Title
Topological relations and frames of reference in Mayan languages: Kaqchikel, K'iche', Tz'utujil and Q'anjobal

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This paper deals with the perception and linguistic expression of topological relationships between spatial objects, and frames of reference that speakers of some Mayan languages of highland Guatemala, Kaqchikel, Tz’utujil, and Q’anjob’al employ. Kaqchikel and Tz’utujil both belong to the K’iche’an branch, Q’anjob’al is a member of the Q’anjob’alan branch. Spatial reference in Mayan and other Mesoamerican languages is characterized by the widespread absence or paucity of use of relative frames and and the highly productive use of ‘meronymic’ terminologies for object parts and spatial regions based primarily on object geometry. Terms for parts of the human body are perhaps universally the prototypical meronyms. In many Mayan languages meronomies represent perhaps the most important resource for the expression of place functions (Jackendoff 1983).

It has been hypothesized that the pervasive use of geometric meronyms in the expression of spatial relations is a linguistic factor that biases the speakers of a language against the use of relative frames. This paper will fill a gap and contribute to the discussion by adding three more. The paper will present data on topological relation markers in Kaqchikel, Tz’utujil, and Q’anjobal. The data is based on data collected during fieldwork.

Keywords: Mayan, FAMLi5, topological relations, frames or reference

1 Spatial orientation: topological relations and frames of reference

Space is a non-linguistic category and spatial cognition is at the heart of our thinking. It is indubitably hard-wired in our species. How else would we find our way around? Moreover, spatial cognition is likely necessary for the conceptualization of other domains such as Time (Levinson 2003:1).

Spatial relations involve many aspects. They describe how objects are located in space in relation to a reference object or concept.

There are three significant terms typically used in the analysis of spatial relationships: the Figure, the Ground, and the Anchor. The Figure is the movable entity whose topological location or relationship is being described. The Ground is the primary object or concept that defines the reference point for the topological relationship. In addition to the topological relation which is perspective-neutral there is the perspective from which a spatial scene is viewed. Each spatial scene has an Anchor. The Anchor adds a point of view from which the scene is conceived.

The notion of frame of reference takes into account that a speaker can take several possible perspectives on the phenomenon that s/he is considering. These changes of perspective are particularly visible in the language of spatial reference. Three frames of reference are commonly distinguished: relative, intrinsic, and absolute. To illustrate the differences, consider three possible answers to the question, "Where is the frog" in the following reference pictures (Figure 1-3).

*This research was carried out during UMD Summer School Guatemala 2018
The relative frame of reference is a viewer-centered system, describing the location of a Figure in relation to a Ground with the Anchor being the perspective of the viewer/speaker.

1. *The frog is to the right of the man.*

![Figure 1: Relative frame of reference](image1)

The intrinsic frame of reference is an object-based system with the Anchor residing in the Ground. The spatial relationship of the Figure is described from the perspective of an inherent feature of the Anchor/Ground.

2. *The frog is to the man’s left.*

![Figure 2: Intrinsic frame of reference](image2)

The absolute frame of reference is an abstract object-based system wherein the Anchor is some fixed landmark or direction in the scene. The spatial relationship between the Figure and Ground is described referring to the Anchor.

3. *The frog is to the east of the man.*

![Figure 3: Relative frame of reference](image3)

### 2 Coding spatial scenes

SPACE is a non-linguistic category and any language has its means to code it. Spatial information is not restricted to one part of speech, but is typically distributed throughout the clause. It resides in verbs, nouns and different kind of morphemes.
All languages studied so far seem to have special morpho-syntactic ways to express spatial relations of objects. Yet the morpho-syntactic structures differ to a great extent. Prepositions and postpositions or case affixes are common strategies.

