

The Clausal Nature of Universally Quantified Phrases in Karitiana

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1. Introduction

In this paper we discuss the structure and interpretation of universal clauses in Karitiana, which are illustrated in (1):

- (1) [Taso aka-tyym] ø-na-sokǝ'ĩ-t eramby
 man cop-asp decl-tie.up-nfut hammock
 ‘[All the men] tied up the hammock’

Coutinho-Silva (2008) argues that the bracketed structure in (1) is a relative clause. Universal clauses are analyzed as maximizing relative clauses, following Grosu and Landman's (1998) analysis of degree relatives.

Our point of departure from Coutinho-Silva's analysis is the treatment of the aspectual head *tyym* in (1), which is attested in other environments. In order to unify the syntactic and semantic analysis of these expressions across their possible distributions in the language, we propose an alternative analysis of universal clauses as adjuncts headed by the aspectual head *tyym*.

The paper is structured as follows. In section 2, we give an overview of a few aspects of the grammar of Karitiana that are relevant to our discussion. In section 3, we discuss Coutinho-Silva's analysis of universal clauses and we introduce our own analysis. In section 4, we examine a particular variation of the construction which is problematic for both analyses.

2. Background on Karitiana grammar

The purpose of this overview is (i) to establish differences in word order and verb inflection between matrix clauses and various types of embedded clauses and (ii) to show that Karitiana is a bare noun language characterized by an absence of determiners and the use of adverbial quantifiers.

2.1 Word order

Word orders in matrix clauses and embedded clauses are in complementary distribution (Sorto 1999). In matrix clauses, verbs never occur in final position. Both verb initial orders (VSO, VOS) and verb second orders (SVO, OVS) are attested. Embedded clauses are obligatorily verb final, and allow both SOV and OSV orders. The difference in word order between matrix and embedded clauses correlates with a difference in verb inflection. Matrix verbs obligatorily agree with their arguments and may have tense and mood inflection, while embedded verbs are bare (do not agree with their arguments and have no tense and mood inflection.)¹ For this reason, Storto (1999) explains the difference in word orders between matrix and embedded clauses by arguing that Karitiana is a verb final language. Verbs move from the VP to higher functional projections to check tense and agreement features, which derives verb second and verb initial orders. Verbs stay *in situ* in embedded clauses due to the absence of functional projections higher than Aspect in these environments, which explains their verb final word order.

2.2 Cumulativity and Quantification.

Müller, Storto and Coutinho-Silva (2008) and Sanchez-Mendes (2008) show that there are no determiners in Karitiana, and argue that bare nouns are number neutral, both in the sense that they are not inflected for number and in the sense that they have both atomic and plural individuals in their extensions. In support of these proposals, Müller *et al.* (2006) first note that there are no (in)definite determiners in the language, and that bare nouns can be interpreted either as definite or as indefinite:

- (2) Maria naka-m-ʼa-t gooj.
 Maria decl-caus-make-nfut canoe
 ‘Maria built the/a/some canoe(s)’

In example (2) from Müller *et al.* (2006), the object *gooj* ('canoe') is realized as a bare noun and can be interpreted either as a definite or as an indefinite NP, and can be used to refer to a single canoe or to several ones.² Müller *et al.* (2006) argue from these facts and others that Karitiana NPs are cumulative, *i.e.* that they denote sets of atomic individuals closed under sum formation.

In addition, Müller *et al.* (2006) and Sanchez-Mendes (2008) argue that there are no determiner quantifiers in Karitiana, and that all quantifiers are adverbs. Sentence (3) from Sanchez-Mendes (2008; our translation) illustrates the use of the quantifier *kandat* ('many', 'much'):

- (3) $\tilde{}$ jonso \emptyset -naka-ot- \emptyset kandat ese
 woman 3-decl-take-nfut many water
 ‘The/a woman/-en took (the) water many times’

¹ Note however that some verbs have suppletive forms that are used with semantically plural arguments even in embedded clauses, and that pronouns are obligatorily cliticized to the verb in embedded clauses, a phenomenon which is not to be confused with agreement.

² In order to keep the translation and glosses legible, we will show only the singular definite interpretation of NPs when the availability of other interpretations is not relevant to our discussion.

Other distributions are unattested. In particular, *akatyym* cannot occur between the verb and its object, which would be expected if it were an adverb, as illustrated in (9) from Coutinho-Silva (2008):

- (9) *Taso \emptyset -na-sok δ 'i-t akatyym eremby
 man decl-tie.up-nfut cop-asp hammock
 'The man tied up every hammock'

Secondly, *akatyym* constructions are interpreted as maximizing definite descriptions of individuals rather than as quantifiers over events. For instance, (5) is true if and only if all the men tied up the hammock, and it is true even if there was only one event of tying up the hammock, provided all the men partook in it.

