Numeral Variation in Yucatec Maya Sign Languages

Abstract

In this article, we examine various strategies used to express cardinal numbers in Yucatec Maya Sign Languages (YMSLs) from three historically unrelated communities in Yucatán, Mexico: Chicán, Nohkop, and Cepeda Peraza. Our findings describe some numeral strategies, which remained unattested in previous accounts, and demonstrate that YMSL numerals exhibit patterns of systematic inter- and intracommunity variation as a result of linguistic and sociolinguistic factors. These patterns are still in process of becoming solidified and a high level of individual variation persists. The analysis of numerals in YMSLs provides us with an excellent opportunity to observe the emergence of sociolinguistic variation in young village sign languages.

Our study is based on data from elicitation, natural conversations, and interviews, and takes into account several aspects: the influence of Yucatec Maya gestures on the formation of YMSL numeral signs, the regional and intracommunity distribution of numeral signs and numeral strategies, the impact of literacy on YMSL number expression, the existence of familylects and community members’ language attitudes. Finally, we discuss some methodological challenges to studying variation in rural sign languages.

YUCATEC MAYA SIGN LANGUAGES (YMSLs) are a group of sign languages that emerged over the past decades in Yucatec Mayan villages with a high incidence of deafness in Yucatán, Mexico. Even though signers of these communities have not been in contact with each other in the past, their historically unrelated sign languages exhibit striking overlap in their lexicons. On top of similarities rooted in the visual-gestural modality (Currie, Walters, and Meier 2002), these resemblances can be attributed to their shared cultural background and common gestural substrate (Le Guen 2012; Safar 2017). As a consequence, more abstract lexical domains that lack a gestural representation, show a high degree of inter- and intracommunity variation; for instance, higher cardinal numbers. In the literature on numerals, YMSL of the village Chicán received attention because of its typologically rare system including additive base-20 and base-50 numerals (Zeshan et al. 2013). These features are previously unattested in urban sign languages and unrelated to the surrounding spoken languages Yucatec Maya and Spanish or to Mexican Sign Language (Lengua de Señas Mexicanas; LSM). They can thus add important insights to cross-modal and intramodal typology in the number domain (Zeshan et al. 2013; Sagara and Zeshan 2016).

The earlier account on YMSL numerals only focused on the village Chicán and did not consider family-related and individual variation within this community. While Zeshan et al. (2013) highlight YMSL’s typologically unusual system, this article identifies the existence of additional structures and takes variation into account to paint a more complex and more complete picture. This diversity can be illustrated with variants for the sign HUNDRED (figures 1-4).1

In this article, we look at data from elicitation, natural conversations, and interviews recorded in three YMSL communities: Chicán, Nohkop, and Cepeda Peraza.2 Our objective is to describe the variation found in numeral signs and numeral strategies in YMSLs and to find out which linguistic and sociolinguistic factors influence the choice of a certain variant or strategy. Concentrating only on
cardinal numbers, we examine regional and age-related variation in the use of additive and digital numbers and discuss the impact of formal education and literacy on YMSL numerals. Furthermore, we provide evidence for the existence of familylects, signing varieties that originated within an (extended) family of signers, in YMSL of Chicán. Sandler et al. (2011) discuss familylects in Al-Sayyid Bedouin Sign Language. For YMSL, Shuman (1980) noted lexical variation between Chicán signers from different families, but his account remained anecdotal.

Cardinal Numbers in the Signed Modality

Signed languages exhibit rich typological diversity in their numeral systems, including certain structures known from spoken languages as well as modality-specific peculiarities (e.g., simultaneous morphology or spatial modification) (Zeshan et al. 2013; Sagara and Zeshan 2016).

For expressing numbers up to ten, sign languages employ either one- or two-handed strategies (Zeshan et al. 2013, 361). For quantities higher than ten, more complex and diverse patterns can be identified.

A fundamental notion for the analysis of cardinal numbers are “numeral bases,” upon which higher numerals are constructed, most commonly through addition to or multiplication of the base (Comrie 2013). As in spoken languages, base-10 seems to be most common in sign languages of the world (Sagara and Zeshan 2016). YMSL of Chicán is one of the first documented sign languages with nondecimal
The language combines the bases 10, 20, and 50, put together in additive sequences from the largest to the lowest number, such as in FIFTY TWENTY TEN “80”* (Zeshan et al. 2013). Note that YMSL uses these nondecimal bases only as “additive bases”; they cannot undergo multiplication (ibid., 371).

