Proceedings of SALT 32: 498–521, 2022

Against a generalized quantifier analysis of certain quantity expressions in Ch'ol*

Carol Rose Little
University of Oklahoma

Abstract This paper discusses a quantity word alternation in Ch'ol, a Mayan language of southern Mexico. Drawing on fieldwork and additional texts, I show that numerals, *pejtyel* 'all,' and *oñ* 'many/much' may appear with additional possessive morphology. I present evidence against a generalized quantifier analysis of these expressions and provide an analysis where the possessed quantity expressions are adjuncts co-indexed with a null pronoun. I also consider the alternation between *oñ* 'many/much' and its possessed form meaning 'most.' While the morphosyntactic distribution is similar, there are certain semantic reasons to not treat the 'many'/'most' alternation in the same way as 'all' and the numerals. I suggest that the form corresponding to 'most' has arisen via analogy with the other forms. I conclude with some observations on other quantity words in the language and cross-linguistic implications in the study of quantificational phrases.

Keywords: quantification, Mayan, numerals, maximality, modifiers, quantifiers, Ch'ol

1 Introduction

Quantifiers such as 'every' or 'most' are typically analyzed as relations between sets and type $\langle\langle et\rangle\langle\langle et\rangle t\rangle\rangle$. One motivation for such an analysis is that generalized quantifiers like 'every girl' lack certain referential properties typical of other noun phrases like 'the girl' or names like 'Taylor.' While many maintain that quantifiers like 'every' are relational in English, not all agree that quantifiers such as 'all' are (e.g., Brisson 1998, 2003). In cross-linguistic studies of quantificational expressions (e.g., Bach, Jelinek, Kratzer & Partee 1995, Matthewson 2008 and Keenan & Paperno 2012), it has been argued that not all languages have generalized quantifiers (see: Lee 2008: San Lucas Quiavani Zapotec; Baker 1995: Mohawk; and

* Many thanks to the Ch'ol speakers I worked with, especially Morelia Vázquez Martínez and the Arcos López family. *¡Wokoxme la'wälä!* I thank Sarah Murray, Mary Moroney, Todd Snider, Justin Royer, Brian Buccola, Lingzi Zhuang, Luismi Toquero-Pérez and audiences at SALT 32, the Cornell Semantics group and the University of Kansas for comments and discussion. Most of this data was collected between 2016–2022 thanks to funding from Engaged Cornell and a Doctoral Dissertation Research Improvement Grant from the National Science Foundation under grant no. BCS-1852744. Unless indicated otherwise, data comes from fieldwork in Chiapas, Mexico. Any errors are my own.

Vieira 1995 Asurini Do Trocará). Indeed Gil (1995) notes that many languages have a form for 'all', but not all languages have a form for 'every.'

The focus of this paper is to investigate a set of morphologically complex quantity expressions in Ch'ol, a Mayan language of Mexico. The alternation under investigation is exhibited in (1) and (2). As shown in (1a), the form for *pejtyel* 'all' can appear prenominally, or with a preposition *tyi*, a possessive prefix *i-* and a relational suffix *-el* in (1b).[1] Numerals also participate in this alternation as in (2); the possessive morphology in (2b) adds a maximal interpretation, as the translation indicates. The third person possessive prefix *i-* in (1b) and (2b) index *waj* 'tortilla', evidence that *waj* is syntactically a possessor.

(1) a. Tyi j-k'uxu [**pejtyel** waj].
PFV A1-eat all tortilla
'I ate all (of) the tortillas.'

b. Tyi j-k'uxu [**tyi** **i-pejtyel-el** waj]
PFV A1-eat PREP A3-all-RS tortilla
'I ate all (of) the tortillas.'

(2) a. Chächäk [**cha'-k'ejl** waj].
red two-CLF tortilla
'Two tortillas are red.'

b. Chächäk [**tyi** **i-cha'-k'ejl-el** waj].
red PREP A3-two-CLF-RS tortilla
'The two tortillas are red.'

This paper focuses on the morphosyntactic status as well as compositional semantics of the expressions in (1b) and (2b). I provide diagnostics that the possessed quantity expressions in (1b) and (2b) are not generalized quantifiers. I propose that they are adjuncts co-indexed with a null pronoun in the argument structure, previewed in (3).

(3) Tyi majli-yob pro_i [tyi i-pejtyel-el-ob wiñik-ob$_i$].
PFV go-PL PREP A3-all-RS-PL man-PL
'All the men left.'

I propose that the relational suffix *-el* converts numerals and *pejtyel* from a modifier to an obligatorily possessed noun. This derives the literal meaning where the property of 'two' or the property of maximality is understood as a property of the possessor: 'the tortillas' two-ness' (2b) and 'the maximality of the tortillas' (1b).

1 Glossing follows Leipzig conventions with the additions of set A = possessive and ergative markers; set B = absolutive markers; CP = completive aspect; LV = light verb; RS= relational suffix.

The paper is organized as follows. In Section 2 I provide background on the language and the morphological features of the possessed quantity words. In Section 3, I provide data that the possessed forms refer to a maximal entity in the discourse. Section 4 argues for a non-quantificational treatment of these quantity expressions and Section 5 proposes they are adjuncts co-indexed with a null pronoun. In Section 6, I provide a compositional morphosemantic analysis for the possessive morphology, drawing on analyses that the relational suffix *-el* type-shifts the numeral or *pejtyel* 'all' to a relational noun. Before concluding, I discuss one additional quantity word alternation in Section 7: *oñ* 'much/many' and *tyi yoñlel* 'most'. I consider a unified account with the numerals and *pejtyel* 'all' but note a few challenges for a such an account, suggesting the many/most alternation has arisen via analogy. In Section 8, I end with some observations on other quantity words in Ch'ol as well as implications for the way languages treat quantificational expressions in general.

2 Quantity words in Ch'ol

2.1 Grammatical overview

Ch'ol is a Mayan language of southern Mexico, spoken in the Mexican states of Chiapas, Tabasco and Campeche, with Chiapas begin the state with the largest number of Ch'ol speakers. There are about a quarter of a million speakers of Ch'ol aged three and older according to data from the Mexican Institute of Statistics and Geography (INEGI 2020). The language continues to be learned and spoken by multiple generations, though it is being replaced by Spanish in many contexts. Data comes from original fieldwork in Chiapas, various text sources cited throughout, and the Ch'ol-Spanish dictionary (Aulie & Aulie 1978).

Ch'ol is a head-marking, ergative-absolutive, predicate-initial language. I adopt the Mayanist labels of set A and set B labels for person markers. Set A prefixes index ergative and possessive arguments; set B markers index absolutive arguments. Third person set B markers are null and not included in glosses. Examples of Ch'ol clauses are given in (4). Possessive arguments follow their possessees with possessive set A markers appearing on the possessed noun, as in (5). Certain morpheme glosses such as stem suffixes are not separated out in this paper for simplicity.

