

Possessed numerals in Ch'ol*

Carol-Rose Little

Cornell University

1. Introduction

In this paper, I investigate a set of underdescribed numeral constructions in Ch'ol that I call *possessed numerals*. Unlike the bare numeral in (1), these possessed numerals in (2) occur with the possessive prefix *i-* and relational suffix *-el*.

- (1) cha'-k'ejl waj
two-CL tortilla
'two tortillas'¹

- (2) a. **tyi** i-cha'-k'ejl-**el** waj b. **i-**cha'-k'ejl-**el** waj
 TYI A3-two-CL-**RS** tortilla **A3**-two-CL-**RS** tortilla
 'the two tortillas' 'a/the second tortilla'

The example in (2a) contains a particle *tyi* in addition to the possessed numeral. The ordinal in (2b) does not have *tyi*. I concentrate on the semantics of the possessed numerals in (2a) and how each morpheme contributes meaning to the semantics. Building on the semantics of bare numerals in Ch'ol (Bale & Coon 2014), I propose a compositional semantics for these possessed numerals. I argue that the possessive morphology contributes a relational meaning and *tyi* contributes definiteness.

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¹Glosses: 1 = first person; 2 = second person; 3 = third person; A = A markers in Ch'ol, marks ergative/possessive; B = B markers in Ch'ol, marks absolutive; CL = classifier; IV = intransitive verb; PART = participant; PL = plural PREP = preposition; PROG = progressive; PRF = perfective aspect; RS = relational suffix; SP = Spanish borrowing. Ch'ol uses a Spanish-based orthography: ' = [ʔ]; ä = [i]; b = [β] ch = [tʃ]; j = [h]; ñ = [ɲ]; ty = [tʲ]; x = [ʃ]; y = [j]; C' = ejective consonant.

This data is interesting as Ch'ol allows bare nouns to be definite (3a) or indefinite (3b), but certain structures, like the possessed numerals in (2a), are inherently definite.

- (3) a. In a story about a single deer, halfway through the story:
Ta' k'oty-i i-tyaj **me'**.
PRF arrive-IV A3-find **deer**
'He arrived to find the deer.' (Coon 2004, E.49)
- b. Bare noun under scope of existential *añ* and first mention of *tabla* in story:
Ya'añ **tabla** tyi i-jol otyoty=i.
there-EXT **SP:board** PREP A3-head house=ENCL
'There was a board on the top of the house.' (Xiba.8)

For a language that allows bare nouns to be definite, where does this definiteness come from? In the possessed numeral cases I argue that *tyi* indicates definiteness and is associated with strong quantifiers.

The paper is structured as follows. First, I provide some background on Ch'ol and the morphology of the possessed numerals (§2). Then, I provide data on entailment patterns of the possessed numerals in §3. I argue that *tyi* contributes maximality to the meaning of the possessed numerals (§4). Evidence for this comes from: (i) the fact that the possessed numeral 'one' without *tyi* is not maximal; (ii) ordinals are also possessed numerals without *tyi* and but not always definite; and (iii) other strong quantifiers are also formed with possessive morphology and *tyi*. In §5, I posit that the *-el* suffix is a relational element, given its distribution in deriving inalienably possessed nouns and part-whole constructions. In §6, I propose a compositional analysis for the possessed numerals. To do this, I review previous work on numerals in Ch'ol. Given the data at hand, I must make a modification to the denotation for numerals and nouns in Ch'ol from Bale & Coon 2014. I argue that *tyi* heads a Quantificational Phrase and contributes the definiteness to the meaning. Finally, I conclude and discuss some implications of this analysis on strong quantification and definiteness.

2. Background

Ch'ol is a head-marking, ergative-absolutive Mayan language, spoken in Chiapas, Mexico by about 222,000 people. There are three dialects: Tumbalá, Tila, and Sabanilla. Data in this paper comes from the Tumbalá and Tila dialects. Ch'ol is a predicate initial language, so the basic word order is Verb-(Object)-Subject and possessee-possessor (Coon 2010), like many Mayan languages (see England 1991, Aissen 1992). In this paper, I use the Mayanist convention for glossing person markers: ergative/possessive "set A" and absolutive "set B".

Possessed numerals are formed by *tyi* and adding the morphological elements in (4) to a numeral.

Possessed numerals in Ch'ol

(4) Parts of *tyi icha'tyikl-el*

<i>tyi</i>	<i>i-</i>	<i>cha'</i>	<i>-tyikl</i>	<i>-el</i>
<i>tyi</i>	A3	two	-CL	-RS
↑	↑	↑	↑	↑
particle	possessive prefix	numeral	classifier	relational suffix

Speakers of Ch'ol use Ch'ol numerals up to number five and Spanish-borrowed numerals for numbers six and up. Ch'ol numerals always appear with a classifier, but Spanish-borrowed numerals 6 and 7 (*seys* and *syete* in the Ch'ol orthography) do not appear with classifiers as per Table 5. Both Ch'ol and Spanish-based numerals can appear with the morphology in (4), as seen in the rightmost column in Table 5.