Mayan languages are typologically unusual in that they are generally sparse of prepositions, often they have only one or two prepositions. To provide specific topological information expressions of various lexical categories can come into service. Mayan languages use positionals to express topological information. Only a small number of the thirty Mayan have been investigated in sufficient detail regarding both the linguistic coding of spatial relationships and frames of reference. Topological relations have been studied in Mam (England 1978), Tseltal (Brown 1974, Bohnemeyer & Brown 2007), Tsotsil (de Leon 1992), Yokot’an (or Chont’al (Delgado Galván 2013), Yucatec (Goldap 1992, Lehmann 1992, Bohnemeyer & Brown 2007)


3 Topological relations in Kaqchikel, Tz’utujil and Q’anjob’al

To provide specific topological information expressions of various lexical categories can come into service. In basic locative constructions (BLC) prepositions and relational nouns play a major role in specifying a spatial relation between objects.

3.1 Prepositions

All three languages have two prepositions

<table>
<thead>
<tr>
<th></th>
<th>Kaqchikel</th>
<th>Tz’utujil</th>
<th>Q’anjob’al</th>
</tr>
</thead>
<tbody>
<tr>
<td>pa, chi</td>
<td>pa, chi</td>
<td>b’ay, tet</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Prepositions in Kaqchikel, Tz’utujil and Q’anjob’al

These prepositions have the general function of indicating a locative relationship between objects.

The preposition *pa* in Kaqchikel and Tz’utujil (*b’ay* in Q’anjob’al) has a broad range of meanings, all of which imply some sort of surroundedness as the following examples show:

(4) Kaqchikel

a. pa rachoch
   pa rachoch
   PREP POSS.3SG-house.POSS
   ‘in the house’

b. pa ch’akät
   pa ch’akät
   PREP chair
   ‘on the chair’

c. pa ulew
   pa ulew
   PREP ground
   ‘on the ground’ or ‘in the ground’

d. pa chakäch
   pa chakäch
   PREP basket
   ‘in the basket’

e. pa taq che’
   pa taq che’
   PREP PL tree
   ‘among trees’
Thus, expressions like *pa jay* ‘in the house’, *pa chakäch* ‘in the basket’ the meaning refers to the most likely interpretation.

(6) Kaqchikel

K’o jun xajonik pa jay.
K’o jun xajonik pa jay
is one dance PREP house

‘There will be some dancing in the house.’

(7) Q’anjob’al (Barreno & Mateo & Mejía 2005:132)

Ch’ach xew b’ay hana.
ch-ach xew b’ay ha-na
ICPL-2SG.ABS relax PREP POSS.2SG-house

‘Relax in your house.’

The prepositions *chi* in Kaqchikel and Tz’utujil are all semantically restricted. *Chi* in Kaqchikel and Tz’utujil exclusively precede relational nouns (see §3.2) whereas *pa* occurs with other nouns.

In Kaqchikel and Tz’utujil, the two general prepositions can be assumed to derive from the body part terms *pam* ‘belly’ and *chi* ‘mouth’.

In Q’anjob’al the preposition *b’ay* seems to be the more general one, more or less corresponding to the use of *pa* in Kaqchikel and Tz’utujil. Differently from *pa* in these languages *b’ay* in Q’anjob’al may precede a relational noun.

(8) Q’anjob’al

a. b’ay yich te’ te’
   b’ay y-ich te’t e
   PREP POSS.3SG-under CLF tree
   ‘under the tree’

b. b’ay sti ha
   b’ay s-ti ha
   PREP POSS.3SG-mouth river
   ‘at the headwater of the river’

The preposition *tet* occurs less frequently and can be assumed to be the more restricted one. However, the two prepositions in Q’anjob’al also seem to be subject to regional varieties.
3.2 Relational nouns

Nouns in Mayan languages are classified by the way they react to possession. Body part terms belong to the group of nouns that, apart from their unpossessed form, have a possessed form. These possessed forms are relational nouns seen in relation to their possessor and obligatorily carry a possessive prefix.

