

Floating Numeral Phrases and Event Measurements in Guaymí

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1. Introduction

The syntactic status of floating quantifiers across languages continues to be debated within formal linguistics. Generally, they are argued to constitute a special class of adverb, or a class of adnominal item that only appears disjoint from associated nouns at the surface. To contribute to this debate, this paper considers the case of floating numerals in an indigenous language of Panamá. Guaymí (or Ngäbe, Ngäbere; ISO 639-3: gym; 8°21'0"N, 81°41'0"W) is an SOV language of the Chibchan family of Central and South America (Uhle 1890; Constenla Umaña 1989, 1991, 1995). In this language, numerals that express quantity information about a noun's referent display two canonical distributions. First, they may occur in overtly adnominal positions, after their associated noun and before the main verb. In example (1) below, the numeral *krobu* 'two' occurs immediately after its associated noun *mütü* 'pig', both occurring in the direct object position.

- (1) tigre [mütü **kro-bu**] kämiri
tiger pig CL-two kill.REC
'The tiger killed two pigs.'

They may also occur in dedicated floating positions immediately after the main verb, overtly detached from their associated nouns. Examples (2) and (3) below show floating numerals in such arrangements.

- (2) migel mütü märi-te **krä-rige**
Miguel pig tie.up.REC-DER CL-five
'Miguel tied up five pigs.'
- (3) migel nugro bini **krä-ti** [maria ie]
Miguel dog give.REM CL-six Maria DAT
'Miguel gave six dogs to Maria.'

In (2) above, the numeral *krä-rige* 'five' occurs after the main verb *märite* 'tied up', completely disjoint from its associated noun *mütü* 'pig'. In (3), the floating numeral *krä-ti* 'six' is wedged in between the ditransitive verb *bini* 'gave' and the indirect object *maria ie* 'to Maria', also disjoint from its associated noun *nugro* 'dogs'.

The examples above recall the basic research questions of the floating quantifier debate, especially that of how to characterize the grammatical mechanism of association between a floating quantifier and its associated noun. This paper argues that this grammatical mechanism is semantic in nature, rather than syntactic, and that floating numerals in Guaymí are essentially adverbs. This means that there is no underlying syntactic level where the floating numeral forms a constituent with its associated noun, and that these items are base-generated in completely different regions of the sentence. In order to

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formally represent the association between a floating numeral and its associated noun, a grammatical mechanism within the semantics is preferable. Justification for these claims comes from data showing that floating numeral distribution beyond their canonical distribution resembles that of adverbs. In fact, floating numerals display an incapacity to co-occur with multiplicatives (e.g. *once, twice*), suggesting their membership in this category of adverbs. Floating numerals also never occur adjacent to their associated nouns, casting doubt on their hypothetical status as adnominal items underlyingly.

A second argument of this paper considers the exact nature of the grammatical mechanism of association between a floating numeral and its associated noun. The paper argues that floating numerals are event measurement phrases. This means that they express a measure of the event described by a verb along some parameter. Similar to multiplicatives, which indicate the extent of an event in the quantity of its occurrences, floating numerals indicate the extent of an event along the parameter of an event patient, who undergoes a change expressed by the main verb. For example, a floating numeral denoting the quantity ‘2’ would indicate that an event has changed the state of the patient by a measure of two entity units, i.e., two entities from the total patient were affected. Support for this analysis comes from floating numerals’ penchant for partitive readings, and the strictly non-specific or non-referential interpretation they impose on associated nouns, beyond their similarity with multiplicatives.

The rest of this paper is organized as follows. In §2, the general speaker background for the language is provided, along with a basic structure of the numeral phrase. In §3, two approaches to the analysis of floating numerals’ syntactic behavior are considered, positing either an adverbial status or an underlyingly adnominal status, and further data supporting an adverbial status is offered. In §4, data on the distributional and semantic differences between floating and overtly adnominal numerals is presented, and a greater case is made for the adverbhood of floating numerals. In §5, the formal mechanism of association between floating numerals and nouns is offered, which proposes floating numerals to be event measurement phrases. §6 concludes the paper with a summary and future directions.