Thirdly, the position that *akatyym* occupies in the sentence determines the content of the definite description. When *akatyym* is not fronted, as in (5) and (6), the content is provided by the NP that immediately precedes it. In (5), the description is about men, while in (6) it is about hammocks. When *akatyym* is fronted, the anaphoric pronoun that is suffixed to it has to match the function of the NP that provides the descriptive content (subject or non-subject), as illustrated in (7) and (8). This distinguishes *akatyym* from A-quantifiers such as *kandat*, whose interpretation is not affected by its position in the sentence. In conclusion, *akatyym* differs from A-quantifiers in several respects: (i) it does not have the distribution of an adverb, (ii) it does not quantify over events but provides a maximizing definite description of individuals and (iii) its interpretation is constrained by its position in the sentence.

3.2 Akatyym is a complex verbal head

We will now argue that *akatyym* is not a determiner but rather that constructions with *akatyym* are clauses, in which *aka* is a verbal head and *tyym* an aspectual head. Storto (2010) shows that *aka* is used as a copula, which selects a small clause complement headed either by a noun (examples 10 and 11), an adjective (example 12) or an intransitive verb (example 13):

- (10) Byyty \emptyset -na-aka-t kinda'o-t
 papaya 3-decl-cop-nfut fruit-abs.cop.agr
 'Papaya is a fruit'
- (11) Kinda osiito \emptyset -na-aka-j kinda'o-t
 flower 3-decl-cop-fut fruit-abs.cop.agr
 'The flower will be a fruit'
- (12) Taso \emptyset -na-aka-t i-se'a-t
 man 3-decl-cop-nfut part-good-abs.cop.agr
 'The man is good looking'
- (13) Taso \emptyset -na-aka-t i-kat- \emptyset
 man 3-decl-cop-nfut part-sleep-abs.cop.agr
 'The man is sleeping'

The use of *aka* in copular sentences and the fact that it is inflected for mood and tense show that it is a verb.

Tyym is used in embedded sentences that are interpreted as temporal adjuncts, and translated as *when*-clauses:

- (14) Ayry tyym yjxa ø-na-oky-j
 2-arrive asp 1ppl.incl 3-decl-kill-fut
 ‘When you arrive, we will kill (game)’

At this point it might be tempting to analyze *tyym* as the head of a CP, in keeping with current analyses of the subordinator *when* in English (c.f. Haegeman 2009). However, Coutinho-Silva (2008) and Storto (to appear-b) argue that *tyym* is an aspectual head, which embeds a VP headed by *aka*.

A first argument is based on the observation that *tyym* is a member of a paradigm of expressions used to introduce temporal clausal adjuncts. Other members of this paradigm are *tykiri* and *tyki'oot*. Storto (to appear-b) shows that the subordinator *tykiri* expresses perfective aspect. When the event is ongoing, the subordinator *tyki'oot* is used instead:

- (15) Ti'y Marcelo 'y tykiri ø-na-pa'ira-t João
 food Marcelo eat perf 3-decl-anger-nfut João
 ‘When Marcelo ate the food, João got angry’

- (16) Gok Maria amang tyki'oot ø-na-oky-t him taso
 manioc Maria plant perf 3-decl-kill-nfut game man
 ‘While Maria was planting manioc, the man killed the game’

Furthermore, the morpheme *ty* that enters in the composition of these aspectual subordinators is also attested inside aspectual auxiliaries in matrix clauses, c.f. Storto (2002):

- (17) Y-'a tyki y-haj
 1-be perf 1-elder.brother
 ‘I am here, brother’

- (18) ø-py-mangat tyka-dn taso Luciana
 3-assert-lift impf.mvt-nfut man Luciana
 ‘Luciana is lifting a/the man/men’

- (19) I ø-na-oky tysyp- ø saara
 he 3-decl-kill impf.supine-nfut alligator
 ‘He is killing the alligator’

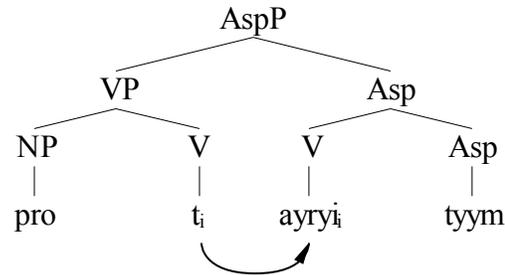
- (20) Taso ø-na-atik tyso-t kinda
 man 3-decl-throw impf.stdng-nfut thing
 ‘The man is throwing things’

Storto (2002) argues that these aspectual auxiliaries are composed of a root (*ki*, *ka*, *syp*, *so*) that expresses the position of the agent of the embedded verb, and a prefix *ty*. The function of the latter is not well understood. As we have seen already, it is attested inside perfective as well as imperfective aspectual auxiliaries.