<table>
<thead>
<tr>
<th>ROOT</th>
<th>MEANING</th>
<th>UNPOSSESSED NOUN</th>
<th>POSSESSED NOUN, 3RD PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>-wi’</td>
<td>hair</td>
<td>wi’aj</td>
<td>ruwi’</td>
</tr>
<tr>
<td>-chi’</td>
<td>mouth</td>
<td>chi’aj</td>
<td>ruchi’</td>
</tr>
<tr>
<td>-ij</td>
<td>back</td>
<td>ija’</td>
<td>rija’</td>
</tr>
<tr>
<td>-pam</td>
<td>stomach</td>
<td>pamaj</td>
<td>rupam</td>
</tr>
<tr>
<td>-xkin</td>
<td>ear</td>
<td>xkinaj</td>
<td>ruxikin</td>
</tr>
<tr>
<td>-tz’am</td>
<td>nose</td>
<td>tz’amaj</td>
<td>rutz’am</td>
</tr>
<tr>
<td>-awäch</td>
<td>face</td>
<td>wachaj</td>
<td>ruwäch</td>
</tr>
<tr>
<td>-q’a’</td>
<td>arm</td>
<td>q’abaj</td>
<td>ruq’a’</td>
</tr>
<tr>
<td>-aqän</td>
<td>leg</td>
<td>aqanaj</td>
<td>raqän</td>
</tr>
<tr>
<td>-jolom</td>
<td>head</td>
<td>jolomaj</td>
<td>rujolom</td>
</tr>
</tbody>
</table>

Table 2: Kaqchikel body part terms

<table>
<thead>
<tr>
<th>ROOT</th>
<th>MEANING</th>
<th>UNPOSSESSED NOUN</th>
<th>POSSESSED NOUN, 3RD PERSON</th>
</tr>
</thead>
<tbody>
<tr>
<td>-wii’</td>
<td>hair</td>
<td>wi’aj</td>
<td>rwii’</td>
</tr>
<tr>
<td>-chii’</td>
<td>mouth</td>
<td>chi’aj</td>
<td>rchii’</td>
</tr>
<tr>
<td>-ij</td>
<td>back</td>
<td>ija’</td>
<td>riija’</td>
</tr>
<tr>
<td>-pam</td>
<td>stomach</td>
<td>pamaj</td>
<td>rpam</td>
</tr>
<tr>
<td>-xkin</td>
<td>ear</td>
<td>xkinaj</td>
<td>ruxikin</td>
</tr>
<tr>
<td>-tz’am</td>
<td>nose</td>
<td>tz’amaj</td>
<td>rutz’am</td>
</tr>
<tr>
<td>-awäch</td>
<td>face</td>
<td>wachaj</td>
<td>ruwäch</td>
</tr>
<tr>
<td>-q’a’</td>
<td>arm</td>
<td>q’abaj</td>
<td>ruq’a’</td>
</tr>
<tr>
<td>-aqän</td>
<td>leg</td>
<td>aqanaj</td>
<td>raqän</td>
</tr>
<tr>
<td>-jolom</td>
<td>head</td>
<td>jolomaj</td>
<td>rujolom</td>
</tr>
</tbody>
</table>

Table 3: Tz’utujil body part terms
### Table 4: Q’anjob’al body part terms

Body part nouns in Kaqchikel, Tz’utujil and to some extent in Q’anjobal can refer, quite productively, not only to partitions of the body, human or animal, but also to spatial locations. Mayan languages are well-known for the extensive use of body part terminology when it comes to the expression of spatial relations. It has been debated whether the productive meaning extension of body-part terms is due to metaphorical extension of the human body as a source domain or part labelling based on the visually segmented outline of the subject entity. The following examples from Kaqchikel illustrate how body part terms are used as locative expressions.

(9) Kaqchikel *rupam* ‘belly’ → ‘inside’