2. Background on Guaymí

2.1. Speaker data

Guaymí is one of several indigenous languages of Panama, with over 150,000 speakers, making it the most widely spoken indigenous language in the country. It is primarily spoken in the Ngöbe-Buglé Comarca, an indigenous autonomous zone established in 1997 for the Ngäbe and Buglé ethnic groups (Quesada-Pacheco 2008:16). Speakers of Guaymí can also be found in the neighboring provinces of Bocas del Toro, Chiriquí, and Veraguas, and some migrant populations have ventured as far as southern Costa Rica. Most of the data in this paper comes from fieldwork in the Veraguas province conducted with bilingual migrant workers. Other data is collected from previous grammars or descriptions of Guaymí.

2.2. Numerals

Guaymí is similar to many western Chibchan language in being a numeral classifier language. Numerals in Guaymí are bound morphemes on classifiers,¹ which indicate a classification of the associated noun by shape or animacy. Classifiers themselves can be free morphemes, although some cases are ambiguous. Examples (4) and (5) below both show adnominal numerals with this structure.

- (4) mädä **krä-mä**
horse CL-three
‘three horses’
- (5) meri **ni-rige**
woman CL-five
‘five women’

¹ The numeral + classifier combination is actually a single word within which principles of vowel harmony operate, as in *krä* ‘elongated’ + *bu* ‘2’ → *krobu*.

In (4) above, the numeral *mä* ‘three’ combines with the classifier *krä* for animals, given the associated noun *mädä* ‘horse’. In (5), *rige* ‘five’ combines with the classifier *ni* for humans, given *meri* ‘woman’.

3. Floating numerals as adverbs

This section considers the evidence in Guaymí that floating numerals are either covertly adnominal and only detach from associated nouns at the surface, or are simply adverbs and associate with nouns in a semantic manner. In the literature, these two perspectives fall under the labels of the Stranding Approach and the Adverbial Approach to floating quantifiers, respectively. They are summarized below.

Stranding Approach: Floating numerals are stranded in trace positions by NPs, forming a unit with the NP syntactically and semantically.

Adverbial Approach: Floating numerals are base-generated as adverbs to the VP, syntactically independent from the NP.

The details of Guaymí floating numerals allows for argumentation in either direction. Sensitivity to the status of nouns as either internal or external arguments would imply that floating numerals are located in trace positions, yet their additional adverbial behavior would suggest adverbhood.

3.1. Evidence for the Stranding Approach

The Stranding Approach to floating numerals is taken up by Miyagawa (1989) and Fitzpatrick (2006) for Japanese cases. It is the analysis that floating numerals are covertly adnominal, despite their overt detachment from their associated nouns. According to this analysis, floating numerals are base-generated in verb argument positions with their associated nouns and form constituents with them underlyingly. Detachment occurs when associated nouns undergo A-movement, stranding floating numerals in trace positions. As such, floating numerals are thought to mark trace positions for A-moved nouns and support the VP-internal subject hypothesis (Koopman & Sportiche 1991).

Proponents of the Stranding Approach point to the distinct distributions of floating numerals associated with internal and external arguments as evidence for it. In Japanese, floating numerals associated with these two argument positions display distinct ordering constraints with respect to low adverbs, such as degree adverbs. Floating numerals associated with internal arguments may intervene between a degree adverb and the main verb, suggesting their proximity to the main verb structurally. In contrast, floating numerals associated with external arguments lack this capacity, suggesting their base-generation in structurally higher subject positions.

In Guaymí, similar differences between floating numerals associated with internal and external arguments are observed. Floating numerals associated with object nouns and subject nouns for unaccusative verbs pattern together in their syntactic distributions, while floating numerals associated with subject nouns for unergative and transitive verbs are different in their behavior. For floating numerals associated with object nouns, the postverbal position immediately after the the main verb is always available. While in this immediate postverbal position, they occur before all other postverbal items, including secondary verb arguments besides the subject and direct object. Examples (6)-(8) below show several cases of floating numerals occurring postverbally and before secondary arguments.

- (6) ni kutwä migani **kwa-ti** [ja dägwä bitɪ]
 person basket put.REM CL-one REF head over
 ‘The man put a basket over his head.’ (Quesada-Pacheco 2008:120)
- (7) kwichi mädä kögani **kra-ti** [meri ni-bu grä]
 Kwichi horse buy.REM CL-one woman CL-two for
 ‘Kwichi bought a horse for two women.’

