

An exploration in the domain of time: from Yucatec Maya time gestures to Yucatec Maya Sign Language time signs

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Introduction

Time is generally considered an abstract conceptual domain and although it can be divided on the basis of more or less complex calendar calculations, all human cultural groups have some ways of expressing temporal relations in language, which can be spoken or signed. This chapter discusses how linguistic divisions for time have been constructed in an emerging language, Yucatec Maya Sign Language (hereafter YMSL) used by individuals in the Yucatán Peninsula in Mexico. Because of its sociolinguistic setting, YMSL is actively in contact not only with spoken Yucatec Maya but also with Yucatec Maya co-speech gestures that provide signers with manual input for the construction of the time domain. I will argue that Yucatec Maya speakers produce gestures with time reference that have been taken up and adapted in YMSL by signers.

Languages have diverse strategies for the linguistic expression of time (see Klein, 2010 for a comprehensive review). This chapter focuses on the deictic and sequential expression of time in Yucatec Maya speech and gesture and in YMSL. In the deictic expression of time, the time of an event is localized with respect to the time of the production of speech (e.g. I'll leave *tomorrow*), while in the sequential expression of time, events are often related to each other independently of the time of speech production (e.g. I will leave *after* the party, *August follows* July).

Many languages use spatial metaphors to talk about time and Fauconnier and Turner (2008, p. 55), for instance, assert that "Time as Space is a deep metaphor for all human beings. It is common across cultures, psychologically real, productive and profoundly entrenched in thought and language." However, more recent studies in non-Western settings suggest that this mapping may not be universal (Sinha, Sinha, Zinken, & Sampaio, 2011).

I will show that spoken Yucatec Maya has relatively few linguistic tools to talk about sequential time (compared to English or French for instance) and that sequential events are expressed with a rolling gesture that implies cyclicity rather than linearization of events or orientation of time flow. In other words, there is no metaphorical time line in the Yucatec Maya gestural space, and this specific form of gesturing about time is taken up and adapted in YMSL. This contrasts with speakers of languages such as French (Calbris, 1990), who use a time line to organise sequences of events as left-past to right-future, or signers of many sign languages, who productively use a front-future and back-past strategy (Kendon, 1993; Meir & Sandler, 2008; Valli, Lucas, Mulrooney, & Villanueva, 2000, *inter alia*).

The chapter is structured as follows: Section 1 gives an overview of the sociocultural context shared by Yucatec Maya and YMSL. Section 2 summarizes the main linguistic strategies for the expression of time in spoken Yucatec Maya and section 3 examines the co-speech gestures that relate to time. In section 4, I discuss the expression of time in YMSL and how time gestures have been adapted as signs in YMSL. Section 5 summarizes the main issues raised in the chapter.

1. The sociocultural context

Yucatec Maya Sign Language (or YMSL) is defined here as a signed language that develops in a Yucatec Maya speech community. This implies that YMSL signers share a cultural background with Yucatec Maya speakers and that spoken Yucatec Maya and YMSL are two languages actively in contact. This chapter focuses on a particular village, Chican, where many deaf and hearing individuals have been developing a sign language also referred as Chican Village Sign Language or CVSL. Johnson (1991) gives a comprehensive overview of the sociolinguistic situation of Chican in the late 1980's. Escobedo Delgado, this volume, provides an updated sociolinguistic sketch (see also Zeshan et al., this volume).

1.1. The socio-linguistic context of spoken Yucatec Maya and YMSL in Chican

Yucatec Maya is a language spoken in the Yucatán peninsula in Mexico and Northern Belize, with the number of speakers approximating 786,000 in 2010 (INEGI, 2010). The Yucatán peninsula is a flat terrain covered with semi-tropical forest.

In Chican (or *Chi' Kaan* 'the snake's mouth' in Yucatec Maya),¹ all women older than 60 are monolingual in Yucatec Maya and even if most men and members of the younger generation are bilingual, interactions in the village are still conducted in Yucatec Maya. Spanish is learnt at school and used only with non-Mayan interlocutors. However, many children are socialized in Spanish and now speak it within the household. Dramatic linguistic changes may be occurring in the next generations.

Many men in Chican practice subsistence corn farming, using a slash and burn type of agriculture. A number of families also have pigs, poultry, or even some cows. The basic staples cultivated in Chican, as in many other Mayan populations, are corn (prepared as tortilla), beans, and other cucurbitaceous vegetables (e.g. pumpkins, squashes).

In the last few years, different sources of income have emerged. Currently, many people from the village go to work in the city. Typically, men take jobs in the construction industry (*albañiles*) and women work as housekeepers. Two Chican deaf women work as housekeepers in Mérida, the state capital, and come back to the village regularly on the weekends, although not every week (LTP and MCC, see Table 1 below). Handicrafts, especially hammock weaving (*wak'k'áan*) have become a significant source of income for many deaf and hearing families in the village. An increasing tendency, at least among hearing men, is to go to the USA or Canada for temporary work.

The forest in this region is low and big trees and palms are rare. In the past, houses were made of wood; walls were built with thin branches of wood woven together (*kolox che'*) covered with clay, and thatched roofs were made of palm leaves. But because such material is now hard to find or too expensive to import from other states of the Peninsula, the current tendency, often supported by governmental support, is to build houses with concrete blocks.

As far as its sociological composition, I would consider Chican a 'family village,' insofar as the village was founded by members of a single family, and most of the villagers are related to some extent by kinship. One crucial cue is given by the family surnames that, in Mexico, encompass both the father's and the mother's side. It is significant that most of the villagers, and many of the deaf in particular, bear identical first and last surnames (Collí Collí in this case), indicating that their father and mother are somehow related. This means that the deafness in Chican probably has a genetic origin. The fact that one deaf couple has two deaf children also provides additional support for the genetic hypothesis of deafness in this village.

The YMSL Chican community is, to this day, the largest deaf community identified in the Yucatec Peninsula. It comprises 17 signers. In Yucatec Maya,

various terms are used to refer to deaf persons. The term *kook* means ‘deaf’ and refers more generally to people with any kind of hearing impairment. One term that specifically applies to ‘deaf people’ is *toot* but it is mostly used by elders. Due to the general influence of Spanish language and Mexican culture (in Chican, this influence also includes other non-Mayan non-Mexican visitors) the loan term *soordo-muudo* ‘deaf-mute’ is also widely used. Generally, Yucatec Maya people recognize deaf as people ‘having no (verbal) words/voice,’ *mina’an ut’an*. Interestingly, to refer to how signers communicate or to cite a signed utterance, Yucatec Maya speakers use the verb *e’es* ‘show’ (as in *ba’ax kuye’esik ...* ‘what (s)he is showing is...’) and not the verb *a’al* ‘say’ used for the spoken language.

1.2. Yucatec Maya attitudes towards deafness

As a community, the Yucatec Maya are tolerant towards deafness. As noted by Johnson (1991), and in contrast with western settings where deaf communities arise, there is no discrimination against the deaf. A similar attitude is also noted by Branson et al. (2002), as well as in de Vos, this volume, for the village locally known as *Desa Kolok* in Bali. More generally, there is no standard in the Yucatec Maya ideology of a ‘normal’ or ‘fully capacitated’ human being. In the Yucatec Maya culture, everyone is considered different and each person is apprehended as a ‘different word’ (*kaada máak yáanal mundo*, see Hanks (1993, p. 221)). In general, Yucatec Mayas believe that God created children just the way they are and that they should be accepted that way. This fact was explicitly stated by parents of deaf children interviewed during fieldwork. In a sense, deafness is considered by the Yucatec Maya as a trait of the individual, as is temperament (some people are *ts’íik*, ‘fierce’ and, according to informants, “that’s the way they are,” *beey umoodoo*) or skin colour (a common girl nickname is *x’Boxi* ‘the black’ and the author’s nickname is *griingo* ‘the white foreigner’). The perception of deafness as a personal characteristic rather than a handicap contrasts with the perception of deaf people in non-indigenous Mexico who use the Spanish term: *discapacitado* ‘disabled, handicapped.’

