Ordering Aspect & the temporal interpretation of Karitiana subordinate clauses

This paper addresses the issue of the temporal interpretation of subordinate clauses in Karitiana, a Tupi language spoken in Northwest Brazil (Storto 1999). We compare the temporal interpretation of subordinate clauses in Karitiana with that of other languages where subordinate clauses are (at least on the surface) tenseless. We conclude that Karitiana shows a freedom of temporal interpretation that must be imputed to a covert semantically underspecified higher aspectual head (Ordering Aspect (ASP_{ord})) in Rullman & Matthewson's (2018) typology. We start by establishing the following three patterns of temporal construals, drawing the implications for possible analyses.

I. *Karitiana Bare Complement Clauses (CCs) are temporally free* (Donazzan et al. 2024). Karitiana main clauses are overtly inflected for Future/NonFuture tense (Storto 1999), while subordinate clauses disallow any morphological F/NF marking. As shown in (1a), the CC can be interpreted as either simultaneous or past-shifted relative to the matrix attitude time (i.e. the attitude holder's now). However, an explicit context can also shift the CC's temporal reference to the future of the matrix attitude time, as in (1b)

Karitiana thus differs from languages such as Mbyá Guarani (Thomas 2012) where bare CCs only allow simultaneous readings, as well as languages such as Washo (Bochnak, Hohaus & Mucha 2019), where bare CCs allow either simultaneous of past-shifted readings, but crucially not future-shifted readings such (1b). The pattern in (1) aligns, however, with Mandarin, as shown (2). Mandarin CCs with a bare stative predicate also yield by default simultaneous readings (in (2a), Lùlu's stay in Paris coincides with the matrix Event Time (ET) of thinking). When an anchoring adverb is provided, however, the ET of the CC can fall either earlier or later than the matrix ET. Thus, if (2b) is uttered in July 2025, Lùlu's stay in Paris can be in the fall of either 2024 or 2025.

ii. *Karitiana CCs with overt perfect or prospective aspect only allow shifted readings: past or future shifted (respectively).* The morpheme *byyk*, a perfect marker as shown in (3a) (Rocha 2022), forces a past-shifted (earlier-than-matrix) reading in (3b) while the prospective morpheme *pasagng* yields a future (later-than-matrix) reading (cf. (9)).

Again, this pattern aligns with Mandarin: as shown in (4), the perfect marker *guo* only allows earlier-than-matrix readings, but never later-than-matrix readings.

iii. *Kariatiana CCs with overt PROGressive aspect still allow temporally-free readings.* Crucially, however, Karitiana and Mandarin no longer patter alike with an overt PROG in the CC. The morpheme *tyka,* a PROG marker as shown in (5a) (Storto 2002), yields by default a simultaneous construal (5b), but is nonetheless compatible with shifted construals, with the appropriate context provided. In particular, the context (5c) licences a future-shifted construal where Ivan's travelling falls later than the matrix attitude time.

In contrast, in Mandarin CCs with PROG aspect (6) only allow simultaneous or past-shifted readings. When no adverb is present in the CC (6a), the time of studying French coincides with the matrix attitude (thinking) time. With an adverbial like *qiūtiān* 'autumn' in the CC, we expect the CC event time to coincide with the time denoted by that adverb –that is, to hold in the fall. Crucially, if the thinking time is located in January 2025, *qiūtiān* can only refer to an autumn earlier, but never later, than January 2025.

We argue that this contrast follows simply on two assumptions: (i) the source of temporally free readings, be it in Karitana or Mandarin, is a semantically underspecified null higher aspectual head; (ii) the difference between the two languages lies in the classification of the (overt) PROG marker: Karitiana *tyka* instantiates lower ASP°, while Mandarin *zài* instantiates higher ASP° (as independently argued by Tsai 2008).