- (8) migel tä meri ngwen **ni-mä** [ja be]
 Miguel be.IND woman carry.IND CL-three REF with
 ‘Miguel is carrying three women with himself.’

Meanwhile, floating numerals associated with subject nouns for unaccusative verbs also occupy immediate postverbal positions canonically. Example (9) below shows a floating numeral associated with the subject noun and occurring immediately after an unaccusative verb.

- (9) kirabe ni nigui **iti** krare
 long.ago person go.REC one hunt.FIN
 ‘Long ago a man went to hunt.’

(Quesada-Pacheco 2008:147)

Here, the floating numeral *iti* ‘one’ occurs immediately after the unaccusative verb *nigui* ‘went’ and associates with the subject noun *ni* ‘person’. As with floating numerals associated with object nouns, it occupies a position before all other postverbal items, including verbal arguments like *krare* ‘hunt’.

In contrast, floating numerals associated with subject nouns for unergative and transitive verbs do not occupy the postverbal position. Placing a floating numeral in the postverbal position while it associates with the subject of a transitive verb produces an unacceptable string. Example (10) below shows a postverbal numeral associated with the transitive verb subject producing an unacceptable string.

- (10) * ngäbe-ombre mädä kürü **ni-mä**
 person-man horse buy.REC CL-three
 (‘Three men bought a horse.’)

Here, the floating numeral bears the classifier *ni* for humans, indicating that it associates with the human subject *ngäbe-ombre* ‘men’ of the transitive verb *kürü* ‘bought’. The result is not an acceptable sentence for speakers, who might say that the wrong classifier was used, assuming the intended association was with object noun *mädä* ‘horse’. In order for floating numerals to associate with ergative or transitive subjects, they must occur instead in a preverbal position after the subject. In example (11) below, a negated floating numeral occurs in such a position.

- (11) [ngäbe ni-mä gwe] **ni iti** ñö ñani
 person CL-three ERG NEG one water drink.REM
 ‘None of the three men drank water.’

Here, the negated floating numeral *ni idi* ‘not one’ occurs in a preverbal position as it associates with the subject *ngäbe ni-mä* ‘three men’. The floating numeral is separated from its associated noun by the ergative marker *gwe*, although this may not be sufficient for establishing its floating status. Regardless, the data shows distinct distributional patterns for floating numerals associated with internal or external arguments, providing support that they occupy trace positions. On the other hand, the Stranding Approach has little to say about the adverbial behaviors of floating numerals.

3.2. Evidence for the Adverbial Approach

The Adverbial Approach to floating numerals is espoused by Nakanishi (2003, 2007) for Japanese cases. This approach takes the distribution of floating numerals at face value and classifies them as a type of adverbial item. As such, floating numerals are base-generated in adverbial positions and never form constituents with their associated nouns. This simplifies the formal machinery required to explain the distribution of floating numerals, relative to the Stranding Approach. However, it creates the new formal problem of explaining the mechanism of association between floating numerals and their associated nouns, which are syntactically disjoint. Formally, the Adverbial Approach is more of a hypothesis than an analysis, and further questions regarding the exact adverbial category of floating numerals and how they achieve association with nouns must be addressed for explanatory adequacy.

Support for the Adverbial Approach comes from any evidence of the adverbhood of floating numerals, especially evidence of distributional similarity to adverbs. Guaymí indeed offers some of this type of evidence. Although floating numerals have canonical positions immediately after the verb, they are not stuck in these positions. They may also move quite freely within a sentence, postposing or preposing themselves at sentence edges. They may switch ordering relative to other postverbal items, including secondary predicates. Example (12) shows a floating numeral *komä* ‘three’ being able to occur before or after the secondary predicate *tain* ‘red’.

- (12) a. nuchi ju jügani tain **ko-mä**
 Nuchi house paint.REM red CL-three
 ‘Nuchi painted three houses red.’
 b. nuchi ju jügani **ko-mä** tain
 Nuchi house paint.REM CL-three red
 ‘Nuchi painted three houses red.’

In these examples, it is certain that the floating numeral is shifted in position and not the secondary predicate. Secondary predicates are incapable of extraction from their dedicated position. In example (13), two secondary predicates may co-occur, but they are incapable of switching ordering.