Sociologically, deaf individuals are fully integrated into Yucatec Maya society. As pointed out by Johnson (1991), deaf people work and marry just as hearing people do. As long as one participates and contributes productively to daily activities and chores, he or she is fully incorporated into the Maya social setting. As do their hearing counterparts, deaf women cook, make handicrafts and take care of children, and deaf men can work in the

fields or engage in other manual work just as hearing men do. There is no restriction on deaf people in their choice of spouse and deaf people marry other deaf people, as well as hearing people. In Chican, two men are married to hearing women and there are two deaf couples, one with 2 children.

The only real sociological difference from hearing people lies in the education deaf individuals receive. As pointed out by Poy Solano (2011), deaf children are not literate because the Mexican educational system cannot integrate them as students, making them *de facto* monolingual in YMSL. In contrast, many inhabitants of Chican are trilingual to various degrees in Yucatec Maya, Spanish, and YMSL.

1.3. Speech communities

Typically, signers of YMSL are persons who are born deaf (see Escobedo Delgado, this volume, for data on the deafness ratio in Chican). In contrast with some deaf children who are raised in urban environments with highly restricted language input (see for instance Goldin-Meadow and Mylander (1984)), Yucatec Maya deaf children are not isolated interactionally and are surrounded by many individuals. A typical Yucatec Maya family is composed of at least three children (and often up to eight or ten). Linguistic interactions in a typical Yucatec household rely heavily on multimodal channels and especially on the gestural channel. This particular sociolinguistic situation is characterized by a high degree of use of ‘quotable gestures’ (Kendon, 1992), and thus provides a deaf child growing up in a Yucatec Maya environment the systematic input required to develop a signed language. That is, Yucatec Maya speakers produce a lot of gestures, and these gestures have, in their majority, a consistent form as well as retrievable and constant semantics (see Le Guen (2011a) for the case of space). One cue that supports the hypothesis of transfer from gestures to signs is that in domains that are not systematically encoded in Yucatec Maya gestures (e.g. colours) YMSL tends to be more idiosyncratic, among speakers as well as among variants.

One important feature to point out is that a deaf child (or adult) in a Yucatec Maya setting is never alone. Yucatec hearing people acquire YMSL through extensive interaction with the deaf (there is no formal teaching), but during this process they also participate in constructing the sign language on the basis of their extensive gestural repertoire and gestural habits. We can distinguish two types of hearing interlocutors, or co-signers, who are all bimodal bilinguals in spoken Yucatec Maya and YMSL: those who have a deaf person in their family and those who live in the same village but are

not related (or very distantly related) to a deaf person. The family members who live with or close to a deaf person greatly stimulate the development of the signed language. Peers usually constitute everyday interlocutors and are themselves fluent in sign language. In contrast, the parents of deaf children are usually poor signers. This is due to the fact that among Yucatec Mayas, parents usually interact quite minimally and asymmetrically with their children, primarily sending them to do chores (Gaskins, 1999, 2006). The second type of interlocutors are other members of the village, whether distant family or unrelated, who display varying degrees of proficiency in the sign language. The speakers who have good metalinguistic awareness of the Yucatec Maya gestural repertoire can easily communicate with deaf signers at a basic level, even if they have never before been in the presence of deaf people.² Having a good grasp of one's gestural repertoire is a first step to understanding YMSL.

Deaf people engage in chatting daily and are often accompanied by hearing people (Johnson 1991, pp. 468–469). It is mostly men who gather in the street, usually at night, while women, following a more general Mayan pattern, rarely leave the household except for short trips during the day (to go shopping or to grind corn) and for public events. The 'deaf-only' gatherings that happened in Chican were always triggered by external factors, such as meetings initiated by the government or by foreign researchers.³

1.4. Interactional groups

Defining generations of signers is a delicate issue since age alone is not a straightforward criterion. According to Kisch (this volume), groups of signers are better defined in terms of cohorts or interactional groups, i.e. speakers who have been socialized as a coherent speech community. Another important feature that frames communication in the Yucatec Maya cultural setting is the family network. Mayan people primarily interact with their family members, and proximity between households does not necessarily guarantee social interaction. Non-kin neighbours habitually do not engage in communicative exchanges (chatting, asking favours, etc.) unless they have no other choice.⁴ For instance, the neighbours who lived in front of a family with various deaf signers explained to the author that they do not know the sign language, for they never interacted with deaf people.

In Chican, I consider there to be six interactional groups of signers, overlapping to a great degree with settlements. The age range of deaf people is between 78 and 10 years of age, and some interactional groups comprise siblings/cousins or deaf parents with deaf children. The first generation is

composed of only one signer, who is the oldest deaf person in the village (DnT, approximately 78 years old); the second generation is made up of 13 adults (from 19 to 57 years of age), and the third generation is comprised of 3 deaf children aged 10, 13, and 14 years. Data collected during the summer of 2011 suggest some intergenerational differences. Preliminary results from tasks that were meant to elicit ditransitive constructions tend to show an evolution in the use of space among the members of the second generation, who are deaf children born to deaf parents. This is particularly interesting because similar processes of conventionalization have been described in other incipient sign languages; see for instance Senghas et al. (2001; 2004; 2002) on Nicaraguan Sign Language or Sandler et al. (2005) on Al-Sayyid Bedouin Sign Language.

Across the three generations described above, six interactional groups can be identified (summarized in Table 1). A family of four constitutes the first interactional group, two deaf parents and their two deaf children. Three other relatives of interactional group 1 (brothers and cousins) form interactional group 2. In interactional group 2, StCC is married to a hearing woman and they have two hearing children. GUC has two hearing parents and hearing siblings. Interactional groups 1 and 2 live almost in front of each other and interact regularly. Adults of interactional groups 1 and 2 have been the main informants of Johnson and have been in close contact with the cinematographer Hubert Smith. MCC, the older sister in interactional group 2, goes to work regularly in Mérida and has not been continuously present in the village. Interactional group 3 contains three deaf siblings and their various hearing family members. LTP also has been working for several years as a housekeeper in Mérida, for a wealthy family who decided to help her financially so that she could take lessons in Mexican Sign Language. As a result she shows some peculiarities in her signing with respect to other YMSL signers. However, she and other members of her family said that her Maya interlocutors did not like the borrowed MSL signs she was using at first and that she now shifts from MSL to YMSL whenever she comes back to Chican. The third member of interactional group 3, BTP, has a young hearing child. Interactional group 4 was originally composed of 3 deaf siblings and their hearing siblings and parents. However, in 2010 CCC died unexpectedly of a heart attack and a marriage is planned between LCC and ACC (from interactional group 5), which means that she will leave her home and go to live with (or nearby) the members of interactional group 5. Interactional group 5 is formed by 3 deaf siblings who live alone in the same house. Signers of interactional group 5 and interactional group 3 are related by kin, live close by and have regular interactions with each other. Interactional group 6 is formed

by a deaf man married to a hearing wife with several children. Finally, interactional group 7 is formed by the oldest deaf person in the village and his hearing family members: his son and his son’s wife and children.

