Mayan Semantics*

Robert Henderson ♣ University of Arizona

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1 Overview

This article has two interlocked goals. The first is to highlight the strands of research that have played an important role in shaping our understanding of Mayan language semantics. The second is to acquaint non-Mayanists, and especially semanticists, with empirical phenomena that might prove especially interesting on typological or theoretical grounds. Given its particular dual mandate, this article cannot be an exhaustive survey of Mayan semantics, but it should instead be seen as introduction to those aspects of Mayan languages that have had an impact on the wider field of semantics, and that are current research hotspots. That said, I do want to acquaint the reader with a broad range of phenomena, and so the paper is organized like a grammar would be, first considering lexical categories, then phrase- and clause-level phenomena, and finally issues of discourse and information structure. In particular, section 2 considers the semantics of major lexical categories. Section 3 looks at three aspects of verbal semantics that have been subject to sustained research, namely space, time, and modality. Section 4 reviews work on clause typing, including polarity and questions. Section 5 discusses topic, focus, and those aspects of obviation in Mayan that concern information structure and reference-tracking. Finally, section 6 provides a brief conclusion.

2 Lexical Semantics

2.1 Verbs

In virtue of containing more than 30,000 lexical stems, Laughlin's (1975) *The Great Tsotsil Dictionary of San Lorenzo Zinacantán* has permitted the most detailed work on the morphological and lexical-semantic distribution of verb roots in Mayan. What is most striking is how small the relevant categories are. Out of 2,715 roots, Haviland 1994a finds only 45 unambiguously intransitive roots and 157 unambiguously transitive roots. In addition to these, there are another 380 roots whose derivational possibilities prevent a clear classification. Almost all of these are roots that cross-classify as transitive verbs and positionals.[1] In addition, there are two smaller classes of

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[1]Positionals are a morphologically distinguished root class distinguishable from the roots for stems of more familiar categories like noun or verb. Very broadly, positionals lexicalize interval states (sitting, standing, lying down, etc.) as well as gradable properties (broken, fat, flexible, etc.). Section 2.3 takes up the question of positionals in detail.

roots (about 30 each). The first accept both intransitive and positional derivations, while the second accept transitive, intransitive, and positional derivations. The take-away is that your average Mayan verb root is polycategorical, but at least shares the formal properties of an ambiguously transitive verb root. At the other end of the spectrum, we find that intransitive verb roots are comparatively rare.

While no Mayan language verbal lexicon has received a comprehensive lexical semantic classification in the style of Levin 1993, Haviland 1994a does further categorize these roots into semantic classes, as illustrated in the following tables.

UNAMBIGUOUSLY INTRANSITIVE ROOTS

BIOLOGICAL	sweat, awaken, grow, die
PHYSICAL EVENTS AND STATES	catch fire, split, open, close, escape, fill, dry out, ooze, melt
BEGINNING AND ENDING	start, finish, finish (something disagreeable)
MANNER OF MOTION	jump, fly, fall, come, go, ascend, descend

UNAMBIGUOUSLY TRANSITIVE ROOTS

BIOLOGICAL	cry, drink, stutter, swallow, smoke, gag, revive, eat
MENTAL	count, believe, teach, want, know, remember
PERCEPTION	hear, see, look
SPEECH	ask, say, answer, tell, summon
HUMAN ACTIVITIES	sow, weave, set up weaving, harvest
HITTING	strike, bash, punch butt
HOLDING	grab, carry, lift, hold, press, punch, touch
SEPARATION	grind, hew, split, rip, crack
OPENING AND CLOSING	open, close, cover, wrap, hide, husk
INSERTING AND EXTRACTING	stab, poke, pull out, prick, dig out, uproot
TRANSITIVE MOTION	bounce (baby), turn, whirl, chase, shoo
WASHING	wash, wipe, rinse (interior), rinse (exterior), anoint
SURFACE EFFECT	smooth, scratch, scrap, sweep

While these notional categories illustrate some of the variation and unity of the Tsotsil lexicon, motivating such classes on event-structural and argument-structural grounds awaits further research.

Even though there are many open questions about the fine-grained structure of the verbal lexicon, some aspects of verbal lexical semantics have received considerable attention. Classificatory verbs are one example. Mayan languages do not have the kind of pervasive suppletive classificatory verb systems familiar from Athabaskan languages—that is, where a large number of verbs paradigmatically vary according to the same set of object categories (Aikhenvald 2000). It is very common, though, for Mayan languages to lexicalize the same verbal concept a large number of times depending on fine-grained properties of an argument's spatial or physical properties. An example of this is Berlin's (1967) classic study of Tseltal verbs of eating. Tseltal has seven transitive verb roots that mean 'to eat', which suppletively alternate depending on the physical properties of the object.

tun	eating in general
ch'up	chewy object with pulp expectorated
ti'	meat
lo'	mushy or gelatin-like objects
k'ux	individuated hardish objects
we'	bread-stuffs
buch'	foods that dissolve in mouth with little mastication

We find similar phenomena across the family with verbs of handling, as well as verbs with affected patients, like verbs of cutting and breaking (Haviland 1994b; Furbee-Losee 1976: 238-242; Pye 1996). For instance, in his study on K'iche' verbs of cutting and breaking, Pye 1996 reports the following seven transitive verb roots meaning 'to pick', which differ in terms of the physical properties of the plant picked.

ch'up	something large
b'oq	whole (including roots)
jach'	corn
mak	small beans
q'ol	leaves (broad)
xul	with stem

One promising area for future research would be to determine exactly how far away Mayan languages are from having a paradigmatic verbal classifier system. Careful quantitative work on the lexicon might find more regularities than currently acknowledged.

Aktionsart, or lexical aspect, is another fundamental part of verbal lexical semantics. While lexical aspect has not been thoroughly investigated for many Mayan languages, there are good studies from isolated languages. Intriguingly, there appear to be significant differences between languages. I will focus on the coding of telicity, which has been best studied. Hendrick Krueger 1986: 181-200 translates the classic tests from Dowty 1979 / Vendler 1967 into Kaqchikel and runs them against a number of Kaqchikel verbs. She finds that the sentence-frame tests are generally applicable and are able to sort Kaqchikel verbs into achievements, accomplishments, activities, and statives. For instance, Kaqchikel has two types of temporal adverbials, the first built on Kaqchikel's only preposition *pa*, and the second built on the relational noun *–ichin*, which canonically marks benefactive arguments.[2] Hendrick Krueger 1986 shows that these adverbials approximate in-adverbials and for-adverbials respectively and allow one to probe verbs for telicity.

(1) *Ri achin x-u-xajon (r-ichin) /#pa ka'i' ora.*
the man COMPL-A3SG-dance (A3SG-RN) / in two hour

'The man danced for / # in two hours.'

(2) *X-apon #r-ichin / pa ka'i' ora.*
COMPL-arrive A3SG-RN / in two hour

'He arrived # for / in two hours.'

[2]Note that the relational noun *–ichin* is actually optional in the for-adverbial construction.

While Kaqchikel supports classic aspectual tests, other Mayan languages do not morphologically code the relevant distinction adverbially or on aspectual verbs, and so tests based on syntactic frames do not work. For instance, Bohnemeyer 2001 shows that Yucatec does not make a distinction between durational adverbials describing culminating and non-culminating events. Consider the following pair, which both employ the preposition *ichil ti'*, even though the former contains a predicate that intuitively describes an activity, while the latter contains a predicate that intuitively describes a discrete change of state.

(3) *Maria=e' t-u=pax-ah piyàano ich-il ti' ka'-p'èel òora.*
Maria=TOP PFV-A3SG=play-COMPL(B3SG) piano in-RN PREP two-CLF hour

'Maria, she played the piano for two hours.'

(4) *T-u=xot-ah=xan hun-kùul che' Pedro ichi-il ti' ka'=p'èel òora.*
PFV-A3SG=cut-COMPL(B3SG)=also one-CLF tree Pedro in-RN PREP two-CLF hour

'Pedro also cut a tree in two hours.'

Similarly, Yucatec verbs can be freely embedded in frames like 'spend X time' and 'take X time' whether or not they intuitively denote inherently bounded events. While aspectual properties like telicity cannot be diagnosed in Yucatec via co-occurrence restrictions, unlike in Kaqchikel, there are other tests based on semantic entailments that support the existence of lexically-encoded telicity in Yucatec. For instance, the following frame tests whether an aborted event is realized.

(5) *Pedro=e' ts'-u=chúun-ul u=VERB, káa=h=t'a'n-ih, káa*
Pedro=TOP TERM=A3SG=start.ACAUS-INC A3SG=VERB káa=PFV=call.PASS-B3SG káa
t-u=p'at-ah. Ts'-u=VERB Pedro?
PFV-A3SG=leave-COMPL(B3SG) TERM-A3SG=VERB Pedro

'Pedro, he had started to VERB, (when/and then) he was called (and) quit. Had Pedro VERB-ed?'

As predicted, the entailment generally goes through for atelic, but not telic verbs. Interestingly, while lexically encoded telicity can be identified through tests like (5), Bohnemeyer finds variability across his telicity tests by lexical item. In particular, cognate object intransitives like *nàay* 'dream' or *k'áay* 'sing' behave like activities on some tests, but pattern as telic on the test in (5). Further research is clearly needed on these lexical-semantic categories in Mayan. What we can conclude from the existing work is that categories like telicity are clearly relevant at the level of the root in Mayan, but how these aspectual categories are formally coded varies across the family. In Kaqchikel, temporal adverbials and aspectual predicates like *start* and *finish* make direct reference to telicity in ways that they do not in Yucatec.

Another phenomenon that is closely related to lexical aspect, and pervasively marked throughout the Mayan family is pluractionality. First discussed in the context of Chadic languages (Newman 1980, 1990), pluractionality is now recognized as a widespread phenomenon, though one that occurs especially frequently in the languages of the Americas (e.g., Mithun 1988; Wood 2007). Canonically, pluractional morphology derives verbs that make reference to plural events. While

the character of these event pluralities is known to vary depending on the particular pluractional construction, pluractional events tend to vary crosslinguistically along the same set of parameters (Wood 2007; Lasersohn 1995). We see a similar range of variation across the pluractional markers in the Mayan family. For instance, languages often have a series of pluractional markers that exhibit fine-grained control over the amount of downtime between the repetitions that compose an appropriate plural event. In his work on Tseltal expressive predicates, Pérez González 2012 describes a series of affixes that derive verbs which must describe multi-event scenarios. Crucially, they differ in how they structure those repetitions. Consider the three-way opposition between *-C_1on*, *-Vnaj*, and *-lajan* described below.

-C_1on	'multiple repetitions with intermediate pauses'
-Vnaj	'multiple (fast) periodic repetitions'
-lajan	'multiple chaotic repetitions'

The difference between these suffixes can be described in terms of downtime between the events that compose the plural event. For instance, *-Vnaj* requires periodic downtime that is not too long, *-C_1on* requires pauses that are unstructured, though potentially longer than in the case of the other two suffixes, and *-lajan* requires unstructured downtime where the events do not repeat at an even interval.