<table>
<thead>
<tr>
<th>Root</th>
<th>Meaning</th>
<th>Unpossessed</th>
<th>Possessed</th>
</tr>
</thead>
<tbody>
<tr>
<td>-xil</td>
<td>hair</td>
<td>xilej</td>
<td>sxil</td>
</tr>
<tr>
<td>-ti’</td>
<td>mouth</td>
<td>ti’ej</td>
<td>ti’</td>
</tr>
<tr>
<td>-ichin</td>
<td>back</td>
<td>ichinej</td>
<td>yichin</td>
</tr>
<tr>
<td>-yulk’ul</td>
<td>stomach</td>
<td>yulk’ulej</td>
<td>syulk’ul</td>
</tr>
<tr>
<td>-txixin</td>
<td>ear</td>
<td>txikinej</td>
<td>stxixin</td>
</tr>
<tr>
<td>-txam</td>
<td>nose</td>
<td>txamej</td>
<td>stxam</td>
</tr>
<tr>
<td>-sat</td>
<td>face</td>
<td>satej</td>
<td>ssataq</td>
</tr>
<tr>
<td>-q’ab</td>
<td>arm</td>
<td>q’ab’ej</td>
<td>sq’ab</td>
</tr>
<tr>
<td>-xub’</td>
<td>leg</td>
<td>xub’ej</td>
<td>sxub’</td>
</tr>
<tr>
<td>-xolom</td>
<td>head</td>
<td>jolomej</td>
<td>sxolom</td>
</tr>
</tbody>
</table>

(9) Kaqchikel *rupam* ‘belly’ → ‘inside’

a. rupam           ri       ruq’a
    ru-pam          ri       ruq’a
    POSS.3SG-inside DET POSS.3SG-hand
    ‘inside of hand’ (‘palm’)

b. rupam           ri       b’ojoy
    ru-pam          ri       b’ojo’y
    POSS.3SG-inside DET pot
    ‘the inside of the pot’

(10) Kaqchikel *ruwi’* ‘hair’ → ‘top’

a. ruwi’           ri       juyu’
    ru-wi’          ri       juyu’
    POSS.3SG-top DET mountain
    ‘top of the mountain’

b. ruwi’           ri       kotz’i’i
    ru-wi’          ri       kotz’i’i
    POSS.3SG-top DET flower
    ‘the head of the flower’

c. ruwi’           ri       saq’ul
    ru-wi’          ri       saq’ul
    POSS.3SG-top DET banana
    ‘the top of the banana’

(11) Kaqchikel *raqän* ‘leg/foot’ → ‘bottom/foot’

a. raqän           ri       juyu’
    r-aqän          ri       juyu’
    POSS.3SG-foot DET mountain
    ‘foot of the mountain’

b. raqän           ri       oköx
    r-aqän          ri       oköx
    POSS.3SG-foot DET mushroom
    ‘bottom part of the mushroom’

(12) *ruchi’* ‘mouth’ → ‘edge’
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a. ruchi’ ri wäy
   ru-chi’ ri wäy
   POSS.3SG-edge DET tortilla
   ‘the edge of the tortilla’

b. ruchi’ ri ulew
   ru-chi’ ri ulew
   POSS.3SG-edge DET ulew
   ‘the border of one’s territory’

(13) ruxikin’ ‘ear’ → ‘side’

a. ruxikin ri q’aq’
   ru-xikin ri q’aq’
   POSS.3SG-side DET fire
   ‘next to the fire.’

b. ruxikin ri b’ojiy
   ru-xikin ri b’oji’y
   POSS.3SG DET pot
   ‘next to the pot’/at the side of the pot’

(14) -tz’am ‘nose’ → ‘protuberance’

a. rutz’am ri juyu’
   ru-tz’am ri juyu’
   POSS.3SG-inside DET POSS.3SG-hand
   ‘nose of the mountain’ (‘protuberent part’)

b. rutz’am ri saq’ul
   ru-tz’am ri saq’ul
   POSS.3SG-nose DET banana
   ‘the nose of the banana’

In Q’anjob’al the relational nouns are commonly used for spatial relations: -tii ‘mouth’ → stii ‘at the side’, -sat ‘eye’ → ssataq ‘in front of’. Q’anjob’al yul derives from yul k’ul ‘belly’ and is used in the meaning of ‘in’.

(15) Q’anjobal

a. yul ha’
   yul ha’
   inside river
   ‘in(side) the river’

b. yul xij
   yul xij
   inside pot
   ‘in(side) the pot’

c. kichi’ ri taq b’ey
   ki-chi’ ri taq b’ey
   POSS.3PL-edge DET road
   ‘edges of the road’

d. yul xuk
   yul xuk
   inside box
   ‘in(side) the box’

The assignment of meronyms has been viewed in the light of the speakers’ analyses of an object with respect to its geometry. Although the geometry and shape of an object determine the assignment of body part terms to its inherent parts, cultural specifics are also crucial but mostly neglected in the discussion.

