}(t')$

Suppose, for instance, that according to what Pedro had in mind when he stated what is in the embedded clause of (73) the number of past travels by Susana would remain constant throughout a certain amount of time (say, one month or so). Then, (73) could be felicitously uttered after Pedro’s original statement but within an approximately month-long interval. On the other hand, if a longer interval has elapsed since Pedro’s statement and his presumed state of mind at that time did not warrant any conclusions about Susana’s recent travels, then uttering (73) would not be appropriate. This seems correct and a good approximation of the meaning of (73) and the related examples presented above.

Needless to say, this is not a worked-out, formal account of double-access readings, which is certainly beyond the scope of this paper. Nevertheless, it can shed light on how (superficial) past-under-past configurations can give rise to such readings in a way that is not substantially different from the more discussed present-under-past configurations. The key idea defended here is that this synthetic past tense is actually the spell-out of a present+perfect combination, an idea that is in line with the Giorgi and Pianesi facts reviewed in the beginning of this section, as well as the relative clause interpretations discussed in 4.1.

5 Non-Indexical Present Perfects

We have now gathered considerable evidence that *pretérito perfeito* can be the realization of a present+perfect combination, and that this built-in present tense is responsible for the indexical character of this verbal form. As we saw, this indexicality reveals itself in matrix as well as in embedded contexts in which *pretérito perfeito* appears under a superordinate past tense.

There are cases, however, when a present tense does not behave as an indexical tense, and it is important to see how the non-anaphoric uses of *pretérito perfeito* that we are looking at behaves in these contexts. Our prediction is that it should also lose its indexical behavior. As we will see, this prediction is borne out.

5.1 Zero Tenses

Kratzer (1998) extends Partee’s 1973 analogies between tenses and pronouns to embedded tenses related to the so-called sequence of tense phenomena. These are cases in which the features that constitute a tense morpheme – present or past – are not interpreted as such and seem to merely reflect some sort of formal agreement with a controlling tense. Two typical examples are presented below:

- (74) John will buy a fish that is alive.

(75) John said he would buy a fish that was alive.

In (74) (from Ogihara 1996) the present tense of the relative clause need not be interpreted as overlapping the utterance time, but rather as overlapping the time of buying, which is located in the future. Similar observations apply to (75). In this case, the past tense of the relative clause can also be interpreted as overlapping the time of buying, which can precede, overlap, or follow the utterance time. If we follow Abusch and others and assume that *will* is the present tense form of an abstract future operator *woll* (*would* being its past tense form), the embedded tenses in (74) and (75) could be treated as uninterpretable, only reflecting the temporal specification of their superordinate tenses.

Kratzer's implementation of these ideas is that English has as part of its lexicon what she called a zero tense. Zero tenses – represented as \emptyset – are not indexical morphemes, and do not carry any presupposition that constrains their denotation:

(76) $[[\emptyset_i]]^{g,c} = g(i)$

Semantically, they are interpreted as bare variables that need to be bound by the closest temporal/intensional operator present in the syntactic structure. Morphologically, they inherit the tense marking of these controlling operators. This feature transmission does not affect interpretation. (74), for instance, can be represented as follows:²¹

(77) John will buy a fish that is alive
 pres FUT λt_1 . John buy- t_1 a fish that $\emptyset_1 \lambda t_2$.be.alive- t_2

The analogy in this case is with personal pronouns as in (78) below, attributed by Kratzer to Irene Heim (see Heim 2008):

(78) Only I got a question that I understood.

Here the second instance of the first person pronoun *I* need not be interpreted indexically, i.e. referring to the speaker. It can be interpreted as a bound variable ranging over individuals, giving rise to an interpretation according to which the speaker is the only person that verifies the following formula: *x* got a question that *x* understood.

Back to the temporal domain, among the operators that can act as semantic binders of a zero pronoun, and transmit to them their morphological tense marking are the future operator WOLL as seen above, and attitude verbs, such as *believe*, giving rise to *de nunc* readings:

(79) It is nine o'clock, but John believes it is ten.

(80) It will be nine o'clock when John gets home, but he will believe it is ten.

(81) It was nine o'clock, but John believed it was ten.

²¹The representation in (77) assumes that there are silent object language interval pro-forms that saturate the verb's temporal argument and that gets bound by a local lambda operator. On the necessity of these object language pro-forms, see Kusumoto (2005).

In these examples the embedded tense in the clauses that serve as the complement of the attitude verbs are interpreted as simultaneous to the subjective now of the attitude holder (John) at the time of his belief (nine o'clock). If the present tense in (79) denoted the utterance time, we would be attributing to John a contradictory belief (that it is nine o'clock and ten o'clock at the same time), and that is not what the sentence means in its most natural reading. The same would apply to (80) and (81) if we took the embedded tense to be anaphoric to the future/past reference time, and both denoting nine o'clock.