Table 1. Interactional groups with deaf signers in Chican

		age (approx.)	gender	hearing members in the interactional group
group 1	JCC	55	male	NO
	NCT	47	female	
	MICC	15	female	
	CaCC	10	male	
group 2	StCC	45	male	YES
	MCC	57	female	
	GUC	25	male	
group 3	BTP	20	female	YES
	LTP	18	female	
	RTP	13	male	
group 4	LCC	55	female	YES
	†CCC	42	male	
	VCC	35	male	
group 5	ACC	45	male	NO
	SiCC	50	female	
	ECC	55	female	
group 6	ICC	45	male	YES
group 7	DnT	78	male	YES

†: died in 2010

Importantly, there are two types of interactional groups, those composed of deaf people surrounded by hearing interlocutors such as parents, siblings, spouses, and children (interactional groups 2, 3, 4, 6 and 7) and the interactional groups constituted by deaf individuals only (interactional groups 1 and 5). Undoubtedly, the fact that interactional groups comprise either hearing and deaf people, or deaf people only gives different impulses to the sign language varieties in those interactional groups. It is important to under-

line that YMSL is what I would call an ‘opportunistic language’ since its primary interest lies in the efficiency of communication and not so much in the systematization of the language. As a consequence, we notice in the lexicon some idiosyncrasies within interactional groups, acknowledged by the signers themselves, and even among individuals. For instance, although ECC lives with her two deaf siblings, she has created some signs of her own. However, in the domain of time, no significant variations were noted (besides lexical ones, such as the days of the week, see below).

In the following section I explore in more detail the conception of time in spoken Yucatec Maya, in co-speech gestures and in YMSL.

2. Time in spoken Yucatec Maya

Yucatec Maya lacks grammatical tense. In short, this means that its resources for relating two events that occur at different times from the moment of the utterance are highly constrained. For instance, example (1) in English would have to be expressed as (2) in Yucatec Maya. Note that example (2) can be a present, past or future event.

(1) Lila entered while Joe was speaking on the phone

(2) *táan u-tsikbal ti’ telefono Jo(e)-e’ ka’ h-hook Liila*
 PROG 3A-talk FOC phone Joe-TD CONJ CP-enter Lila

‘Joe is speaking on the phone and Lila enters’

In (2), only progressive and completive aspect is marked, which means that in the absence of other temporal information, the event could be occurring at the moment of utterance production. Secondly, the ordering of the events in Yucatec Maya should fit their chronological order in the utterance. The conjunction *ka’(ah)* is only a generic temporal connective and can be translated according to context as *when*, *then* or *and*. In (2), the conjunction could have been replaced by a full stop, changing the coordinate clause introduced by *ka’(ah)* into a construction with two juxtaposed main clauses. The conjunction *ka’(ah)* does not express any ordering relation; it only indicates that the time of the main clause is somehow related to the time of the coordinate clause. The order of events is then inferred from the order of the clauses on the basis of implicature. Because Yucatec Maya also lacks time connectors (e.g. *before*, *after*, *while*), the ordering of the events is crucial to the meaning of the sentence.

2.1. The expression of sequential time

Bohnenmeyer (2009) proposes that Yucatec Maya relies on temporal anaphora, which is “the contextual determination of topic times” in any given utterance.⁵ He shows that the ordering of aspectual operators is crucial to understanding sequences of events: Whereas completive aspect implies a new topic time, the use of imperfective or progressive aspect includes the sentence in the running time of the event described, until a new completive marker comes to ‘reset’ the running discourse time. Therefore, in order to express sequences, Yucatec Maya uses completive markers as “natural reference points”, for instance the expression *ken ts’o’ohke’/ka’ah ts’o’oke’* ‘when it will be/was done.’ In order to convey the meaning of example (3), Yucatec Maya should make explicit the state of completion of each event, which is presented separately and ordered chronologically, as in (4). A more extensive discussion on time in Yucatec Maya grammar can be found in Bohnenmeyer (2003, 2009) and Vapnarsky (1999). A discussion on time sequence and spatial metaphors in Yucatec Maya is also presented in Le Guen and Pool Balam (2012).

(3) wash your hands before and after eating

(4) *ken ts’o’ok-ok* *a-p’o’-ik* *a-k’ab-e’* *k-a-taal* *hanal*
 CONJ finish-SUBJ 2A-wash-TR.IC 2A-hand-TD HAB-2A-come eat

ken ts’o’ok-ok *k-a-bin* *a-p’o’-ik* *a-k’ab*
 CONJ finish-SUBJ HAB-2A-go 2A-wash 2A-hand

‘when you’re done washing your hands, you come eat, when it’s done,
 you go wash your hands’

2.2. The expression of deictic time

If Yucatec Maya only has a limited set of linguistic strategies to express sequences of events, forms of expressing deictic time are abundant. Crucially, deictic time expression always considers the time of the production of the utterance. Yucatec uses a large number of adverbs and particles to express deictic time such as *úuch*, ‘distal past time’, *ka’achi*, ‘distal past time (within lifetime frame)’, *ho’oloh*, ‘the day before’, *sáam(y-ak)*, ‘recent past (within the day)’, *táant*, ‘immediate past in terms of minutes (within the day)’, *be’oor*, ‘now’,

walak(-il-a'), 'now/at the same time as now', *ta'ayt(-ak)*, 'immediate future in terms of minutes (within the day)', *mun-xáan-tal*, 'immediate future in terms of minutes, hours (within the day)', *mun-(y)úuch-tal*, 'immediate future in terms of days', *bíin*, 'remote, prophetic future.'

In addition, Yucatec Maya has a set of what I would refer to as 'indexical adverbs' that specifically refer to past and future days with respect to the time of the production of the utterance, such as *óoxyak*, 'three days ago', *ka'ahvyak*, 'two days ago', *ho'olyak*, 'yesterday', *o'nyahak*, 'yesterday in the evening', *behla('ak)e*, 'today, nowadays', *sáamal*, 'tomorrow', *ka'abeh*, 'in two days', *óoxeh*, 'in three days.'

Temporal adverbs can be used to set up a reference point in discourse to locate the time of the events, as in (5). Indexical adverbs on the other hand tend to take the syntactic slot of the aspect marker, as in (6). The implication is that indexical adverbs directly tie the narrated event to the time of utterance production.

- (5) *úuch-il-ak-e'* *táan u-máan Hesukriisto* *way yóok'ol kàab-e'*
AM-NOM-TEMP-TD PROG 3E-pass Jesus here on earth-TD

'Long ago, Jesus-Christ walked this Earth' [lit. 'In remote past, Jesus-Christ is walking here on the Earth']

- (6) *óoxeh* *in-bin*
+3.days 1A-go

'I'll go in three days' [lit. 'three days from now, I go']

In sum, in Yucatec Maya, the expression of sequences of events is highly constrained: events should be ordered chronologically because the existing connectors express essentially the completion (or non-completion) of events. Importantly, in Yucatec Maya, each sentence bears its own aspect and events are considered separately. In Yucatec Maya however, it is possible to insert past events like flashbacks in discourse under specific conditions (see Bohne-meyer, 2003, pp. 155–156 for details). On the other hand, Yucatec Maya is able to express deictic time with precision and has an important set of adverb markers that can be used to place events with respect to the moment of the utterance production.

3. Time Gestures in Yucatec Maya

In order to address the question of time gestures, spontaneous discourses (including one natural conversation in which the researcher was not present) were analysed.⁶ The data were collected among Yucatec Maya speakers of Kopchen and Chemax who are not acquainted with deaf people or YMSL signers. We looked specifically at gestures produced with time reference in a corpus of 4 different contexts that totalled 63 minutes. We concentrated on deictic adverbs that set a reference point in time (e.g. *úuch* ‘a long time ago’) and on indexical time adverbs (e.g. *sáamal* ‘tomorrow’). Data and results are presented in Table 2 and Table 3.