Coutinho-Silva (2008) and Storto (to appear-b) argue from these facts that the subordinators *tyym*, *tykiri* and *tyki'oot* are actually aspectual heads. In keeping with Storto's (1999) analysis of embedded clauses in Karitiana, we assume that temporal clausal adjuncts lack all functional projections higher than the Aspectual projection (AspP). The reader will remember that this claim is supported by the lack of person agreement and tense inflection on embedded verbs, and the verb final word order of embedded clauses. Let us now consider what would be the structure of a temporal adjunct headed by *tyym*, such as (14) repeated here as (21):

- (21) Ayry tyym yjxa ø-na-oky-j
 2-arrive asp 1ppl.incl 3-decl-kill-fut
 'When you arrive, we will kill (game)'

(22)

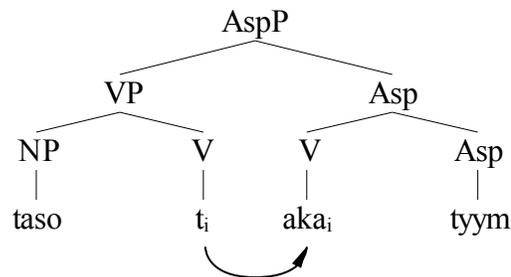


The Aspectual head *tyym* takes the VP headed by *ayry* as its complement. *Ayry* is then adjoined to *tyym* by head movement. The same structure is assumed for universal clauses with *akatyym*. Consider example (5), repeated here as (23):

- (23) Taso aka-tyym ø-na-sokõ'i-t eremby
 man cop-asp decl-tie.up-nfut hammock
 'All the men tied up the hammock'

Taso akatyym is also analyzed as an AspP headed by *tyym*:

(24)



Note that there is an additional use of *tyym* that is not expected in this analysis. In addition to being used as an aspectual head, *tyym* appears to be used as a conjunction:

- (25) Yn ø- na-sokõ'i-t tyym ataotam
 1s 3-decl-tie.up-nfut tyym 2s-decl-chegar-nfut
 'I tied it up and you arrived'

The presence of the declarative morpheme *na* on the verb and the fact that the pronoun *yn* is not incorporated show that *yn nasoko'it* is not a subordinated clause, but a matrix clause that is conjoined with *ataotam*. In 3.4, we will propose an analysis of *tyym* that predicts its occurrence as a conjunction.

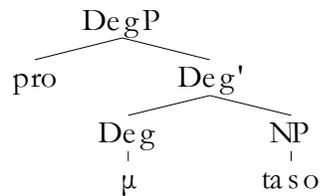
We investigate the interpretation of *akatyym* in more details in the rest of this section. First, we review Coutinho-Silva's (2008) analysis of universal clauses as relative clauses. Then, we propose an alternative analysis of universal constructions as adjunct clauses.

3.3 Coutinho-Silva (2008)

Coutinho-Silva (2008) argues that universal clauses in Karitiana are actually degree relatives, following the analysis of Grosu and Landman (1998). Since Coutinho-Silva (2008) does not offer a detailed compositional analysis of *akatyym* clauses, we present our own compositional implementation of Coutinho-Silva's (2008) proposal.

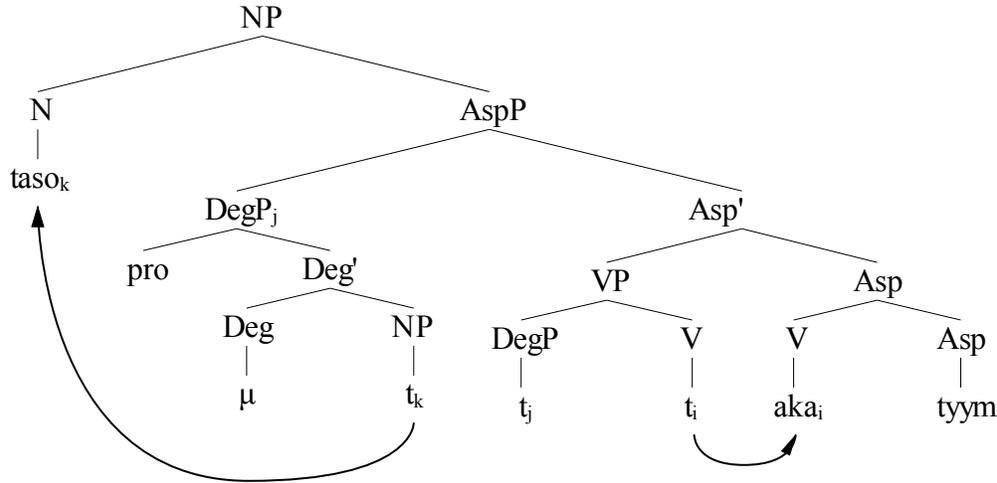
Following Sorto (1999), it is argued that relative clauses are AspPs, rather than CPs. The aspectual head takes as a complement a VP headed by *aka*. We assume that the subject of *aka* is actually a degree phrase DegP rather than a simple NP, which is generated as the complement of a degree head μ . A pronoun denoting a degree argument is realized in the specifier of DegP:

(26)



This DegP is base generated inside the VP headed by *aka*, and moves to the specifier of AspP. From there, *ta so* moves outside of the relative clause (AspP), where it projects an NP. This derivation follows Grosu and Landman's (1998) head-raising analysis of degree relatives (see also Kayne 1994), modulo the fact that relative clauses are AspP in Karitiana:

(27)



Let us now discuss the interpretation of the structure in (27). DegP is interpreted *in situ*. The Deg' [μ *tasok*] denotes a relation between degrees and individuals. The degree head μ introduces in the semantic representation an operator DEGREE_P that maps (plural) individuals that belong to a set P to measures of their 'cardinality' (how many atomic individuals they are composed of). The open degree argument of the relation denoted by [μ *tasok*] is saturated by the degree denoted by the pronoun in the specifier of DegP:

$$(28) \quad \begin{aligned} \llbracket \mu \text{ tasok} \rrbracket^g &= \lambda d. \lambda x. \text{man}^*(x) \ \& \ \text{DEGREE}_{\text{man}^*(x)} = d \\ \llbracket \mu \text{ tasok} \rrbracket^g(\llbracket \text{pro}_i \rrbracket^g) &= \lambda x. \text{man}^*(x) \ \& \ \text{DEGREE}_{\text{man}^*(x)} = g(i) \end{aligned}$$

The verb *aka*, also interpreted *in situ*, denotes an existential predicate, which we take to be an existential quantifier:

$$(29) \quad \llbracket \text{aka} \rrbracket^g = \lambda P. \exists x: P(x)$$

The combination of *aka* with its subject yields a sentence that is true only if there exist $g(i)$ many men:

$$(30) \quad \llbracket [[\mu \text{ tasok}] \text{pro}_i] \text{aka} \rrbracket^g = 1 \text{ iff } \exists x: \text{man}^*(x) \ \& \ \text{DEGREE}_{\text{man}^*(x)} = g(i)$$

The aspectual head *tyym* does not seem to play a crucial role in the interpretation of universal clauses in Coutinho-Silva's analysis, and we will assume that it is uninterpreted. A more delicate part of this analysis is the interpretation of the movement of the DegP to the specifier of AspP. As we have seen, DegP is interpreted *in situ*. In Grosu and Landman's analysis of degree relatives in English, the interpretive effect of the movement of DegP to the specifier of CP is to create a set of degrees. In our case, we argue that the copy of DegP that is merged in the specifier of AspP is interpreted as a lambda operator that binds the pronominal degree argument in DegP, therefore creating a property of degrees:

$$(31) \quad \llbracket \text{DegP Asp}' \rrbracket^g = \lambda d. \exists x: \text{man}^*(x) \ \& \ \text{DEGREE}_{\text{man}^*(x)} = d$$

Here comes the crucial step in the analysis, which is also the central idea in Grosu and Landman (1998). The degrees that have been abstracted over are not just numbers that measure the cardinality of a plural individual. They are complex objects, composed of (i) a number that measures the cardinality of an individual, (ii) this individual itself and (iii) a predicate P that holds of this individual. This is captured in the following definition of $\text{DEGREE}_P(x)$, which is only defined for P-individuals:

(32) For all plural individuals x: $\text{DEGREE}_P(x) = \langle |x|, P, x \rangle$

Using 'rich' degrees of this sort allows Grosu and Landman (1998) to map a degree back to the individual that it measures, which they argue is needed to capture the range of interpretation of degree relatives in English. This is also crucial to Coutinho-Silva's analysis of universal clauses in Karitiana. Following Grosu and Landman, Coutinho-Silva argues that the presence of DegP in SpecAspP triggers an operation of maximalization applied to the set of degrees denoted by AspP^4 . This operation yields a singleton set containing the maximal degree in the set denoted by AspP , if there is such a degree, and is undefined otherwise. In our case, maximization yields the singleton set containing the degree composed of (i) the maximal number of men that there are, (ii) the property *man** and (iii) the group of all men that there are. This set is defined as $\text{MAX}(\llbracket \text{AspP} \rrbracket)$, where MAX is defined as follows (adapted from Grosu and Landman (1998). σ is the supremum operator of Link (1983)):