(5) *Possessed numerals 2–7*

Number	Numeral(-CL)	Possessed form
2	<i>cha'-tyikil</i>	<i>tyi i-cha'-tyikl-el</i>
3	<i>ux-tyikil</i>	<i>tyi y-ux-tyikl-el</i>
4	<i>chǎñ-tyikil</i>	<i>tyi i-chǎñ-tyikl-el</i>
5	<i>jo'-tyikil</i>	<i>tyi i-jo'-tyikl-el</i>
6	<i>seys</i>	<i>tyi i-seys-lel</i>
7	<i>syete</i>	<i>tyi i-syete-lel</i>

Possessive agreement on the numeral tracks the person features of the set it quantifies over as in (6). For instance, when referring to ‘the two of us’, the possessive agreement on the possessed numeral is first person (A1) in (6b).

- (6) a. *tyi i-cha'-tyikl-el*
TYI A3-two-CL-RS
‘the two of them’
- c. *tyi la-a-cha'-tyikl-el*
TYI PART.PL-A2-two-CL-RS
‘the two of you’
- b. *tyi la-k-cha'-tyikl-el*
TYI PART.PL-A1-two-CL-RS
‘the two of us’

The *tyi* particle requires the possessive morphology *-el* and a possessive prefix, as shown below in (7) by the ungrammatical examples that are missing one of these parts.

- (7) a. * *tyi i-cha'-tyikil* b. * *tyi cha'-tyikil* c. * *tyi cha'-tyikl-el*
TYI A3-two-CL TYI two-CL TYI two-CL-RS

It is of note that *tyi* is homophonous with the all-purpose preposition *tyi* in Ch'ol. Here, I consider these two distinct forms. Prepositional phrases are barred from being arguments or predicates, whereas these possessed numerals with *tyi* can appear in predicate (8a) and argument position (8b).

- (8) a. **Tyi la=k-ux-tyikl-el-oñ=la.**
TYI PART.PL-A1-three-CL-RS-B1=PART.PL
 ‘We are the three.’
- b. Tsa’ i-k’ux-u **tyi iy-ux-k’ejl-el** waj aj-Maria.
 PRF A3-eat-TV TYI A3-three-CL-RS tortilla NC-Maria
 ‘Maria ate the three tortillas.’

Additionally, the *tyi* of the possessed numerals in Ch’ol could be related to the determiner in Tseltal *te*, a closely related language.

I also assume *tyi* in the possessed numeral construction is different from the perfective aspect marker *tyi* of the Tila dialect. Evidence for this comes from the Tumbalá dialect, where the perfective aspect is realized as *ta’* or *tsa’*. The *tyi* of the possessive numerals is never realized as *tsa’* or *ta’*.

3. Possessed numerals as definite

In this section, I provide evidence that the possessed numerals have a different meaning than bare numerals. Using multiple diagnostics, I argue that they are definite, whereas bare numerals are not. I show that the possessed numerals refer to a unique set of entities in a context and that they can be anaphoric, two properties associated with definiteness.

3.1 Bare numerals versus possessed numerals

To show the differences in entailments of the possessed numerals, I compare them to bare numerals. Ch’ol bare numerals are not maximal, as shown with the example in (9a) and the felicitous follow up in (9b). In other words, bare numerals in Ch’ol, like in many languages, have “exactly”-implicatures that can be canceled.

- (9) a. Chumul-ob **cha’-tyikil** k-alobil tyi Estados Unidos.
 live-PL **two-CL** A1-child PREP SP:states SP:united
 ‘Two of my children live in the United States.’²
- b. ...Ityäle je’e ya’ tyi majl-i yambä.
 actually also there PRF go-IV other
 ‘... Actually another one went there as well.’

Possessed numerals, on the other hand, have different entailments than bare numerals in Ch’ol. The possessed numeral *tyi icha’tyikl-el* in (10a) describes a maximal set of ‘two’, translated to English as a possessive pronoun and numeral, which is maximal in English. Therefore it is not felicitous to follow up (10a) with the assertion that the speaker has

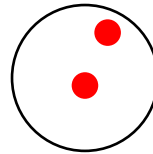
²Unlike in English, bare numerals and possessive constructions are not definite in Ch’ol, which is why I do not translate this sentence as ‘my two children’.

another child that lives in the United States in (10b), as (10a) entails that the speaker only has two children.

- (10) a. Chumul-ob **tyi i-cha'-tyikl-el** k-alobil tyi Estados Unidos.
 live-PL TYI A3-two-CL-RS A1-child PREP SP:states SP:united
 'My two children live in the United States.'
- b. # ...Ityäle je'e ya' tyi majl-i yambä.
 actually also there PRF go-IV other
 '... Actually another one went there as well.'

Additional diagnostics confirm that the possessed numeral picks out a maximal, salient set. In contexts with a unique salient set of two tortillas like in Figure 11, the possessed numeral 'two' in (12) is felicitous as it describes the whole set.

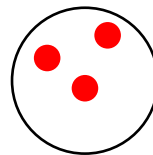
- (11) *Context with two red tortillas: Felicitous for (12)*



- (12) Chächäk **tyi i-cha'-k'ejl-el** waj.
 red TYI A3-two-CL-RS tortilla
 'The two tortillas are red.'

If the context contains more than two tortillas as in Figure 13, the possessed numeral 'two' plus *waj* 'tortilla' in (14) is not felicitous.