- (13) a. nuchi ju jügani tain **käjuto**
 Nuchi house paint.REM red content
 ‘Nuchi painted the house red content.’
 b. * nuchi ju jügani **käjuto** tain
 Nuchi house paint.REM content red
 (‘Nuchi painted the house content red.’)

In (13a), resultative *tain* ‘red’ and depictive *käjuto* ‘content’ co-occur postverbally, with the resultative occurring nearer to the main verb, as is typical crosslinguistically (Rothstein 2003). A rearrangement of their ordering in (13b) produces an unacceptable string.

Besides switching their mutual orderings with other postverbal items, floating numerals may even be extracted to certain preverbal positions, such as at the start of a sentence.

- (14) **öda-be** migel sandia kwedani
 piece-how.many Miguel watermelon eat.REM
 ‘How many pieces of watermelon did Miguel eat?’

Here, the wh-expression *ödabe* ‘how many’ is extracted from its canonical postverbal position and preposed to the start of the sentence.

Finally, floating numerals resemble adverbs in being unable to co-occur with adverbs of a particular class. Multiplicatives are adverbs that denote the quantity of iterations of an event expressed by the verb (Csirmaz 2008, 2009a,b), like English *twice* or *three times*. Floating numerals cannot co-occur with multiplicatives, regardless of their mutual ordering. Example (15) shows the incapacity of floating numerals to co-occur with multiplicatives.

- (15) a. * idochi daba täri **ko-mä** **bä-mä**
 Idochi pifa throw.REC CL-three moment-three
 (‘Idochi threw three pifas three times.’)
 b. * idochi daba täri **bä-mä** **ko-mä**
 Idochi pifa throw.REC moment-three CL-three
 (‘Idochi threw three pifas three times.’)

Here, floating numeral *komä* ‘three’ co-occurs with multiplicative *bämä* ‘three times’ to produce unacceptable strings. The ordering of *komä* ‘three’ before *bämä* ‘three times’ can improve acceptability marginally, but remains awkward. This incapacity for floating numerals to co-occur with multiplicatives, in contrast to their general capacity to co-occur with other postverbal items, might indicate that they are multiplicatives themselves.

4. Differences between floating and adnominal numerals

Beyond their distributional similarity to adverbs, floating numerals in Guaymí also lack certain qualities that would otherwise support their status as covertly adnominal items. They contrast sharply in their lack of these qualities with true adnominal numerals in Guaymí, which constitute a separate class of item. True adnominal numerals overtly occur adjacent to their associated nouns, and they accommodate a variety of quantificational interpretations. Floating numerals, on the other hand, are more restricted in these regards. They never occur adjacent to their associated nouns, and they are confined to indefinite or non-specific readings. Their strictly indefinite reading further points to their proper analysis as a type of multiplicative, complementing the distributional facts.

4.1. Syntactic distinction from adnominal numerals

Floating numerals are distinct from true adnominal numerals in their capacity to co-occur with them. While occurring together, the floating numeral has a partitive interpretation, while the adnominal numeral has an attributive interpretation. Examples (16) and (17) show how these two classes of item co-occur, while each occupies its dedicated position.

- (16) nuchi mädä **krä-rige** kögani **krä-mä**
 Nuchi horse CL-five buy.REM CL-three
 ‘Nuchi bought three of the five horses.’
- (17) nuchi mütü **krä-rige** märi **kro-bu**
 Nuchi pig CL-five tie.up.REC CL-two
 ‘Nuchi tied up two of the five pigs.’

In both examples, the adnominal numeral *krä-rige* ‘five’ occurs adjacent to its associated noun, while the floating numerals *krämä* ‘three’ and *krobu* ‘two’ occur in the dedicated postverbal position. These syntactic regions do not accommodate more than one numeral. The adnominal numeral cannot join the floating numeral in the postverbal region, nor can the floating numeral join the adnominal numeral in the region adjacent to the associated noun. Example (18) shows that two numerals in either region are unacceptable.

- (18) a. * nuchi mädä kögani **krä-rige krä-mä**
 Nuchi horse buy.REM CL-five CL-three
 (‘Nuchi bought three of the five horses.’)
- b. * nuchi [mädä **krä-rige krä-mä**] kögani
 Nuchi horse CL-five CL-three buy.REM
 (‘Nuchi bought three of the five horses.’)