The second parameter along which pluractionals vary is whether they derive predicates of events that are construed as a single event, or whether each of the events that belong to that plurality is independent. In the literature, this is called the event-internal / event-external contrast. Henderson 2012 builds an extended argument that this contrast exists in the Kaqchikel pluractional system, but it is clearly detectable in other languages. For instance, in his discussion of expressive affixes, Pérez González 2012 discusses what he calls the subevent property, which clearly maps to event-internality. For instance, the following example has a verb derived by *-Vnaj* from a positional meaning to be elevated. Since *-Vnaj* requires a plurality of events with minimal downtime between them, the result is a predicate that means something like to wobble.

(6) *X-pich-unaj* *y-it.*
ASP-elevated-PLRC A3SG-butt.

'He's wobbling his butt.' Pérez González 2012: ex. 4a

The point here is that lifting your butt once, or even repeatedly, has a different quality than wobbling your butt. The latter results when the events are repeated rapidly, and then construed as constituting a single atomic event.

A final parameter on which pluractionals differ is whether they can by satisfied by participant plurality. That is, only if a plurality of participants each engages in just one event of the relevant sort, does this plurality of event count as a pluractional event. Pérez González 2012 discusses a pluractional with this property, namely *-lajan*, which has already been discussed. With respect to example (7), Pérez González 2012: p. 220 says that it does not describe a situation where one frog gets to its feet many times, but is true in a situation where a plurality of frogs each starts to come to its feet.

(7) *X-tejk'-lajan* *jajchel* *ts'iin* *te* *pokok=e.*
ASP-de.pie-PLRC DIR then DET frog=ENCL

'and then the frogs start to come to their feet.' Pérez González 2012: ex. 12

Another example of this type of pluractionality is discussed in detail for Kaqchikel by Henderson (2014) under the heading of distributive pluractionality. For instance, (8) can be true in a scenario where the kids receive a group hug. In contrast, with the pluractional suffix *-la'*, example (9) most naturally describes a situation where each kid is hugged once. The sum of these individual hugging events is what satisfies the pluractional.

(8) *X-e'-in-q'etej* *ri* *ak'wal-a'.*
ASP-B3PL-A1SG-hug the child-PL

'I hugged the children.'

(9) *X-e'-in-q'ete-la'* *ri* *ak'wal-a'.*
ASP-B3PL-A1SG-hug-PLRC the child-PL

'I hugged the children individually.' Henderson 2014: ex. 85

It is clear that within the Mayan family we find the full range of pluractionality attested in the typological literature. The Mayan languages are thus the perfect laboratory for exploring the connections between categories like pluractionality on hand, and other categories like aspect and plurality in the nominal domain. In relation to this latter point, one of the interesting facts about plural morphology in Mayan is that it often has a cross-categorial distribution. That is, the same morphology that derives plural nominals can also affix to verbs indicating a plural argument (see section 2.2 for examples). The connection between plural marking of this sort and participant-based pluractionality, both historically and in synchronic grammars, is ripe for further exploration.

A final aspect of Mayan verbal lexical semantics I want to consider concerns the lexicalization of path information, that is, the lexicalization of the (relative) motion of a participant in the event denoted by the verb. Languages can be classified typologically into those that are verb-framing and those that are satellite-framing (Talmy 1985, 2000). Verb-framing languages lexicalize path information on the verb, while satellite-framing languages lexicalize it elsewhere, most notably on prepositions. Mayan languages stand out on this continuum in virtue of being 'radically verb-framing' (Bohnemeyer et al. 2007, 2008). They completely avoid lexicalizing path information outside of verb roots. Consider the following minimal pairs presented by Bohnemeyer et al. (2008: ex. 7-8) comparing Yucatec and the canonical verb-framing language Spanish. Notice how the noun *the box* is marked as it appears in different spatial roles, where the LOCATIVE role indicates the ground, the SOURCE role indicates the beginning of a path, and the GOAL indicates the end of a path.

(10) a. *El carro estaba en la caja.*

'The car was in the box.' LOCATIVE

b. *El carro entró en la caja.*

'The car went into the box.' SOURCE

c. *El carro salió de la caja.*

'The car went out of the box.' GOAL

(11) a. *Le=kàaro=o'* *ti'=yàan* *ti'* *le=káaha=o'.*
DET=cart=DEIC PREP-exist(B3SG) PREP DET=box=DEIC

'The cart, it is [lit. in] the box.' LOCATIVE

b. *Le=kàaro=o'* *h-òok* *ti'* *le=káaha=o'.*
DET=cart=DEIC PFV-enter(B3SG) PREP DET=box=DEIC

'The cart, it entered [lit. in] the box.' SOURCE

c. *Le=kàaro=o'* *h-hòok* *ti'* *le=káaha=o'.*
DET=cart=DEIC PFV-exit(B3SG) PREP DET=box=DEIC

'The cart, it exited [lit. in] the box.' GOAL

Example (10) shows that Spanish marks the path relative to the ground NP *caja* 'box' with a combination of verb and prepositional phrase. It is clearly more verb-framing than English, which is shown in the glosses to be able to code all of this information on prepositions. In contrast, Yucatec uses the same preposition across these three constructions in (11). The path information relative to the ground is necessarily lexicalized on the verb. This is true across the family, where most languages have only one or at most two prepositions.

A consequence of having no prepositions that encode path, almost all Mayan languages have verbal clitics, called directionals, that enrich verbs with path information.[3] For instance, the verb *-torij* 'throw' in Kaqchikel conveys no information about the path of the projectile. Furthermore, because Kaqchikel has only one locative preposition *pa* 'in', the directionals in examples (12-13) are what determine whether the projectile should land inside or outside the building.

(12) *T-a-torij* *el* *pa* *jay.*
IMP-A2SG-throw DIR PREP building

'Throw it out [lit. in] the building!'

[3]It is reported by Osorio May 2005: 32 that Chontal does not have directionals, nor do the Yucatecan and Wastekan languages (Zavala 1993: 48).

(13) *T-a-torij* *ok* *pa* *jay.*
IMP-A2SG-throw DIR PREP building

'Throw it in [lit. in] the building!' (fieldnotes)

Directional systems in Mayan typically include expressions for movement relative to the deictic center (*go*, *come*), movement relative to an enclosure (*enter*, *exit*), and vertical movement (*ascend*, *descend*), as well as a directional for movement across (or through) a point and a directional for remaining at a point. That said, the systems can become even more complex. For instance, England 1983 gives the following 12 simple directionals for Mam.

xi	'away from'	*tzaj*	'toward'
ul	'there to here'	*pon*	'here to there'
kub'	'down'	*jaw*	'up'
el	'out'	*ok*	'in'
kyaj	'remaining'	*aj*	'returning from here'
iky'	'passing'	*b'aj*	'complete'

In addition, whereas some Mayan languages allow only one directional per verb (as in Kaqchikel above), Mam allows a large number of complex directionals like *ajk* 'returning down' (from *aj kub'*) and *jax* 'up away' (from *jaw xi*). While not all combinations are attested, the complex directionals contribute 16 more to the Mamean inventory. The Mam system is large and compositional, but an upper-bound for complex directionals is provided by Tsotsil, which allows up to 4 per verb. Haviland 1993 further reports that there is preferred ordering among the Tsotsil directionals when they co-occur based on semantic considerations. In particular, those that convey movement across a boundary precede those that convey vertical movement which precede the deictic movement directionals. The directionals that can have aspectual meanings like *likel* 'arise / start' come last.

While it is not clear from the glosses, across the family, the directional particles are indistinguishable from root intransitive verbs. For example, the Kaqchikel directional *ok* in (13) is of the same form as an intransitive verb root meaning 'to enter'. In this way, the directional construction looks like a serial verb construction, where the object of the transitive verb *torij* 'throw' is simultaneously the thematic argument of the intransitive verb *ok* 'enter'. This is precisely how Mateo Toledo 2008 analyses directionals in Q'anjob'al.

Q'anjob'al is an especially interesting case because the language has extensively elaborated on this general form observed in the directional construction—a monoclausal construction with multiple verbs roots sharing arguments.[4] Mateo Toledo 2008 describes a resultative construction illustrated in (14), which is also attested in Akatek (Zavala 1992; Francisco Pascual 2008), Popti' (Ramírez Pérez et al. 1996), and Chuj (Hopkins 1967: 111) . Note that the object of the transitive verb *hoq* 'hit' is simultaneously the single thematic argument of the intransitive verb *poj* 'break'.

(14) *...tol* *hoq* *ma'* *poj* *naq* *jun* *iglesya.*
that POT hit break CLF INDF church

'...that he will break the church by hitting it.' Mateo Toledo 2008: ex. 3

[4]Complex predicate constructions beyond the directional type are apparently restricted to a subset of the Western-branch languages, and centered on the Q'anjob'alan subgroup.

In addition to the resultative, there is also a complex predicate causative construction, illustrated in (15), which has an analog in a larger number of languages, including Popti' (Craig 1977: ch5), Chuj (Hopkins 1967: 111), Tsotsil (Aissen 1987: ch11), Akatek (Zavala 1992: ch5), and Tseltal (Polian 2013: 448-451). While best translated with the verb 'feed' in English, the Q'anjob'al verb phrase could be more literally translated as 'make the cat eat'. Once again, the causee—*no mis* 'the cat'—is simultaneously the transitive object of the causative verb *a'* 'give' and the thematic argument of the intransitive verb *lo* 'eat'.

(15) *Y-uj k'al k'am ch-y-a' lo-w naq no mis ix ix tu'....*
A3SG-by always NEG INC-A3SG-give eat-ANTIP CLF CLF cat CLF woman DEM

'Only because he does not feed that woman's cat...' Mateo Toledo 2008: ex. 10

While these constructions are surface similar, Mateo Toledo 2008 shows that they have radically different event structures. The resultative describes a single event, while the causative requires two sequentially ordered events. Finally, both constructions can be distinguished from directionals, some of which have the ability to induce argument-structure alternations (in addition to affecting event-structure). Consider the contrast in (16). With the directional *ok*, the verb *chuk* 'stick' takes a GOAL object, otherwise it takes a THEME object.

(16) a. *Ch'-ul s-chuk w-ichin ti y-etoq s-q'oqoch.*
INC-come A3SG-stick A1SG-back DEM A3SG-with A3SG-walking.stick

'He comes to stick my back with his walking stick.'

b. *At y-in w-ichin ti at ch'ul chuk-ok q'oqoch tu.*
there A3SG-at A1SG-back DEM there INC-come stick-DIR walking.stick DEM

'It is on my back that he comes to stick with his walking stick.'Mateo Toledo 2008: ex. 87

The picture we come to is that Mayan languages tend to use sequences of verbs to build complex events, change argument structure, and code aspectual / spatial information where other languages would use prepositional or biclausal constructions.

2.2 Nouns

Section 2.1 discusses suppletive verbal classifiers in Mayan, which is only quasi-systematic. The story is completely different in the nominal domain. The majority of Mayan languages have fully grammaticalized systems of nominal classification, and often multiple such systems that only partially overlap. We will not be considering the K'ichean languages, as they have no, or only minimal grammaticalized systems of nominal classification.[5]

Numeral classifiers are the family's most widespread form of nominal classification. The classic study is Berlin 1968, which finds over 400 morphemes like those below in Tseltal.