For instance, the inherent parts of the traditional grinding stone (k’a’ in all three languages) are all body part terms. Interestingly, in Kaqchikel, the lower part of the stone is referred to as ruwi’ ‘top’. To someone not familiar with the culture this denotations appears to be almost counter-intuitive. For Kaqchikel speakers, this term makes perfect sense as this is the top part once the grinding job is finished and the stone leaned upright against a wall (Duerr 1988). Studying the reference to space

Figure 4: Grinding stone and metate
in Colonial Quiché (K’iche’) demonstrates convincingly how “[t]he concept of ‘intrinsic’ (....) helps lead us to a better understanding of cosmological beliefs in Quiché culture.” (Duerr 1988: 1) illustrates his point by investigating the ‘face’ or ‘front side’ of objects with vertical or horizontal orientation (Duerr 1988: 14). He also mentions that the front of the house was usually the side facing the courtyard and not the one facing the street. Apart from body parts terms there are a number of other relational nouns specifically denoting spatial relations

<table>
<thead>
<tr>
<th>Locational noun root (relational noun)</th>
<th>3rd person possessive</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-nik’ajal</td>
<td>runik’ajal</td>
<td>middle</td>
</tr>
<tr>
<td>-naqaj</td>
<td>runaqaj</td>
<td>proximity</td>
</tr>
<tr>
<td>-wa</td>
<td>ruwa</td>
<td>outside</td>
</tr>
<tr>
<td>-xe</td>
<td>ruxe</td>
<td>under (root)</td>
</tr>
<tr>
<td>-xokon</td>
<td>ruxokon</td>
<td>left</td>
</tr>
<tr>
<td>-iqiq’a’</td>
<td>riq’iq’iq’a’</td>
<td>right</td>
</tr>
<tr>
<td>-kojol</td>
<td>kikojol</td>
<td>between</td>
</tr>
<tr>
<td>-ikin</td>
<td>rikin</td>
<td>with</td>
</tr>
</tbody>
</table>

**Table 5:** Locational relational nouns in Kaqchikel

In Kaqchikel and Tz’utujil relational nouns are preceded by one of the two prepositions in a locative clause. In Q’anjobal they often occur without.

**Figure 5:** Kaqchikel

**Figure 6:** Tz’utujil

The use of the two prepositions *pa* and *chi* is a modern development. In Colonial Quiché (cf. Duerr 1988 and personal communication, Duerr and Sachse 2017) relational nouns exclusively combined with the preposition *chi:* *chuvi* ‘on top’, *chi rupam* ‘in’, *chi rih* ‘behind’, *chi qaxukut* ‘to our sides’.
Topological relations and frames of reference in Mayan languages: Kaqchikel, K’iche’, Tz’utujil and Q’anjobal

<table>
<thead>
<tr>
<th>Body part term (relational noun)</th>
<th>Meaning</th>
<th>Prepositional phrase</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-wi’</td>
<td>hair</td>
<td>pa ruwi’ ri ch’al</td>
<td>on top of the table</td>
</tr>
<tr>
<td>-ij</td>
<td>back</td>
<td>chi rij ri ch’atal</td>
<td>behind the table</td>
</tr>
<tr>
<td>-wäch</td>
<td>face</td>
<td>chi ruwäch ri ch’atal</td>
<td>in front of the table</td>
</tr>
<tr>
<td>-xikin</td>
<td>ear</td>
<td>chi ruixin ri ch’atal</td>
<td>to the side of the table</td>
</tr>
<tr>
<td>-pam</td>
<td>stomach</td>
<td>chi rupam ri b’ojo’y</td>
<td>inside the pot</td>
</tr>
<tr>
<td>-k’ux</td>
<td>heart</td>
<td>chi ruk’ux ri tinamit</td>
<td>in the centre of the town</td>
</tr>
<tr>
<td>-tzam</td>
<td>nose</td>
<td>chi rutzam ri juyu’</td>
<td>at the nose of the mountain</td>
</tr>
<tr>
<td>-xe</td>
<td>root</td>
<td>chi ruxe/chuxe ri chat’al</td>
<td>under the table</td>
</tr>
<tr>
<td>-nikajal</td>
<td>middle</td>
<td>pa runikajal ri b’ey</td>
<td>in the middle of the road</td>
</tr>
<tr>
<td>-kojol</td>
<td>middle (among)</td>
<td>chi kikojol che’</td>
<td>among trees</td>
</tr>
</tbody>
</table>