(33) Let S be a set of degrees of the form $\langle |x|, P, x \rangle$
 $\text{max}(S) = \langle \sigma x[x \in \{x: \langle |x|, P, x \rangle \in S\}], P, \sigma x[x \in \{x: \langle |x|, P, x \rangle \in S\}] \rangle$
 $\text{MAX}(S) = \{\text{max}(S)\}$ if $\text{max}(S) \in S$, undefined otherwise

Following Grosu and Landman (1998), Coutinho-Silva argues that the movement of NP from inside the DegP in SpecAspP to an external position triggers an operation that maps the degree obtained from AspP to the individual member that this degree measures. In (23), repeated here as (34), this would be the group of all the men that there are:

(34) Taso aka-tyym ø-na-sokõ'ĩ-t eremby
 man cop-asp decl-tie.up-nfut hammock
 'All the men tied up the hammock'

In Grosu and Landman's account, although the nominal head that is external to the relative clause is not interpreted, it determines the feature content of its NP projection. They take this to mean that the whole NP should denote the kind of entity that its head denotes. Following this logic, $[_{NP} \text{Taso akatyym}]$ must denote an individual rather than a degree.

In sum, Coutinho-Silva argues that universal clauses denote the maximal individual in the denotation of their subject NP. They are therefore interpreted as plural definite descriptions. This, together with assumptions on the distributivity of verbs, explains the apparent universal force of *akatyym*.

⁴ Strictly speaking, in our analysis AspP denotes a function from degrees to truth values. Since this is the characteristic function of a set of degrees, we allow ourselves to think about the denotation of AspP as this set.

3.4 Universal clauses as clausal adjuncts

Although Coutinho-Silva's analysis derives the meaning of *akatyym*, there are two reasons why one might want to consider an alternative analysis. Firstly, relative clauses are never introduced by subordinating heads in Karitiana, such as *tyym*, *tykiri* and *tyki'oot*. As we discussed in section 3.2, these particles are used instead to introduce adverbial subordinated clauses. Secondly, it is not clear how the aspectual value of *tyym* affects the interpretation of universal clauses in their analysis as maximizing degree relatives, and what it is that relates the use of *tyym* in universal constructions with its uses as a subordinator and as a conjunction. In this section, we develop a semantic analysis of universal constructions as adverbial clauses. Our analysis preserves Coutinho-Silva's intuition that the apparent universal quantification in these constructions actually comes from the maximizing effect of a plural definite description. However, we argue that the definite description comes from an E-type pronoun in the matrix clause, whose descriptive content is provided by the subordinated *akatyym* clause.

Let us first sketch the intuition behind our analysis. Consider our stock example again:

- (35) Taso aka-tyym ø-na-sokō'ĩ-t eremby
 man cop-asp decl-tie.up-nfut hammock
 'All the men tied up the hammock'

In (35), *taso akatyym* is an adverbial clause which denotes a property of situations. These are situations in which there are men. Let us then assume that the subject of the main verb *nasokō'ĩt* is a null pronoun, say *pro*. The main clause denotes a property of situations in which the referent of *pro* tied up the hammock. Now, we argue that *pro* is interpreted as a definite description whose content is provided by the adverbial clause. In this case, it will be interpreted as the definite description *the men*. The intersection of the two properties of situations yields a property of situations *s* such that there are men in *s*, and the men in *s* tied up the hammock. This entails that the maximal individual in the extension of *men* in *s* tied up the hammock. Provided the verb is interpreted distributively, this in turn entails that every man tied up the hammock.

3.4.1 Universal clauses

Our analysis is laid out within situation semantics, in the tradition of Kratzer (1989) and subsequent works. A recent overview can be found in Kratzer (2011). Situations are parts of worlds, which are themselves maximal situations. Propositions are properties of situations. We assume that NPs like *taso* ('men') denote relations between individuals and situations:

- (36) $\llbracket \text{taso} \rrbracket^s = \lambda x. \lambda s. \text{man}^*(x)(s)$

The aspectual head *tyym* denotes a relation between properties of situations, i.e. a relation between propositions. Let us assume that it has the following (provisional) interpretation:

- (37) $\llbracket \text{tyym} \rrbracket^s = \lambda P. \lambda Q. \lambda s. \exists s' [s' \leq s \ \& \ P(s') \ \& \ Q(s')]$

As for *aka*, remember that it is used as a copula in matrix sentences. In universal clauses, we have argued that *aka* is a verbal head that undergoes head movement to adjoin to *tyym*. We assume that *aka* is semantically uninterpreted, and therefore that the complex head *akatyym* is interpreted just as in (37).