Iv. *Semantically underspecified ordering Aspect (ASP_{ord})*

We adopt Rullman & Matthewson's Two-Tier Aspect Hypothesis decomposing aspect into

two layers. Lower ASP° serves to map properties of events (type ⟨*v*, *st*⟩) to properties of times (type ⟨*i*, *st*⟩) by imposing conditions on the relation between the run-time of the event and a Ref(erence)-T(ime. Thus the lower PROG aspect marker *tyka* (5) requires the RefT (*t*) to be included within the ET (cf. Kratzer 1998)

(7) Lower Asp: $[[_{\text{ASP-INC}}\ \text{PROG}\ \textit{tyka}\ ]]^{g,c} = \lambda p_{<v,t>}.\ \lambda t_i.\ \exists e[\ t \subseteq \tau(e)\ \&\ p(e) = 1\ ]$

Higher ASP° (type <<i,st>,<i,st>>), on the other hand, maps the property of times denoted by the lower AspP onto another property of times by imposing ordering constraints on the two times it relates.

We claim that Karitiana has three aspectual heads instantiating ordering ASP with the denotations given in (8).

(8) Karitiana Higher ASP a. $[[_{\text{ASP-ORD}}\ \text{PERF}\ \textit{bykk}]]^{g,c} = \lambda p_{<i,t>}.\ \lambda t_i.\ \exists t'[t' < t\ \&\ p(t') = 1]]$

b. $[[_{\text{ASP-ORD}}\ \text{PROSP}\ \textit{pasagng}]]^{g,c} = \lambda p_{<i,t>}.\ \lambda t_i.\ \exists t'[t < t'\ \&\ p(t') = 1]$

c. $[[_{\text{ASP-ORD}}\ \emptyset]]^{g,c} = \lambda p_{<i,t>}.\ \lambda t_i.\ \exists t'[p(t') = 1]$

PERF *byyk* and PROSP *pasagng* constrain the two times they relate (*t, t'*) to precedence/subsequence (respectively). But Karitiana also has a covert higher ASP° that is semantically underspecified, imposing no restriction on the two times it relates.

Evidence for this classification of aspectual heads is provided in (9), which shows that *tyka* and *pasagng* can co-occur, as predicted if they instantiate different layers of aspect.

The derivations below illustrate how our proposal derives the Karitiana pattern of temporal interpretation in (7)/(9) where PROSP constrains the CC running time to fall later than the matrix attitude time vs. (5c)/(10) where the CC is temporally free.

(9) $[_{CC}$ her husband was going to be running] (cf. (9)

a. $[[_{\text{AspP2}}\ \text{PROG VP}]]^{g,c} = \lambda t_i.\ \lambda w_s.\exists e[t \subseteq \tau(e)\ \&\ \text{run(husband)}(e)(w) =$

b. $[[_{\text{AspP1}}\ \text{PROSP AspP2}]]^{g,c} = \lambda t_i.\ \exists t'\ [t < t'\ \&\ \exists e\ [t' \subseteq\ \tau(e)\ \&\ \text{run(husband)}(e)(w) = 1]]$

c. $[[\text{TP}]]^{g,c} = 1$ iff $\exists t'[g(n) < t'\ \&\ \exists e\ [t' \subseteq \tau(e)\ \&\ \text{run(husband)}(e)(w) = 1]]$, 0 otherwise

d. $[[\text{CC}]]^{g,c} = \lambda w_s.\ \exists t'[g(n) < t'\ \&\ \exists e\ [t' \subseteq \tau(e)\ \&\ \text{run(husband)}(e)(w) = 1]$

(10) $[_{CC}$ that Ivan was/had been/would be travelling to São Paulo] (cf. (5c)]

a. $[[_{\text{AspP1}}\ \text{Asp°}\ \emptyset\ \text{AspP2}]]^{g,c} = \lambda t_i.\lambda w_s.\exists t'\exists e\ [t' \subseteq \tau(e)\ \&\ \text{travel to SaoP (Ivan)}(e)(w) = 1]$

b. $[[\text{TP}]]^{g,c} = 1$ iff $\exists t'\ \exists e\ [t' \subseteq \tau(e)\ \&\ \text{travel to Sao Paulo(Ivan)}(e)(w) = 1]$

c. $[[\ \text{CC}]]^{g,c} = \lambda w_i.\exists t'\exists e\ [t' \subseteq\ \tau(e)\ \&\ \text{travel to Sao Paulo(Ivan)}(e)(w) = 1]$

PROSP in (9) constrains the evaluation time of the CC –*g*(*n*) in (9c-d) – which ends up bound by the matrix attitude time, to fall before the subinterval *t'* of Ivan's travelling time. In contrast, since the higher zero aspect ($\emptyset_{\text{ASP}}$) in (10) imposes no ordering constraint on the subinterval *t'* of Ivan's travelling, the latter will thus be free to fall before, during, or after the matrix attitude time.