Additionally, we also asked five speakers to produce some conventional gestures, among them some time gestures, and speakers produced the citation form for each gesture. That is, these gestures are usually well-formed and bigger than what we found in the spontaneous data, though the gesture shape is similar. We asked participants how they would gesture the following deictic time expressions: *be’oora/behlae* ‘now/these days,’ *sáamal* ‘tomorrow,’ *ho’olyak* ‘yesterday,’ *ts’uyúuchtal* ‘it was a long time ago,’ *yan uyúuchtal* ‘it will be in a long time,’ *sansáamal* ‘everyday,’ *kaada áanyo* ‘every year.’

Results from the analysis of spontaneous and elicited gestures show three main types of time gestures used among Yucatec Maya speakers. All three gesture types are mapped onto the spatial domain.

Table 2. Data of spoken Yucatec Maya

ref.	types	content	parti- pants	duration (min.)	Number of utterances*	Number of gestures*	Time ref. in speech	Time ref. + any gesture	Time ref. + time gesture
n1	Personal narrative	the speaker talks about his precog- nitive dreams	JCC (male, 38), author	20	553	–	43	10	7
n2	Narrative	story of a husband who find out his wife is a witch	DCC (male, 45), author	12	258	301	23	5	3
i1	Interview	descri- ption of the Saint's journey	WCC (woman, 45), daughters, author	14	308	222	70	26	18
nc1	Natural conver- sation	various themes, gossips	2 elderly women	17	861	–	44	18	8
TOTAL				63	1,980	523	183	67	35

*only the speaker's utterances are counted and not the author's (OLG). Only in n2 and i1 were all the gestures transcribed.

Table 3. Gesture types occurring with time adverbs and time reference

Gesture type	Here-now	Distant	Rolling	Pointing	Counting
Personal narrative (n1)	2	-	6	-	-
Narrative (n2)	1	-	1	1	-
Interview (i1)	-	-	6	5	4
Natural conversation (nc1)	-	3	3	1	2
TOTAL	3	3	16	7	6

3.1. The here-now gesture

The here-now gesture is used to refer to precise space (*way-e* ‘here’) and metaphorically precise time (now). This gesture is widely used across cultures and languages and is not in any way specific to Yucatec Maya. This *here-now* gesture usually co-occurs with time references such as *be’oora* ‘now’ or *te’ semana he’ela* ‘this week.’ It is typically done with a finger pointing towards the feet of the speaker.

3.2. The distant time and space gesture

The distant time and space gesture is used to refer to distant space (very far and/or not known/uncertain) and metaphorically to ancient or future time. This type of gesture is primarily used for unknown space. Yucatec Maya speakers (and YMSL signers) use a geocentric Frame of Reference and tend to use all the gestural space that surrounds the speaker for spatial information. They always use direct pointing to refer to existing places, and not metaphorical pointing when the referent is too distant or if its location is unknown, as Westerners do, see McNeill (2003), McNeill et al. (1993). Thus, if a distant or remote referent lies behind them, they will point in that direction (see Le Guen, 2011b for a detailed explanation of gesture production in relation to frames of references). Basically, when Yucatec Mayas point to existing places the orientation of their gestures is always accurate with respect to the location of the place mentioned. This is not specific to Yucatec Maya, but also occurs in other spoken languages (cf. Haviland (1993, 2000), Levinson (2003) or

Dasen and Mishra (2010), *inter alia*). Furthermore, Yucatec Mayas also use the space surrounding their bodies to locate a distant figure and a distant ground in virtual space with respect to their actual location, i.e. if the figure is north and the ground south, they will point to locate the figure to the north of their body and place the ground southward, usually south of their body (see Le Guen (2011a) for more details). Such use of the gesture space to express spatial information involves a continuum from very precise information indicated in the here-now gestural space, towards a more distant-remote-unknown information located upwards; the middle space is commonly used to point to existing locations, i.e. only for spatial reference. Remote space is localised on top of the head of the speaker, and this is where distant time is mapped. Interestingly, in Yucatec Maya gestures, both the past and the future are metaphorically mapped onto the same *distant space* gestural space: above the speaker's head, but never backwards. The *distant time and space gesture* usually occurs with time references such as *úuch* (*ka'achi'*) 'very distant past', but also with *yan uyúuchtal* 'distant future' (see Figure 2 in Section 3.4). The lack of metaphorical timeline for temporal gestures that oppose 'not now' vs. remote time has not yet been documented in spoken languages but it is attested in sign languages (see section 5). This conflation of past and future also exists, unsurprisingly, in YMSL, as shown below.

3.3. The rolling gesture

The rolling gesture is used to refer to repetitive events and time unfolding. Elicitations conducted with several informants as well as results from non-verbal tasks (see Le Guen and Pool Balam, 2012) made clear that Yucatec Maya speakers do not conceive of time unfolding as a line, i.e. events are not organized along a metaphorical line in space (neither front-back, left-right or down-up). Yucatec Maya speakers, as the linguistics of time in their language would predict, conceive of events in terms of their completion and, to put it briefly, for Yucatec Mayas 'time does not go anywhere.' In order to represent an event's completion or more generally time unfolding, speakers use variations of the rolling gesture, allowing them to represent it visuo-spatially, as happening at one and the same point in space. Among Yucatec Mayas, the rolling gesture seems the *only* way to represent time unfolding. In the representation of sequences of events, one *rolling gesture* would represent one event and the next gesture the following event, etc., and this corresponds to the more general non-linear cyclic conception of time in this culture (see Le Guen and Pool Balam, 2012, for more detail). The rolling

gesture occurs in spontaneous discourse with time references such as *kàada áanyo* ‘every year’ but also *tusigyènte diya/ken sáaschahke* ‘the next day.’ The *rolling gesture* occurred 16 times out of the 35 total time gestures (46%). This gesture is performed with one hand or one finger (10 gestures, 63%) or with both hands, one rotating around the other (6 gestures, 38%). The rolling gesture is not, however, always performed as a full circle (i.e. a 360 degree movement, Figure 1a) but is also realised as a half circle (i.e. a 180 degree movement, Figure 1b). Often a flat hand or a finger is placed at the chest level, around which the dominant hand rotates, as presented in Figure 1b.



Figure 1. Example of rolling gesture (a) 360 degrees and (b) 180 degrees

3.4. No distinction in gesture between past and future direction

What is striking in the way that the Yucatec Maya gesture about time is the fact that they do not distinguish past and future. This contrasts with many spoken languages where speakers consistently use a metaphorical gestural time line (e.g. front-back) to make this opposition between past and future (Calbris, 1990; Casasanto & Jasmin, in press; Cooperrider & Núñez, 2009; de Jorio, 2000; Kendon, 1993; Núñez & Sweetser, 2006, inter alia). The absence of a time line in the Yucatec Maya gestural space also coincides nicely with the way in which a succession of events is linguistically expressed, i.e. in terms of completion, with no directionality. Additionally, it also reflects the more general cyclic conception of time where events are thought to unfold and replace each other in the same place.

Data from elicitations and interviews shows that the distant time and space gesture forms used to express past and future are similar to each other,

as shown in the following examples of participants gesturing *ts'uyúuchtal* '(it was) long ago' (Figure 2a) vs. *yan uyúuchtal* 'it will be in a long time' (Figure 2b). Equally, when participants were asked to gesture *sáamal* 'tomorrow' vs. *ho'olyak* 'yesterday' they did not contrast the orientation of the gesture for past and future, as in Figure 2c,d; instead, they produced two rolling gestures (180 degrees) with a similar orientation for both past and future.