[5]See, for instance, the discussion below on plural marking in K'ichean languages, which acts as a kind of nominal classification, even if not as elaborate as plural classifiers in the Q'anjob'alan languages.

kuh	thick-bodied, non-pointed head
kul	thick-bodied, pointed head
tel	thin-bodied, non-pointed head
t'el	wedge-like, symmetrical ends
hen	large sphere, flattened bottom
pis	ball

Whenever a noun is quantified, one of these 400 classifiers must suffix the numeral, as with *pis* 'ball' in (17) where *manko* 'mango' is quantified by the numeral *ox* 'three'. Without such a suffix, the expression is ungrammatical.

(17) *Te kerem-e' ox-pis-bal manko lah s-lo'?*
DET boy-CLF three-CLF-Q mango PFV A3SG-eat

'The boy, was it three mangos that he ate?' Shklovsky 2012: ex 119

In this way, Tseltal, as well as other languages from the Ch'olan, Yucatecan, and Q'anjob'alan branches are similar to classic numeral classifier languages like Mandarin. Mayan languages have recently become important for theoretical debates about the semantics of numeral classifiers first raised for East Asian languages. In particular, Ch'ol, like Tseltal has obligatory numeral classifiers, but they are only obligatory for the numerals of Mayan origin. Numerals that were historically borrowed from Spanish ban classifiers. Crucially, the historical origin of the noun does not matter, as shown in (18).

(18) a. *Tyi k-mäñä ux-p'ej mansana.*
ASP A1SG-buy three-CLF mansana

'I bought three apples.'

b. *Tyi k-mäñä nuebe mansana.*
ASP A1SG-buy nine mansana

'I bought nine apples.' Bale et al. 2014

Bale et al. 2014 uses this kind of data from Ch'ol to argue that numeral classifier languages have numerals with special properties (Krifka 1998), not noun roots with special properties (Chierchia 1998).

While numeral classifiers are the most widespread classificatory device found across the family, the Q'anjob'alan and Mamean languages spoken around the Guatemalan state of Huehuetenango (Q'anjob'al, Akatek, Popti', Chuj, Mam, and Ixil) have innovated nominal classifiers. Akatek, for instance, has 14 such classifiers (Zavala 2000).

naj	man	*ts'an*	thread
'ix'	woman	*tx'otx'*	soil, dirt
k'o	honorific	*a'*	water
yab'	familiar	*ka'*	fire
te'	tree	*'atz'an*	salt
ch'en	rock	*an*	vegetable
('i)xim	corn		

These classifiers either occur unstressed inside a noun phrase or stressed as an independent pro-form, a contrast shown in (19).

(19) a. *tatol* *chinchax* *an* *yuu* *naj* *smam konob'*.
because.if find B1SG by CLF king

'...because if I am found by the king.'

b. *chinsma' kam* *naj* *an*
he.kill.me CLF B1SG

'He is going to kill me.' Zavala 2000: ex. 37

Importantly, the use of nominal classifiers is never morphosyntactically conditioned in Akatek or other Q'anjob'alan languages (see Craig 1986 for Popti' or Mateo Pedro 2004 for Q'anjob'al). That is, Akatek would allow for a null pronoun in (19b) or a plain definite NP in (19a). Instead, the use of classifiers is controlled by discourse factors that, while not having been completely investigated, are related to notions of definiteness and topichood. We see something similar for the Mamean languages with nominal classifiers. In Mam, classifiers are not NP-internal, but instead optionally suffix verbs, non-verbal predicates, and relational nouns with third person pro-drop arguments (England 1983: p. 158). Thus, nominal classifiers in Mam are already restricted to contexts with discourse-old referents.

A final interesting property of these nominal classifiers is that because their distribution is not strictly morphosyntactically governed, their use is open to the affect of other pragmatic and discourse factors. Mateo Pedro 2004 describes a striking case of this in the Q'anjob'al of Santa Eulalia. In this dialect, the classifier *ix*, which is usually used with NPs that have human female referents, can replace the classifier *naq*, which is usually used for NPs with human male referents. As he describes, this only happens for jocular speech when all of the interlocutors are male. In this way, a classifier that is generally used to indicate definiteness has been extended, not to reflect properties of the nominal referents in question, but to reflect social relations between interlocutors.

The final type of widespread classificatory system we find in Mayan is closely related to another aspect of nominal semantics, namely plurality. For this reason, I will consider them both simultaneously. Intuitively, plurality is conceptually posterior to some notion of individuation. Any noun phrase that makes reference to more than one of the individuals given under the particular notion of individuation should be marked plural. Of course, the facts on the ground are much richer, and Mayan languages, taken as a whole, exemplify this richness. First, it is well known that the typological distribution of plural marking is conditioned by animacy (Smith Stark 1974). We see this tendency across the Mayan family. For instance, in the K'ichean-branch languages only a small number of nouns are obligatorily marked for plurality. These nouns uniformly denote humans or culturally important animals. For instance, consider the following examples from Tz'utujil (Dayley 1981: p. 198).

winaq ∼ *winaqii'*	person ∼ people
xten ∼ *xtenii'*	girl ∼ girls
ch'uuch' ∼ *ch'uuch'aa'*	baby ∼ babies
k'ooy ∼ *k'ooyaa'*	monkey ∼ monkeys
mama' ∼ *mama'ii'*	rooster ∼ roosters

This kind of restriction of plural marking to sentient animates has been further elaborated in the Q'anjob'alan languages and now forms a simple classificatory system. Craig 1986 describes a system in Popti' with a plural marker for humans (*heb'*) and plural marker for animals (*hej*), which contrasts with a zero plural marker for inanimates. In this way, the plural markers partially track the nominal and numeral classifiers, which we discussed previously. We can see all three occurring in the following examples.

(20) a. *ka-waŋ* *heb'* *naj* *winaj*
two-NUM.HUMAN PL.HUMAN CLF.HUMAN man

'the two men'

b. *ka-k'oŋ* *hej* *no'* *noq'*
two-NUM.ANIMAL PL.ANIMAL CLF.ANIMAL animal

'the two animals'

c. *ka-b'* *∅* *te'* *ŋah*
two-NUM.INANIMATE PL.INANIMATE CLF.PLANT house

'the two houses' Craig 1986: ex. 2

While plural marking has partially unified with nominal classification in the Q'anjob'alan languages, this has not happened in the Yucatecan and Ch'olan languages, even though they have numeral classifiers. Instead, these languages often have multiple, cross-categorial plural markers that operate somewhere in-between the verbal, nominal, and pronominal realms. Ch'ol, for instance, has the suffix *-ob'* that marks plural third person nominals as in (21).[6]

(21) a. *ili* *x-k'aläl-ob*
DET CLF-girl-PL

'these girls' Vázquez Álvarez 2011: p. 85

b. *li* *ñox-ob-tyak*
DET elder-PL-PL

'(some of) the elders' Vázquez Álvarez 2011: p. 87

At the same time, we see *-ob* on verbs to indicate that at least one of the participants is third person plural.

(22) *Tyi* *y-il-ä-y-ob.*
ASP A3-see-ITV-PL

'They saw him/her.'
'S/he saw them.'
'They saw them.' Vázquez Álvarez 2011: p. 84

[6]Example (21b) gives an example of one of the other plural markers in Ch'ol, in this case *-tyak*, which indicates an indefinites plural partitive NPs, i.e., 'some of the X' (Vázquez Álvarez 2002: p. 82).

Even though *-ob* is morphosyntactically different than K'ichean-style plural marking, there are some similar pressures. In particular, Vázquez Álvarez 2011: p. 85 reports that *-ob* is ungrammatical on non-human nouns and strongly dispreferred on verbs to crossrefererence non-human nouns. Where they most diverge, though, is that nouns in K'ichean-branch languages that accept the plural affix must be marked plural when having plural reference. This is not the case for Ch'ol and other Western-branch languages. For instance, it is possible for nouns, even human nouns like *k'aläl* 'girl' in (21a) to have plural reference without *-ob*, as example (23) shows.

(23) *X-ixik, x-k'alä, mu'=bi i-kuch majl-el.*
CLF-woman CLF-girl ASP=REP A3-carry away-INF

'Women, girls, he takes them all away.' Vázquez Álvarez 2011: ex. 43

The optionality of plural marking in these languages raises the question of when nouns with plural reference are actually marked as such. This question has started to be explored experimentally for languages like Tseltal (Foushee 2013) and Yucatec (Butler 2011; Butler et al. to appear). For instance Yucatec has a plural affix *-o'ob*, which like Ch'ol *-ob*, optionally marks nouns as plural.

(24) a. *le x-ch'úupal*
DET CLF-girl

'the girl' / 'the girls'

b. *le x-ch'úupal-o'ob*
DET CLF-girl-PL

'the girls' Butler et al. to appear: ex. 6-7

Butler et al. to appear use timed translation and timed picture description tasks to investigate features that bias the use of *-o'ob*. On the picture description task, the major semantic result was that plural marking is significantly greater when describing a scene with many individuals satisfying a predicate rather than a simple plurality of two individuals. This reinforces an effect that was found in the translation task in which NPs like *two girls*, where plurality is semantically recoverable, were significantly less often marked plural than both translations of simple plural NPs like *the girls* and NPs describing scenes with only two girls. These results only emphasize what we have already seen. Plural marking in Mayan is generally not merely a reflection of prima facie plural reference, but a function of animacy, cardinality, the availability of other plural-marking strategies (like plural agreement and plural quantifiers), and almost certainly discourse-level properties like topicality.

2.3 Positionals and adjectives

Just as Mayan languages have CVC root nouns and verbs, they also all have a morphosyntactically distinct class of adjectival roots. Where adjectival roots stand apart is in their size. In contrast to nouns and verbs (and the class of positional roots to be discussed in this section), Mayan languages have small adjectival inventories. For instance, England 2004 counts about 50 adjectival roots in Mam. As expected, the majority fall into those semantic classes that are most commonly expressed

by adjectives, including dimensions (e.g., *big*, *thick*, *small*), colors (e.g., *red*, *blue*), physical properties (e.g., *heavy*, *cold*, *dirty*), evaluatives (e.g., *bad*, *good*), and human propensities (e.g., *fierce*, *stubborn*). Not only are the number of bona fide adjective roots few, but adjective semantics in Mayan has been poorly studied. The extant data, though, is sufficient to at least partially contextualize their place in current crosslinguistic work. Adjectives are the canonical gradable predicate, that is, predicates expressing properties like *big*, which are most naturally held only relative to some contextually salient degree. There has been a lot of recent research on the universality of degree denoting expressions (Bochnak 2013), as well as how languages express canonical degree constructions like the comparative (e.g., Bogal-Allbritten 2013; Beck et al. 2009; Schwarzschild in press). Mayan languages make use of familiar strategies. For instance, they have a variety of degree expressions, both free and bound morphemes, that alter the standard of comparison of gradable adjectives, like *yiin* 'somewhat', *matiij* 'very', *-xax* 'very', etc. in (25-26) from Mam.