Kratzer's idea then is that in addition to two indexical tenses (*past* and *pres*), English has a non-indexical zero tense (\emptyset) that is spelled out as present or past depending on the tense marking of its controlling operator.

5.2 Portuguese Zero Tense

Does Portuguese have a zero tense? Consider first present/past under future configurations that do not involve an attitude verb. The examples below are Portuguese translations of the Ogihara sentences (74)-(75):

- (82) João comprará um peixe que está fresco.
 John buy-fut a fish that is fresh
- (83) João disse que compraria um peixe que estava fresco.
 John said that he_would_buy a fish that was fresh

The examples are not ungrammatical, but they sound degraded if the embedded tenses are not read indexically. (82) indicates that the fish is fresh at the utterance time, and (83) that it was fresh at some point before the utterance time. However, simultaneous readings according to which the most embedded tenses are interpreted as overlapping the time of the embedding predicate (the time of buying in these examples) become available if subjunctive forms replace the indicative ones used above:

- (84) João comprará um peixe que esteja fresco.
 John buy-fut a fish that is-subj fresh
- (85) João disse que compraria um peixe que estivesse fresco.
 John said that he_would_buy a fish that was-subj fresh

Subjunctive tenses, whenever licensed, seem to be preferred over indicative forms as the spell-out of zero tense pro-forms. What happens if subjunctive forms are not licensed? This is the case of complement clauses of attitude verbs, when the verb selects for indicative mood. As the examples below illustrate, both present and past indicative forms are fine:

- (86) Serão nove horas, mas João achará que são dez.
 will_be nine hours, but John believe-fut that are ten.
 "It will be nine o'clock, but John will believe it is ten."

- (87) Serão nove horas, mas Maria disse que João acharia que eram dez.
 will_be nine ours, but Mary said that John would_believe that were_imp ten.
 “It will be nine o’clock, but Mary said that John would believe it was ten.”

Finally, another piece of data that points in this direction is (88) below, a Portuguese variation on a well-known English example by Dorit Abusch:

- (88) João decidiu uma semana atrás que em dez dias no café-da-manhã ele contaria
 João decided a week ago that in ten days at breakfast he would_tell
 pra mãe dele que aquela era a última refeição deles juntos.
 to mother his that that was_imp the last meal their together.
 “John decided a week ago that in ten days at breakfast he would say to his mother
 that that was their last meal together.”

According to Abusch, the most embedded past tense in the English translation can be interpreted as simultaneous to the time of the embedding verb (*to say*), which is located in the future. This reading (although not readily available to some speakers I consulted) is fine in (88), in which this most embedded verb appears in the past (imperfect) indicative. Here there is no subjunctive alternative since the embedding verb (*contar*) selects for indicative mood.

What is the relevance of all this to our analysis of the non-anaphoric uses of *pretérito perfeito* as a present perfect? The relevant point is that in the same environments in which the simple present can be read non indexically, these non-anaphoric *pretérito perfeitos* can be too. And when subjunctive forms that can compete with the *pretérito perfeito* are available, the use of this indicative form becomes comparatively degraded. Consider, first, the complement of an indicative selecting verb:

- (89) Em duas horas, o juiz perguntará ao júri se eles já chegaram a um
 In two hours the judge will_ask to_the jury if they already arrived to a
 veredito.
 verdict.
 “In two hours, the judge will ask the jury if they have already reached a verdict.”

In this case, the moment the jury reaches the verdict does not need to precede the utterance time. *Pretérito perfeito* only indicates precedence with respect to the (future) question to be posed by the judge. This lack of indexicality is parallel to what we saw above in (86).

What about relative clauses in cases similar to (77)?

- (90) João vai comprar um peixe que já foi limpo.
 John will buy a fish that already was cleaned

In this case a non-indexical interpretation sounds degraded, specially when compared to its subjunctive counterpart:

- (91) João vai comprar um peixe que já tenha sido limpo.
John will buy a fish that already has-subj been cleaned