Figure 2. Gestures for (a) *ts'uyúuchtal* '(it was) long ago' and (b) *yan uyúuchtal* 'it will be in a long time' [IPM]; and gestures for (c) *sáamal* 'tomorrow' and (d) *ho'olyak* 'yesterday' [MBC]

In sum, for Yucatec Maya speakers, there is no metaphorical time line that expresses time unfolding. The here-now gesture used for precise time (and space) contrasts with distant/remote non-precise gesture for time (and space). It is also clear that in Yucatec Maya gestures for time, there is no opposition in directionality between past and future. In order to be able to gesture about time unfolding, the Yucatec Maya use the rolling gesture that, again, does not contrast past and future. Elicitations with informants show that they instead conceive of events as replacing each other in space (see Le Guen and Pool Balam 2012, for more details on this point). As a consequence, sequences of events have no linear organisation and no direction. The use of a geocentric frame of reference also constrains the use of the gestural space for time.

4. From time gesture to time sign

In order to describe how time reference is accomplished in YMSL, I rely on two types of data: structured interviews designed to specifically elicit time signs and monologue narratives produced spontaneously by signers, addressed to me and to other signers. In this section, I show that many of the gestural strategies used among speakers of Yucatec Maya are taken up in YMSL and adapted to the specificities of this language. Like spoken Yucatec Maya, YMSL seems to lack grammatical tense (although it has lexical aspect). Additionally, as in Yucatec Maya, there is no metaphorical time line to organise sequences of events in space.

The reader will notice that not all the signs presented in this chapter are glossed in the same way. Some signs are specific to sign language grammars and are glossed accordingly (e.g. PRO-1 for first person). Others are glossed in Yucatec Maya and translated into English. The motivation for this choice lies in the fact that many signs have an equivalent in the Yucatec Maya gestural repertoire, from which they originate. In some cases, signs are calques from Yucatec Maya idiomatic expressions. Another fact that supports this choice is that translations of signs by bilinguals are usually in Yucatec Maya; when signs are translated into Spanish for non-Maya speakers, this is via the initial translation into Yucatec Maya. Not only are some of the bilingual informants more comfortable glossing signs in Yucatec Maya, but when conversing with a deaf person, they often start the first few sentences by signing and speaking Yucatec Maya at the same time. Finally, the lexical signs that have no direct equivalent in the Yucatec Maya gestural repertoire are directly glossed in English for convenience.

4.1. Other forms of time keeping in Yucatec Maya and YMSL

In this section I mainly describe forms of time keeping in YMSL that have their roots in gesture. More information on this matter can be found in Le Guen and Pool Balam (2012).

Although there is no metaphorical time line among Yucatec Mayas, they use the movement of the sun and of the moon to indicate the time of the day along a ‘celestial time line’ (cf. DeVos, forthcoming, for Kata Kolok). Speakers use metonymic pointing to indicate the position of the sun or the

moon in the sky (in absentia) in order to refer to the time of the day. Thus, pointing straight up to indicate the position of the sun means midday and pointing 45 degrees east expresses a time around 10am. Crucially, these types of reference are limited to time of day and cannot be used to refer to past or future time in general.

Another common gestural strategy used by Yucatec Maya speakers to keep track of time is referring to the number, age and height of children. Speakers commonly refer to a particular event showing the height of a child (e.g. ‘Last time you came, my first born was this tall [+ flat hand gesture].’ This height gesture is used in YMSL as a human classifier (see Figure 12).⁷

Finally, in order to indicate sequences of events, Yucatec Maya speakers generally count on their fingers starting with the little finger (the smallest one meaning the smallest number) up to the thumb. For instance, in a discourse about the activities conducted during the Holy Days, the speaker refers to day 1 pointing to her little finger, to day 2 on the ring finger, etc. This strategy is also productive in YMSL (see Figure 13 below). These strategies are taken up and adapted in YMSL (see sections 4.3 and 4.4).

4.2. Time units

In YMSL there is no sign for ‘day.’ The use of a celestial time line, such as pointing to the sun to indicate the time of day is, surprisingly, not common among signers, although it is among speakers. As far as I am aware, the point to the moon is not used in YMSL.⁸ Still, signers are aware of the position of the sun and they indicate events like ‘dawn’ and ‘dusk’ instead of a particular hour. Conventional signs for (TUN) SÁASTAL ‘(BECOMING) CLEAR (i.e. DAWN)’ and (TUN) E’HOCH’E’ENTAL ‘(BECOMING) DUSKY’ have their roots in Yucatec Maya gestures. Examples in Figure 3 and Figure 4 show how the Yucatec Maya idiom for dawn *tunp’il uyich k’iin* ‘the sun opens its eye’ is gestured by a speaker from Kopchen not acquainted with deaf using opening hands (Figure 3) and how it is signed by a signer from Chican (Figure 4). In order to disambiguate the idiom “the sun opens its eye” from the action of “opening an eye” the signer first points to the east where the sun comes up. The YMSL sign seems to be a calque from the expression in Yucatec Maya language and gesture. The sign for dusk is done the opposite way by closing hands.



Figure 3. Speaker from Kopchen gesturing *tunsáastal, tunp'il uyich k'iin* 'it's becoming clear (dawn), the sun opens its eye' [DCC]



EAST

(TUN)P'IL UYICH (K'IIN) 'OPEN EYE (SUN)'

Figure 4. Signer from Chican signing DAWN

[StCC]

Signers from Chican have invented signs for each day of the week and some signs for the months. The signs for the days are presented in Figure 5 by a woman bilingual in spoken Yucatec and YMSL, who is the sister and niece of various deaf signers of interactional groups 1 and 2. The sign for SUNDAY is done with both hands: thumbs up and index fingers extended in order to iconically represent a rifle. This is also the sign for RIFLE and HUNT, both *ts'on* in Yucatec Maya, because Sunday is typically the day when people go to hunt collectively (called *p'uh* in Yucatec Maya). The sign for MONDAY reproduces the salute to the flag, the Spanish *saludo a la bandera*, done by students on Monday when entering school. Note that in interactional groups 4 and 5, for instance, signers do not use the sign for MONDAY, but the sign for SUNDAY plus one rolling gesture, which is the sign PASSt(ime) (see Section 4.3), i.e.: SUNDAY+1. The sign for TUESDAY is MONDAY +1, and, in some interactional groups, it is SUNDAY+2 (i.e. two rolling signs). WEDNESDAY is done either with two fingers next to the head opening and

closing, or with the hand above or on top of the head and shaking with all the finger tips pointing upward. According to some informants, this sign refers to a children's program that is broadcast on Wednesdays. However, in some interactional groups, WEDNESDAY is signed with the index finger oriented towards one's arm to iconically represent a syringe or more broadly 'getting a shot,' indexing the fact that government doctors and nurses come on Wednesdays to provide consultations and medicines. The sign for THURSDAY is WEDNESDAY (either sign) +1. The sign for FRIDAY is done with an open hand waving from one side to the other. This sign represents the movement of the fanning of the matador's cape and refers to the televised *corrida* (bullfight) on Friday. Other bilingual informants have also identified the same sign as meaning HAMMOCK, for Friday is the day when the hammocks woven by people in Chican are picked up by foreign contractors. SATURDAY is done with a fist punching the jaw and represents the act of boxing, indexing the airing of boxing on Saturday. It is important to recall that at less than 70 years old, YMSL is a young language that evolved with modern media, including television, a visual input *par excellence*.



Figure 5. The signs for days of the week in Chican [PUC]

Signs for names of months were only mentioned by bilinguals of interactional groups 1 and 2 and do not seem to be in use in everyday conversation. Signs for the days also vary among interactional groups and some signs seem to be known by everyone while others are not. However, this is

not a problem for communication since signers always have the resource of adding the rolling sign, similar to the rolling gesture of the speakers, to add one or several day(s) to a sign for a day of the week. As shown in Figure 5, in Chican TUESDAY and THURSDAY are compounded as MONDAY+1 and WEDNESDAY+1 respectively. All signs of the days are iconic-indexical, at least in their original state, meaning that they iconically represent an event or part of an event and index the day that this event occurs. However, when deaf individuals and their co-signers were asked about the origins of signs, most of them could only retrieve with confidence SUNDAY, MONDAY and sometimes SATURDAY. This indicates that signs tend to lose their iconic meaning when they become conventionalized symbols (see for instance Keller, 1998).