(25) a. *nuxh yiin*
small ATT

'somewhat small'

b. *matiij weena*
big very

'very big'

c. *puura k'ook'j*
very delicious

'very delicious' England 2004: p. 136

(26) a. *naach-xax*
ugly-INTS

'very ugly'

b. *spiiky'an-ka*
clear-ATT

'somewhat clear' England 2004: p. 131

Moving to comparative constructions, we find that Mayan languages generally follow one of two strategies, both common. First, in some languages, mostly Eastern-branch languages, there is no comparative marker, like *more* or *–er* in English. Only the comparative standard is marked, and it is done so with a locative relational noun—an obligatorily possessed nominal expressing spatial or other relations commonly marked in other languages via prepositions. The relation noun in example (27b) from Mam is *twiz* 'face' or 'front', and so the comparative is literally 'Juan is tall in front of Pedro'.

(27) a. *B'ala kya' meeb'a-x t-oo' ky-witz nemass nasyoon.*
maybe like.that poor-still EXT-B3PL A3PL-RN the.rest nation

'Maybe because of that we are poorer than other nations.'

b. *Nim-x t-qan Xwan t-witz Luuch.*
big-still B3SG-FOOT Juan A3SG-RN Pedro

'Juan is taller than Pedro.' England 2004: ex. 65-66

In many Western-branch languages, though, the locative relational noun standard marker is supplemented with a comparative morpheme. For instance, Popti' in (28) uses the *ka'* 'very / more'.

(28) *ka' icham hin s-sataj naj Pel.*
more old I A3PL-RN CLF Peter

'I am older than Peter.' Craig 1977: ex. 122

Some of the languages with a comparative standard marker have borrowed Spanish *más* in this function e.g, Tsotsil (Aissen 1987: p. 187).

While Mayan languages have small adjective inventories, the functional load is made up by a special class of roots that have come to be called *positionals*. Positionals are defined as a root class in virtue of their canonical CVC form and unique derivational morphology. The definitory derivation is generally taken to be the affix that derives a stative predicate from a positional root, which is usually of the form *-Vl*. The following examples from Sakapultek illustrate positional roots and their corresponding positional stative predicates.

(29) a. *Jun achin k'oq-ol-ek chu' ni-teem*
a man seated-POS-ITV in A1SG-chair

'A man is seated in my chair.'

b. *Li yaab' katz'-al-ek.*
the sick lying.down-POS-ITV

'The sick person is lying down.' Mó Isém 2006: ex. 408-409

The most frequently encountered positionals, like those above, describe physical configurations that are lexicalized as (interval stative) verbs in English. That said, Mayan languages have many hundreds of these positionals, most of which have meanings that are lexicalized as adjectives in languages with large adjective inventories, as the following Sakapultek examples show.

kup	short
yun	weak
pan	fat
tak'	tall

Mó Isém 2006: ex. 417

Given the large number of positional roots, their formal parity with the roots of more familiar lexical classes like verbs and nouns, and their evocative semantics, the lexical semantics of positional roots have received detailed attention in the literature. The primary issue that has occupied previous researchers is to determine the semantic field in which positionals denote and to develop a classification of positional roots based on these semantic categories. The classic study in this domain is Martin 1977, a book-length treatment of positional morphology and semantics in Q'anjob'al. Martin 1977 identifies six semantic categories that positionals express: size, shape, texture, angle (aperture), flexibility, and quantity. More importantly, though, she shows (building off of Norman 1973), that positionals show rampant conflation of these categories in the meanings of single roots. This gives positionals their strikingly specific meanings. For instance, while the K'iche' roots *san* and *b'ol* both describe cylindrical objects, the latter also requires those cylinders to have a horizontal orientation, as well as a different cluster of physical properties (Norman 1973: p. 2).

san	cylindrical, thick, solid (though not hard)	shape + physical property
b'ol	horizontal, cylindrical, long	shape + orientation + physical property
pich	long, thin, straight, vertical	shape + orientation + physical property

In addition to these descriptive dimensions, Haviland 1994a emphasizes that Mayan positionals are also often conflated with evaluative content. He gives the following example from Tsotsil to illustrate the phenomenon. If someone asks where their scarf is, and receives the reply in (30), they do not just get the information that their scarf is lying flat on the ground, but also that the speaker is critical of this fact. The positional *pak'al* is used for things that aren't just lying flat, but carelessly thrown down. As Haviland says, example (30) "criticizes as much as it locates."

(30) Where is my scarf?
Te *pak'al* *ta* *lum*
there lying.flat PREP ground

'It's lying flat on the ground.' Haviland 1994a: p. 698

The majority of work on positional semantics has continued in this vein, grouping them into classes based on some set of notional semantic categories, and then looking at patterns of conflation across these categories (e.g., Haviland 1994a; Knowles 1983; Martin 1977). There are studies that take a different route, though. First, Brown et al. 2007 asks not what semantic criteria allow for a felicitous subgrouping positionals, but what unifies positionals as a semantic class. They build off of the observation that positionals, in their positional stative predicate form, canonically appear in the basic locative construction as answers to *where*-questions. Semantically, then, Brown et al. 2007 treat positionals as primarily spatially concerned. They express additional information about the configuration of the figure in a Figure-Ground construction. Interestingly, they find that Mayan languages differ in how readily speakers use positionals to answer simple *where*-questions. In Tseltal, the positionals are an integral part of the basic locative construction, while in Yucatec, they are most often used to answer a *where*-question when the context makes salient the possible contrasting configurations of a figure. Brown et al. 2007 comes to propose that Tseltal speakers have a general preference for expressing as much information about the theme as possible. Positionals, which impose fine-grained selectional restrictions on the theme of an existential predicate, are thus the ideal kinds of predicates to use in the basic locative construction.

Finally, some newer works have been able to branch out, exploring not just the notional semantics of positional roots, but how certain semantic properties correlate with properties of argument structure. The standout work in this vein is Sántiz Gómez 2010, which investigates the syntax and semantics of positionals in the Tseltal of Oxchuc. Sántiz Gómez splits the positionals first into those that occur in the basic locative construction and those that do not. They are then further split according to whether they participate in any of the following two diathesis alternations. In the first, a locative argument *jk'ab* 'my hand' is promoted to the theme of the positional predication. In the second, the locative and theme arguments–*yal k'abil* 'finger (lit. son of hand)' and *ch'okow* 'ring', respectively–are switched with no apparent semantic difference.

(31) a. *Loch'-ol ta j-k'ab te ixim=e*
contenido-POS PREP A1SG-hand DET corn=ENCL

'The corn is contained in my hand.'

b. *Loch'-ol te s-k'ab=e*
contenido-POS DET A3SG-hand=ENCL

'My hand is in the form of a container (to receive corn).' Sántiz Gómez 2010: ex. 62-63

(32) a. *Xoj-ol ta y-al k'ab-il te ch'okow-il=e*
inserted-POS PREP A3SG-son hand-B3SG DET ring-B3SG=ENCL

'The ring has the finger inserted in it.'

b. *Xoj-ol ta ch'okow-il te y-al k'ab-il=e*
inserted-POS PREP ring-B3SG DET A3SG-son hand-A3SG=ENCL

'The finger is inserted in the ring.' Sántiz Gómez 2010: ex. 46-47

The diathesis alternations can then be used to support notional semantic classifications of positionals. For instance, all of the positionals expressing properties of intervals between two reference points anchored on the figure also fail to occur in the basic locative construction. In addition, many participate in the diathesis alternation in (32). In contrast, the positional roots that express notions of containment are also distinct in occurring in the basic locative construction, as well as frequently undergoing both diathesis alternations. The future of research on positionals will surely take place at this intersection between syntax and semantics, looking for alignments between semantic categories and argument structure, and then trying to explain why we find the particular patterns we do.

2.4 Ideophones

Ideophones express complex sensory phenomena. In addition, they often have a restricted syntactic distribution and their own morphology, allowing them to be grouped together as a lexical class. Mayan languages have a clearly identifiable class of ideophones that are well-integrated into the CVC root system. Ideophonic roots in Mayan are canonically used underived in a light-verb

construction. Notice in (33) that Tseltal uses the verb *chi* 'say', while the Kaqchikel example in (34) has *b'än* 'do'.

(33) *pura ch'il-bil, tsok' x-chi ta mantekat.*
puro frito-ASP IDF.frying ASP-say PREP manteca

'completely fried, they go *tsok'* in the fat.' Pérez González 2012: p. 154

(34) *Tzër x-u-b'än ru-tzijb'al pa q'equ'n ri achin.*
IDF.match.striking ASP-A3SG A3SG-match PREP darkness the man

'In the darkness the man's match went *tzër*.' Cojtí Maracario et al. 1998: p. 369

Pérez González 2012, which focuses on Tseltal, provides the most detailed study of ideophones in any Mayan language. In addition to identifying the basic construction for introducing ideophones, he also surveys their semantics and the semantics of their derivations. As expected, the class is dominated by those that depict sounds, but other modalities are represented, in particular, the visual as in (35).

(35) a. *Teme t'ul x-chi k'oyel=e.*
is IDF.drop ASP-say arrive.there=ENCL

'Yes, it arrived going *t'ul*¡being in the form of a drop¿.'

b. *Eh pe yak s-nuk' moel pom x-chi=la x-ch'ail-el*
eh buy ASP A3SG-blow DIR IDF.puff ASP-say=REP A3SG-smoke-POS
s-may.
A3SG-tobacco

'Eh, but he was smoking and the smoke from his cigarette went *pom*¡in puffs¿.' Pérez González 2012: p. 183

From a semantic perspective, one of the more interesting facts about ideophones in Tseltal is that their category-specific reduplicative derivations track closely the pluractional derivations discussed in section 2.1 (Pérez González 2012: p. 189-190). If the root is reduplicated twice in the *chi*-contruction, the stimulus is understood to occur repeatedly, though with regular pauses. If the root is reduplicated three times, the stimulus occurs with contiguous repetition. Finally, when the root is reduplicated four times, it is understood that the stimulus reoccurs in an intense and chaotic manner. The main take-away is that there is clearly a close connection between pluractionality in the verbal domain and ideophonicity that has still only been partially explored.

3 Space, time, and modality

3.1 Space

The overview of positionals and directionals has already hinted at the depth of the discussion on spatial language in Mayan semantics. This section focuses on three different areas where Mayan languages have informed the wider literature on spatial language.

Crosslinguistic work has identified a variety of strategies for locating objects in the horizontal plane, where there isn't a universal perceptually salient anchor like gravity for vertical plane. Consider English, where speakers most frequently and naturally use an egocentric reference frame, locating objects to the right, left, front, and back of some salient individual (e.g., the bathroom is to the left when you walk in). A different approach is found in some Mayan languages. In particular, there is a large literature documenting the use of absolute reference systems based on altitude in Tseltal.[7] As described in Levinson 2003; Brown et al. 1992, 1993, Tseltal speakers most freely locate objects within an absolute reference frame imposed by the slope of the land on one axis, and a crossways direction on the other axis fixed on visible or known landmarks. For instance, in a task described in Brown et al. 1992, speakers of Tenejapa Tseltal were asked to tell a second speaker to put a wooden man with flexible arms and legs into certain positions. Overwhelmingly, speakers chose to encode space in absolute terms, as in (36-37).