Here, the string of numerals *krä-rige krämä* is unacceptable whether it occurs in either the postverbal position or adjacent to the associated noun. This shows the distinctiveness of floating numerals from true adnominal numerals, weakening support for the Stranding Approach to the syntax of floating numerals.

4.2. Semantic distinction from adnominal numerals

Floating numerals are also more restricted in their quantificational interpretations compared to true adnominal numerals. True adnominal numerals may host a number of quantificational interpretations

that are typical of numerals crosslinguistically. They may take on indefinite readings, but they may also take on attributive readings that make them compatible with definite descriptions. Floating numerals, on the other hand, only host indefinite or non-specific readings. The distinction between the meaning contributions of the two numeral classes is most easily detected with negation. Under negation, only the adnominal numeral is compatible with a wide scope reading, which allows an inference that a quantity of entities indicated by the numeral exists. Floating numerals under negation are not compatible with such inferences, accommodating only a narrow scope reading.

- (19) a. kwichi ni mütü mägäni-te **krä-mä**
 Kwichi NEG pig tie.up.REM-DER CL-three
 ‘Kwichi did not tie up three pigs.’
 b. kwichi ni [mütü **krä-mä**] mägäni-te
 Kwichi NEG pig CL-three tie.up.REM-DER
 ‘Kwichi did not tie up the three pigs.’

In (19a), the floating numeral *krämä* ‘three’ occurs under scope of negation to indicate that there were no three pigs that were tied up. In (19b), the adnominal numeral *krämä* ‘three’ occurs under scope of negation to indicate that there are three pigs that were not tied up.

The differences in the interpretation of floating and adnominal numerals are perhaps best shown with examples of anaphora. Since true adnominal numerals accommodate wide scope readings with respect to negation, they may serve as antecedents to anaphors. Meanwhile, floating numerals under negation lack this capacity, as observed in example (20).

- (20) a. nuchi ni [daba **kwä-mä**] kwedani. tä käme.
 Nuchi NEG pifa CL-three eat.REM be.IND bad
 ‘Nuchi did not eat the three pifas. They are bad.’
 b. # nuchi ni daba kwedani **kwä-mä**. tä käme.
 Nuchi NEG pifa eat.REM CL-three be.IND bad
 (‘Nuchi did not eat three pifas. They are bad.’)

In (20a), adnominal numeral *kwämä* ‘three’ licenses anaphora and serves as an antecedent to the follow up comment about how bad the pifas are. In (20a), floating numeral *kwämä* ‘three’ does not license anaphora, and the follow up comment about pifas becomes awkward without pifas introduced in the discourse to discuss.

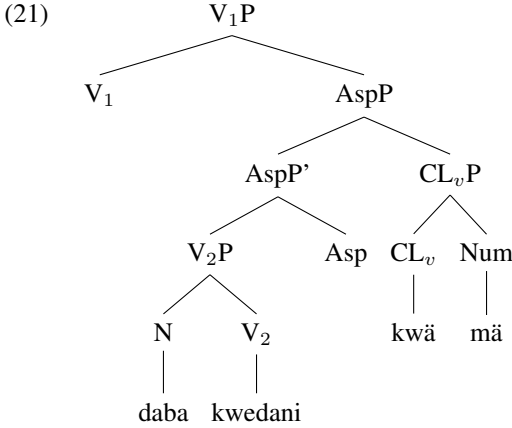
5. Floating numerals as event measurement phrases

The previous sections have shown that Guaymí floating numerals have adverbial distributions, which supports a basic adverbial syntactic analysis. However, two issues remain with this view. First, the adverbial syntactic account alone does not explain how they serve as verb modifiers while contributing quantity information about their associated nouns. Second, it cannot be ignored that floating numerals display sensitivity to the status of their associated nouns as internal or external arguments, and a semantic account that considers thematic relations to the verb is desirable. To address these outstanding issues, we analyze floating numerals as event measurement phrases in the semantics. This means that they express the measure of an event described by a verb along some parameter, which, in their case, is an event patient or theme parameter. This analysis predicts the basic facts, including the imposition of partitive and non-specific readings on associated nouns.