Table 6: Kaqchikel relational nouns and prepositional phrases

<table>
<thead>
<tr>
<th>Relational noun</th>
<th>Meaning</th>
<th>Locative phrase</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-tii’</td>
<td>mouth</td>
<td>sti’ b’e</td>
<td>at the side of the road</td>
</tr>
<tr>
<td>-txikin</td>
<td>ear</td>
<td>stxikin te’ mexha</td>
<td>at the edge/corner of the table</td>
</tr>
<tr>
<td>-sat</td>
<td>face</td>
<td>ssataq sna</td>
<td>in front of his/her house</td>
</tr>
<tr>
<td>-yul k’ul</td>
<td>belly</td>
<td>yul jun te kaxha</td>
<td>in the box</td>
</tr>
<tr>
<td>-ich</td>
<td>bottom</td>
<td>yich te’ taj</td>
<td>at the bottom of the pine tree</td>
</tr>
<tr>
<td>-ib’an</td>
<td>on</td>
<td>yib’an te’ mexha</td>
<td>on the table</td>
</tr>
<tr>
<td>-alan</td>
<td>under</td>
<td>yalan te’ q’aja’</td>
<td>under the bridge</td>
</tr>
<tr>
<td>-intaq</td>
<td>behind</td>
<td>yintaq no txitx</td>
<td>behind the rabbit</td>
</tr>
<tr>
<td>-nan</td>
<td>middle</td>
<td>snan kawan anima</td>
<td>in the middle of two people</td>
</tr>
<tr>
<td>-xol</td>
<td>between</td>
<td>sxol</td>
<td></td>
</tr>
</tbody>
</table>

Table 7: Q’anjob’al relational nouns and locative phrases

It should be noted that the relational noun -kojol ‘between’ is prefixed by the third person plural prefix ki- ‘Poss.3Pl’ as the location of an object has two reference points.

(16) Ri ixok tz’uyül chi ki-kojol ka’i’ achi’a’a.
    ‘The woman sat between two men.’

The relational noun -ikin ‘with’ may also be used to express a local relationship. The noun differs from all other relational nouns in that it is not preceded by a preposition.

(17) Rija’ x-tz’uye’ junan r-ikin ri xten.
    ‘He sat down next to a girl.
    (Lit.: ‘He sat with the girl.’)
3.3 Locative clauses

Locative clauses may specify the location of an object by means of simple prepositions, noun phrases commonly involving relational nouns, positionals. All these means may interact.

3.3.1 Basic locative constructions

A basic locative construction is the construction that occurs in response to a question of the kind ‘where is the X’? In basic locative constructions prepositions and relational nouns code the position of an entity. In Tzutujil and Kaqchikel a basic locative construction usually contains the verb $k'o$, an existential and locative ‘be’. The constituent order differs depending on whether X is definite or indefinite. In Q’anjobal the verb ‘be (located)’ is often not expressed.

(18) Kaqchikel
a. $k'o$ jun wuj pa ruwi’ ri ch’atal.
$k'o$ jun wuj pa ru-wi’ ri ch’atal
is one book PREP POSS.3SG-top DET table
‘There is a book on the table.’
b. La wuj $k'o$ pa ruwi’ la ch’atal.
la wuj $k'o$ pa ru-wi’ la ch’atal
DET book is PREP POSS.3SG-top DET table.
‘The book is on the table.’