(36) A: But one of his legs doesn't touch the ground.
B: Ja' bal ta alan?
it-is Q PREP downhill

'The downhillwards one?'

(37) *k'atal x-bichoj bel ta Turuwit,*
crossways ASP-extend DIR PREP Turuwit

'It [arm] is extending crossways towards Turuwit,'

For instance, in (36), the first speaker asks for the location of the dolls leg, which the second speaker locates, not with an egocentric coordinate like right or left, but an absolute direction based on the slope of the earth. Crucially, example (36) does not say that the leg is downhill, merely that it is oriented in the same direction as downhill. The second example above shows the preferred strategy when an object cannot be located on the uphill-downhill plane relative to some reference point. In these situations, the objects is located as being *k'atal* 'crossways' relative to the uphill-downhill plane in the direction of some landmark, in this case, the mountain Turuwit.

The fact that some Mayan languages like Tseltal privilege absolute reference frames for semantically encoding space has raised the question of whether there are wider cognitive consequences. In particular, since being a competent Tseltal speaker means locating objects relative to features of the environment like elevation, does that mean that Tseltal speakers attend better to those features than speakers of languages that use egocentric reference frames? The data here are mixed. There is clear experimental evidence that Tseltal speakers more readily encode experience in memory in terms of absolute reference frames. For instance, Majid et al. 2004 and Pederson et al. 2004 both describe experiments that force participants to reconstruct a scene from memory after rotating 180°. If a speaker imposes an absolute reference frame on the scene while memorizing it, then

[7] Tseltal is by no means the only Mayan language where the use of absolute reference frames to locate objects in local space has been described. Bohnemeyer 2011 found that while not the dominate strategy, adult male speakers of Yucatec, when speaking to each other, do use cardinal points to locate the relative position of small, manipulable objects in the same visual field, which is unheard of languages that by default use relative reference frames. This is part of his evidence that Yucatec speakers use a mixed system.

after rotating, it should be reconstructed in a way that flips all left/right relations of objects in the scene relative to the body. If the speaker imposes an egocentric reference frame on the scene as it is encoded in memory, then it should be reconstructed after rotating in a way that preserves left/right-relations among scene objects. What they find is that speakers of Tseltal consistently prefer to reconstruct such scenes relative to an absolute frame of reference, while speakers of languages like Dutch reconstruct scenes using an egocentric reference frame. It follows that Tseltal speakers must be attending to some pair of points anchoring the absolute reference frame that speakers of Dutch can safely ignore.

Even though Tseltal speakers are quicker to impose an absolute reference frame on a scene, does this mean that they are adept than speakers of languages like English at manipulating absolute references frames (and are English speakers inversely better at dealing with egocentric reference frames)? Li et al. (2011) find that this is not the case. They run a series of experiments that force speakers to use either an absolute or an egocentric reference frame. They find that speakers of Tseltal perform on par or better than English speakers on tasks that require the use of an egocentric reference frame. Moreover, they find that across language populations, tasks that require an egocentric reference frame are, in fact, easier to perform than those that require an absolute reference frame. The primary conclusion is that facts about language, like the left/right lexical gap in Mayan, might affect what kind of reference frame is preferentially used, but it does not seem that these facts constrain cognition.

Experimental work has shown that Tseltal speakers strongly prefer to use an absolute reference frame based on elevation. Intriguingly, this privileged spatial reference frame in Tseltal has spread into other areas of the grammar, in particular, temporal reference. While Tseltal has a full complement of temporal adverbials, speakers additionally impose an absolute reference frame on the passage of time, with the future uphill (and to the north) and the past downhill (and to the south) (Brown 2012). This allows for the reuse of the preferred spatial vocabulary in talking about time, as the following examples illustrate.

(38) *Alan ya s-k'an ya s-na' s-toj-ol*
downhill INC A3SG-want INC A3SG A3SG-strait-NML

'He wants to know beforehand [lit. downhill].' Brown 2012: ex. 20

(39) *Moel ya x-ben y-u-il, ya x-mo bel te ja'wil=e*
ascent INC A3SG-walk A3SG-month-NML INC ASP-ascent away DET year=ENCL

'The months go upwards, the years ascend awaywards.' Brown 2012: ex. 22

(40) *Ya ko-tes-be s-k'al-elal te junta=e.*
INC A1SG-descend-CAUS A3SG-day-NML DET meeting=ENCL

'I lower the date for the meeting.' [i.e., make it earlier] Brown 2012: ex. 24

While languages like Tseltal are famous for privileging absolute reference frames over egocentric reference frames, there are other strategies for locating objects that are also unfamiliar from a

eurocentric perspective, even more widespread across the Mayan family. In particular, when describing the location of something relative to a ground object, one can take either the perspective of some external viewer or the perspective of the object itself. For instance, imagine there is a car in front of us, but it is pointing away so that we are looking at its trunk. If I say that an object is behind the car, this is most naturally interpreted as being at the car's front. That is, we assume our perspective, treating *behind* what lies to the non-visible side of the ground. An alternative is to assume the perspective of the ground object, whose behind is clearly where the trunk is located. This is called an intrinsic reference frame. Within this frame, describing an object being behind the car would place it, in the current scenario, between us and the car.

The MesoSpace project (e.g., Bohnemeyer et al. 2012) has experimentally confirmed that intrinsic reference frames are the dominate strategy across Mesoamerica, including within the Mayan languages. Mopan provides a prime example. For instance, Danziger 2001 describes an experiment where one speaker has to describe the position of a boy relative to a tree to a speaker who does not share the same visual field. The second speaker must then appropriately arrange representations of a boy and tree. Across all trials there were no instances of speakers using anything but an intrinsic reference frame, as illustrated in the following example.

(41) [The boy is standing to the left of the tree with his back to it.]
Ka'-a-käx-t-e' a nene' tz'ub' a la a t-u-pach ke'en a top'o.
you-should-find-him the little child who is.here who at-his-back is-located the bush

'You should find the little child here who at his back is located the bush.' Danziger 2001: p. 208

Example (41) shows that where an English speaker would most naturally use a prepositional phrase like *to the side* or *to the left*, Mopan speakers prefer to use the equivalent of *behind*, but which is interpreted intrinsically relative to the figure's body. An even more striking example comes from how the use of words like *left* and *right* are themselves used. In one case, the picture under discussion had the boy standing to the right of the tree facing the speaker. After the speaker described the boy as having the tree to his side, the listener asked for clarification as in (42a), and received the reply in (42b).

(42) [The boy is facing the viewer with his right hand extended toward the tree.]

a. *Ich lef waj ich rait?*
at left or at right

'Is it at the left of the right?'

b. *Ich rait ke'en a top'o.*
at right is.located the bush

'The bush is located at the right.' Danziger 2001: p. 208

From the perspective of a language like English, which does not normally use an intrinsic frame of reference, it is surprising that Mopan speakers use the English borrowings *lef* and *rait* to describe the location of the tree from the perspective of the boy. When the speaker utters (42b), it is clear

that both speakers assume that a word like *rait* is to be interpreted intrinsically as the boy's right, not the interlocutors right, as it would normally be English.

There is an interesting twist on the fact that intrinsic reference frames are often used in many Mayan languages. In those same languages, it has been shown that on non-linguistic cognitive tests, speakers often prefer an absolute reference frame, in contrast to speakers of European languages (Bohnemeyer 2011; Danziger 2001; Le Guen 2011). This has bolstered the claim that intrinsic reference frames make a poor default frame, and so speakers of such languages often use a fluid mixing of reference frames based on the particular task at hand (Bohnemeyer 2011; Le Guen 2011).

3.2 Time

The typology of tense systems has been a major focus of semantic work across theoretical frameworks. One contentious question, in the generative literature in particular, is whether there are languages that are tenseless. That is, languages which lack expressions that locate the runtime of events relative to the utterance time. Mayan languages have played a central role in this debate due to Bohnemeyer's (2002) extensive argument that Yucatec is tenseless. Instead of tenses, Bohnemeyer describes for Yucatec a rich system of aspectual / mood markers that cross-classify with a three-way aspectual classification system for verb stems. The following examples illustrate the core properties of the system. Example (43) shows the contrast between perfective and imperfective aspect, which co-occur with the incompletive and completive verbal status suffixes respectively. In example (44), note that the progressive and terminative aspectual predicates both trigger the incompletive status suffix, while the prospective marker *mukah* co-occurs with the null subjunctive marker.

(43) Bound Aspect Markers

a. *K-in xok-ik le periyòodiko-o'.*
IPFV-B1SG read-INC DET newspaper-DEIC.

'I (used to) read the paper.'

b. *T-in xok-ah le periyòodiko-o'.*
PFV-B1SG read-COMPL DET newspaper-DEIC

'I read the paper.' Bohnemeyer 2002: p. 4

(44) Aspectual Predicates

a. *Táan in xok-ik le periyòodiko-o'.*
PROG B1SG read-INC DET newspaper-DEIC.

'I /am/was/will be/ reading the paper.'

b. *Ts'o'k in xok-ik le periyòodiko-o'.*
TERM B1SG read-INC DET newspaper-DEIC.

'I /have/had/will have/ read the paper.'

c. *Mukah in xok le periyòodiko-o'.*
PROSP B1SG read DET newspaper-DEIC.

'I am/was/will be/ going to read the paper.' Bohnemeyer 2002: p. 5

While example (43b), which has perfective aspect, is best translated with English past tense, we know it is not a tense because it does not necessarily locate events that take place before the speech time, as the following example shows.

(45) *Le káa t-uy a'l-ah u ts'o'k-s-ik le ba'x k-u*
DET káa PFV-A3SG say-COMPL A3SG end-CAUS-INC DET what IPFV-A3SG
bèet-ik-e', ts'o'k in kim-il.
do-INC-TOP TERM A1SG die-INC.

'By the time he finishes [lit. says the end of] what he is doing, I shall be dead.' Bohnemeyer 2002: p. 255

Note that in (45), the speaker is still alive at the utterance time, and thus on pain of contradiction, the doer of the deeds that bring about the speaker's death must not be finished with what he is doing. Yet, the introductory clause in (45) is still marked perfective. This would clearly be impossible if perfective necessarily located events in times anterior to the speech time, as we can see from how awkward English past tense would be in this introductory temporal clause. Instead, Yucatec perfective is a true perfective. It merely presents events as a whole, which in the case of telic predicates like *finish* in (45) means that they are presented as complete, without regard to their runtime. Similar arguments show that the use of *incompletive* marking and the aspectual predicates is not constrained by the utterance time.

Something similar to this core system is found across the Mayan family, that is, a system with bound perfective and imperfective aspect markers, aspectually conditioned status suffixes, and independent predicates expressing aspectual notions like progressive and terminative. Yucatec goes further though, and in addition to these more common aspectual markers, also has a series of aspectual predicates that most closely approximate the graded tenses most familiar from Bantu languages (Comrie 1985; Dahl 1985).

Graded Distance Markers

ta'itik	proximate future
táant	immediate past
sáam	recent past
úuch	remote past

(Bohnemeyer 2002: p. 328)

These expressions are crucially not merely temporal adverbials. As we can see from the following examples, they preclude a second aspectual marker and themselves condition a verbal status suffix, just like the aspectual markers already discussed.