(4) a. Tyi i-k'uchu si' aj-Rosa.
PFV A3-carry wood NC-Rosa
'Rosa carried wood.'

b. Tyi a-k'ele-yoñ.
PFV A2-see-B1
'You saw me.

bare		possessed	
cha'-p'ej	'two-GEN.CLF'	*tyi i-**cha'-p'ejl**-el*	'the two'
ux-tyikil	'three-HUM.CLF'	*tyi y-**ux-tyikl**-el*	'the three'
pejtyel	'all'	*tyi i-**pejtyel**-el*	'all'
oñ	'many/much'	*tyi y-**oñ**-lel*	'most'

Table 1 Bare–possessed alternation

c. Tyi juli-yoñ.
PFV arrive-B1
'I arrived.'

(5) a. i-juñ aj-Rosa
A3-book NC-Rosa
'Rosa's book'

b. k-juñ
A1-book
'my book'

2.2 Quantity word alternation

I concentrate on a set of quantity words that appear with possessive morphology and *tyi*, Ch'ol's all-purpose preposition. The quantity words that participate in this alternation are given in Table 1. As described in Little (2018), all numerals in Ch'ol participate in this alternation (only two numerals are shown in the table). Numerals in Ch'ol appear with an obligatory classifier, which changes depending on the shape, size or position of the noun modified (see discussion of classifiers in Arcos López 2009, Bale, Coon & Arcos 2019 and Little, Moroney & Royer 2022). The two other quantity words that allow this are *pejtyel* 'all' and, for some speaker communities, *oñ* 'many/much,' the latter which is discussed further in Section 7. The morphological components of these forms are given in (6).

(6) Morphology of the possessed quantifiers, exemplified for *tyi icha'tyiklel*

tyi	*i-*	{ ***cha'***	***-tyikl*** }	*-el*
PREP	A3	two	-CLF	-RS
↑	↑	↑	↑	↑
preposition	possessive prefix	numeral	classifier	relational suffix

The item inside the braces can be replaced with *pejtyel* 'all', *oñ* 'much/many' or any other numeral+classifier in Ch'ol. The forms *pejtyel* and *oñ* do not appear with a classifier, unlike numerals.

Possessive agreement on these quantity words tracks person features of the set

it describes, as exemplified in (7). In (7a), the overt possessor *waj* 'tortilla' follows the possessed quantity word and appears with third person possessive agreement *i-*. In (7b) and (7c), the possessive prefixes are first person plural and second person plural, respectively, agreeing with a null pronoun, indicated as *pro*, in possessor position. In addition to the third person agreement, the animate/human plural marker also can optionally appear on the possessed quantity word in (7d). I analyze the null pronouns and overt nominals as possessors due to their distribution: they appear after the possessed quantity word as is expected of possessors and they trigger possessive agreement on the quantity word.

(7) a. tyi **i**$_i$-cha'-k'ejl-el waj$_i$
PREP A3-two-CLF.FLAT-RS
'the two tortillas'

b. tyi **la-k**$_i$-cha'-tyikl-el *pro*$_i$
PREP PL.IN-A1-two-CLF-RS
'the two of us'

c. tyi **la'-w**$_i$-oñ-lel *pro*$_i$
PREP PL.IN-A2-many-RS
'most of you'

d. tyi **i**$_i$-pejtyel-el**-ob** aläl-ob$_i$
PREP A3-all-RS-PL child-PL
'all the children'

With the preposition *tyi*, the additional possessive morphology is required.[2]

(8) a. *tyi i-cha'-tyikil b. *tyi cha'-tyikil c. *tyi cha'-tyikl-el
PREP A3-two-CLF PREP two-CLF PREP two-CLF-RS

In the following section, I concentrate on the semantic interpretation of the possessed numeral forms, compared to bare numerals. I briefly sketch how this can be extended to *pejtyel* 'all' and its possessed form.

3 Possessed numerals and *pejtyel* are maximal

Possessed numerals have different entailments from bare numerals, as I have shown in Little (2018). They are maximal, unlike bare numerals. For example, in (9) with the bare numeral there are no maximality entailments of the numeral—the speaker can have two or more children. When the possessed numeral is used, the speaker

2 The form *pejtyelel* without *tyi* is also possible. However, it may *only* modify third person arguments and does not appear with possessive marking.

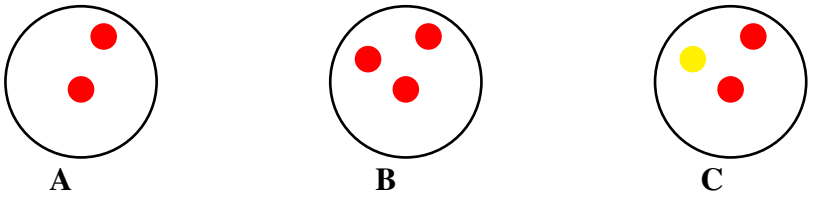


Figure 1 Various contexts with red and yellow tortillas (Little 2018)

necessarily has exactly two children as demonstrated in (10). In (9) and (10) the (b) examples are meant to be follow-ups to the (a) examples. (The perfective marker *tyi* is homophonous to the preposition but they are unrelated.)

(9) a. Chumul-ob **cha'-tyikil** y-alobil tyi Estados Unidos.
live-PL two-CLF A3-child PREP SP:states SP:united
'His two children live in the United States.'

b. Ya' tyi majli yambä je'e.
there PFV go other also
'Another one went there as well.' Modified from Little (2018)

(10) a. Chumul-ob **tyi i-cha'-tyikl-el** y-alobil tyi Estados Unidos.
live-PL PREP A3-two-CLF-RS A3-child PREP SP:states SP:united
'His two children live in the United States.'

b. #Ya' tyi majli yambä je'e.
there PFV go other
'Another one went there as well.' Modified from Little (2018)

Further evidence that the possessed numerals are maximal comes from felicity judgements regarding the contexts in Figure 1. Example (11) is felicitous when there are two and only two tortillas and they are red. The infelicity with Context C shows that the possessed forms do not have a partitive interpretation.

(11) Chächäk **tyi i-cha'-k'ejl-el** waj.
red PREP A3-two-CLF-RS tortilla
'The two tortillas are red.' ✓A ✗B ✗C

Possessed forms cannot appear in predicative position (12b), unlike the bare forms, in (12a).

(12) a. **Cha'-tyikil**-oñ=la.
two-CLF-B1=INCL.PL
'We are two.'

b. *__Tyi la=k-cha'-tyikl-el__-oñ=la.
PREP PL.INCL=A1-two-CLF-RS-B1=PL.INCL
Int.: 'We are the two.'