(19) Tz’utujil
a. $k'o$ jun siaf chuxe ch’k’at
$k'o$ jun siaf chi-ru-xe ch’k’at
is one cat PREP-POSS.3SG-under DET chair
‘There is a cat under the chair.’
b. Jun sq’u’ul k’o chpam jun kjon
Jun sq’u’ul k’o chi-r-pam jun kjon
DET banana is PREP-POSS.3SG-inside DET box
‘The banana is in the box.’

(20) Q’anjob’al
a. Aiyatoj jun b’akal yib’an te’ mexha
aiyatoj jun b’akal y-ib’an te’ mexha
is one olote POSS.3SG-top CLF table
‘There is a corn trunk on the table.’
b. No pejei ayekno yik’ul ch’en ka’.
no pejei ayekno y-ik’ul ch’en ka’
CLF frog is POSS.3SG-in DET grinder.’
‘The frog is on the grinder.’

3.3.2 Positionals

Positionals are CVC roots that never occur uninflected. They are a major inflectional class in all Mayan languages that may form adjectives, nouns, stative predicates, and verbs. Positionals indicate among other
things (like quality) locative position or posture. In many cases the specification regards the shape and position of the Figure as well as the Ground. A positional by itself may be sufficient to provide information on the location of an object.

(21) Kaqchikel

a. Ximïl la ti aq’
   ximïl la ti aq’
   tied.3SG DET DIM pig
   ‘The pig is tied.’

b. E ximïl la taq aq’
   E ximïl la taq aq’
   be.tied.3PL DET PL pig
   ‘The pigs are tied.’

In many cases the positional verb provides the context and specifies the meaning. In the following example from Kaqchikel tilik ‘be planted’ implies that the sweet potato is in ground rather than on the ground as is implied by basic verb k’o.

(22) Kaqchikel

a. La camote k’o pa ulew.
   DET sweet potato is PREP ground
   ‘The sweet potato is on the ground.’

b. La camote tilik pa ulew.
   DET sweet potato planted PREP ground
   ‘The sweet potato is planted in the ground.’

4 Frames of reference in Kaqchikel, Tzutujil, and Q’anjob’al

All three languages make use of the intrinsic frame of reference whenever possible, provided the object (Ground) that a Figure relates to does have intrinsic parts. The human body not only has intrinsic body parts but also an intrinsic left and right side. For the speakers of Kaqchikel, Tz’utujil and Q’anjob’al the location of the frog is to the boy’s left or right. Even though all three languages have terms for left and right, these are often not favored and other suitable terms like ‘to the side’ are chosen. In Kaqchikel riqiq’a’ the term ‘right’ is probably related to q’ij’sun’.

Figure 7: Frog to the man’s left

Figure 8: Frog to the man’s right
Cars have intrinsic parts for which body part terms are used. The word denoting the front is most commonly the term for ‘face’ in the languages under discussion. For cars with a very protuberant front the term for nose may be used. The back of the car is invariably referred to as ‘back’.
Topological relations and frames of reference in Mayan languages: Kaqchikel, K’iche’, Tz’utujil and Q’anjobal

Figure 9: Pig at the back of the car
Figure 10: Pig at the front of the car

(29) Kaqchikel
La ti aq k’o chi
DET DIM pig is PREP
rij la ch’i’ch.
rij la ch’i’ch
POSS.3SG-back Det car
‘The pig is at the back of the car.’

(30) Tz’utujil
K’o jun a’aq
is one pig
tzrij ch’e’ch.
tz-rij ch’e’ch.
PREP-POSS.3SG-back car
‘The pig is at the back of the car.’

(31) Q’anjob’al
Ayek’ no txitam
ayek’ no txitam
is CLF pig
yintaq ch’en carro
y-intaq ch’en carro
PREP-POSS.3SG-back CLF car
‘The pig is at the back of the car.’

(32) Kaqchikel
La ti aq k’o
DET DIM pig is
chuwäch la
chi ru-wäch la
PREP POSS.3SG-front DET
ch’i’ch. ch’i’ch
car
‘The pig is at the front of the car.’

(33) Tz’utujil
K’o jun a’aq
is one pig
chwäch ch’e’ch.
chi-ru-wäch ch’e’ch
PREP-POSS.3SG-front car
‘The pig is at the front of the car.’