(46) a. *Táant in xok-ik le periyòodiko-o'.*
IMM B1SG read-INC DET newspaper-DEIC.

'I had/have/will have just read the paper.'

b. *Úuch in xok le periyòodiko-o'.*
REM B1SG read DET newspaper-DEIC.

'I read/had read/will have read the paper a long time ago.' Bohnemeyer 2002: p. 328

While superficially similar to the gradable tenses reported in the literature, once again, it can be shown that these expressions are not tenses. They do not make reference to the utterance time. For instance, (46b) can be used to locate an event of reading the paper that took place in the distant past relative to the utterance time, but it can also locate an event of reading the paper that takes place in the future, but which is itself in the remote past of some far future topic time. The temporal distance markers show once again how Mayan languages eschew tense in favor of locating an event relative to a topic time, which is itself never obligatorily located with respect to the moment of utterance.

3.3 Modality

The most well-studied aspect of Mayan modality is what is called irrealis marking in the literature. Irrealis marking is most often a verbal affix or clitic, and is most commonly encountered as obligatorily accompanying negation. For instance, example (47) provides an example from Tz'utujil, where the irrealis clitic *ta* must co-occur with the negative particle.

(47) *Ma x-war ta.*
NEG COMPL-sleep IRR

'He didn't sleep.' Dayley 1981: p. 113

Irrealis in Tz'utujil is also obligatory in the formation of counterfactual conditionals, as shown in (48), but it otherwise has a fairly narrow distribution. It is not required in future-marked clauses or in the complement of non-veridical predicates, like desideratives.

(48) *Wi ta xa k'o n-paq n-in-b'e ta.*
if IRR only EXT A1SG-money ASP-B1SG-go IRR

'If I had money, I would go.' Dayley 1981: ex. 149

Moving both north and westward from the K'ichean-branch languages, we find Mayan languages where irrealis plays a larger role. For instance, Martin 1998 describes the place of irrealis in the Q'anjob'alan language Mocho'. Here we find that it is not only used in the scope of negation, but can affix both nominals and functional elements like numerals and interrogative pronouns to express epistemic uncertainty.

(49) *la iix-i ma' kaab-oq ma' haabil...*
and live-ITV perhaps two-IRR year

'And she lived (there) perhaps about two years maybe...' Martin 1998: ex. 4

(50) *Huun-e' tíra x-poch'-o' kene hach-oq ch'in.*
one-NUM time A3SG-kill-TV DIR2:remain Q-IRR children

'All at once, he killed who knows how many children.' Martin 1998: ex. 12

(51) *Ook-i ch-antiil-oq óso.*
enter-ITV A3SG-wife-IRR wife

'She became the bear's (so-called) wife.' Martin 1998: ex. 19

In addition to these irrealis, or modal uses of *-oq*, Martin 1998 also shows that irrealis marking appears in a variety of syntactic contexts that do not appear to be semantically related (see Hofling 1998 for similar data in the Yucatecan language Itzaj). In particular, irrealis marking appears on intransitive complements of intransitive verbs and on intransitive complements of positional stems, regardless of their particular lexical semantics. This raises the question of whether there is one *–oq* or two. In the latter case, we would have an *–oq* that compositionally contributed irrealis semantics, as in (49) and (51), and a second *–oq* that marked certain types of subordination. Mateo Toledo 2008: p. 57-58 takes the second route for Q'anjob'al and its cognate irrealis marker *–oq*. He argues that one *–oq* marks irrealis, namely complements of negation, potential aspect, and desiderative predicates. A second *–oq* is actually an infinitive suffix that is found across all inflectionless clauses. Future work might be able to unify these two contexts by saying that the events introduced by infinitive and irrealis verbs are instantiated (or fail to be instantiated) in the same way. For now, though, this is an open question.

Whether we choose to analyze *–oq* in the Q'anjob'alan and Yucatecan languages as one or two morphemes in the synchronic grammar, the affix has clearly undergone a significant amount of semantic change. Tseltal provides a limit case for the semantic diversification of irrealis marking in Mayan. As described in Polian 2007, a detailed account of the semantic distribution of the suffix *–uk*, cognate to *–oq*, irrealis marking in Tseltal now appears across a wide variety of modal and evaluative constructions. In particular, it not only marks negation, counterfactuality, certain types of embedding, and epistemic uncertainty (as with approximation), but it also appears in various optative, interrogative, and emphatic constructions. For instance, when *–uk* affixes preverbal aspectual markers, as in (52), the clause is interpreted as optative.

(52) a. *Yak-uk x-ju' aw-u'un a-koltay-on.*
INC-IRR INC-poderse-b3sg A2SG-RN A2SG-help-B1SG

'I hope you can help me.' Polian 2007: ex. 55

b. *Ya-uk=la x-ba jk-il-tik=e.*
INC-IRR=REP INC.I-go a1sg-go

'I hope we go to see it.' Polian 2007: ex. 25

When used with polar questions, irrealis marking does not indicate doubt, as one might expect, but instead generates a question with affirmative bias. This is shown in examples (53-54).

(53) *me we'-k-at=ix?*
yes COMPL.I-eat-irr-B2SG=already

'You already ate, right?' Polian 2007: ex. 54

(54) *me jich-uk=to?*
yes thus-irr=DEM

'It's like this, right?' Polian 2007: ex. 57

Finally, *–uk* plays a role in the answering of questions. In particular, it can be used for emphatic positive answers. As discussed below in section 4, Tseltal polar questions are preferentially answered by repeating the question's preverbal auxiliary (or the verb root if the question has none). When the affirmation bears *–uk* it is interpreted as emphatic.

(55) a. *Ja'-at a-wol winik xi?*
FOC-B2SG A2SG-address-B3SG man say

'You're going to address the people, he said?'

b. *Ja'-uk! la jk-ut.*
FOC-IRR COMPL.T A1SG-say-IRR

'Yes! I told him.' Polian 2007: p. 61

4 Clause-typing

4.1 Polarity

The expression of polarity in Mayan, and negative polarity in particular, is striking for the amount of language internal morphological variation that exists. What we find is that the expression of negation is often conflated with other syntactic and semantic categories. For instance, consider the following three-way contrast in Chontal described in Knowles-Berry 1987. First, examples (56a-56b) show that negating a transitive verb in perfective aspect proceeds uneventfully by merely adding the negative particle *mach*.

(56) a. *'A k'ux-i.*
A2SG eat-PRF

'You ate it.'

b. *Mach 'a k'ux-i.*
NEG A2SG eat-PRF

'You didn't eat it.' Knowles-Berry 1987: ex. 25-26

In contrast, in imperfective aspect we get a series of splits based on person marking and verb class. If the verb phrase contains a CVC root transitive with a third person object, negating it requires the use of imperative, not imperfective morphology (even though the interpretation remains imperfective).

(57) a. *'A k'ux-e'.*
A2SG eat-IPFV

'You eat it.'

b. *Mach 'a k'ux-u.*
NEG A2SG eat-IMP

'I don't eat it.' Knowles-Berry 1987: ex. 21-22

When the verb is a derived transitive, negation precludes the use of imperfective aspect marking.

(58) a. *Kï tz'ib'-ï-n.*
A1SG write-TV-IPFV

'I write it.'

b. *Mach kï tz'ib'-ï.*
A1SG write-TV

'I don't write it.' Knowles-Berry 1987: ex. 30,34

What we have, then, is a situation where negation and syntax co-condition the distribution of aspect and mood marking.

Q'anjob'al is another language where the conflation of negation and aspect is readily seen. Q'anjob'al has a general purpose clausal negation particle *toq* that negates the aspectless existence predicate as well as clauses of all aspect classes. In addition, the language has three other markers of clausal negation whose distribution is conditioned by aspectual concerns. First, examples (59) and (60a) show that *k'am* negates imperfective clauses and existential clauses, though in the latter case the existential predicate disappears (compare to (60b) with *toq*).

(59) *K'am ch-a-man jun no' txutx kaxhlan tu'.*
NEG INC-B3SG-buy DET CLF mother chicken DEM

'You do not buy that hen.' Mateo Pedro 2011: ex. 3b

(60) a. *K'am anima b'aytu.*
NEG people DEM

'There are no people there.' Mateo Pedro 2011: ex. 4b

b. *Toq ay anima b'aytu.*
NEG EXS people DEM

'There are no people there.' Mateo Pedro 2011: ex. 5b

The negative particle *man* is specialized to negating clauses in potential aspect, and cannot negate existential clauses.

(61) *Man hoq-ach lo-w yekal.*
NEG POT-B2SG eat-ANTIP tomorrow

'You will not eat tomorrow.' Mateo Pedro 2011: ex. 2

Finally, Q'anjob'al has *maj*, which conflates negative polarity and completive aspect. The latter cannot appear when *maj* does, as the following contrast shows.

(62) a. *Max-ach lo-w ewi.*
COMPL-B2SG eat-ANTIP yesterday

'You ate yesterday.'

b. *Maj hach lo-w ewi.*
NEG B2SG eat-ANTIP yesterday

'You didn't eat yesterday.' Mateo Pedro 2011: ex. 2

Like in Chontal, the expression of aspect in Q'anjob'al is not uniform under negation, and simultaneously, aspect conditions the particular morphological expression of negation.

Negation is not only conflated with aspect. There are also cases where negation interacts with aktionsart. For instance, Coon 2006 describes two negators in Ch'ol, *mach* and *ma'añ*. In the terminology of Carlson 1977, the former occurs with individual-level predicates, while the latter occurs with stage-level predicates. Thus, properties of individuals, like those in (63), are negated with *mach*, while properties of spatiotemporal stages of individuals are negated with *ma'añ*, as in (64).

(63) a. *Mach bi'tyik-ety.*
NEG ugly-B2SG

'You're not ugly.' Coon 2006: ex. 14a

b. *Mach lichikyañ-oñ.*
NEG stupid-B1SG

'I'm not ugly.' Coon 2006: ex. 14c

(64) a. *Ma'añ mich'-oñ.*
NEG angry-B1SG

'I'm not angry.' Coon 2006: ex. 15a

b. *Ma'añ 'ach' hiñi pisil.*
NEG wet DET clothes

'The clothes aren't wet.' Coon 2006: ex. 15c

The primary conclusion the data point to, though it is has not been explored from a theoretical perspective, is that negation in Mayan is not merely a boolean operator. It instead concerns how events are presented, and is better treated as part of the aspectual system.

While there has been no work in Mayan concerning negative polarity items, there are cases of clausal negation interacting with negative quantifiers under concord. Tandet 2013 gives the most extensive treatment of such phenomena for the language Chontal. For instance, the Chontal *ni'untu* 'nobody' must be licensed by clausal negation. The following examples show that this holds whether *ni'untu* is subject, object, or oblique.

(65) a. *Mach kä-chän-en ni'untu.*
NEG A1SG-see-IPFV nobody

'I don't see anyone.' Tandet 2013: ex. 75a

b. *Ni'untu mach u ta.*
nobody NEG IMFV come

'Nobody comes.' Tandet 2013: ex. 74a

c. *Mach x-ik-et tok ni'untu.*
NEG go-OPT-B2SG with nobody

'Don't go with anyone.' Tandet 2013: ex. 80

Chontal negative concord diverges from more well-known cases in that it is not clause-bound. Clausal negation in a matrix clause can license *ni'untu*, as the following example shows. In this way, it is more like a negative polarity item.