As exhibited for numerals, *tyi ipejtyelel* also indicates a maximal entity. Unlike with numerals, however, both the bare form *pejtyel* and the possessed form *tyi ipejtyelel* are maximal. An example is given below; I translate both as 'all.'

(13) a. Tyi k-mäk'a { **pejtyel / tyi i-pejtyel-el** } ja'as.
PFV A1-eat all PREP A3-all-RS plantains
'I ate all the plantains.'
b. #... i tyi k-äk'e jum-p'ej k-chich.
PFV 1-give one-CLF A1-sister
'...and gave one to my sister.

While not semantically distinct in terms of maximality, below I note that the possessed form *tyi ipejtyelel* is better in strictly anaphoric contexts.

4 Against a quantificational treatment

In this section, I investigate the status of these possessed quantity expressions—do they pattern like generalized quantifiers of type $\langle\langle et\rangle t\rangle$? I provide evidence that they are not quantifiers and propose they are adjuncts co-indexed with a null pronoun. Evidence against a quantificational treatment comes from the fact they are marked with a preposition, they do not induce weak crossover effects, they lack expected scope effects and they can be referential. Taken together, these properties challenge a generalized quantifier treatment of these phrases.

4.1 Morphosyntactic distribution

A morphosyntactic piece of evidence that these quantity words are not quantifiers comes from the fact they appear with *tyi*, Ch'ol's all-purpose preposition. It marks prepositional phrases in (14a) and (14b) and also serves to introduce by-phrases of passives in (14c).

(14) a. Tyi ochi-yoñ [$_{PP}$ **tyi** otyoty].
PFV enter-B1 PREP house
'I went into the house.'

b. Tyi lok'i-yoñ [$_{PP}$ **tyi** otyoty].
PFV leave-B1 PREP house
'I went out of the house.'

c. Tyi me'tyäñ-tyi x-much [**tyi** tyuñ].
PFV squash-PASS NC-frog PREP stone
'The frog was squashed by the stone.' (Vázquez Álvarez 2011: 352)

The fact that the possessed phrases are marked with *tyi* provides evidence that they are syntactically not arguments of verbs, but rather oblique-marked adjunct phrases. Further evidence comes from extraction. As noted in Little (2020a), adjuncts introduced with *tyi* are islands for extraction, thus the possessed quantity expressions should not allow extraction from them, borne out in (15).

(15) a. Tyi juli-yob [tyi i-pejtyel-el-ob **wiñik-ob**].
PFV arrive-PL PREP A3-all-RS-PL man-PL
'All the *men* arrived.'

b. *__Wiñikob__$_i$ tyi juliyob [tyi ipejtyelelob t$_i$]. [3]

4.2 Weak crossover

Baker (1995) uses weak crossover effects as one diagnostic to argue against a quantificational treatment of *akwéku* 'all' in Mohawk. Weak crossover effects can be observed in the following examples in English A′-movement. Wh-movement over a co-indexed possessor yields a questionable or ungrammatical structure, as in (16).

(16) a. ??What$_i$ did its$_i$ owner break t$_i$?
b. ??Who$_i$ did her$_i$ father see t$_i$?

By extension, if we take the hypothesis that quantifiers undergo quantifier raising, then we could expect similar effects to happen with quantifiers that have been raised, as discussed in Chomsky (1976). This is borne out in (17) with their LFs in (18).

(17) a. ??Its$_i$ owner broke [every machete]$_i$.
b. ??Her$_i$ father saw everyone$_i$.

(18) a. Every machete$_i$ [its owner broke t_i]
b. Everyone$_i$ [her father saw t_i]

3 This example sounds good with the reading 'the *men* arrived, all of them' where 'all of them' is interpreted as an appositive. The consultant noted there 'needs to be a coma [a pause] between' the verb and quantity adjunct.

In order to use this diagnostic for Ch'ol, I first establish that weak crossover effects exist in the language. When wh-movement of the co-indexed object takes place in (19), the sentence is rendered ungrammatical under coreference.[4]

(19) *Chuki$_i$ tyi i-xulu i$_i$-yum?
what PFV A3-break A3-owner
Int.: 'What$_i$ did its$_i$ owner break?'

With the quantity expressions under investigation here, there are not any weak crossover effects, such as those exhibited in (19). The possessed quantity expression appears after the subject in (20a); binding the possessor of the subject is also possible when the quantity word is in the preverbal focus position, in (20b).[5]

(20) a. Tyi i-xulu i$_i$-yum [tyi i-cha'-p'ejl-el machity]$_i$.
PFV A3-break A3-owner PREP A3-two-CLF-RS machete
'Their$_i$ owner broke the two machetes$_i$.'
b. [Tyi i-pejtyel-el machity]$_i$ tyi i-xulu i$_i$-yum.
PREP A3-all-RS machete PFV A3-break A3-owner
'Their$_i$ owner broke all the machetes$_i$.'

The lack of weak crossover effects is thus one piece of evidence against a quantificational treatment of these possessed quantity expressions.

4.3 Scope effects

Quantifiers have been known to interact with negation in different ways. For example, the sentence in English can have two meanings: one where the universal scopes over negation; the second where negation scopes over the universal.

(21) All that glitters is not gold. $\forall > \neg$; $\neg > \forall$

I have noted elsewhere that numerals in Ch'ol can have different scopal properties depending on their syntactic position, argued to be due to whether they appear inside or outside of the VP (Little 2020b). Here, I present data showing that, at least with negation, these possessed forms do not show any difference in scope. In (22), no Ch'ol person voted, with 'all' scoping over the negation. Indeed the content of

4 When asked for a felicitous response to (19), speakers responded with *iyok* 'his leg' (i.e., of the owner) or *jump'ej machity* 'one machete' with the caveat that it is not known who the owner of the machete it; crucially it is not the aforementioned owner.

5 It is unclear if the whole expression is co-referential to the possessor of 'owner' or if the just nominal *machity* is. For now, I leave the index around the brackets of the possessed quantity expression, remaining agnostic as to the exact details of which constituents co-refer.

the possessed *pejtyel* projects, much like would be expected for a definite entity.

(22) **Ma'añ** tyi i-cha'le-yob tyi votar tyi i-pejtyel-el aj-Ch'ol-ob.
NEG PFV A3-LV-PL PREP SP:vote PREP A3-all-RS NC-ch'ol-PL
'All the Ch'ol people didn't vote.' $\forall > \neg$; $*\neg > \forall$

A caveat is needed. There are two types of negation in Ch'ol: *ma'añ* and *mach*. *Ma'añ* appears with predicates and is most likely composed, at least historically, of *mach* and *añ*, the existential predicate. This negation particle is used for sentential negation (stage-level predicates) whereas *mach* is for individual-level predicates (Coon 2006). Indeed, to obtain the other reading where negation scopes over the universal, the individual-level negation marker *mach* is used in (23).