5.1. Analysis

Like Nakanishi (2003, 2007), we propose that floating numeral phrases in Guaymí are event measurement phrases, rather than stranded modifiers of the direct object. Following Travis (2010),

we assume that the theme argument is generated within the inner aspect VP, and the floating numeral is base-generated at the specifier of the inner aspect as in (21).



This syntactic arrangement alone already captures the adverbial distribution of floating numerals.

Semantically, we propose that floating numeral phrases measure out the extent of an event described by the verb along an event theme parameter. This requires a means of operationalizing event measurement, which we accomplish with operations on Davidsonian event arguments. Both the associated noun and the verb feature operations on event variables in their denotations.

- (22)
- a. $\llbracket \text{daba} \rrbracket = \lambda P \lambda e [P(e) \wedge \theta'(e) \in *pifa]$
 - b. $\llbracket \text{kwedani} \rrbracket = \lambda e [eat'(e)]$
 - c. $\llbracket \text{daba kwedani} \rrbracket = \lambda e [eat'(e) \wedge \theta'(e) \in *pifa]$

First, the direct object introduces the theme of an event, but only specifies the nominal kind of the theme, e.g., *pifa* kind as in (22a). The θ' function extracts the thematic participant of the event (Champollion 2016), which must be a member of the nominal kind described by the direct object. Second, the verb is simply interpreted as a predicate of events in (22b). Composing (22a) with the verb in (22b), we derive an event description whose theme is of *pifa* kind.

In the spirit of Kennedy (2012) and Zhang (2018), we propose that the floating numeral phrase has a shifted event measurement meaning as in (23).

- (23)
- a. $\llbracket \text{kwä} \rrbracket = \lambda n \lambda P \lambda e [CL_{\Delta}(\theta'(e))(e) = n \wedge P(e)]$
 - b. $\llbracket \text{kwä-mä} \rrbracket = \lambda P \lambda e [CL_{\Delta}(\theta'(e))(e) = 2 \wedge P(e)]$

$CL_{\Delta}(x)(y)$ is a measure function that indicates the amount of change on x in an event e by the unit specified by the classifier. In the formula, it measures the theme's, i.e. $\theta'(e)$, change in the event e . Composing the V_1P with the CL_vP , we get the following.

- (24) $\llbracket AspP \rrbracket = \lambda e [CL_{\Delta}(\theta'(e))(e) = 2 \wedge eat'(e) \wedge \theta'(e) \in *pifa]$

A total amount of two pifas is consumed, because the classifier measures out the amount of change in the theme by the unit specified by the classifier. This correctly predicts the lack of a specific reading or capacity for anaphoric reference for the associated noun, *pifa*, since the floating numeral never semantically forms a unit with it. Furthermore, the floating numeral is associated with the inner aspect so that it is only compatible with unaccusative verbs, and not unergatives.

5.1.1. Including adnominal numerals

When both the adnominal numeral and the floating numeral are present, as in (16) previously, the sentence has a partitive reading that can also be easily accommodated in our current account. Recall that adnominal numeral phrases can give rise to a specific reading, licensing anaphora in follow up sentences, whereas floating numerals do not. We propose that the adnominal numeral does form a unit with the noun, denoting a plural individual affected in the event as in (25).

- (25)
- a. $\llbracket \text{mädä} \rrbracket = \lambda x[*horse(x)]$
 - b. $\llbracket \text{krä} \rrbracket = \lambda n \lambda x[CL(x) = n]$
 - c. $\llbracket \text{krä-rige} \rrbracket = \lambda x[CL(x) = 5]$
 - d. $\llbracket \text{mädä Krä-rige} \rrbracket = \lambda x[*horse(x) \wedge CL(x) = 5]$

This plural individual description enters into the semantic composition as the theme of the event, with a meaning as in (26a). Notice that here, the noun phrase denotes a plural individual, which serves as the theme of an event description in (26b). In comparison, the direct object with a bare noun does not have a similar individual-denoting semantics.