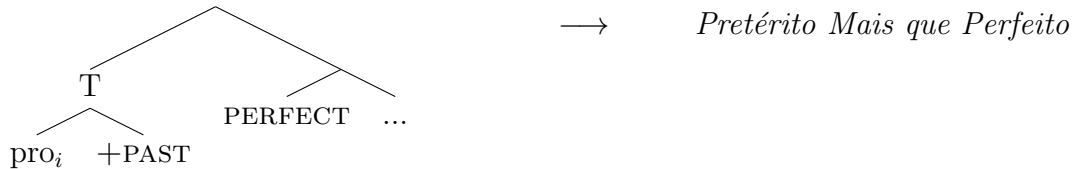
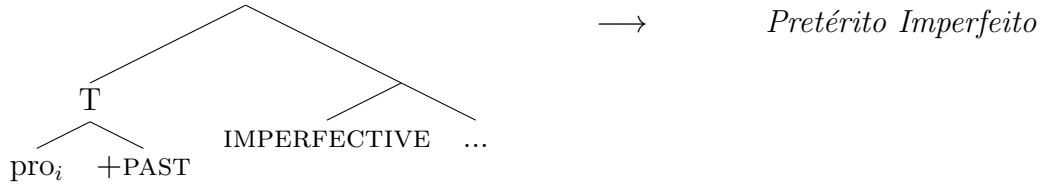
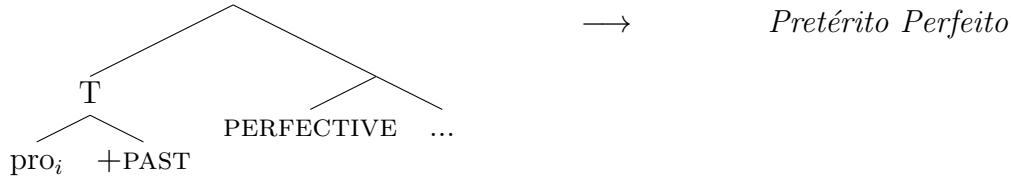
In this case a periphrastic perfect (have+participle) is available with the auxiliary appearing in the present subjunctive. This form, which can only be read non-indexically, is preferred over the indicative.

Summing up, the parallels between the indexical behavior of non-anaphoric uses of *pretérito perfeito* and the simple present carry over to non-indexical uses of these forms too, and reinforces the claim that these instances of *pretérito perfeito* should be viewed as a present perfect in disguise. One only has to bear in mind that the disguised *present* stands for an abstract feature marking, and not to a specific semantic value. It can be an inborn indexical T head, but it can also be a *zero tense* that inherited its tense feature from a superordinate present.

6 Conclusion

The first proposal of this paper was that Portuguese has a referential past tense that is built out of a temporal pro-form combined with a shiftable indexical presupposition. This presupposition restricts the denotation of its sister constituent to range over intervals that precede the temporal coordinate of a context. This context can be either the local context associated with an attitude verb or the speech context with respect to which the matrix clause is evaluated. This past tense head can combine with any aspectual head, and then be spelled out as one of the three past tense verb forms of the Portuguese indicative system, as represented in the tree-lets below:

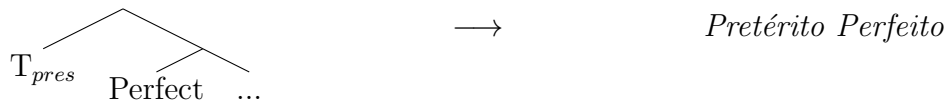
- (92) *Spell-Out of Portuguese Past Verb Tenses*

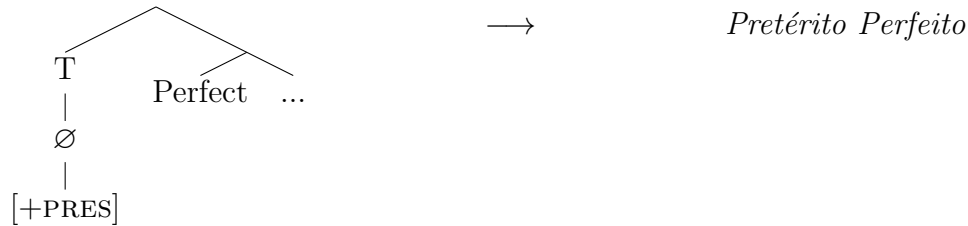


When any of these tree-lets is embedded within the complement of an attitude verb, the pro-form is interpreted *de re*, its assignment dependent denotation is not restricted to intervals that precede the speech time, and can refer to future (after the speech time) intervals as well. As we have shown, this is a consequence of the syntactic separation between the pro-form and the presupposition trigger. The crucial point is that the former can be targeted by *de re* interpretive mechanisms while leaving the presupposition trigger to be interpreted *in situ*. Section 2 showed that this interpretation is attested in Portuguese.

The second proposal of the paper was that the Portuguese synthetic verb form *Pretérito Perfeito* can be the spell out of a [+present] T head combined with a PERFECT Asp head, in the spirit (though not the letter) of Giorgi and Pianesi (1998). This [+present] T head can correspond either to an indexical pro-form or a zero-tense (Kratzer 1998) whose feature specification was inherited by a super-ordinated present tense, and does not affect T's interpretation.

(93) *Spell-Out of Portuguese Indicative Present+Perfect Combination*





As we discussed in sections 4, 5 and 6 this allows for present and future perfect interpretations. We also showed that past tense + perfect combinations are never spelled out as *pretérito perfeito*, but rather as *pretérito mais que perfeito*. We went through several examples showing that although in some circumstances the two forms seem synonymous it is always possible to set up appropriate scenarios that can tease the interpretations apart and reveal truth-conditional differences between them.

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