(23) [**Mach** tyi i-pejtyel-el aj-ch'ol-ob] tyi i-cha'le-yob tyi votar.
NEG PFV A3-all-RS NC-ch'ol-PL PFV A3-LV-PL PREP SP:vote
'Not all Ch'ol people voted.' $*\forall > \neg$; $\neg > \forall$

While the scope facts do not point conclusively towards a non-quantificational treatment of these forms, they nevertheless tell us that the possessed quantity expressions do not interact with negation in ways expected of generalized quantifiers.

4.4 Collective predication

Another notable difference with true quantifiers in English like 'every' is that they are not felicitous in collective predicates in contrast to 'all' (Brisson 1998, 2003). Examples of this are given in (24a) and (24b).

(24) a. *Every girl gathered in the hallway. (Brisson 2003: 130)
b. All the girls gathered in the hallway.

In Ch'ol, there is no such restriction with the possessed quantity expressions as in (25): they can appear with collective predicates, constituting more evidence against a generalized quantifier analysis. (The verb 'gather' is expressed with the verb *tyempañ* and a reflexive *bäj*.)

(25) a. Tyi i-tyempa-yob i-bäj [tyi i-pejtyel-el-ob wiñikob].
PFV A3-meet-PL A3-REFL PREP A3-all-RS-PL man-PL
'All the men gathered.'
b. Tyi i-tyempa-yob i-bäj [tyi y-ux-tyikl-el-ob wiñik-ob].
PFV A3-meet-PL A3-REFL PREP A3-three-CLF-RS-PL man-PL
'The three men gathered.'

4.5 Referential properties

It has been noted that 'every' and 'all' have different referential properties, exhibited in (26), examples from Baker (1995: 25).

(26) a. *The guy who read every book$_i$ in the library said it$_i$ was boring.
b. The guy who read all the books$_i$ in the library said they$_i$ were boring.

Baker (1995: 25), citing Reinhart (1983), notes that "quantified NPs...can have anaphoric relations only with pronouns which they bind." This relation is not the case for 'all' as shown in (26b), evidence that "the anaphoric properties for 'all' are not significantly different from those of ordinary definite NPs."

In Ch'ol, it is possible to refer back to the possessed quantity expressions, as exhibited by the following example in (27).

(27) K-ujil che' mi kej i-k'otyel-ob [**tyi i-pejtyel-el-ob**
A1-know C IPFV PROS A3-arrive PREP A3-all-RS-PL
aj-Campanariojob]$_i$ tyi k'iñijel che' tyi k-päyä**-yob**$_i$.
NC-Campanario-PL PREP C PFV A1-invite-PL.
'I knew that [all the people from Campanario]$_i$ would come to the party when I invited them$_i$.'

This example shows that the possessed quantity expression can be a valid antecedent for a pronoun, a property not typically associated with generalized quantifiers. While it is of note that the boundaries between referential expressions and generalized quantifiers can be blurred—for instance *they* could swapped with *it* in (26a) to improve the sentence—this diagnostic does not provide evidence in *favor* of a generalized quantifier treatment of the possessed quantity expressions.

4.6 Summary

A summary of the evidence against a generalized quantifier treatment of the possessed quantity words in Ch'ol is provided in (28).

(28) The possessed forms of the quantity expressions:
a. are marked with a preposition
b. do not exhibit weak crossover effects
c. do not have scope effects
d. can combine with collective predicates
e. can be referential

5 Co-indexed adjuncts

If these phrases are not noun phrases, nor are they generalized quantifiers, then what are they? I argue they are PP adjuncts where the possessor is co-indexed with a null pronoun (*pro*) in argument position as in (29).

(29) Tyi majli-yob pro_i [tyi i-pejtyel-el-ob wiñik-ob$_i$].
PFV go-PL PREP A3-all-RS-PL man-PL
'All the men left.'

Agreement patterns provide further evidence. There must be co-indexation in order to license these expressions, or else the sentence is unacceptable. In (30a), agreement on the predicate *majli* indexes first person plural—the same as what we see in the possessed form of 'all.' Lack of agreement, as in (30b), yields an ungrammatical sentence.

(30) a. Tyi majli-**yoñ=la** pro_i [tyi **la=k-**pejtyel-el pro_i].
PFV go-B1=PL.INCL PREP PL.INCL=A1-all-RS
'We all left.'

b. *Tyi majli pro_i [tyi **lak**pejtyelel pro_i].

The overt nominal must be in possessor position inside the adjunct marked with *tyi*, co-indexed with a *pro* in argument position. If the overt nominal appears in argument position as in (31), the sentence is ungrammatical.

(31) *Tyi juli-yob **wiñik-ob**$_i$ [tyi i-pejtyel-el-ob pro_i]
PFV arrive-PL man-PL PREP A3-all-RS-PL
Int.: 'All the men arrived.'
Speaker comment: it sounds like you need a comma in there [indicating between *wiñikob* and *tyi*].

Interestingly, these quantity expression adjuncts behave differently from locational PPs with a co-indexed possessor (e.g., 'Rosa$_i$ arrived at her$_i$ house'), such as those reported in Royer (Accepted). At this point I do not know why they might behave differently, however, quantity terms and locational PPs are clearly syntactically and semantically distinct classes. It is also of note that the ordering of these quantity expressions is strict with respect to other PPs: the quantity expressions must occur before locational ones, as exhibited in (32).

(32) Tyi juli-yob {*tyi Saltu } tyi i-pejtyel-el-ob wiñik-ob {✓tyi Saltu }.
PFV arrive-PL PREP Salto PREP A3-all-RS-PL man-PL PREP Salto
'All the men arrived in Salto.'

6 The semantics of the possessive morphology

In this section, I propose a compositional semantic analysis of the possessive morphology, drawing on observations from Little (2018). I propose that the possessor argument of these forms must be a known entity in the context, an argument of type *e*. Data from this largely comes from the possessed and non-possessed form of 'all.' First, I present data on the contribution of the relational suffix *-el*. Evidence from the definite status of the possessor points towards a type-shifting analysis of the nominal in possessor position. This type-shifting analysis builds on work in the verbal domain discussed in Little (2020b).

6.1 The relational suffix *-el*

Appearance of *-el* on the possessed noun changes the relational meaning between possessor and possessee—creates a "tighter" intrinsic relation, in the words of Barker (1995, 2012). Compare the semantic interpretation of (33) and (34) with and without *-el*.