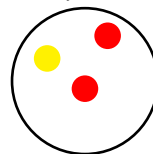
- (13) *Context with three red tortillas: Infelicitous for (14)*



- (14) # Chächäk **tyi i-cha'-k'ejl-el** waj.
 red TYI A3-two-CL-RS tortilla
 'The two tortillas are red.'

Additionally, the possessed numerals do not give rise to a partitive interpretation: they do not mean 'two of the tortillas are red'. This is clear with the infelicity of (16) with the context in Figure 15.

- (15) *Context with two red tortillas and one yellow: Infelicitous for (16)*



- (16) # Chächäk **tyi i-cha'-k'ejl-el** waj.
 red TYI A3-two-CL-RS tortilla
 'The two tortillas are red.'

The possessed numerals describe a maximal set. The first context in Figure 11 works for the possessed numeral *tyi ichak'ejlel* 'the two' since there are only two tortillas and they are both red. In the second context, since there are three red tortillas, the possessed numeral cannot be used felicitously to describe this situation. Furthermore, in a context with two red tortillas and one yellow, the possessed numeral describes the maximal set of tortillas and since there are three, it cannot be used.

3.2 Anaphoricity

Anaphoricity/familiarity has also been traditionally associated with definiteness (e.g., Heim 1982, see Schwarz 2013 for recent discussion). The sentence in (17a) introduces two girls and three boys into the discourse. To refer back to the two girls and three boys in (17b) and (17c), respectively, possessed numerals are felicitous.

- (17) *Possessed numerals can be anaphoric*
- a. Ya'-añ-ob cha'-tyikil x-ch'ok yik'oty ux-tyikil aläl ...
 there-EXT-PL two-CL NC-girl-PL with three-CL child-PL
 'There are two girls and three boys.'
 - b. **Tyi i-cha'-tyikl-el** x-ch'ok-ob woli i-mään-ob bu'ul.
 TYI A3-two-CL-RS NC-girl-PL PROG A3-buy-PL beans
 'The two girls are buying beans.'
 - c. **Tyi y-ux-tyikl-el** aläl-ob woli i-mään-ob waj.
 TYI A3-three-CL-RS NC-child-PL PROG A3-buy-PL tortilla
 'The three boys are buying tortillas.'

Use of bare numerals in (18b)–(18c) to refer back to the discourse referents is not felicitous.

- (18) a. Ya'-añ-ob cha'-tyikil x-ch'ok-ob yik'oty ux-tyikil aläl ...
 there-EXT-PL two-CL NC-girl-PL with three-CL child
 'There are two girls and three boys.'
- b. # Woli i-mään-ob bu'ul **cha'-tyikil** x-ch'ok.
 PROG A3-buy-PL beans **two-CL** NC-girl
 'Two girls are buying beans.'
 - c. # Woli i-mään-ob waj **ux-tyikil** aläl.
 PROG A3-buy-PL tortilla **three-CL** NC-child
 'Three boys are buying tortillas.'

I focus on the unique interpretation for the semantics, however these sentences show that the possessed numerals can be anaphoric, a property associated with definiteness.

3.3 Other diagnostics

Other diagnostics like the Law of Contradiction and sensitivity to existential predicates also confirm that these possessed numerals are definite. For instance, where a definite term is associated with uniqueness, it is expected that if P is true for a definite term t , then $\neg P$ cannot be true for the definite term t (Löbner 1985). Example (19) shows that *tyi icha'kojtylel mis* cannot refer to two different sets of two cats. It creates a contradiction.

- (19) # Mi k-mul-añ **tyi i-cha'-kojty-lel** mis pe ma'añ mi k-mul-añ **tyi**
IMF A1-like-NML TYI **A3-two-CL-RS** cat SP:but NEG IMF A1-like-NML TYI
i-cha'-kojty-lel mis.
A3-two-CL-RS cat
'I like the two cats but I don't like the two cats.'

Another diagnostic is Milsark's (1977) Definiteness Restriction. This restriction states that definite nouns and strong quantifiers are barred from being in theme position of existential predicates. The predicate *añ* 'there exists' has been shown to have definiteness effects (Coon 2006). This is exemplified in (20). When a bare noun *wakax* is the argument of the predicate *añ*, the sentence is felicitous (20a). But when the determiner *jiñi*, which has been described as definite (Vázquez Álvarez 2011, Coon 2010, Little & Vázquez 2018), is added, the sentence is no longer grammatical, as in (20b).

- (20) a. Añ wakax.
EXT cow
'There is a cow.'
- b. * Añ **jiñi** wakax.
EXT DET cow

This same test can be used for bare numerals and possessed numerals. If possessed numerals are strong quantifiers, then they should be barred from appearing in theme position of *añ*. Indeed, while bare numerals are possible in the theme position of the existential predicate *añ* (21a), possessed numerals are not (21b).

- (21) a. Añ cha'-kojty wakax.
EXT two-CL cow
'There are two cows.'
- b. * Añ **tyi i-cha'-kojty-lel** wakax.
EXT TYI A3-two-CL-EL cow

3.4 Summary

Table 22 provides a summary of the diagnostics above comparing bare numerals and possessed numerals.