Additionally, signers can also make use of numbers and days of the week to refer to deictic time (i.e. date is calculated from the moment of the utterance). For instance, a signer from Chican explains that she will get married in 7 weeks, using the names of the days and numbers to refer to a future event: PRO-1 7 SATURDAY 7 'I (will get married) in 7 Saturdays (from now).'

4.3. Temporal and indexical adverbs

Like spoken Yucatec Maya, YMSL has a number of ways to refer to deictic time, i.e. reference with respect to the moment of utterance production. Time adverbs are used, like in Yucatec Maya, to define a reference point in time. YMSL distinguishes between temporal adverbs NOW vs. REMOTE TIME (past or future) and indexical time deictics such as TOMORROW or IN 2 DAYS.

Time deictics in YMSL oppose present and non-present. The signs are formally and (to some extent) semantically equivalent to the spontaneous gestures described in section 3.1, the "here-now" gesture pointing at the speaker's feet, and the "distant time" gesture for remote past or future, performed over the speaker's head. I gloss the corresponding signs in YMSL as 'HERE-NOW' and as ÚUCH '(a) LONG TIME.'⁹ Figure 6a presents the sign for NOW / TODAY that can also mean 'here' (see section 5.1 on disambiguation). Figure 6b presents the sign for ÚUCH 'LONG TIME' here produced to refer to past time. Figure 6c shows an idiomatic expression calqued from Yucatec Maya, *ya'ab ubin* 'in a long time in the future' (lit. 'a lot is to go') reproduced almost literally in sign. It is composed of the sign YA'AB 'A LOT' (done the same way in Yucatec Maya co-speech gesture but

here with an additional intensifier expressed via a facial cue) and the ÚUCH sign. Interestingly, the mapping to space is equivalent since arguably, the distant time/space sign ÚUCH resembles the gesture typically produced with the verb *bin* ‘go.’¹⁰

BE’OORA/BEHLA’AKE’	ÚUCH	YA’AB	ÚUCH
NOW(ADAYS)/TODAY	LONG TIME	IN A LONG TIME (future)	

Figure 6. Time deictics in YMSL [StCC]

The rolling gesture has also been adapted in YMSL. Since in Yucatec Maya the rolling sign is glossed as *bey umáan k’iin*, lit. ‘like time is passing’ (from the verb *máan* ‘pass by, move’) but meaning something closer to the English ‘time unfolding, time evolution’, I shall gloss the sign PASSt(ime). Just as the rolling gesture described in section 3.3, the PASSt sign is produced either as a 180 degree semi-circle (Figure 7a) or as a 360 degree rotation. It can mean either TOMORROW or YESTERDAY depending on the context. Some variation exists among signers and a specific sign for YESTERDAY, also sometimes used for past times, is occasionally produced as PASSt rotated backward, as in Figure 7b. However, note that in the elicited form presented in Figure 7b the signer first uses the sign TS’OK ‘FINISH’ (see below) in order to specify that he is talking about something that ended - that is, in the past - which contrasts with the sign he previously made for TOMORROW in Figure 7a. The use of the TS’OK sign is one strategy used to disambiguate future from past times (see section 4.4), as is the use of the sign PASSt produced with a backward rotation, although the latter does not yet seem to be systematised in the language and is rare in spontaneous discourse. As in ASL for instance (Liddell, 2003, p. 20), the integration of numbers in deictic time reference is productive in YMSL. In Figure 7c, the signers produced the number 2 and the PASSt sign to refer to KA’ABEH ‘IN 2 DAYS.’

SÁAMAL/ HO'OLYAK	HO'OLYAK	KA'ABEH
'TOMORROW/ YESTERDAY'	'YESTERDAY'	'IN 2 DAYS'

Figure 7. Indexical time signs in YMSL [StCC]

The sign EVERYDAY / A LONG TIME is done with the PASSt sign repeated several times. In this case, the sign can also be intensified either by slowing down the movement and/or making multiple circles and complemented with a non-manual facial marker ('pain face'). In Figure 8, a signer mentions that she is going to work tomorrow. The meaning of the PASSt sign as 'tomorrow' in this particular context relies on the fact that it is produced after the sign for HERE-NOW. Additionally, the reference to the work activity P'O' 'WASH' is a synecdoche for all the types of work she does (see also Figure 13 in Section 4.4), and the distant place (in this case Mérida, where the pointing is directed) reinforces the contextual interpretation of the sign as MONDAY, the day she is going back to work in the city. Note that the PASSt is done with both hands, one being stable at the chest, around which the other rotates 180 degrees, the same way it is performed in Yucatec Maya spontaneous gesture (Figure 1b in section 3.3).

BEHLAE'	PASSt	PRO-1	BIN	P'O'
'TODAY'	'TOMORROW'	'I'	'GO'	'WORK'

Figure 8. 'Tomorrow, I'll go to work (in Mérida)' [LTP]

The sign PASSt can also be used as a deictic marker meaning ‘several days from now,’ as in Figure 9 where the signer explains that they will have a meal organized by a researcher (E.) with all the deaf in the village. In this case, the signer (GUC) does not give any precise time. The iterative production of PASSt (done twice, Figure 9c) conveys the meaning of ‘several days’ (from now). As a matter of fact, the same sign could also mean ‘in 2 days from now,’ but the prosody and the shared background knowledge that the meal will take place in a few more days is enough to disambiguate the meaning of the sign in this utterance. As mentioned above, if the speaker had wanted to be more precise about the date, he could have used a numeral along with the PASSt sign, as in Figure 7c.



HANAL 'EAT' YA'AB 'A LOT'

Figure 9. ‘We will get together to eat in a few days, we’ll eat together’ [GUC]

An example used with 7 and PASSt to represent ‘7 weeks’ is presented below in Figure 10. In this case, the inference that the event described will take place in seven weeks and not in seven days or months is based on previous shared knowledge.

4.4. Other signs used for time

TS'OK sign could be glossed as 'FINISH.' The sign originates from the Yucatec Maya gesture TS'OK, which co-occurs with the completive marker *ts'(ok)* or other verbal references to completive events. Use of the YMSL sign resembles the completive aspect *ts'(ok)* of spoken Yucatec Maya, and therefore I shall gloss it as TS'OK. Note that in many sign languages, signs such as FINISH or WILL are used as aspect markers (see for instance Fischer and Gough (1999) or Valli et al. (2000) for ASL).

The gesture TS'OK is often produced at the end of Yucatec Maya narratives, usually with the verbal expression *ti' ts'o'oki* 'there it ends.' The gesture and the sign are performed in the same way: both flat hands cross each other at the centre of the body and move outwards towards the left and right. The gesture and the sign can also be performed with one hand. In YMSL, we note a similar use of the sign TS'OK at the end of narratives. But the use of the TS'OK sign in YMSL is much broader than the gesture use and seems to have evolved to act as a discourse maker, equivalent to a full stop in written language. It is very frequent at the end of utterances or chunks of discourses (see TS'OK₂ in Figure 10 for instance). A similar description of completive aspect in Kata Kolok can also be found in De Vos (this volume).