(33) a. i-pisil aj-Rosa
A3-cloth NC-Rosa
'Rosa's cloth' (e.g., laundry)

b. i-pisl-**el** aj-Rosa
A3-cloth-RS NC-Rosa
'Rosa's clothing' (e.g., she is wearing) (Coon 2010: 86)

(34) a. i-tye' otyoty
A3-wood house
'wood to build a house' (the house has not yet been built)

b. i-tye'-**el** otyoty
A3-wood-RS house
'the house's wood' (the house is made of wood) (Little 2018)

In the constructions with *-el* the possessor is obligatory.[6] The *-el* in these contexts can be thought of as an instantiation of Barker (2012)'s type shifter, π, which shifts non-relational nouns into inherently relational ones, given in (35).

(35) $\pi = [\![\text{-}el]\!] = \lambda P \lambda x \lambda y.[P(y) \wedge R(x,y)]$ where R is a variable standing in for the possession relation

6 This morpheme also appears on intransitive verbs and is analyzed as a nominalizer (Coon 2013). When it attaches to intransitive verb roots, the possessor is not obligatory. I assume that nominalizer *-el* and relational *-el* are distinct.

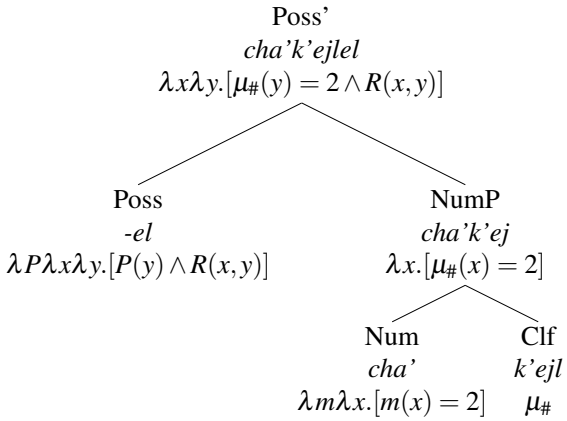
I build on previous work on numerals in Ch'ol (Bale & Coon 2014; Bale et al. 2019) that the classifier provides the measure function for the numeral, given in (36). I also adopt the proposal in Little (2018) that numerals are intersective modifiers in Ch'ol, given in (37).

(36) Denotation of classifier *ke'jl* (used for flat round things)
$[\![\ k'ejl\ ]\!] = \mu_{\#}$

(37) Denotation of numeral *cha'* 'two' as an intersective modifier
$[\![\ cha'\ ]\!] = \lambda m \lambda x.[m(x) = 2]$

The relational suffix takes the possessee—the numeral phrase in this case—as its first argument in (38).

(38)



I now turn to the semantics of the possessor.

6.2 The possessor is anaphoric to some salient set

Data from the two forms for 'all' in Ch'ol provide insight into the possessive argument—that it is a definite entity familiar in the context. While *pejtyel* also allows for this reading, the possessed form is comparatively better in such contexts. In contrast to the possessed 'all', the bare form is better in contexts referencing kinds. For example, the non-possessed form of *pejtyel* in (25a) is better in a context when talking about cats in general, whereas in (39b) the cats must be known.

(39) [Context: talking about what animals do in general]

a. Miawakña-yob [**pejtyel** mix].
meow-PL all cats
'All cats meow.'
Speaker comment: Meaning all the cats in the world

b. #Miawakña-yob [**tyi** **i-pejtyel-el** mix].
meow-PL PREP A3-all-RS cats
Int.: 'All cats meow.'
Speaker comment: Only if you know which cats you're talking about

The possessed form of *pejtyel* was judged to be better in a context such as (40a) where the set of dogs is clear.

(40) a. Tyi majli tyi cholel [**tyi** **i-pejtyel-el** ts'i'], jiñäch
PFV go PREP cornfield PREP A3-all-RS dog namely
x-Pinto, Shakira yik'oty x-Rocky
NC-Pinto Shakira and NC-Rocky
'All the dogs went to the cornfield, namely Pinto Shakira and Rocky'
Speaker comment: better with *tyi*

b. ?Tyi majli tyi cholel [**pejtyel** ts'i'], jiñäch x-Pinto, Shakira
PFV go PREP cornfield all dog namely NC-Pinto Shakira
yik'oty x-Rocky
and NC-Rocky
'All the dogs went to the cornfield, namely Pinto Shakira and Rocky.'
Speaker comment: Also ok, but not as good as first example

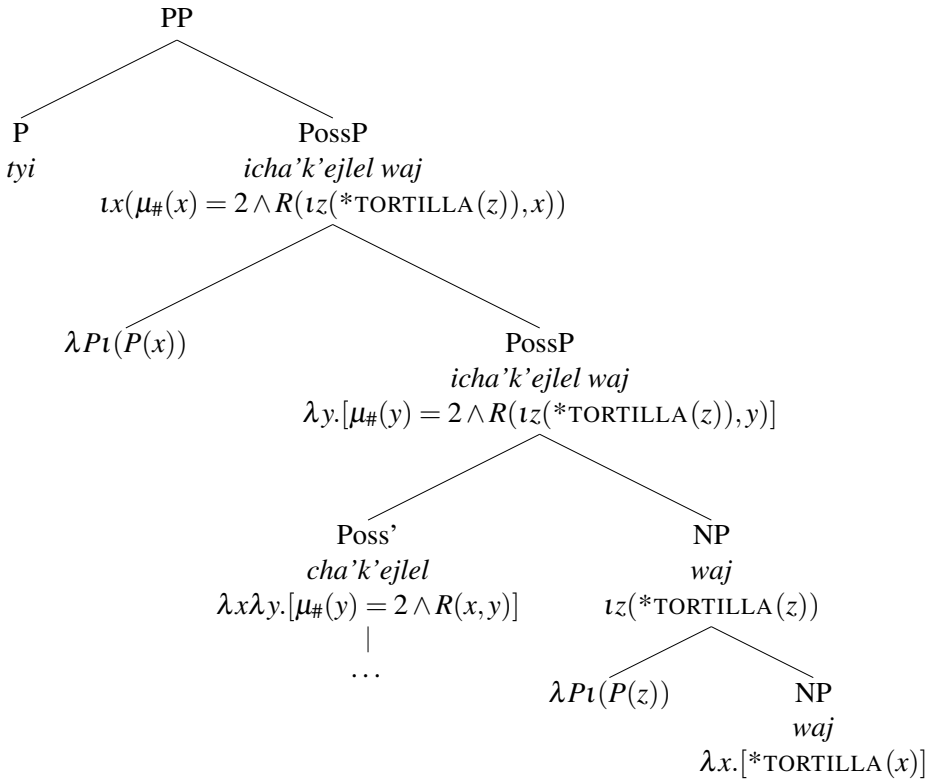
Given these facts, I adopt a ι type-shifter that shifts the bare noun in possessor position from a property to an individual (see discussion on type-shifting for bare nouns in Ch'ol in Little 2020b). In (41), the meaning for *tyi icha'k'ejlel waj* 'the two tortillas', is literally 'the tortillas' two-ness' where numbering in two is a property of the tortillas. Similarly, *tyi ipejtyelel waj* 'all the tortillas', corresponds to 'the maximality of the tortillas.'[7]

7 Kaqchikel dependent numerals can also appear with possessive morphology (Henderson 2021), similar to that of Ch'ol's. Henderson gives a literal translation of the bolded numeral below as 'their one-by-oneness'.