(66) a. *Mach ko kä-chän-en ni'untu.*
NEG want.1SG.IPFV A1SG-see-IPFV nobody

'I don't want to see anyone.' Tandet 2013: ex. 78

b. *Mach ko t-ik ni'untu.*
NEG want.1SG.IPFV come-OPT nobody

'Nobody comes.' Tandet 2013: ex. 112

While not all Mayan languages exhibit concord with negative quantifiers, such expressions often have other licensing requirements. In particular, it is common for negative indefinites and expressions under constituent negation to be obligatorily preposed. For instance, this is described for Kaqchikel in García Matzar et al. 1997: p.226-7, 408-421. Example (67) shows a preposed negative indefinite, while (68) has a preposed relational noun under constituent negation.

(67) *Majun ru-k'am-on pe.*
nothing A3SG-bring-PRF DIR

'He brought nothing.' García Matzar et al. 1997: ex. 320

(68) *Man r-uk'in ta machit xti-qa-chöy wi.*
NEG A3SG-with IRR machete POT-A1PL-cut FOC

'It wasn't with a machete that we cut it.' García Matzar et al. 1997: ex. 397e

This suggests that negation in Mayan is closely related to focus. Durbin et al. 1978 makes this connection explicit in Yucatec, where negation co-occurs with particle *–i'*, which independently indicates the scope of an answer to a question under discussion. That is, it is new, or focal information.

4.2 Questions

The formation of constituent and polarity questions in most Mayan languages is fairly standard. The former is done with intonation alone, or with the support of a polarity question particle, as the following examples show.

(69) Tsotsil
Mi l-a-'ay ta Tuxta?
Q COMPL-B2SG go Tuxtla.

'Did you go to Tuxtla?' Aissen 1987: ex. 28

(70) Ch'ol
mu'=ba i-tyemp-añ-o' i-bäj li wakax y-ik'oty li bajläm?
IPFV=Q A3SG-meet-TV-PL A3SG-RN DET cow A3SG DET jaguar.

'Do the cows and jaguars meet?' Vázquez Álvarez 2011: p. 287

(71) K'iche'
La x-in-wa' k'ut?
Q COMPL-B3SG-eat Q.

'Did I eat?' Can Pixabaj 2010: ex. 15

Constituent questions, in contrast, are often formed with a special set of interrogative pronouns.

(72) Mam
Tqal x-tzaj t-q'o-'n-a q-ee-ky'?
what ASP-DIR A2SG-give-DIR-2sg A1PL-RN-1pl.

'What did you give us?' England 1983: ch. 7, ex. 160

(73) Chuj
Mach ix-y-il winh?
who ASP-A3SG-see PRON

'Who did he see?' (fieldnotes)

Being morphologically unexceptional, the semantics of questions in Mayan have been largely unexplored. The one exception is in the Yucatecan branch, where questions are quite different from the other branches. In particular, these languages have almost no dedicated question morphology. Instead, questions are formed by borrowing morphology from other domains and using it in concert with the focus construction. For instance, Yucatec constituent questions are formed with a focused indefinite, as in (74), while polar questions are formed with a focused partial disjunction (75). We know that the indefinite *máax* 'someone' and the partial disjunction *Juan wáaj* 'Juan or' are focused because they appear in the preverbal focus position, triggering the agent focus form of the verb.

(74) *Máax uk' le sa'-o'?*
someone drink.AF the atole-DEIC

'Who drank the atole?' AnderBois 2012: ex. 1

(75) *Juan wáaj uk' le sa'-o'?*
Juan or drink.AF the atole-DEIC

'Was it Juan who drank the atole?' AnderBois 2012: ex. 4

These examples raise issues about how question meaning is compositionally determined. For instance, how does disjunction and focus in (75) combine to generate the effect of a polar question? AnderBois 2012 is directed at this question. He shows that the data in (74-75) have an elegant account within particular theory of meaning, called Inquisitive Semantics, which keeps track of both the informative content of an expression, but also the implicit questions that are raised by receiving that content (Groenendijk 2009; Groenendijk et al. 2009; Mascarenhas 2009). For instance, using an indefinite in a sentence like 'someone drank the atole' provides the information that someone drank the atole, but also raises the issue of who exactly did the drinking. AnderBois 2012 then shows that when used in the Yucatec focus construction, like (74), the informative aspect of the indefinite is stripped away as a presupposition that standardly accompanies focus. This leaves only the inquisitive meaning, making it a question. The Inquisitive Semantics research program is still young, but Yucatec questions have provided the most extensive empirical testing ground for its core ideas.

It's not just questions that have been of wider interest to the linguistics community, but answers as well, especially answers to polar questions. The reason is that some Mayan languages, like Yucatec, are among the world's languages that do not have response particles. Instead, a positive answer to a polar question involves repeating the auxiliary of the question at hand, and in case there is no auxiliary, the verb root itself is repeated (Bohnemeyer 2002: §4.2.1.4).

(76) a. *Táan wáah u hats'ik-ech?*
PROG Q A3 beat-INC-b2sg

'Is he beating you?' Verhoeven 2007: ex. 99b

b. *Táan.*
PROG

'He did.' Verhoeven 2007: ex. 99b'

A negative response merely requires using clausal negation, as if you were negating some elided repetition.

(77) a. *Pero, k-u ts'u'uts?*
but IMP-A3SG smoke

'But, does he smoke?'

b. *Ma'. Mix jim-p'éel clase vicio yaan ti', jach jumpuli', mina'an.*
NEG not.even one-CLF type vice EXT PREP very ever not.exist

'No. He does not even have a single vice, never, none.'

Finally, example (78) shows that when there is no auxiliary to deploy, the root itself is repeated.

(78) a. *K'aja'an wa teech ba'ax aanyo-i?*
recall Q you what year-DEIC

'Do you recall what year it was?' Bohnemeyer 2002: p. 268

b. *K'aja'an.*
recall

'Yes (I do recall).'

The most extensive study of question responses is Brown 2010 for Tseltal. What it finds in a corpus of more than 400 question/response pairs is that while Tseltal has polarity response particles, as in (79), speakers prefer repetition, and in completive aspect, the Yucatec-like repetition strategy shown in (80).

(79) a. *Ya x'-och-ex tal i bi k-antzil.*
INC ASP-enter-B2PL DIR DEIC Q A1SG-daughter

'You all are coming inside are you, my girl?'

b. *Yak.*
yes

'Yes.' Brown 2010: ex. 36

(80) a. *La* *y-ich'* *s-k'u'* *y-u'un-ik* *ek'* *tz'in.*
COMPL 3ERG.SG-get 3ERG.SG-clothes 3ERG.SG-RELN-PL too EVID

'They got their own (Tenejepan) clothes too then?'

b. *La.*
COMPL

'They did.' Brown 2010: ex. 32

One also commonly finds examples of full repetition in answering questions (modulo indexicals), as in (81) in Tseltal or (82) in Yucatec.

(81) a. *Ma'yuk* *to* *ba* *ay* *te'ye?*
NEG.A still where EXT EVID

'There's none there yet [young corn]?'

b. *Ma'yuk* *to* *ba* *ay* *ajan.*
NEG.A still where EXR young.corn

'There's no young corn yet.' Brown 2010: ex. 29

(82) a. *T-u* *hats'ik-ech* *wáah?*
PFV-A3 beat-COMPL-b2sg Q

'Did he beat you?' Verhoeven 2007: ex. 99a

b. *T-u* *hats'-ah-en.*
PFV-A3 beat-COMPL-B1SG

'He did.' Verhoeven 2007: ex. 99a'

Once again, this goes slightly against the general preference crosslinguistically for omitting given information, especially in focal contexts (see, for instance, Merchant 2008 on MAXELIDE). This fact is most likely related to the important place repetition plays in structuring discourse in Mayan more widely (e.g., Brown 2010 for Tseltal).

5 Information structure

5.1 Topic and focus

Informational structural concerns like topic and focus have been mostly studied from a syntactic perspective, the goal being to understand the structure of clauses deviating from the canonical verb-first word order. For instance, in a classic paper Aissen (1992) shows that Mayan languages have preverbal topic and focus positions into which arguments and adjuncts move from their thematic positions. In contrast, there is a second 'external' topic position that involves the base-generated adjunction of expressions to the root clause. The fine-grained semantic properties of topic and focus constructions in Mayan have not been as well studied, but that is beginning to change in

recent work. For instance, as we have already seen, the account of Yucatec polar questions in AnderBois 2012 crucially depends on the existential presuppositions of the focus construction. In particular, AnderBois confirms that a topic-marked sentence like (83) can be used in a context where the hearer does not know that someone has drank the atole, while the focal sentence in (84) cannot be.

(83) *Juan-e'* *t-u* *yuk'-aj* *le* *sa'-o'*.
Juan-TOP PFV-a3sg drink.TV the atole-DEIC

'Juan drank the atole.' AnderBois 2012: ex. 33

(84) *Juan* *uk'* *le* *sa'-o'*.
Juan drink.AF the atole-DEIC

'It's Juan who drank the atole.' AnderBois 2012: ex. 32

In recent work, Can Pixabaj et al. 2011 and Yasavul 2014 go further, showing that K'iche' has two species of focus constructions that differ both in terms of syntax and semantics. On the semantics side, the distinction conforms to the difference between informational and identificational focus described first in Kiss 1998. Informational focus is used to present new information that answers a current question under discussion (in the QUD model of Roberts 1996). It is marked, as shown in (85), by simple preposing. Note here that we have identified as the context the current question under discussion.

(85) *Context:* Who slept?
A *Raul* *x-war-ik.*
CLF Raul COMPL-sleep-ITV

'Raul slept.' Yasavul 2014: ex. 3

The second focus construction also involves preposing, but is additionally marked with the particle *aree*. This construction, like that in (85), is used to provide answers to the question under discussion, but as a form of identificational focus, carries both existential and exhaustive presuppositions. The contrast between (86) and (87) shows that *aree*-focus can only be used when the context entails the existence of some individual satisfying the prejacent. The informational focus construction is licit in both contexts.

(86) *Context:* An inspector from the Ministry of Education is visiting the community. Hes surveying all the primary school teachers about their students and asking them questions like the following: *Who (in your class) has a computer? Who has more than two siblings? Whose parents are divorced?* Maria, a teacher, knows that in her class, Raul has a computer. When the inspector asks his first question, she says:

a. *A Raul (ko jun u-kematzib).*
CLF Raul EXT one A3SG-computer

'Raul (has a computer).'

b. *#Aree a Raul (ko jun u-kematzib).*
FOC CLF Raul EXT one A3SG-computer

'It's Raul (who has a computer).' Yasavul 2014: ex. 5

(87) *Context:* Same as in (86) except that the principal or another teacher told the inspector about Marias class and Maria knows that the inspector knows about this. When the inspector asks his first question, she says:

a. *A Raul (ko jun u-kematzib).*
CLF Raul EXT one A3SG-computer

'Raul (has a computer).'

b. *Aree a Raul (ko jun u-kematzib).*
FOC CLF Raul EXT one A3SG-computer

'It's Raul (who has a computer).' Yasavul 2014: ex. 5'

In addition to the existence presupposition, the *aree*-focus construction also has a presupposition that it provides an exhaustive answer to the question under discussion. The contrast between (88a) and (88b) shows that one can append answers to the informational focus construction, but not the one providing identificational focus.