(22) *Summary 1*

Construction	Translation	Maximal	Theme position of <i>añ</i>
<i>tyi icha'tyiklel</i>	'the two'	✓	✗
<i>cha'tyikil</i>	'two'	✗	✓

Given the entailment data outlined in this section, it is clear that possessed numerals describe a maximal, definite set. At this point, it is not entirely clear where and what is introducing the maximality into the semantics of the numerals. Data on the possessed numeral one, ordinal possessed numerals and other quantificational phrases in the next section can provide evidence for the definiteness of *tyi*. I also tie the appearance of *-el* in the possessed numeral constructions to its meaning in other possessive structures.

The goal of the rest of this paper is a compositional analysis. The three elements of the possessed numeral added to the bare numeral are *tyi*, the possessive prefix *i-*, and *-el*. I assume following Coon (2013) that the agreement *i-* is derived through an Agree relation and does not factor into the compositional semantic analysis.

In the next sections I discuss (i) *tyi* contributing definiteness and (ii) *-el* as providing a part-whole relation between possessor and possessee. I will provide data showing that *tyi* is used to derive other strong quantifiers.

4. Evidence for definiteness from *tyi*

4.1 Possessed numeral one

The possessed numeral one *ijuñtyiklel* in (23b) is formed with the morphology from (4) added on the bare numeral *juñtyikil* 'one' in (23a). It can appear with or without *tyi*.

- (23) a. *Bare numeral one*
 juñtyikil
 one-CL
 'one'
- b. *Possessed numeral 'one'*
 (tyi) *i-juñtyikl-el*
 TYI A3-one-CL-RS

The possessed numeral 'one' without *tyi* has different entailments than the possessed numeral 'two'. The possessed numeral 'one' in (24a) does not introduce the entailment that the speaker only has one child. Therefore, (24a) can be felicitously followed up with (24b).

(24) *ijuñtyiklel* does not describe a maximal individual

- a. Chumul **i-juñtyikl-el** k-alobil tyi Estados Unidos.
 live **A3-one-CL-RS** A1-child PREP SP:states SP:united
 'One of my children lives in the United States.'
- b. ... Ityäle je'e ya' tyi majl-i yambä.
 actually also there PRF go-IV other
 '... Actually, another one went there as well.'

Additionally, some speakers accept the possessed numeral ‘one’ in the theme position of the existential predicate *añ*. This is different that the other possessed numerals.

(25) % Añ **i-juñ-kojty-lel** wakax.

EXT **A3-one-CL-RS** cow

‘There is a/one of the cows.’

Unlike the data in Section 3.2, *ijuñtyikl* cannot be anaphoric to some individual in the context, as in (26b).

(26) a. Ya’-añ juñ-tyikil x-ch’ok.

there-EXT one-CL NC-girl

‘There is one girl over there.’

b. # Woli i-män bu’ul **i-juñ-tyikl-el** x-ch’ok.

PROG A3-buy beans **A3-one-CL-RS** NC-girl.

Intended: ‘The (one) girl is buying beans.’

With *tyi*, the possessed numeral means ‘the whole’ or ‘the entire’.

(27) Context: Maria took half of a piece of bread. Celia says to her:

Ch’äm-ä **tyi i-jum-p’ejl-el** pan!

take-IMP **TYI A3-one-CL-RS** bread

‘Take the whole bread!’

These data provide evidence for the fact that the possessed numeral ‘one’ without *tyi* does not have the same entailments as the possessed numerals with *tyi*. Namely, without *tyi*, the possessed numeral is not definite or maximal.

4.2 Evidence from ordinals

Besides the ordinal ‘first’, which is the suppletive form *ñaxañ* (a common suppletion crosslinguistically (Stolz & Veselínova 2013)), ordinals are formed regularly with the same possessive morphology from above.

(28) *Ordinal numerals*

Number	Numeral(-CL)	Ordinal
1	<i>juñ-tyikil</i>	<i>ñaxañ</i>
2	<i>cha’-tyikil</i>	<i>i-cha’-tyikl-el</i>
3	<i>ux-tyikil</i>	<i>y-ux-tyikl-el</i>
...
7	<i>syete</i>	<i>i-syete-lel</i>

Unlike the cardinal possessed numerals, ordinal possessed numerals *always* have the *third* person possessive marker. They also do not have *tyi*. Below, I show that in addition to their definite meaning, ordinals can also be used in indefinite contexts in Ch’ol.

In (29) the ordinal receives a definite interpretation.

(29) In a context talking about the order of siblings:

Y-ux-tyikl-el aj-Morelia.
A3-three-CL-RS NC-Morelia
 ‘Morelia is the third.’

However, it is also possible to change the context where an ordinal can receive an indefinite interpretation like in (30).³

(30) Context: I made my cousin one tortilla. She ate it, then she says to me:

K-om=tyo **i-cha’-k’ejl-el** (waj).
 A2-want=still **A3-two-CL-RS** (tortilla)
 ‘I want a second (tortilla).’

Finally, ordinals, like other indefinites, can be in theme position of the existential predicate *añ* as in (31).

(31) **Añ i-cha’-k’ejl-el** waj tyi we’tye’.
 EXT **A3-two-CL-RS** tortilla PREP table
 ‘There is a second tortilla on the table.’

The ordinals, though composed like the possessed numerals (except the possessive marking is *always* third person), do not have *tyi* and are not obligatorily definite.