The sign TS'OK seems to also be used as a marker of completive aspect, for instance before or after any given time sign. In Figure 10, a signer is talking about his future wedding. Since he is not married yet, we can safely assume that the events he describes are located in the future. In Figure 10, TS'OK₁ is performed after the PASS_t sign is done twice and implies a new temporal reference 'when some time has passed' (in this case 7 weeks). The sign TS'OK₂ on the other hand marks the end of the utterance. We note that the second TS'OK is larger than the first. Additionally, TS'OK₁ is not prosodically detached from the surrounding signs, while for TS'OK₂ the signer makes a short pause (1s) after the preparation phase of the sign (i.e. when the arms are crossed) and before the stroke (extended arms).



Figure 10. ‘I will get married in 7 weeks. It is a civil wedding (we’ll sign the papers).
Soon now (= in a little bit)!’ [ACC]

Another use of TS’OK, also somewhat similar to Yucatec Maya, is to talk about sequences. In this sense, this use of TS’OK in YMSL is parallel to the conjunction *ka’ ts’ohke’/ken ts’o’okok* ‘when it was/will be done’ also used to describe sequences of events in spoken Yucatec Maya (see example 4 above). In the following example (Figure 11), a young signer describes the kind of work she does in the city. In order to separate each event, she uses the sign TS’OK that could be translated in English as ‘and’ or only as a comma.



Figure 11. 'I wash (clothes) and I mop, and ...' [LTP]

Another sign also used for temporal reference is the sign HUMP'ÍIT 'A LITTLE.' This sign has a direct equivalent in Yucatec Maya gesture and, as in YMSL, can also refer to quantity of objects or quantity of time. It is done using the thumb and the index finger close to one another as if showing the size of something small. The sign is presented in Figure 10 (still 3 of the second line).

The sign PA'ATIKI' 'WAIT (FOR IT)' can also be used to refer to time. Among the Yucatec Mayas, this gesture is performed with an open flat hand that moves forward one or more times. PA'ATIKI' is a holophrastic gesture (i.e. a gesture that can replace a verbal utterance) meaning that it can be used with or without speech, and has some illocutionary or performative force, as in the case of 'come here' or 'go' (see Poggi cited in Kendon 1992). Holophrastic gestures occur frequently in Yucatec Maya conversation. Often, holophrastic gestures replace speech in a preliminary non-verbal stage of conversation among Yucatec Mayas. For instance, it is not uncommon for two speakers at some distance to communicate 'what's going on?', 'where are you going?', etc., using, e.g., a gesture with open hands moving outwards that functions as a question marker (used also as such in YMSL) and a point in the direction that one is going. In YMSL, although PA'ATIKI' can have

illocutionary force, the sign is also used for temporal reference meaning 'wait for some time'; the two uses are differentiated by their syntactic context. When used for time reference, PA'ATIKI' seems to mark periods or intervals of time, though without precision. In some cases, it is used to refer to a period of time between two future events, as in Figure 10 where it follows the HUMP'ÍIT 'A LITTLE' sign. It is the sequential arrangement of the two signs that gives them their temporal meaning. In Figure 12, a signer relates how some people get robbed by government administrators, who keep for themselves the money they should distribute. In the following extract, the signer is talking about the case of his sister, who is single and does not get paid, although everyone else does, for the money comes from a Mexican national program. In the extract, the sign PA'ATIKI' is followed by the sign PASS_t and implies that some time passes between the two events that precede and follow.

Finally, YMSL also uses buoys to make reference to time or sequences of events, a strategy also found in ASL (Liddell 2003, pp. 223ff). Figure 13 presents an example of the use of buoys in YMSL. In this example the signer summarises all the tasks she does as a housekeeper in Mérida. In order to describe the sequences of events (i.e. the different tasks) she uses buoys. Interestingly, buoys are used in the same way in YMSL and among Yucatec Maya speakers: counting from the little finger up to the thumb and again on the other hand (consider for instance the use of 6 in Figure 13 still 4, second line). This manner of counting using buoys in YMSL contrasts with ASL, where signers use the index finger to stand as 1 and count up to the little finger (4) and, if necessary, add to thumb for FIVE-LIST buoys (Liddell 2003, p. 228). Note also the use of TS'OK 'FINISH' in Figure 13 to demarcate the two first events; TS'OK is not used afterward since it is redundant with the use of buoys.



Figure 12. ‘My sister MCC, she’s on her own (not married), (but) she doesn’t get paid, she (goes to) do all the paperwork, time passes and when (the government person) comes (in the village) he pays everyone’ [JCC]



1
'FIRST'

P'O'
'WASH'

TS'OK

2
'SECOND'

'FOLD
(cloth)'

(...)

'ARRANGE'

3
'THIRD'

IRON

6
'SIXTH'

WIPE

Figure 13. 'One thing I do is (hand-)wash (clothes). That's it (= that's one thing). Second, I fold (the clothes and) stack them. Third, I iron (the clothes) (...). Six, I clean the windows' [LTP]

5. Discussion

An examination of the conception of time in speech and gesture in Yucatec Maya and in YMSL shows that both are quite similar in the way they linguistically conceptualize deictic and sequential time. However, even if we can argue that Yucatec Maya and YMSL are two languages in contact, YMSL is an independent language that has developed specific strategies to talk about time, given its expression in only the manual modality in contrast with Yucatec Maya, which makes use of both verbal and manual channels. In this section, I discuss in more detail the linguistic evolution from Yucatec Maya gestures to YMSL signs in the domain of time.

5.1 Disambiguation of time adverbs

In the absence of grammatical tense, Yucatec Maya as well as YMSL use temporal adverbs to express discourse time and aspect (see De Vos, this

volume for discussion of a similar phenomenon in Kata Kolok). Despite the mapping of space onto time and the lack of opposition between past and future in gesture, Yucatec Maya speakers can always use words to clarify or disambiguate when gesturing about time or space, past or present. However, when YMSL signers use the time and space gestures, they face two problems: first, disambiguating space from time, and second, in temporal reference, disambiguating past from future. Two main strategies emerge from the data for disambiguation in YMSL. The first happens at the discourse level and mainly relies on previous shared background knowledge about the event described (as exemplified in Figure 9 and Figure 10). At the utterance level, various forms of disambiguation are possible. One is *compositionality*. What I mean by compositionality is that two signs are produced contiguously and are not semantically independent from each other. That is, for some signs the spatial or temporal meaning is determined by the following sign. This is the case in Figure 7, Figure 8, Figure 10 and Figure 12. A second strategy relies on the *utterance elements or surrounding context* that allows for inference about space or time and past or future. For instance, in Figure 8 the signer says she is going to work and since the recording was made on Sunday we can infer that she means Monday. Finally, we note a tendency among certain bilingual signers and in particularly ambiguous contexts, to *perform the PASSt backward (i.e. with a reversed rotation) to represent the past*. This iconic solution allows disambiguation and is particularly suited to expressing time contrasts in the gestural modality.

5.2 Evolution of co-speech gesture into sign

It is striking that a large number of signs in YMSL originate in Yucatec Maya co-speech gestures (Shuman, 1980). This means that the Yucatec Maya gestural repertoire is not only vast but that many gestures belong to the category of 'quotable gestures' (Kendon, 1992) having a stable and systematic form and meaning. As a matter of fact, when speakers are asked to gesture concepts of time (as well as more lexical gestures, e.g. YA'AB 'many'), the data show a consistency in the gesture forms produced that suggests easy recall and recognition on the part of Yucatec Maya speakers. The fact that the two languages share a lot of gestural forms is one of the reasons why Yucatec Maya speakers acquire YMSL with relative ease.

Additionally, we also notice some calques (i.e. word-to-word translations) from Yucatec to the target language YMSL. This is unsurprising given that most of the signers are in fact bilingual in spoken Yucatec Maya and

YMSL. The expression *tunp'il uyich k'iin* 'the sun opens its eye' (Figure 4) is based on a cultural conception of the sun is an animate being having an eye, more precisely, a divinity referred to as *Yum K'iin* 'Lord Sun.' Such use in YMSL suggests cultural transmission and calibration between hearing and deaf people.