(i) X-e'-el **chi-ki-ju-jun-al** ri achi'-a'.
CP-A3.PL-leave PL-ERG.3PL-one-RED-NOM the man-PL
'Each of the men left.'

In contrast to the Ch'ol facts discussed here, these possessed numerals in Kaqchikel are distributive.

(41)



The extension of this possessor relationship must be understood more abstractly where properties are metaphorical parts of the objects that possess them in the sense of Moltmann (2004). Moltmann discusses properties such as color, taste or speed as being literally part of the object that possesses them. For example, to say 'the greenness of the leaf' it is understood that greenness is literally part of the leaf.[8]

The semantics of *pejtyel* 'all' and its possessed form proceed in a similar fashion to (41). I analyze *pejtyel* 'all' as a modifier in the sense of Brisson (2003). Adopting her analysis for 'all' in English makes 'all' not a quantifier, but rather an adjective that forces maximality.[9]

7 Extending the analysis to many/most?

In this last section I note some particular behaviors of an additional quantity word alternation: *oñ* 'much/many/a lot' versus *tyi yoñlel* 'most.' I consider a unified

8 While more is needed to be said about how the structure in (41) interfaces with the argument structure of the sentence, I leave that for future research.

9 I have avoided providing an explicit semantics for ι as we would want it to still allow for a non-maximal interpretation to contrast with the maximality entailments forced by *pejtyel*. See discussion in Brisson (2003) for how one might implement non-maximal definites.

compositional analysis similar to the one for numerals and *pejtyel*, but flag some key differences. All speakers agreed upon the use and distribution of *oñ*, but not all speakers have the possessed form *tyi yoñlel*. The judgements below are from speakers from two communities[10] that do have the possessed form in their dialect. Examples of *oñ* and its possessed form are given in (42), both taken from texts.

(42) a. **Oñ** mi j-k'ax ixim.
a.lot IPFV 1-harvest corn
'I harvest a lot of corn.' (Aulie & Aulie 1978: 67)
Spanish: *Cosecho bastante maíz.*

b. **Tyi y-oñ-lel** toñel cha'añ ty'añtyak jiñ=jach cha'añ
PREP A3-much-RS work PREP language-PL FOC=EXCL PREP
ty'añ pejkabil=bä tyi Europa.
language spoken=REL PREP Europe
'Most of the work in linguistics is on European languages.' <txt>

7.1 Distribution of *oñ*

There are a number of differences with *oñ* compared to the numerals and *pejtyel* discussed above. Unlike the bare forms for numerals and *pejtyel*, *oñ* is only possible in predicative position, with the meaning of 'a lot.' *Oñ* is a not verb—it cannot appear with any aspectual marking. *Oñ* can be in the preverbal position (associated with secondary predicates) in (43a), but cannnot appear as a modifier in (43b). It can also be a predicate in (43c). When in secondary predicate position, *oñ* modifies internal arguments.

(43) a. [$_{PRED}$ **Oñ**-ob] tyi k'otyi-yob kixtyañuj-ob.
many-PL PFV arrive-PL people-PL
'Many people arrived.'

b. *Tyi k'otyi-yob [$_{NP}$ **oñ**-ob kixtyañuj-ob].
PFV arrive-PL many-PL people-PL
Int.: 'Many people arrived.'

10 These two communities are San Miguel (Tumbalá dialect) and Campanario (Tila dialect). They are about 60 km away from each other. Three speakers from the Tila dialect of Ch'ol (from Limar, Tila and Masoja Shucjá) and one speaker of the Tumbalá dialect (from Ignacio Allende) did not accept *tyi yoñlel* as a form; all remarked that it sounds like a form from a different dialect. These speakers do have the word *yoñlel/yoñel*, the possessed form of *oñ* with the relational suffix/nominalizer *-el*. They translated this as 'a (large) amount (of something).' Indeed, Aulie & Aulie (1978) transcribe *yoñlel* as 'mucho', though unlike 'mucho' which is a quantity word in Spanish, *yoñlel* is nominal and appears with an obligatory possessor.

c. **Oñ**-ety=la.
many-ABS2=PL.INCL
'You are many.'

A semantic difference between *oñ* and the other quantity words discussed is that numerals and *pejtyel* are not context-dependent *in the same way*. Possessed numerals force an exact measure ('NP measuring in *n*'); possessed *pejtyel* is the maximal set. The quantity word *oñ*, on the other hand, varies from context to context, just like English 'a lot'/'many'/'much.' One could imagine situations where the amount 'many tortillas' is equivalent to seven (i.e., that one person ate in five minutes), but equivalent to 100 in another (i.e., that have been made for a party of 20 people).

7.2 Semantics of *tyi yoñlel*

The morphosyntax of the possessed form of *oñ* is parallel to those discussed above for numerals and *pejtyel*. I provide evidence that the possessed form of *oñ* can have both a relational meaning 'most' as well as a relative meaning for 'most.' I then present challenges for unifying the analysis discussed above with *oñ/tyi yoñlel*.

The possessed form *tyi yoñlel* has a similar morphosyntactic distribution to the other possessed quantifiers detailed above. Morphologically it is composed of the same elements: the preposition, possessive prefix and a relational suffix. The possessive morphology indexes the ϕ-features of the set being described. Verbal agreement must also track the person features of the possessive morphology as in (44)—evidence that it is an adjunct co-indexed with a null pronoun in the verbal domain. The possessed form of *oñ* cannot appear in predicative position as per (45).

(44) Tyi la-'w-äk'ä cooperación [tyi la-'w-oñ-lel].
PFV PL.INCL-A2-give SP:dues PREP PL.INCL-A2-many-RS
'Most of you paid the dues.'

(45) *__Tyi la-'w-oñ__-ety=la.
PREP PL.IN-POSS.2-many-ABS2=PL.INCL

The possessed form *tyi yoñlel* has a meaning resembling 'most,' exhibited below. For the speakers who have *tyi yoñlel* in their vocabulary, it is felicitous in the proportional and relative contexts of (46). Context A and B are adapted from Coppock, Bogal-Allbritten & Nouri-Hosseini (2020). Context C was used to test whether *tyi yoñlel* could also mean some contextually specified large amount.

(46) a. Context A: I made 10 tortillas. I was very hungry so I ate seven.
b. Context B: I made 10 tortillas. I ate three, my brother ate two and my sister ate one.

c. Context C: I made 10 tortillas. I ate four.