4.3 Other quantificational phrases in Ch’ol with *tyi*

I argue that when *tyi* appears, the meaning is definite. In these quantificational cases, I take definiteness to be a type of strong quantification (see Barwise & Cooper 1981, 2002).

Further evidence for this comes from other quantifiers in Ch’ol like *pejtyel*, which have a bare form *pejtyel*⁴ and also a possessed form, formed like the possessed numerals, *tyi i-pejtyel-el*. Examples of unpossessed and possessed quantifiers are given in Table 32.

(32) *Other quantifiers in Ch’ol*

Weak	Translation	Possessed/Strong	Translation
<i>cha’tyikil</i>	‘two’	<i>tyi i-cha’-tyikl-el</i>	‘the two of them’
<i>pejtyel</i>	?	<i>tyi i-pejtyel-el</i>	‘all’
<i>oñ</i>	‘many’	<i>tyi y-oñ-lel</i>	‘the majority’
<i>much’tyäl</i>	‘a handful’	<i>tyi i-much’tyäl-el</i>	‘everything together’

³Indefinite ordinals “pick out an entity outside of the salient set” (Zabbal 2014, 5).

⁴At this point, further work is needed to determine the exact semantics of *pejtyel*.

Though the precise semantics of the bare and possessed forms of quantifiers in Table 32 are outside the scope of this paper, it is important to note that the possessed forms pattern like the possessed numerals. Similar to bare and possessed numerals, *pejtyel* and *tyi i-pejtyel-el* have different entailments, indicated by the minimal pair in (33).

(33) Context: there is a plate of bananas and someone says to you:

- a. K'uxu **tyi i-pejtyel-el** ja'as!
eat **TYI A3-pejtyel-RS** banana
'Eat all the bananas!'
Speaker comment: You have to eat all the bananas on the plate.
- b. K'uxu **pejtyel** ja'as!
eat **pejtyel** banana
'Eat any of the bananas!'
Speaker comment: You do not have to eat all the bananas on the plate.

Furthermore, like bare numerals, the unpossessed form *pejtyel* can appear as an argument to the existential predicate *añ* (34a), but the possessed form with *tyi* cannot (34b).

- (34) a. Añ **pejtyel** wakax tyi potreru.
EXT **pejtyel** cow PREP field
'There are all kinds of cows in the field.'
- b. * Añ **tyi i-pejtyel-el** wakax tyi potreru.
EXT **TYI A3-pejtyel-RS** cow PREP field

4.4 Summary

Table 35 provides a summary of the data. It is clear that when *tyi* is present, the quantifier is definite, or maximal.

(35) *Summary 2*

Construction	Example	Translation	Maximal	Theme position of <i>añ</i>
possessed numeral	<i>tyi icha'tyiklel</i>	'the two'	✓	✗
bare numeral	<i>cha'tyikil</i>	'two'	✗	✓
possessed numeral 'one'	<i>ijuñtyiklel</i>	'one of'	✗	%
ordinal	<i>iyuxtyiklel</i>	'third'	✗	✓
possessed quantifier	<i>tyi ipejtyelel</i>	'all'	✓	✗
bare quantifier	<i>pejtyel</i>	?	✗	✓

5. The *-el* suffix

In this section, I describe the morpheme *-el* glossed as RS ‘relational suffix’. Its appearance in other possessive structures provides clues for its semantic contribution. Appearance of *-el* on a possessed noun changes the relational meaning between possessor and possessee—it creates a “tighter” intrinsic relation (in the words of Barker 1995, 2011). In (36b) it derives the meaning for clothing (that someone is wearing) from cloth and a part-whole relation in (37b).⁵

- (36) a. i-pisil aj-Rosa
A3-cloth NC-Rosa
‘Rosa’s cloth’ (e.g., her family’s laundry, curtains, sheets)
- b. i-pisl-**el** aj-Rosa
A3-cloth-RS NC-Rosa
‘Rosa’s clothing (e.g., that she wears on her body) (Coon 2010, 86)
- (37) a. i-tye’ otyoty
A3-wood house
‘wood to build a house’ Lit.: the house’s wood (e.g., for an unbuilt house)
- b. i-tye’-**el** otyoty
A3-wood-RS house
‘the house’s wood’ (the house is made of wood)

The *-el* suffix’s distribution in these other possessive phrases provides evidence for its semantic contribution in the possessed numeral constructions. This can also be extended to ordinals, which also have the *-el* suffix as in example (38) repeated from above.

- (38) In a context talking about the order of siblings:

Y-ux-tyikl-el aj-Morelia.
A2-three-CL-RS NC-Morelia
‘Morelia is the third.’

Ordinals establish a relation between a point on an ordered set of individuals that a predicate is true of. So if someone is the third sibling, the set is composed of other siblings from (38). The possessive prefix is always third person in ordinals in Ch’ol: it is anaphoric to the contextually ordered set.⁶ Thus, *-el* establishes a part-whole relation between possessor and possessee. I include this relation in the proposed compositional semantics in the next section when I propose a semantics for *-el* that works for the possessed numerals and the *-el* that appears in these other possessive contexts.

⁵Other Mayan languages have a similar suffix that derive intrinsic possessive relations (e.g., Hofling 1990: Itza Maya; Lehmann 2002: Yucatec Maya).