The strategies of number expression documented so far in sign languages are the following (adapted from Sagara and Zeshan [2016, 29] and Zeshan et al. [2013, 361ff.]):

- **Lexical numerals** (e.g., TEN in Swedish Sign Language [SSL])
- **Digital strategy**: sequential signing of digits as they appear in written numbers (e.g., TWO FIVE ZERO “250” in Indo–Pakistani SL)
- **Additive strategy** (e.g., TEN FIVE (10 + 5) “15” in Ugandan SL)
- **Multiplicative strategy** (e.g., TEN THOUSAND [10 x 1,000] “10,000” in SSL)
- **Subtractive strategy** (e.g. FIVE LESS TWO [200 – 5] “195” in Alipur SL [APSL])
- **Simultaneous morphology**: number handshapes are simultaneously combined with specific movements to express multiples (e.g., multiples of 10, 100 or 1,000, such as FORTY in SSL)
- **Spatial modification**: increased spatial articulation of the sign indicates augmentation of the numeral (e.g., THOUSAND in APSL employs a larger signing space than HUNDRED or TEN)

The combination of several strategies is also possible and common, as we will show for YMSLs.

Studies on national sign languages have proved that numbers constitute a domain with substantial variation related to region, age, education, and family background (e.g., McKeen, McKeen, and Major 2011 on New Zealand Sign Language [NZSL] or Stamp et al. 2014 on British Sign Language). Moreover, numerals are often subject to rapid language change: They are sensitive to transformations in deaf education policies (e.g., the introduction of a signed version of a spoken language) and to contact with other sign languages or varieties (e.g., McKeen, McKeen, and Major 2011). Comparable processes of standardization and dialect leveling cannot be expected in the case of YMSLs, where there is no language contact between communities and no institutionalization of the sign language. This allows us to observe how patterns of sociolinguistic variation arise in a language without normative forces from institutions, such as deaf schools.

Communities of Study

**Sociolinguistic Profile**

In this article, we present data from three Yucatec Mayan villages in the peninsula of Yucatán, Mexico. Figure 5 shows the location of four YMSL communities, three of which are included in the study.

Due to a high incidence of deafness in these communities, whose members did not have access to any established sign language, indigenous sign languages emerged independently from institutional contexts. They are unrelated to LSM and are not a signed version of the surrounding spoken language Yucatec Maya. Given the high concentration of deaf people in small, face-to-face settings, almost everyone has deaf relatives or neighbors and the local sign language is shared by deaf and hearing inhabitants.

The villages resemble each other in characteristic features of Yucatec Mayan culture: traditional corn farming, living arrangement on family compounds, daily routines, rituals, etc. They differ, however,
in size and composition of the signing communities. Chicán has a population of 720 (Escobedo Delgado 2012), including seventeen deaf people between 15 and 83 years of age. Deaf signers in Chicán can be divided into seven “interactional groups” (Le Guen 2012, 216). In Nohkop lives a family with five siblings; four of them are deaf and between 17 and 24 years old. There are around thirty hearing signers in the extended family and vicinity. Cepeda Peraza has around 700 inhabitants, with ten deaf people from different families between 27 and 46 years old. For a more detailed sociolinguistic account see Safar (2017).

Previous research has been carried out in Chicán (e.g., Johnson 1991; Escobedo Delgado 2012; Le Guen 2012) and Nohkop (Safar 2017) but detailed linguistic descriptions are lacking. This study is the first to include YMSLs from Cepeda Peraza.

It is controversial whether we are dealing with regional varieties of one common Yucatec Maya Sign Language or separate languages in each village. The case of YMSLs is exceptional in the sense that several languages emerged in the same geographic region without historical contact but with striking similarities due to shared gestural and cultural precursors. There are no directly comparable situations in spoken languages. To account for the important common roots, we chose the unifying label “Yucatec Maya” but speak of “sign languages” in the plural (for further discussion of this issue, see Safar 2017).

All YMSLs are young languages, with three generations of deafness in Chicán and one generation each in Nohkop and Cepeda. The oldest signers in all three communities are still alive.

While the level of formal education and literacy is generally low among the older generation (age 45 and above) in rural Yucatán, most deaf community members received only basic schooling in regular hearing classes, apart from four young deaf people (two in Chicán, two in Cepeda) who finished secondary school. So far, language contact with LSM has been restricted, but it is rising among the younger generation due to increased mobility, networks with LSM signers in Mérida, growing access to technology, and social media.

**Numbers in Spoken Yucatec Maya**

Originally, spoken Yucatec Maya—like many Mesoamerican languages—used a vigesimal (base-20) number system. Since colonial times, however, Spanish numbers and a decimal system replaced the vigesimal one. Today, Yucatec Maya native numbers are only used up to three (sometimes five) and obligatorily accompanied by a number classifier that specifies the type of entity being counted (animacy, size, shape, etc.). For instance, che’ “wood” used with an inanimate classifier p’el, as in jun-p’el che’, means “one tree/piece of wood,” but when used with ki’ul, as in box-ki’ul che’, it refers to “three planted trees” (Lucy 1992). It is even possible (but not obligatory) to combine Yucatec Maya classifiers with Spanish loan numbers as in dos syentos u-ts’it-il che’ (“two hundred sticks of wood”). Despite intense contact between spoken Yucatec Maya and YMSLs, numeral classifiers have not been incorporated into YMSLs.