The NP undergoes existential closure (EC) and combines with the complex aspectual head *akatyym*, which gets us the interpretation of the adverbial clause headed by *akatyym*:

$$(38) \quad \llbracket \text{akatyym} \rrbracket^g (\text{EC}(\llbracket \text{taso} \rrbracket^g)) = \lambda Q.\lambda s. \exists s' [s' \leq s \ \& \ \exists x[\text{man}^*(x)(s')] \ \& \ Q(s')]$$

We said that the subject of *nasokō'it* is a null pronoun. We propose that this *pro* is interpreted as an E-type pronoun (Evans 1977), and more precisely as a function from a situation to a plural definite descriptions of individuals (Heim 1990), where a sum operator σ is used to refer to the maximal individual in a set of atomic individuals closed under sum formation (Link 1983). Note that the interpretation of *pro* depends on the identification of a contextual variable R. In (39), R is understood as the property denoted by the NP *taso* in the adjunct clause, i.e. (40).

$$(39) \quad \llbracket \text{pro} \rrbracket^g = \lambda s.\sigma x [R(x)(s)]$$

$$(40) \quad \lambda s.\sigma x [\text{man}^*(x)(s)]$$

$$(41) \quad \sigma x [P(x)] = \iota x (P^*(x) \ \& \ \forall y(P^*(y) \rightarrow y \leq x))$$

Let us assume that the object of the main verb in (35) is interpreted as an indefinite NP, which we will treat as an existentially quantified NP. Let us assume furthermore that the VP can distribute over its subject, thanks to the presence of a silent distributivity operator (c.f. Link 1983). There are at least two possible interpretations of (35). In the first interpretation, the existentially quantified object takes scope over the D-operator :

$$(42) \quad \begin{aligned} \llbracket \text{nasokō'it} \rrbracket^g &= \lambda x.\lambda y.\lambda s. \text{tie.up}(x)(y)(s) \\ \llbracket \text{eremby} \rrbracket^g &= \lambda Q.\lambda s. \exists x [\text{hammock}^*(x)(s) \ \& \ Q(x)(s)] \\ \llbracket D \rrbracket^g &= \lambda P.\lambda x.\lambda s. \forall y(y \leq x \rightarrow P(y)(s)) \\ \llbracket \text{nasoko'it} \rrbracket^g(\llbracket t_i \rrbracket^g) &= \lambda y.\lambda s. \text{tie.up}(g(i))(y)(s) \\ \llbracket D \rrbracket^g(\llbracket \text{nasoko'it } t_i \rrbracket^g) &= \lambda x.\lambda s. \forall y(y \leq x \rightarrow \text{tie.up}(g(i))(y)(s)) \\ \llbracket D [\text{nasoko'it } t_i] \rrbracket^g(\llbracket \text{pro} \rrbracket^g) &= \lambda s. \forall y(y \leq \sigma z [\text{man}^*(z)(s)] \rightarrow \text{tie.up}(g(i))(y)(s)) \\ \llbracket \text{eremby} \rrbracket^g (I \llbracket [D [\text{nasoko'it } t_i]] \text{pro} \rrbracket^g) &= \\ &\lambda s.\exists x [\text{hammock}^*(x)(s) \ \& \ \forall y(y \leq \sigma z [\text{man}^*(z)(s)] \rightarrow \text{tie.up}(x)(y)(s))] \end{aligned}$$

In the second interpretation, the D-operator takes scope over the existentially quantified object:

$$(43) \quad \llbracket D \rrbracket^g (J \llbracket \text{eremby} [I [[\text{nasoko'it } t_i] t_j]] \rrbracket^g) = \\ \lambda z.\lambda s. \forall y(y \leq z \rightarrow \exists x [\text{hammock}^*(x)(s) \ \& \ \text{tie.up}(x)(y)(s)])$$

$$\llbracket D [J [\text{eremby} [I [[\text{nasoko'it } t_i] t_j]]]] \rrbracket^g(\llbracket \text{pro} \rrbracket^g) =$$

$$\lambda s. \forall y(y \leq \sigma x [\text{man}^*(x)(s)] \rightarrow \exists x [\text{hammock}^*(x)(s) \& \text{tie.up}(x)(y)(s)])$$

The denotation of the adjunct clause is then applied to the denotation of the main clause. Assuming that the D operator takes scope over the existentially quantified object (second reading), the following interpretation is obtained:

$$(44) \quad \lambda s. \exists s' [s' \leq s \& \exists x[\text{man}^*(s')(x)] \\ \& \forall y(y \leq \sigma x [\text{man}^*(x)(s')] \rightarrow \exists x [\text{hammock}^*(x)(s') \& \text{tie.up}(x)(y)(s')])]$$

This property is true of a situation s iff s has a subsituation s' such that there is a group X of men in s' , and the maximal group of men in s' is such that each of them tied up a hammock in s' . This proposition entails the proposition that is true in a situation s iff s has a subsituation s' such that every man tied up a hammock in s' .