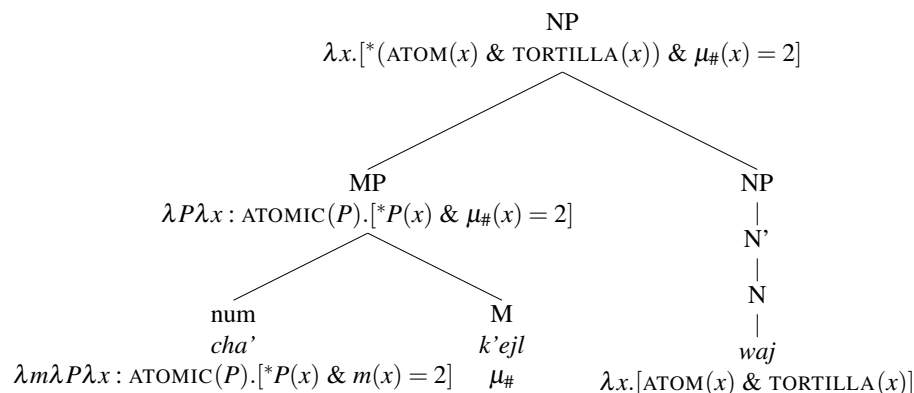
⁶This was also suggested in footnote 12 by Bale et al. (2016)

6.1 Semantics of the numeral and classifier

(39) a. $\llbracket cha' - \rrbracket = \lambda m \lambda P \lambda x : \text{ATOMIC}(P). [{}^*P(x) \ \& \ m(x) = 2]$

b. $\llbracket -ke'jl \rrbracket = \mu_{\#}$

(40) *cha'-k'ejl waj* 'two tortillas' after Bale & Coon 2014



⁷Alternatively, Bale et al. (2010, 593) provide the analysis in (1) for *yergu* ‘two’ in Western Armenian:

The difference between my proposed analysis in (42)–(44) and Bale & Coon's (2014) analysis of numerals and nouns in (40) is that the noun in (42) denotes both atomic tortillas and their groupings. The proposed numeral semantics is a modifier of type $\langle et \rangle$ instead of $\langle \langle et \rangle \langle et \rangle \rangle$. The tree in (44) is similar to the tree in (40) to achieve the same NP meaning of Numeral and NP, though does it in a different way.

This proposed analysis where numerals are predicate modifiers also accounts for the fact that they can appear in predicate position, as in (45).

- (45) Cha'-tyikil-oñ=la.
two-CL-B I=PART.PL
'We are two.'

6.2 Proposed part-whole semantics of -el

As we saw before, *-el* shows up in other possessive constructions to derive inalienable and part-whole relations between possessor and possessee. Given its distribution in these constructions as well as the possessed numeral constructions, I propose the following denotation for *-el* that has a part-whole relation built into it.

- (46) Denotation of *-el*
 $\llbracket -el \rrbracket = \lambda P \lambda Q \lambda x. [\exists y (P(x) \ \& \ Q(y) \ \& \ x \leq y)]$

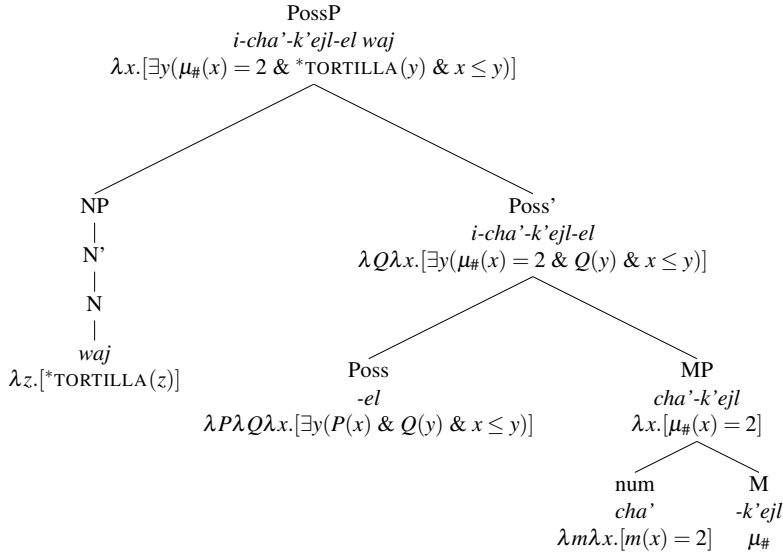
The denotation in (46) for *-el* encodes a part-whole relation between possessee and possessor. As mentioned above, the A3 possessive marker is derived via a local agreement relation.⁹ Given the semantics for numerals in the previous section, the denotation of *-el* takes two arguments of type $\langle et \rangle$. Thus, *-el* can combine with property denoting nominals, as it does to derive intrinsic possessive structures, and numerals of type $\langle et \rangle$.¹⁰ I label the numeral phrase MP, as per Bale et al. (2016), however since it is type $\langle et \rangle$ it can still be the argument to *-el*, the relational suffix. I assume that *-el* is the spell out of a Poss(essive) functional head.

⁹I assume, following Coon (2013), that the possessee fronts to an XP position between *tyi* and the NP possessor phrase to derive the correct possessee–possessor order.

¹⁰Note that possessive morphology on numerals is ungrammatical if *-el* is not present as in (1b).