(88) *Context:* Raul and Roberto are talking about an exam that Raul had taken that has just been graded. He says that the teacher gave a piece of candy to those who got 100%. Roberto asks *Who got 100%?* Raul replies:

a. *A Juan r-ichb'il al Maria. W-eta'm taj we k'o jun chik. / Al Juana xuquje'.*
CLF Juan A3SG-companion CLF Maria A1SG-know NEG if EXT one another / CLF Juana too

'Juan and Maria. I dont know if anyone else did. / Juana did, too.'

b. *Aree a Juan r-ichb'il al Maria. #W-eta'm taj we k'o jun chik. /#Al Juana xuquje'.*
FOC CLF Juaj A3SG-companion CLF Maria A1SG-know NEG if EXT one another / CLF Juana too

'Juan and Maria. # I dont know if anyone else did. / # Juana did, too.' Yasavul 2014: ex. 7

While these facts need to be replicated across the Mayan family, they show that at least some, and most likely many Mayan languages have a variety of focal constructions, where the canonical one bearing focus morphology most likely has the semantic properties of English clefts, if not their syntax.

In addition to the two focal constructions, Can Pixabaj et al. 2011 also find variation in the topic constructions of K'iche' based on data from texts. In particular, they find that K'iche' makes a distinction between two kinds of topics. The first kind of topic construction involves preposing with a pause between the topic and the prejacent. It is used to establish the local topic, that is, some individual that has been previously introduced and is now most likely to antecede subsequent pronouns. For instance, example (89) has 'the hunter', who was first mentioned in the previous clause, in topic position. The speaker then goes on to mention the hunter in the next three clauses anaphorically.

(89) *Ri k'aq-an-eel, iii b'yeen u-b'an-om k'ax ch-k'e s-taq-a'waj-iib'.*
DET hunt-ANTIP-NML eh INTS A3SG-do-PFV bad PREP-A3PL-RN AFF-PL-animal-PL

'The hunter had done much damage to the animals.' Can Pixabaj et al. 2011: ex. 8

In addition to promoting salient individuals to topic status, the same construction can re-establish an individual as topic who is first mentioned several clauses back, so long as that individual is still part of the same scene, or generally topical. For instance, Can Pixabaj et al. 2011 discusses example (90), which establishes 'the bread' as topic. It was first mentioned seven clauses ago, but has not been mentioned for five clauses. Example (90) reaches back into the discourse and makes it the local topic.

(90) *i kwando ri' ri kaxlanwa, k-u'-riq-a*
and when DET DET bread INC-A3SG-DIR-find-TV

'and the bread, when he found it...' Can Pixabaj et al. 2011: ex. 9

While the vanilla topic construction can promote a recently unmentioned entity to local topic, Can Pixabaj et al. (2011) draw a distinction between this and the bona fide switch-topic construction, which is marked with a pause the particle *are k'u*. They describe this construction as signaling a reset of the discourse state. It is as if it signals that we are not only going to be talking about this new topic individual, and that we are not going to be talking about those other potential topic individuals. For instance, in the story discussed early about the hunter, at some point, the speaker uses this construction to signal a switch between talking about what the hunter does when he goes hunting to what the master of the hill does.

(91) *Tonse are k'u ri r-ajaw-al u-winaq-il ri' ri jyub', jawi*
well FOC PART DET A3SG-master-NML A3SG-person-NML DEM DET ill where
r-qas k-e'-k'aqa-n-a wi, x-tak'-i' r-oyowaal.
DET-always INC-DIR-hunt-ANTIP-TV EMPH COMPL-stand-POS A3SG-anger

'Well, on the other hand the master of that hill, where he always went to hunt, got mad.' Can Pixabaj et al. 2011: ex. 25

This same construction is also used to do contrastive focus, for example, in pair-list answers. For instance, if the current questions under discussion is who made what, one can answer as in (92). Note that only the final clause in the list bears *are k'u*. The other clauses have the normal topic construction with the pause.

(92) a. *Ri al Ixchel, x-u-tzak kinaq',*
DET CLF Ixchel COMPL-A3SG-cook beans

'Ixchel cooked beans,'

b. *Ri al Ixkik', x-u-k'ili-j iik,*
DET CLF Ixkik' COMPL-A3SG-toast-tv chili

'Ixkik' toasted chilis,'

c. *Are k'u ri al Nikte' x-u-lej ri wa.*
FOC PART DET CLF Nikte', COMPL-A3SG-make.tortilla DET tortilla

'while Nikte' made tortillas' Can Pixabaj et al. 2011: ex. 26

Finally, it is interesting to note that the *are* in *are k'u* is the same morpheme that appears in the indentificational focus construction discussed previously. The switch, or contrastive topic construction, thus appears to be a hybrid between identificational focus with *are* and the standard topic construction with its pause. Future work is needed to see if *are* and the pause can be given denotations that can compositionally derive their apparent interaction in cases like (91) and (92).

5.2 Obviation and reference tracking

Obviation is most well known from Algonquian languages, and refers to systems of ranking third person arguments within some stretch of discourse along the lines of animacy, agentivity, and topicality. These rankings have morphological consequences in languages with obviation systems, where the highest ranked argument is marked proximate and the other, lower-ranked arguments are marked obviative. In addition, when obviation rank and grammatical function do not align (e.g., when the subject/agent is obviative and object/patient is proximate), the verb must appear in a special form called inverse. Both obviation and inverse have been shown to play a part in the grammars of Mayan languages (Aissen 1997, 1999; Zavala 1997). Here I want to focus on those aspects that are related to semantic notions like topicality and coreference.

Aissen 1999 analyses the agent focus construction of Tsotsil as a type of inverse construction sensitive to obviation rank. Agent focus is used in Tsotsil when the agent of a transitive verb with two third person arguments undergoes A'-extraction. As example (93) shows, the clause remains syntactically transitive, that is, with two direct arguments, but becomes morphologically intransitive in that the verb bears no ergative agreement morpheme.

(93) *Buch'u i-kolta-on li tzeb-e?*
who COMPL-help-AF the girl-ENCL

'Who helped the girl?' Aissen 1999: ex. 3a

Tsotsil is different from some Mayan languages in that omitting agent focus under the A'-bar extraction of the ergative argument is not strictly ungrammatical. Example like (94) are attested.

(94) *Pero buch'u s-tam?*
but who A3SG-take

'But who took it?' Aissen 1999: ex. 13a

Aissen 1999 shows that this variation is not random, but conditioned by the factors that condition inverse in languages with more extensively grammaticalized obviation systems, including topicality and coreference. First, in every agent focus clause in her text sample, Aissen found that the object was definite, and almost always pronominal. Moreover, these clauses almost always had indefinite subjects. This means that the use of agent focus coincides with clauses that have topical objects, but subjects that introduce new discourse referents, and thus cannot be topical. This makes sense if agent focus is an inverse construction and topics rank higher on the obviation hierarchy.

Coreference also plays a critical role in the distribution of agent focus morphology in Tsotsil. The reason is that coreferential arguments must share the same obviation rank. In a clause where an argument and the possessor of a second argument are coreferential, this can completely determine whether or not the clause has inverse status. This is because possessors always outrank possessed entities in obviation rank. Thus, an example like (95) must be inverse because the object and the possessor are coreferential, and so must rank over the subject, which is possessed. Crucially, example (95) must bear agent focus under the given coreferential reading.

(95) *S-tz'i' nox i-ti'-on.*
A3SG-dog just COMPL-bite-AF

'It was his own dog that bit him.' Aissen 1999: ex. 49b

We also find cases where coreference bans agent focus marking because the clause simply cannot have inverse status. Consider the case of reflexives. Here the subject and object are coreferential, which means that they must share obviation rank, which means that the object cannot outrank the subject in obviation status. If the latter relation is what conditions agent focus, then reflexive clauses should ban it, which is that case.

(96) a. *Ch'abal much'u x-(y)-il s-ba ta ak'ubaltik?*
NEG.EXT who NT-A3SG-see A3SG-self at night

'But who took it?'

b. **Ch'abal much'u x-'il-on s-ba ta ak'ubaltik?*
NEG.EXT who NT-see-AF A3SG-self at night

'But who took it?' Aissen 1999: ex. 56

Finally, cross-clausal coreference also determines the distribution of the agent focus construction. In particular, agent focus is necessary when the subject of a matrix clause is coreferential with the object of its complement clause. This follows naturally if, as Aissen 1997 proposes, matrix clause arguments outrank embedded clause arguments in the obviation hierarchy modulo coreference.

The subject of the matrix clause in (97) must be proximate, and so its coreferential object also ranks over the obviative WH-argument, leading to an inverse embedded clause requiring agent focus marking.

(97) *Li* *Petul-e*$_i$ *i-ch'ay* *x-(y)-a'i* *much'u* *i-'ak'-b-on* *tak'in*
the Pedro-ENCL COMPL-lose NT-A3SG-feel who COMPL-give-APPL-AF money
pro$_i$.
PRON

'Pedro$_i$ forgot who had given money to him$_i$.' Aissen 1999: ex. 63

While Tsotsil agent focus is not exactly like agent focus across the rest of the family, there are clear parallels. For instance, the ban on agent focus in reflexive clauses or when the subject binds an object possessor are widespread. A obviation-based account of agent focus across the family highlights the importance of semantic notions like topic and coreference in controlling the fined-grained morphosyntactic structure of clauses in Mayan.

6 Conclusions

The work has aimed to provide non-Mayanists with a bird's eye view of a variety of semantic phenomena in Mayan languages, while highlighting some of the work that has had an especially large impact on the wider subfield of semantics. The discussion was organized by increasing syntactic complexity of the relevant expressions, starting with lexical semantics and growing outward until reaching discourse-level phenomena like information structure and reference tracking. While a variety of empirical areas are covered, I tried to highlight reoccurring motifs that illustrate overarching themes in the literature on Mayan semantics. One example of this would be the semantics of spatial language, which makes an appearance across multiple sections.

While setting a future research program has not been a goal of this paper, surveying the literature has revealed certain lacunae and interesting open areas for future work. Many of these are identified in the body of the text, though there are some larger ones. For instance, nominal quantifiers and their compositional properties (scopal in particular), have played major role in semantic theorizing. It is intriguing, then, that very little is known about the structure of Mayan quantifier inventories and the semantics of those quantifiers. This is certainly an important area for future work. While research on the syntax and semantics of Mayan nominal quantification is immediately pressing, we must recognize we are still in the early days of Mayan semantics. There is still much to be learned, even in the areas discussed above. That said, interest in the semantics of underrepresented languages is growing rapidly, along with the methodological tools, including experimental ones, to do that work. It is my sincere hope, then, that this article is soon made obsolete.

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