Note that as the analysis stands, nothing prevents *pro* in the matrix clause to be interpreted as a regular referential pronoun rather than as an E-type pronoun. In that case, we predict that (35) can be interpreted for instance as ‘There were men and she tied up the hammock’, where ‘she’ refers to a salient woman. If such an interpretation turns out to be unavailable, it will be necessary to explain why the use of an E-type pronoun is necessary, and why this E-type pronoun must be resolved to the descriptive content of the adjunct clause.

Just as in Coutinho-Silva's analysis, universal quantification over individuals arises from the interaction between a plural definite description and the distributivity of the verb. However, we proposed that the plural definite description is not denoted by the *akatyym* clause itself, but by a silent E-type pronoun in the matrix clause. The function of the *akatyym* clause is just to specify the descriptive content of the E-type pronoun. In the next section, we argue that one advantage of this analysis is that it can easily be extended to account for other uses of *tyym*.

3.4.2 Tyym in temporal adjuncts and conjoined clauses

In the following example, *tyym* is used as a subordinator introducing a perfective clause:

$$(45) \quad \begin{array}{llll} \text{Aryy} & \text{tyym} & \text{yjxa} & \text{\textcircled{0}-na-oky-j} \\ 2\text{-arrive} & \text{asp} & 1\text{ppl.incl} & 3\text{-decl-kill-fut} \\ \text{‘When you arrive, we will kill (game)’} & & & \end{array}$$

The two propositions are of course true of different eventualities, which are furthermore temporally related: the killing event starts when the arriving event is concluded. We can express these requirements in situation semantics using exemplifying situations. The notion of exemplification is defined as follows:

$$(46) \quad \text{“A situation } s \text{ exemplifies a proposition } p \text{ iff whenever there is a part of } s \text{ in which } p \text{ is not true, then } s \text{ is a minimal situation in which } p \text{ is true.” (Kratzer 2011)}$$

We can then select the maximal situations among a set of exemplifying situations:

$$(47) \quad \text{For any property of situations } P_{\langle s, t \rangle}, \text{ and any situation } s, \text{ } s \text{ is a maximal situation exemplifying } P \text{ iff } s \text{ exemplifies } P \text{ and there is no situation } s' \text{ that exemplify } P$$

such that s is a proper part of s' . $M(P)$ is the set of maximal situations exemplifying P

Finally, let us write $s \rightarrow_I s'$ for s *abuts* s' , which is true iff s' starts at the moment when s ends. We can now define the interpretation of *tyym* in (47) as:

$$(49) \quad \llbracket \text{tyym}_2 \rrbracket^g = \lambda P. \lambda Q. \lambda s. \exists s' \exists s'' [s' \leq s \ \& \ s'' \leq s \ \& \ s' \rightarrow_I s'' \ \& \ s' \in M(P) \ \& \ s'' \in M(Q)]$$

We predict that (45) is true in a situation s iff there are two situations s' and s'' that are parts of s , such that s' is a maximal exemplifying situation of the addressee arriving, s'' is a maximal exemplifying situation of the speaker and the addressee killing game, and s'' starts when s' finishes. In other words, (45) is true iff we start killing game as soon as you arrive.

This analysis of *tyym* as a subordinator only needs minimal modifications in order to capture the conjunctive use of *tyym*. We just need to assume that *tyym* can be used as the head of a Coordination Projection, which selects a CP complement and a CP specifier, and that *tyym* as a conjunction does not impose restrictions on the temporal relations between the pair of situations that it quantifies over:

$$(50) \quad [\text{ConP CP}_1 [\text{Con}' [\text{Con } \text{tyym}] \text{CP}_2]]$$

$$(51) \quad \llbracket \text{tyym}_3 \rrbracket^g = \lambda P. \lambda Q. \lambda s. \exists s' \exists s'' [s' \leq s \ \& \ s'' \leq s \ \& \ s' \in M(P) \ \& \ s'' \in M(Q)]$$

Therefore, we have arrived at a general characterization of *tyym* across three contexts of uses:

$$(52) \quad \llbracket \text{tyym} \rrbracket^g = \lambda P. \lambda Q. \lambda s. \exists s' \exists s'' [s' \leq s \ \& \ s'' \leq s \ \& \ R(s')(s'') \ \& \ s' \in M(P) \ \& \ s'' \in M(Q)]$$

When *tyym* is used in universal constructions, R is a relation of identity ($s' = s''$). Quantifying over maximal exemplifying situations is not required but does not make incorrect predictions either. When *tyym* is used as a temporal adverbial subordinator, R is a relation of abuttal. Lastly, when *tyym* is used as a conjunction, R is uninterpreted, which we can represent by stating that $R(s')(s'')$ is trivially true for any pair of situations (s, s').