Going back to Mandarin. We will show how Tsai's (2008) two-tier aspect analysis - where both perfect *guo* and PROG-*zài* realize higher aspect - allow us to explain why *zài,* unlike Karitiana *tyka,* does not allow future shifted readings.

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(1) a. 0-py-sondyp-yn Marta [vinho-ty Luiz ahy]-ty
3sg-AST-know-NFT Marta [wine-OBL Luiz drink]-OBL
Marta knows/knew that Luiz drinks/drunk wine

b. *Context: Luiz, Maria & you are invited to Marta's tomorrow. Maria asks why Marta bought wine. You say:*
0-py-sondyp-yn Marta [vinho-ty Luiz ahy]-ty
3sg-AST-know-NFT Marta [wine-OBL Luiz drink]-OBL
Marta knows that Luiz will drink wine (tomorrow)

(2) a. Jīnnián yīyuè Mǎkè yǐwéi Lùlu dāi zài bālí.
this.year January Mac think Lulu stay at Paris
In January (this year), Mac thought that Lulu was staying in Paris.

b. Jīnnián yīyuè Mǎkè yǐwéi Lùlu qiūtiān dāi zài bālí. *✓Fall 2024 ✓Fall 2025*
this.year January Mac think Lulu autumn stay at Paris
In January (this year), Mac thought that Lulu stayed/would stay in Paris in the fall.

(3) a. Koot omenda ø-na-otam **byyk**-ø ĵonso.
yesterday noon 3-DECL-come PERF-NFUT woman
Yesterday at noon the woman had (already) come. (Rocha 2022: 248)

b. Context: why is Edelaine so sad today?
[Ta-man pykyn<a> **byyk**<y>]-ty ∅-nakoro'op.hadna-t Edelaine
[3anph-husband run<ev> PERF< EV>]-obl 3-think-NF Edelaine
Edelaine believes her husband to have run away.

(4) a. Jīnnián yīyuè Mǎkè yǐwéi Lùlu xué **guo** fǎyǔ.
this.year January Mac think Lulu study PERF French
In January (this year), Mac thought that Lulu had studied French.

b. Jīnnián yīyuè Mǎkè yǐwéi Lùlu qiūtiān xué **guo** fǎyǔ.
this.year January Mac think Lulu autumn study PERF French
In January (this year), Mac thought that Lulu had studied French in the Fall.
✓Fall 2024, ✗ Fall 2025

(5) a. Õwã ∅-naka-'y **tyka-**t kinda'o
child 3sg-DECL-eat PROG-NFT fruit
The child is eating fruit (Carvalho 2010: 19)

b. ta-man pykyna **tyka**]-ty ø-na-koro'op hadna-t Edelaine
[ANAF-husband run IMPF]-OBL 3-DECL-think-NFUT Edelaine
Edelaine thought that her husband was running. (Rocha 2022)

c. *Context: You and some friends are at Ana's place, but Ivan is not there. Maria wonders why Ivan was not invited. Ana planned the party yesterday, so you say:*
koot 0-na-koroop.hadnan-0 Ana [Sao Paulo pip Ivan tat **tyka**]-ty
yesterday 3.SG.-AST-think-NFT Ana [São Paulo to Ivan go PROG]-obl
Yesterday Ana thought that Ivan would be travelling to São Paulo (now)

(6) a. Jīnnián yīyuè Mǎkè yǐwéi Lùlu **zài** xué fǎyǔ.
this.year January Mac think Lulu PROG study French
In January (this year), Mac thought that Lulu was studying French.

b. Jīnnián yīyuè Mǎkè yǐwéi Lùlu qiūtiān **zài** xué fǎyǔ. *✓Fall 2024 ✗Fall 2025*
this.year January Mac think Lulu autumn PROG study French
In January (this year), Mac thought that Lulu was studying French in the Fall.

(9) [ta-man pykyna **pasagngã tyka**]-ty ø-na-koro'op hadna-t Edelaine
ANAF-husband run PROSP IMPF-OBL 3-DECL-think-NFUT Edelaine
Edelaine thought that her husband was going to be running. (Rocha 2022)