- | | | | | |
|-----|----|--|----|---|
| (1) | a. | cha'-kojty i-ts'i'
two-CL A3-dog
'his two dogs' | b. | * i-cha'-kojty ts'i'
A3-two-CL dog
Intended: 'his two dogs' |
|-----|----|--|----|---|

(47) How *-el* combines with numeral *cha'-k'ejl* and possessor *waj* ‘tortilla’



The result in (47) is a relation between a set of groupings of two where those groupings of two form part of the set denoting atomic entities and groups of tortillas. In other words, the result is a set of groupings of two that are part of the set of individual tortillas and their groupings. The set of two things must be tortillas, as they are part of the set of tortillas.

6.3 Semantics of *tyi*

In this section, I exemplify my proposed semantics for the possessed numeral with the noun phrase in (48), repeated from (12).

(48) *tyi i-cha'-k'ejl-el waj*
 TYI A3-two-CL-*el* tortilla
 ‘the two tortillas’

In this example, the possessed numeral picks out the maximal set of tortillas in a context which has a cardinality of two. Given data on *tyi* and its appearance in other quantificational phrases, I use insight from Sharvy (1980), Landman (2004) and Solt (2011), where definiteness with pluralities can come through a maximality condition.

(49) $\lambda P.\text{sup}(P)$ if defined; undefined otherwise (Solt 2011, 2)
 where $\text{sup}(P) = \iota x[P(x) \ \& \ \forall y[P(y) \rightarrow y \leq x]]$

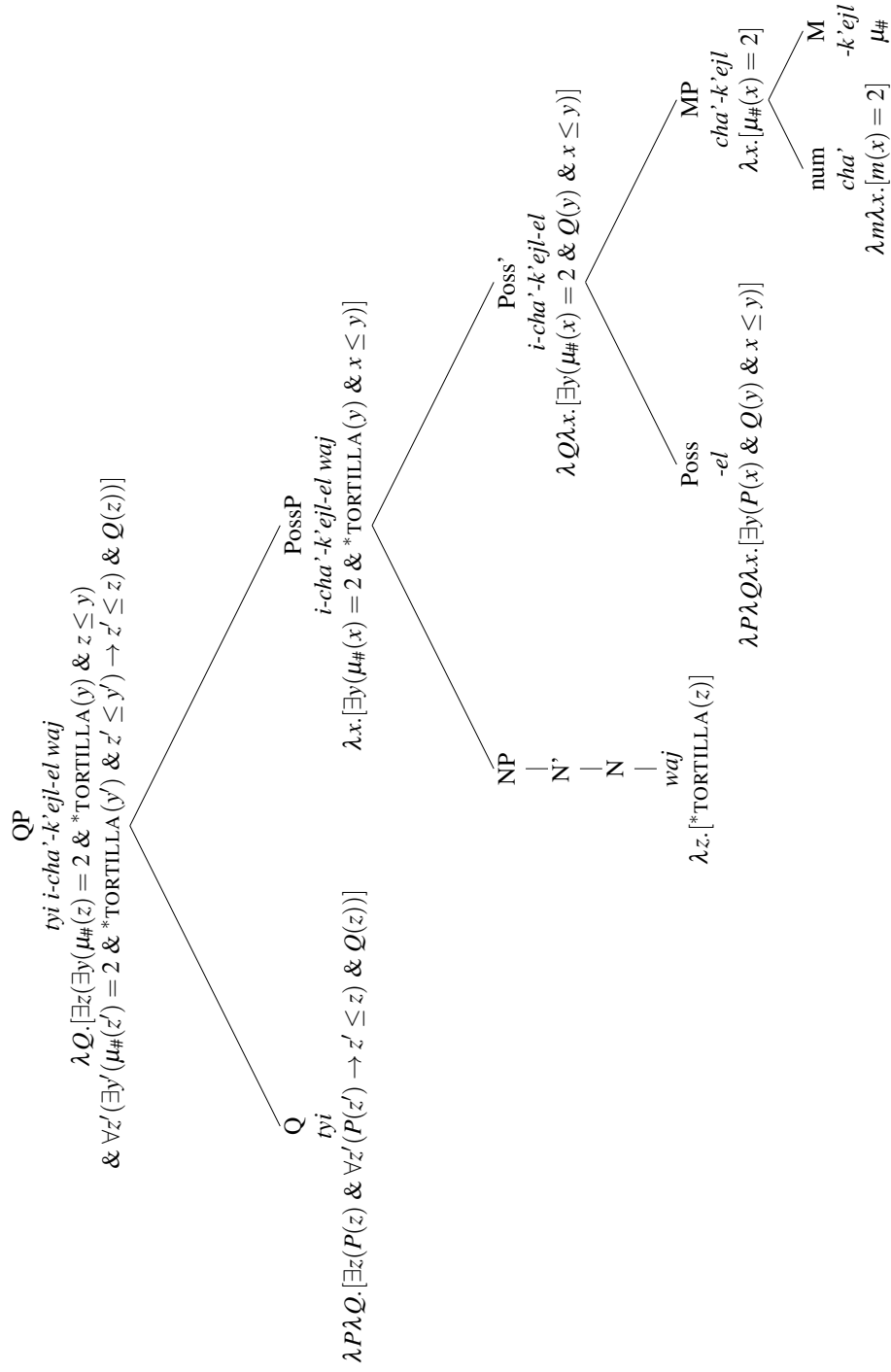
In (49), the maximal individual (which can be plural) is one which all other individuals in the set are part of. However, given the distribution of *tyi* in quantifier phrases like *tyi i-pejtyel-el ja'as* ‘all of the bananas’, I propose that the possessed numerals are quantifier phrases, therefore *tyi* should be of type $\langle\langle\text{et}\rangle\langle\text{et}\rangle\text{t}\rangle$. I propose that the denotation of *tyi* is a part-whole relation that ensures that for some predicate *P* true of *z* (including pluralities), for any other individual *z'* such that *P* is true of *z'*, then *z'* is part of *z*. This incorporates a maximality condition in order to interpret the maximal set of individuals that *P* is true of.