(47) Tyi j-k'uxu tyi y-oñ-lel waj.
PFV A3-eat PREP A3-much-RS tortilla
'I ate most of the tortillas.' ✓A; ✓B; ✗C

The proportional reading of *tyi yoñlel* is further confirmed in the following example. Given the context of an elementary school with 100 students, the following sentence was acceptable if 60/100 had younger siblings, but not if 40/100 did.

(48) Añ-ob iy-its'iñ-ob tyi y-oñ-lel xk'eljuñ-ob.
EXT-PL A3-younger.sibling-PL PREP A3-much-RS student-PL
'Most of the students have younger siblings.'
✓60/100 have younger siblings; ✗40/100 have younger siblings

These data provide evidence that both proportional and relative readings are available for *tyi yoñlel*. Thus, this form patterns to what has been reported in Coppock et al. (2020: 480) for Germanic languages, Arabic, Basque, Finnish, Hungarian, Romanian, and Greek. However, using possessive morphology to derive 'most', like Ch'ol does, has not been documented before.[11]

7.3 A unified account?

Recall that the semantics of the possessed numerals and possessed *pejtyel* derived a maximal interpretation. The quantity word was analyzed as a metaphorical part of the contextually salient set of entities. The semantics provided above was able to capture that the meanings of these two forms were not inherently quantificational.

By simply plugging in the semantic analysis above with *oñ* for *tyi yoñlel waj* 'most tortillas', we end up with meaning 'the many-ness of the tortillas.' However, this does not accurately capture the proportional and relative meaning that the possessed form is observed to have. While morphosyntactically parallel, semantically 'most' is different from the possessed forms discussed above as it is *not* maximal. A unified analysis of deriving *tyi yoñlel* 'most' in Ch'ol with the possessed numerals and 'all' is not so clear-cut. I suggest that *tyi yoñlel* has arisen via analogy with the other forms and has developed into a quantity superlative with proportional and relative readings for some speakers.[12]

How are the relative and proportional readings expressed in Ch'ol by those without *tyi yoñlel* in their lexicon? Speakers use a quantity word like *kabäl* modified by

11 I thank Elizabeth Coppock for pointing this out to me.

12 Additional work is needed to determine whether *tyi yoñlel* has properties associated with generalized quantifiers.

bare form		possessed	
cha'-p'ej	'two-GEN.CLF'	*tyi i-**cha'-p'ejl**-el*	'the two'
ux-tyikil	'three-HUM.CLF'	*tyi y-**ux-tyikl**-el*	'the three'
pejtyel	'all'	*tyi i-**pejtyel**-el*	'all'
oñ	'many/much'	*tyi y-**oñ**-lel*	'most'
ts'itya'	'a little'	**tyi i-**ts'itya'**-lel*	
lamtyal	'a bit'	**tyi i-**lamtyal**-el*	
kabäl	'a lot'	**tyi i-**kabäl**-el*	

Table 2 Bare–possessed alternation

an intensifier such as *ñoj*, exhibited in (49). This phrase is felicitous in Contexts A, B and C from above. For Context C, the interpretation is that the amount eaten was some contextually large amount (perhaps the tortillas were jumbo-sized).

(49) Tyi j-k'uxu **ñoj kabäl** waj.
PFV A1-eat very a.lot tortilla
'I ate a lot of/more/most tortillas.' ✓A; ✓B; ✓C

The form in (49) also available to those who have *tyi yoñlel* in their lexicon.

8 Conclusions and implications

This paper began with the alternation between bare and possessed forms of certain quantity words. While I reported that the bare/possessed alternation exists for numerals, *pejtyel* and *oñ*, it is not is not compatible with all quantity words. Table 2 provides examples of the quantity words discussed here as well as additional quantity words that do not permit this alternation. Among them are *kabäl* 'a lot', *lamtyal* 'part of/a bit' and *ts'itya'* 'a bit'/'a small amount'.

One contrast between the quantity words in the latter half of Table 2 is that they can also appear as prefixes to verbs as in (50b) and (51b), unlike quantity words in the first half (52).

(50) a. ... ta'=ix i-**lamtyal**-chili.
PFV=already A3-a.bit-take
'[The commissary] already took a part of it [our land].'
Aulie & Aulie (1978: 33)

b. Ta'=ix i-chili [$_{NP}$ **lamtyal** la=k-lum].
PFV=already A3-take a.bit PL.IN=A1-land
'He took a bit of our land.'

(51) a. Ta' k-**ts'itya'**-mäk'ä pastel.
PFV A1-a.bit-eat cake.
'I ate a bit of cake.'
b. Ta' k-mäk'ä [$_{NP}$ **ts'itya'** pastel].
PFV A1-eat a.bit cake.
'I ate a bit of cake.'

(52) *Ta' k-{ ***cha'-k'ejl** / ***pejtyel** }-k'uxu waj.
PFV A1- two-CLF all -eat tortilla
Int.: 'I ate two/all the tortillas.'[13]

While all the quantity words can modify nouns, only some can modify what Coon (2010) and Vázquez Álvarez (2011) call incorporation antipassives (IA). IAs appear in the theme position of the light verb *cha'le* in (53). Quantity words that cannot take possessive morphology in Table 2 can modify IAs, but those that can take possessive morphology can*not* modify IAs, shown in (53). *Oñ* may also modify IAs in (54).

(53) Tyi k-cha'le { *pejtyel / *cha'-k'ejl / kabäl / ts'itya' } [$_{IA}$ **mäñ-muty**]
PFV A1-LV all two-CLF many a.bit buy-chicken
'I did *all/*two/ a lot of / a little chicken-buying.'

(54) **Oñ** tyi k-cha'le [$_{IA}$ **mäñ-muty**]
much PFV A1-LV buy-chicken
'I did a lot of chicken-buying.'

One possibility is that the possessive morphology can only combine with modifiers that do not track events. This also helps explain why the alternation with *oñ* is not available for all speakers. If *oñ* can modify events as in (54), this could be why speakers who do not have this form in their vocabulary do not allow the possessive morphology. This is further evidence that the possessed form *tyi yoñlel* 'most' does not lend itself to a compositional semantic analysis.

To conclude, I offer some remarks on encoding quantity cross-linguistically. The analysis provided for Ch'ol's possessed quantity phrases is reminiscent of Jelinek (1984)'s Pronominal Argument Hypothesis (PAH). Under the PAH, overt nominals are adjuncts and markers on the verb are pronominal clitics indexing various arguments. While Ch'ol does not satisfy many of the criteria for a PAH language (it has a basic word order, for example), the possessed quantity expressions discussed here follow the PAH pattern. Quantity expressions have been noted to dis-

13 Ch'ol does possess a verbal prefix, *la'-* or *lu'-*, that is often translated as 'all' or 'completely.' I leave an in-depth analysis of these quantificational verbal prefixes for future work.

play distinct characteristics. For example, it has been noted that in Zapotecan languages, usually VSO, quantified phrases appear preverbally (Lee 2008)—evidence that they behave differently from nominal arguments. The PAH can thus shed insight on languages with quantity expressions that are marked differently from other nominal arguments.