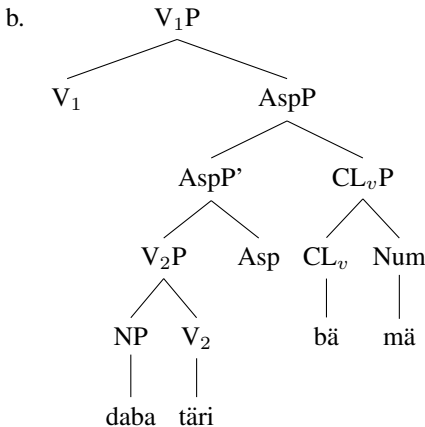
- (26)
- a. $\llbracket \text{mädä Krä-rige} \rrbracket = \lambda P \lambda x \lambda e[P(e) \wedge \theta'(e) = x \wedge *horse(x) \wedge CL(x) = 5]$
 - b. $\llbracket \text{mädä Krä-rige kögani Krä-mä} \rrbracket$
 $= \lambda e \exists x[CL_{\Delta}(\theta'(e))(e) = 3 \wedge buy'(e) \wedge \theta'(e) = x \wedge *horse(x) \wedge CL(x) = 5]$

Note that in (26), because the event measurement function $CL_{\Delta}(\theta'(e))(e)$ has the value of three, only three horses have a change in possession at the end of the event, while actually five horses were involved in the event for a potential purchase. In other words, five horses are involved in the event, but only three of these five horses underwent change in the end. A scenario for such a sentence to be true can be constructed as follows: the seller offers to sell five horses, but the buyer only wants to purchase three of the five.

5.2. Incompatibility with multiplicatives

Our current analysis also correctly predicts that the floating numeral phrase cannot co-occur with multiplicatives. As a type of event measurement phrase, multiplicatives syntactically also occupy the specifier of the inner aspect, in direct competition with the floating numeral phrases.

- (27)
- a. idochi daba ko-mä täri **bä-mä**
 Idochi pifa CL-three throw.REC moment-three
 ‘Idochi threw three pifas three times.’



As shown above in (27b), CL_vP can only host either a floating numeral phrase or a multiplicative, so that these two types of phrases cannot co-occur.

Semantically, like floating numerals, multiplicatives also function as event measurements. Unlike floating numerals, multiplicatives are not concerned with the theme, as in (28).

$$(28) \quad \llbracket \text{bä} \rrbracket = \lambda n \lambda P \lambda e [\text{count}'(e) = x \wedge P(e)]$$

A phrase such as ‘throws pifa(s) three times’ would then have the following semantics as in (29) that there are three counts of pifa-throwing events.

$$(29) \quad \llbracket \text{daba täri bä mä} \rrbracket = \lambda e [\text{count}'(e) = 3 \wedge \text{throw}'(e) \wedge \theta'(e) \in *pifa]$$

5.3. Comparison with Nakanishi (2003, 2007)

Compared with Nakanishi (2003, 2007), we do not analyze the function of floating numerals narrowly as matching the cardinality of the direct object and the number of events, but rather more generally as measuring out the event based on the direct object. As an event measurement phrase, the classifier has a shifted event measurement reading that measures out the thematic participant in the event, which is homomorphic to the event. This meaning is different from the regular plural object semantics if the floating numeral were to form a constituent with the direct object. The specific reading is lacking precisely because of this lack of referential semantics. In addition, although the classifier has a shifted meaning, it still retains its selectional restriction on the N, and therefore even without being the same constituent with the N, the classifier nevertheless still is in concord with the N.

6. Conclusion

This paper considered new data from an understudied language to address a long standing puzzle in the syntax and semantics of floating quantifiers across languages. Guaymí is a Panamanian Chibchan language that features floating numerals, which occur in a canonical postverbal position completely disjoint from their preverbal associated nouns. The general debate in the literature over the syntactic status of floating quantifiers was reviewed, and evidence from Guaymí grammar points to the likelihood that floating numerals in this language are adverbs. Guaymí floating numerals display flexible movement within a sentence, as many adverbs do. They are also unable to co-occur with multiplicatives, suggesting their membership in this adverb class.

The status of floating numerals as adverbs calls for a semantic analysis that explains how they serve as verb modifiers while contributing quantity information about their associated nouns. Floating numerals were also shown to prefer association with internal arguments of verbs, and to restrict the interpretation of their associated noun to a non-specific one. These facts support a view of Guaymí floating numerals as event measurement phrases, which means that they express the measure of an event described by a verb along the parameter of an event patient or theme. Verbs with internal arguments were analyzed as selecting for event arguments, which may be used to define the theme or patient of an event described by the verb. Floating numerals also take event arguments and use them to define the extent to which an event patient or theme has undergone change. This semantics allows for a syntax of floating numerals that treats them as adverbs, attaching to a projection AspP as adjuncts.