- (50) Proposed semantics for *tyi*
 $\llbracket tyi \rrbracket = \lambda P \lambda Q. [\exists z (P(z) \ \& \ \forall z' (P(z') \rightarrow z' \leq z) \ \& \ Q(z))]$

This parallels work on the definite determiner, but instead of creating individuals of type *e*, it creates quantificational phrases of type $\langle\langle et \rangle t \rangle$. A full derivation of *tyi icha'k'ejlel waj* 'the two tortillas' is given on the next page in (51). I label *tyi* as a Q, thus it derives quantificational phrases of type $\langle\langle et \rangle t \rangle$.

To derive the semantics for the other quantifiers with *tyi* from Table 32, *tyi* picks out whatever set is denoted at the PossP level. So for instance, with *oñ* 'many', *tyi* picks out the maximal individual of the set denoted by *yoñlel*. The result, in this case, is more like 'the many', rather than 'most'. Some speakers have given *mucho*, or 'many' in Spanish, as a translation for *tyi y-oñ-lel* so its precise semantics may not be that of English 'most'. Further work is needed to determine the exact semantics of *tyi yoñlel* and other quantifiers in Table 32.

(51)



7. Conclusions

I began this paper with the data repeated below in (52)–(53).

(52) *Bare numeral*

cha'-k'ejl waj
two-CL tortilla

'two tortilla'

(53) a. *Possessed numeral*

tyi i-cha'-tyikl-el waj
TYI A3-two-CL-**RS** waj

'the two tortillas'

b. *Ordinal*

i-cha'-k'ejl-**el** waj
A3-two-CL-**RS** tortilla

'the/a second tortilla'

I provided evidence that the numeral constructions in (53a) are definite and that definiteness is derived by the particle *tyi*. Evidence for this comes from possessed numeral 'one', which, without *tyi*, is not definite. Ordinals, also derived by the possessed numeral constructions, do not have *tyi* and can be definite or indefinite.

I posit that Ch'ol derives strong quantifiers using these possessive structures and the particle *tyi*. For Ch'ol, the definiteness comes in through the morphology. The particle *tyi* is not a definite determiner—it can only combine with these quantifier constructions and not with other nominals. Comparing the quantifiers from Table 32, repeated in Table 54, strong quantification in Ch'ol is derived from weak quantifiers with the additional morphology seen in the possessed numerals.

(54) *Weak vs strong quantifiers in Ch'ol*

Weak	Translation	Possessed/Strong	Translation
<i>cha'tyikil</i>	'two'	<i>tyi i-cha'-tyikl-el</i>	'the two of them'
<i>pejtyel</i>	?	<i>tyi i-pejtyel-el</i>	'all'
<i>oñ</i>	'many'	<i>tyi y-oñ-lel</i>	'the majority'

Indeed, marking strong quantifiers is a pattern seen across other languages; many other languages mark strong and weak quantifiers differently. In Hausa, weak quantifiers are postnominal while strong quantifiers are prenominal (Zimmermann 2008). In Basque, strong quantifiers appear with the definite article (Ettxeberria & Giannakidou 2010).

My proposed analysis brings up certain questions for how languages mark definiteness and strong quantifiers. Though I have not discussed how Ch'ol marks definiteness at length, there appear to be two ways. The determiner *jiñi* marks definite entities but bare nouns can also be definite (Coon 2010, Little & Vázquez 2018). Since *tyi* only occurs in these quantificational phrases, it could be an instance of a Quantificational Determiner (Q-Det), as has been proposed for Basque (Ettxeberria & Giannakidou 2010).¹¹ Basque, however,

¹¹Ettxeberria & Giannakidou (2010) propose that the Q-Det associated with strong quantifiers in Basque is a domain restrictor. In their analysis, the Q-Det attaches to the quantifier itself, not the whole QP.

has one phonological form for the Q-Det and definite determiner. If my analysis for Ch'ol is on the right track, Ch'ol would have at least two ways to derive definiteness: a Q-Det which appears with quantifiers and is type $\langle\langle\text{et}\rangle\langle\text{et}\rangle\text{t}\rangle$ and *jiñi* which combines with nouns and is type $\langle\langle\text{et}\rangle\text{e}\rangle$. An implication of this research is that *tyi* and *jiñi* provide evidence for two types of definite determiners: one for strong quantifier phrases and one for nominal phrases.

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Carol-Rose Little
crl223@cornell.edu