References

Arcos López, Nicolás. 2009. *Los clasificadores numerales y las clases nominales en chol.* Mexico: CIESAS Master's thesis.

Aulie, Wilbur & Evelin Aulie. 1978. *Diccionario Ch'ol-Español, Español-Ch'ol*. México: Summer Institute of Linguistics 3rd edn.

Bach, Emmon, Eloise Jelinek, Angelika Kratzer & Barbara H. Partee (eds.). 1995. *Quantification in Natural Languages*, vol. 54. Springer Science & Business Media.

Baker, Mark C. 1995. On the absence of certain quantifiers in Mohawk. In Emmon Bach, Eloise Jelinek, Angelika Kratzer & Barbara H. Partee (eds.), *Quantification in Natural Languages*, 21–58. Springer.

Bale, Alan & Jessica Coon. 2014. Classifiers are for numerals, not for nouns: Consequences for the mass/count distinction. *Linguistic Inquiry* 45(4). 695–707. doi:https://doi.org/10.1162/LING_a_00170.

Bale, Alan, Jessica Coon & Nicolás Arcos. 2019. Classifiers, partitions, and measurements: Exploring the syntax and semantics of sortal classifiers. *Glossa: a journal of general linguistics* 4(1). doi:https://doi.org/10.5334/gjgl.752.

Barker, Chris. 1995. *Possessive descriptions*. Stanford, CA: CSLI.

Barker, Chris. 2012. Possessives and relational nouns. In Paul Portner Claudia Maienborn, Klaus von Heusinger (ed.), *Semantics: An international handbook of natural language meaning*, 1109–1130. Berlin: de Gruyter. doi:https://doi.org/10.1515/9783110589443-006.

Brisson, Christine. 2003. Plurals, 'all', and the nonuniformity of collective predication. *Linguistics and Philosophy* 26(2). 129–184.

Brisson, Christine M. 1998. *Distributivity, maximality, and floating quantifiers*. New Brunswick, NJ: Rutgers The State University of New Jersey PhD thesis.

Chomsky, Noam. 1976. Conditions on rules of grammar. *Linguistic Analysis* 2. 303–351.

Coon, Jessica. 2006. Existentials and negation in Chol (Mayan). In Charles Chang, Esuna Dugarova, Irene Theodoropoulou, Elina Vilar Beltrán & Edward Wilford (eds.), *CamLing: Proceedings of the Fourth University of Cambridge Postgraduate Conference in Language Research*, 51–58. Cambridge: Cambridge Institute of Language Research.

Coon, Jessica. 2010. *Complementation in Chol (Mayan): A Theory of Split Ergativity*. Cambridge, MA: Massachusetts Institute of Technology Doctoral dissertation.

Coon, Jessica. 2013. *Aspects of Split Ergativity*. Oxford University Press. doi:https://doi.org/10.1093/acprof:oso/9780199858743.001.0001.

Coppock, Elizabeth, Elizabeth Bogal-Allbritten & Golsa Nouri-Hosseini. 2020. Universals in superlative semantics. *Language* 96(3). 471–506. doi:https://doi.org/10.1353/lan.2020.0057.

Gil, David. 1995. Universal quantifiers and distributivity. In Emmon Bach, Eloise Jelinek, Angelika Kratzer & Barbara Partee (eds.), *Quantification in Natural Languages*, 321–362. Springer.

Henderson, Robert. 2021. Dependent numerals in Kaqchikel. In Patricia Cabredo-Hofherr & Jenny Doetjes (eds.), *The Oxford Handbook of Grammatical Number*, Oxford University Press. doi:https://doi.org/10.1093/oxfordhb/9780198795858.013.30.

INEGI. 2020. Lenguas indígenas en méxico y hablantes (de tres años y más) al 2015. Online: https://cuentame.inegi.org.mx/hipertexto/todas_lenguas.htm.

Jelinek, Eloise. 1984. Empty categories, case, and configurationality. *Natural Language & Linguistic Theory* 2(1). 39–76.

Keenan, Edward & Denis Paperno (eds.). 2012. *Handbook of Quantifiers in Natural Language*, vol. 90. Springer. doi:https://doi.org/10.1007/978-94-007-2681-9.

Lee, Felicia. 2008. On the absence of quantificational determiners in San Lucas Quiavani Zapotec. In Lisa Matthewson (ed.), *Quantification: a cross-linguistic perspective*, 353–383. Brill.

Little, Carol-Rose. 2018. Possessed numerals in Ch'ol. In Kimberly Johnson & Alex Goebel (eds.), *Proceedings of the Tenth Conference on the Semantics of Under-Represented Languages of the Americas*, Amherst, MA: GLSA.

Little, Carol-Rose. 2020a. Left branch extraction, object shift, and freezing effects in Tumbalá Ch'ol. *Glossa: a journal of general linguistics* 5(1). 26. doi:https://doi.org/10.5334/gjgl.988.

Little, Carol Rose. 2020b. *Mutual dependencies of nominal and clausal syntax in Ch'ol*. Ithaca, NY: Cornell University Doctoral dissertation.

Little, Carol Rose, Mary Moroney & Justin Royer. 2022. Classifiers are for numerals *or* nouns: two types of numeral modification strategies. *Glossa: a journal of general linguistics* 7(1). doi:https://doi.org/10.16995/glossa.8437.

Matthewson, Lisa (ed.). 2008. *Quantification: A cross-linguistic perspective*, vol. 64. Brill.

Moltmann, Friederike. 2004. Properties and kinds of tropes: New linguistic facts and old philosophical insights. *Mind* 113(449). 1–41. doi:https://doi.org/10.1093/mind/113.449.1.

Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. Chicago: University of Chicago Press.

Royer, Justin. Accepted. Binding and anti-cataphora in Mayan. *Linguistic Inquiry* .

Vázquez Álvarez, Juan Jesús. 2011. *A grammar of Chol, a Mayan language*. Austin, TX: University of Texas Austin Doctoral dissertation.

Vieira, Marcia Damaso. 1995. The expression of quantificational notions in asurini do trocará: Evidence against the universality of determimer quantification. In Emmon Bach, Eloise Jelinek, Angelika Kratzer & Barbara H. Partee (eds.), *Quantification in Natural Languages*, 701–720. Springer.

Carol Rose Little
University of Oklahoma
Modern Languages, Literatures, and Linguistics
Kaufman Hall
780 Van Vleet Oval
Norman, OK 73019
little@ou.edu