That concludes this brief take on the proper treatment of the floating numerals in Guaymí. These findings support a view of floating numerals across languages as adverbial items. Future work will consider a broader range of sentence types and the interaction of floating numerals with individual-level predicates and extraction, as well as possible association with nouns within postpositional phrases. Finally, we hope to expand the analysis to other types of floating quantifiers in Guaymí beyond numerals, such as existential and universal quantifiers.

References

- Champollion, Lucas (2016). Covert distributivity in algebraic event semantics. *Semantics and Pragmatics* 9:15, 1–65.
- Constenla Umaña, Adolfo (1989). Subagrupación de las lenguas chibchas: Algunos nuevos indicios comparativos y léxico-estadísticos. *Estudios de Lingüística Chibcha* 8, 17–72.
- Constenla Umaña, Adolfo (1991). *Las lenguas del Área Intermedia: introducción a su estudio a real*. Editorial de la Universidad de Costa Rica, San José.
- Constenla Umaña, Adolfo (1995). Sobre el estudio diacrónico de las lenguas chibchenses y su contribución al conocimiento del pasado de sus hablantes. *Boletín Museo del Oro* 38-39, 13–55.
- Csirmaz, Anikó (2008). Flexibility and rigidity: Multiplicatives, frequency and quantification adverbs. Berson, Sarah, Alex Bratkievich, Daniel Bruhn, Amy Campbell, Ramon Escamilla, Allegra Giovine, Lindsey Newbold, Marilola Perez, Marta Piqueras-Brunet & Russell Rhomieux (eds.), *Proceedings of the Thirty-Fourth Annual Meeting of the Berkeley Linguistics Society*, Berkeley Linguistics Society, Berkeley, CA, 73–84.
- Csirmaz, Anikó (2009a). Adverbs of quantity: Entities of different kinds. *University of Pennsylvania Working Papers in Linguistics* 15:1.
- Csirmaz, Anikó (2009b). Multiplicatives, frequency and quantification adverbs. *Acta Linguistica Hungarica* 56:2-3, 131–168.
- Fitzpatrick, Justin M. (2006). *The syntactic and semantic roots of floating quantification*. Ph.D. thesis, Massachusetts Institute of Technology, Cambridge, MA.
- Kennedy, Christopher (2012). The composition of incremental change. Demonte, Violeta & Louise McNally (eds.), *Telicity, Change, State: A cross-categorical view of event structure*, Oxford University Press, Oxford, 103–121.
- Koopman, Hilda & Dominique Sportiche (1991). The position of subjects. *Lingua* 85:2-3, 211–258.
- Miyagawa, Shigeru (1989). *Structure and case marking in Japanese*. Academic Press, Inc., San Diego, CA.
- Nakanishi, Kimiko (2003). Semantic properties of floating quantifiers and their syntactic implications. McClure, William (ed.), *Japanese/Korean Linguistics*, CSLI, Stanford, CA, vol. 12, 365–376.
- Nakanishi, Kimiko (2007). *Formal properties of measurement constructions*. Mouton de Gruyter, Berlin.
- Quesada-Pacheco, Miguel A. (2008). *Gramática de la lengua guaymí (ngäbe)*. Lincom Europa, Muenchen.
- Rothstein, Susan (2003). Secondary predication and aspectual structure. Lang, Ewald, Claudia Maienborn & Cathrine Fabricius-Hansen (eds.), *Modifying Adjuncts*, de Gruyter, Berlin, 553–590.
- Travis, Lisa deMena (2010). *Inner Aspect: The articulation of VP*, vol. 80 of *Studies in Natural Language and Linguistic Theory*. Springer, Dordrecht.
- Uhle, Max (1890). Verwandtschaften und wanderung der tschibscha. *Proceedings of the International Congress of Americanists* 7 (Berlin 1888), 446–489.
- Zhang, Anqi (2018). *On Non-culminating accomplishments in Mandarin*. Ph.D. thesis, University of Chicago, Chicago, IL.

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