When gestures are adapted as signs, they undergo some important modifications. Besides the obvious changes in syntactic position, gestures become significantly more reduced when transformed into signs, and points of articulation may be modified. Compare, for instance, the citation form for ÚUCH in co-speech gesture and sign (Figure 2 vs. Figure 6). Phonological reduction is expected for sign language in order to facilitate language production; Zeshan (2003) considers this process of grammaticalization from gesture to sign under the category of 'loss of phonetic substance'.

time reference is present in both Yucatec Maya (e.g. *ka'a-beh* 'in 2 days' is literally '2-paths', *óox-yak* '3 days ago', lit. 3-past.marker) and in YMSL. However, Yucatec Maya has only lexicalized words for three days in the past and three days in the future and then jumps to eight days for a week cycle (for instance **ho'beeh* 'in five days' does not exist in Yucatec Maya). YMSL signers in contrast use numeral incorporation productively. We also notice that YMSL as well as Yucatec Maya make use of buoys in order to refer to series and sequential time in the same way, starting from the little finger and going up to the thumb.

There are some arguments to suggest that absence of grammatical tense in YMSL is not inherited from Yucatec Maya. Pfau and Steinbach (2006) suggest that the grammaticalization of temporal concepts in language starts from lexical elements (nouns or verbs), then evolves to functional elements (adverbs) and eventually develops into affixation (i.e. tense or agreement). In sign languages, grammatical tense is rare, even if the surrounding spoken language has tense. For instance, although Hebrew and standard Arabic have grammatical tense, Israeli Sign Language does not (Meir & Sandler, 2008, p. 89). ISL, like many sign languages, has a number of adverbial forms for time and several aspects (see also De Vos (forthcoming) for Kata Kolok). Tense as an inflectional category on verbs seems to be problematic for sign languages, especially tense inflection of verbs (but see Fridman-Mintz (2010) on Mexican SL). Movements in space are often already exploited to inflect verbs for pronominal reference, and additional changes in the form of the sign would increase difficulty in sign recognition. Several spoken languages around the world also lack to various degrees grammatical tense (see Bohnemeyer (2009) for references). The fact that both Yucatec Maya and YMSL rely on an identical system without grammatical tense makes it easier for bilinguals to express temporal relationships. In my own experience as a native speaker of French and speaker of other Indo-European languages, expressing sequences of time in Yucatec Maya represents a tremendous mental exercise, since using only temporal anaphora is not an intuitive strategy for speakers of languages with grammatical tense.

This exploration in the domain of time gesture and time signs shows that Yucatec Maya and YMSL are two languages in contact and that there are important transfers from Yucatec Maya to the emerging YMSL, facilitated by the vast repertoire of systematic co-speech quotable gestures of Yucatec Maya. We notice a similar conception of time and parallel forms to express deictic and sequential time in both languages.

Another conclusion that we can draw from the examination of the domain of time in Yucatec Maya and in YMSL is that village sign languages

are not independent of their surrounding sociolinguistic context. It is not uncommon in sign language research to reject or simply ignore the importance of the gestures used in the surrounding speaking community as input for the construction of a sign language. Various researchers have however pointed out the limitation of such a stance (Fusellier-Souza, 2004; Marsaja, 2008; Russo & Volterra, 2005, *inter alia*). Considering US English co-speech gestures, McNeill (1992) argues that these are mainly improvised with speech and hence have no stable form or meaning, unlike signs in sign languages. Such lack of systematicity in co-speech gestures is not without consequences in the development of non-institutional sign languages. For instance, Goldin-Meadow and Mylander (1984) emphasize the poor input from American parents in the development of Home Sign systems in the US.

In this respect the Yucatec Maya setting contrasts drastically with the US setting. Yucatec Maya speakers gesture a lot (see Table 2) and accompany their speech with a substantial number of quotable gestures that have a stable form and meaning. As shown in this chapter, the importance of quotable gestures as an input for YMSL is visible in a semantic domain like time, but also in many lexical entries of YMSL, some shown throughout this paper. Crucially, the lack of systematicity between speakers or variants in certain semantic domains of YMSL arises in domains that are not ‘gestured’ in Yucatec Maya. For instance, colour terms vary dramatically between the two variants of YMSL in Chican and Nohkop because Yucatec Maya uses only spoken lexical items for this domain and no gestures. As a consequence, signers have to invent signs from scratch. In the time domain, we also notice some variation in sub-domains such as the names of the days. Yucatec Maya uses a verbal lexicon with loan words from Spanish for the names of the days of the week. Not surprisingly, this is where variations arise in YMSL: the Nohkop variant has only one sign for this sub-domain, the one for SUNDAY: K’OP (the sign is glossed after a conventional way of knocking someone’s head with the fist). The sign, as many signs for days in Chican, has been invented with reference to a TV show for children aired on Sunday. In this show, one kid usually knocks his acolyte on the head. Calculation of the following/preceding days is done in reference to Sunday with the addition of the PASSt sign, as in Chican. In Chican, individual variations also exist among signers for the names of the days (see section 4.1), but not for the deictic time markers that are similar to or adapted from Yucatec Maya co-speech gestures. In sum, the specificities of the Yucatec Maya setting (notably the presence of an important quotable gesture repertoire but also the Maya attitude towards deafness) mean that deaf persons born in this setting are much better off in terms of communication and social integration than

in most western contexts (where deaf people need to be taught conventional sign language within an institution, usually separate from other institutional settings where hearing people communicate).

Finally, the absence of a time line to order events sequentially and of directionality of time flow is original with respect to many spoken and sign languages described. Evans and Levinson (2009) point out the impoverished exploration of the possibility space for linguistic evolution in the linguistics research field, especially because of the focus on Indo-European languages. Hence, descriptions of new emergent non-western sign languages are crucial for sign language typology in particular, but also for language typology in general.

Notes

1. The reason for this name lies, according to some villagers, in that the village was constructed on a prehispanic setting and a big snake's head was found there. An alternative explanation for the name, also given by the villagers, is that it would originate from *chi'ikam* 'jicama' for the setting of the village would have been a place of abundance of this plant. Note that the village has changed name and is previously known as Nohya or, in Yucatec Maya, *noh ya'* '(the) big Chicozapote.' Note that official village names get reduced according to the phonology of Spanish and hence get modified in writing.
2. Several informants who have minimal interaction with deaf individuals have pointed out this fact. Also, my own experience as a fluent speaker of Yucatec Maya and that of my colleague, Lorena Pool Balam, a native speaker of Yucatec Maya, supports this notion.
3. During our stays in Chican with my colleague Lorena Pool Balam, we never attempted to gather deaf signers and have only visited deaf signers in their home.
4. Note that most of the time, extended family live in a similar neighbourhood so neighbours are kin (usually, cousins), but this is not always the case.
5. Klein (2009) contrasts the time of utterance (i.e. the time at which the utterance is expressed), the topic time (i.e. the time about which something is asserted or asked) and the time of the situation (i.e. the time at which the situation obtains or occurs)
6. For this research I benefited from the help of Lorena Pool Balam.
7. Nyst (2007) mentions a similar strategy in Adamorobe Sign Language, which she calls 'growth-line.'

8. Note that among Yucatec Mayas pointing to the moon in another form of time keeping (see Le Guen and Pool Balam, 2012, for details).
9. This is the gloss used by bilinguals for this sign.
10. The quotable gesture *bin* ‘go’ looks like the temporal gesture in Figure 2. However, the upward gesture used with spatial reference is more refined in this domain, so speakers can vary meaningfully the height and the direction of the gesture, even the movement and the hand shape (see Le Guen 2011b for details).

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