(34) Q’anjob’al
Ayek’ no txitam ssataq
ayek’ no txitam s-sataq
is CLF pig POSS.3SG-front
ch’en carro
ch’en carro
Clf car
‘The pig is at the front of the car.’
(35) Kaqchikel
La ti aq k’o
la ti aq k’o
DET DIM pig is
chuwäch la
chi ru-wäch la
PREP-POSS.3SG-front DET
ch’ut.
ch’i’ch
maguey
‘The pig is in front of the agave.’

(36) Tz’utujil
K’o jun a’aq
k’o jun a’aq
is one pig
chwäch sajkiy.
chi-r-wäch ch’e’ch.
PREP-POSS.3SG-front maguey
‘The pig is in front of the agave.’

(37) Q’anjob’al
No txitam k’atan an sawil.
no txitam k’atan an sawil
CLF pig near CLF maguey
‘The pig is near the agave.’

(38) Kaqchikel
La ti aq k’o chi
la ti aq k’o
DET DIM pig is
rij la ch’ut.
r-ij la ch’i’ch
POSS.3SG-back DET maguey
‘The pig is behind of the agave.’

(39) Tz’utujil
K’o jun a’aq
k’o jun a’aq
is one pig
tzrij sajkiy.
tz-r-ij sajkiy.
PREP-POSS.3SG-back maguey
‘The pig is behind the agave.’

(40) Q’anjob’al
No txitam k’atan an sawil.
no txitam k’atan an sawil
CLF pig near CLF maguey
‘The pig is near the agave.’
5 Conclusions

Mayan languages are well known and somewhat celebrated for their being having few prepositions and employing other strategies (in particular relational nouns and positionals) to express spatial relationships.

Two attempts to explain the assignment of meronymics have been made. The assignment may be governed by a metaphorical mapping process (MacLaury), or by an algorithm that takes as input the visually segmented outline of the whole and labels parts on the basis of their shape and the axis of the entity they occur on (Levinson 1994).

It has been hypothesized that the pervasive use of geometric meronyms in the expression of spatial relations is a linguistic factor that biases the speakers of a language against the use of relative frames.

The investigation of Kaqchikel, Tz’utujil (both languages of K’ich’ean branch) and Q’anjob’al (of the Q’anjobalan branch) confirms that prepositions are scarce and that positionals and relational nouns play a crucial role in the expression of spatial relationships. In Kaqchikel and Tz’utujil many relational nouns denoting body parts come into service. In Q’anjob’al fewer body part nouns but other relational nouns are used. All three languages have relational nouns not related to a body part with the meaning ‘middle’ and ‘between’.

It has been hypothesized that the meronymic use of body part terms correlate with a "Mayan intrinsic world view". It is correct to say that speakers of the three languages under discussion describe a spatial scene from an object-centered view whenever possible. If the shape of the reference object (Ground) has intrinsic parts the speaker will refer to those in order to describe the location of an object. While it is common to specify the vertical Up-Down axis and the horizontal Front-Back axis, it is less common to specify the Left-right axis with the terms of ‘left’ and ‘right’. Rather, speakers tend to say ‘to the side’.

However, if the referential object cannot claim to have intrinsic parts, i.e., entities like trees for instance, speakers of Kaqchikel and Tz’utujil often take the speaker-centered (relative) perspective and assign the horizontal axis terms ‘left’ and ‘right’ or ‘front’ and ‘back’ (even though the object does not have an intrinsic front and back or left and right side). Alternatively they may just say an object is near another. Q’anjobal seems to differ from the K’ichean languages in that it does not allow the speaker to change perspective (from intrinsic to relative).

Abbreviations

| 1  | 1st person | DIM | diminutive         |
| 2  | 2nd person | ERG | ergative           |
| 3  | 3rd person | ICPL| incompletive aspect|
| ABS| absolutive case | PL | plural             |
| CLF| classifier   | POSS| possessive case    |
| CPL| completive aspect | PREP| preposition        |
| DET| determiner   | SG  | singular           |

References