4. Fronting of the universal clause

Cases of fronted universal clauses are problematic for both analyses:

(53)	Ta-aka-tyym	ø-na-sokõ'ĩ-t	eremby	taso
	3subj.anaf-cop-asp	decl-tie.up-nfut	hammock	man
	'All the men tied up the hammock'			

(54)	I-aka-tyym	ø-na-sokõ'ĩ-t	eremby	taso
	3-cop-asp	decl-tie.up-nfut	hammock	man
	'The man tied up all the hammocks'			

Storto (2007) shows that *ta* is a subject oriented anaphoric pronoun, which permits long distance anaphora:

(55) Taso \emptyset -na-oky-t ta-ota
 man 3-decl-hurt-nfut 3anaf-friend
 ‘The man₁ hurt his_{1/*2} friend’

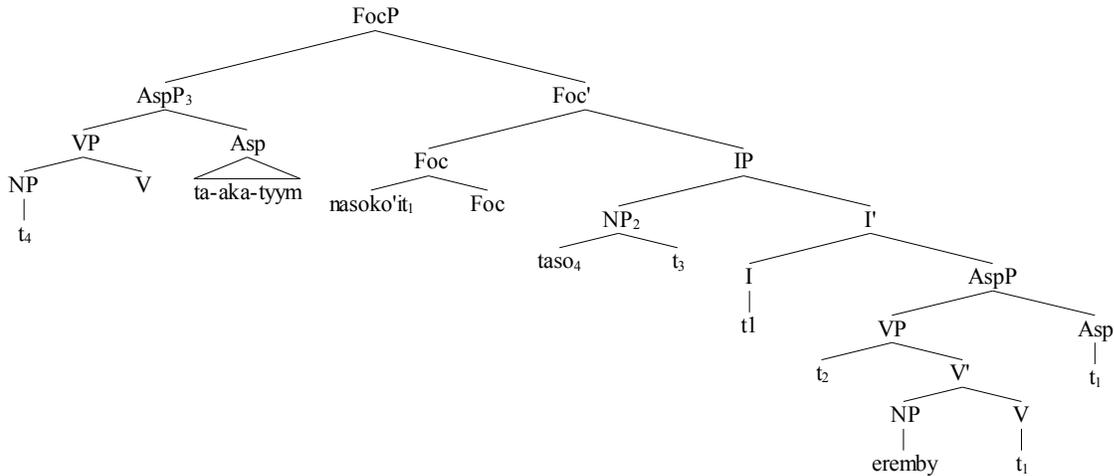
(56) Taso \emptyset -na-oky-t $\tilde{}$ jonso opok-ot ta-so’oot tykiri
 man 3-decl-kill woman enemy-obl 3anaf-see when
 ‘The man₁ killed the woman when he_{1/*2} saw the enemy’

The pronoun *i* however must be free in its local domain:

(57) Taso \emptyset -na-oky-t i-ota
 man 3-decl-hurt-nfut 3-friend
 ‘The man₁ hurt his_{2/*1} friend’

Coutinho-Silva suggests that (53) and (54) are derived by the remnant movement of AspP, after the head NP *taso* has moved out of the relative AspP:

(58)



However, it is not clear how the anaphor *ta* in the AspP should be interpreted in this analysis, since it competes with the external head *taso* for the function of subject of the relative clause. One way out is to interpret *ta* as a resumptive pronoun, but it must then be explained why this pronoun is attested in the relative clause only when the latter is fronted, and how it gets bound by the external head.

Fronted AspP are not easier to analyse in our proposal. We have assumed that the embedded AspP is an adverbial clause whose semantic function is to provide the descriptive content of an E-type pronoun in the main clause. In the case of (53) and (54) however, the distribution of pronoun and full NP is inverted, since the pronoun is realized in the adverbial clause and the full NP is realized in the main clause.

5. Conclusion

Coutinho-Silva (2008) shows that universal constructions with *akatyym* are clauses, and argues that they are maximizing relative clauses. We have argued for an alternative analysis of these constructions as adjuncts, which provide the descriptive content of a silent E-type pronoun in the main clause. In both analyses, there is no quantifier in the

main clause but only a plural definite description, which denotes the maximal individual in a set. The impression of universal quantification results from the distribution of the VP over the parts of this plural individual.

An advantage of our analysis is that it can easily be extended to account for uses of *tyym* in temporal adverbial clauses and as a conjunction.

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