**Numbers in Yucatec Maya Gestures**

In an account of number gestures, we should distinguish between **showing** and **counting**, which roughly correspond to the linguistic categories **cardinal** versus **ordinal** numbers. While showing displays a number in isolation on the fingers, counting represents a sequence of numbers.

**Counting** As signers do, gesturers commonly recruit “number for number iconicity” (Taub 2001) for counting: Countable entities are mapped onto the hands and the number of fingers iconically represents the target number. Among hearing people in Mexico, and generally in Mesoamerica, we find two main strategies for counting on the fingers. Based on our observations in various contexts and locations in Mexico, it seems that the first one probably originated from European (more specifically Spanish) influence. Counting from one to five starts with the index and consecutively adds the middle finger, ring finger, pinky, and thumb. The same sequence continues on the other hand for six to ten. The second option, used by speakers of Yucatec Maya, appears to be the most common, and probably the indigenous strategy across Mexico. The counting sequence begins with the pinky for one, going up to the thumb for five (figure 6). On the other hand, fingers are added in the same order for six to ten. The order of the fingers (from smaller to bigger) is iconic in Maya; the little finger is called t’up “last child” and the thumb unal’ ka’ab (or in modern Yucatec: umaamal [u]ka’ab “the mother of the hand”).
Showing. When showing numbers in isolation, Yucatec Maya speakers represent them as follows, typically with the palm(s) facing outward: index (one), adding middle finger (two), adding ring finger (three), adding pinky (four), adding thumb (five). Combined with five on the dominant hand, the same order expands to the nondominant hand for six to ten (figure 7). For the number 10, speakers usually add a forward movement. Interestingly, the number three (and more rarely one and two) can be shown based on the same order as counting, as in starting with the pinky (one), adding ring finger (two), and then middle finger (three) (see figures 11 and 12 for YMSL).

For 10–19, speakers sequentially combine “10” and the numbers one to nine. For numbers over 20, gesturers also use an additive strategy: Each multiple of ten is repeated with a forward movement, followed by the number one to nine, such as ten ten one for “21” (figure 8).

Numbers over 30 are usually not encoded in gesture but only produced verbally. “One hundred” can occasionally be gestured with the index; its interpretation is, however, context-dependent.

Methodology
The YMSL data for this study was collected from a total of twenty-seven participants in Chicán, Nohkop, and Cepeda Peraza (see table 1).

<table>
<thead>
<tr>
<th>Village</th>
<th>Deaf</th>
<th>Hearing</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
<th>Age Range (at date of recording)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicán</td>
<td>14</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td>17</td>
<td>13–63</td>
</tr>
<tr>
<td>Nohkop</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>6</td>
<td>14–22</td>
</tr>
<tr>
<td>Cepeda</td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>27–35</td>
</tr>
<tr>
<td>All</td>
<td>22</td>
<td>5</td>
<td>15</td>
<td>12</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>
The majority of the participants ($n = 22$) are deaf signers who use YMSL as their only language and five participants are hearing bimodal-bilingual signers who learned YMSL from birth.

The majority of the participants have a low level of literacy, and elicitation techniques had to be chosen accordingly. Certain methods (e.g., the arithmetic game described in Sagara and Zeshan 2016), are not suitable for participants with little formal schooling, but all participants do handle money on a daily basis and are familiar with its value. For this reason, we conducted a picture elicitation task similar to the “monetary value activity” employed by Zeshan et al. (2013, 367). Photos of Mexican pesos (coins and bills) in variable quantities and arrangements were shown to participants on a tablet. The material was pilot tested with two signers in Chicá. In the stimulus set, we also included control items showing objects in easily countable quantities to see whether there are distinct number signs for monetary units.

Because the stimulus arrangement in the task and the elicitation situation itself can influence the choice of strategy for number expression, elicited data was cross-checked and complemented with data from conversations and narrations. Additionally, we interviewed signers about certain variants that caught our attention in the elicited and conversational data. The videos were transcribed in ELAN, following the annotation conventions applied by Zeshan et al. (2013). We use the ^ symbol to indicate sequential compounds (e.g., twenty^ten “30”) and the # symbol for simultaneous articulation on both hands (e.g., five#two “7”).

Cardinal Numbers in YMSLs
In this section, we only report findings that diverge from the results in Zeshan et al. (2013) or are absent therein.

1–10
For the cardinal numbers 1–10 (figure 9), signers from all three villages use a two-handed strategy, starting with holding up the index for one, followed by index and middle finger for two.

Note that for ordinal numbers (or “list buoys” in discourse; Liddell 2003), YMSLs maintain the counting sequence from Yucatec Mayan gesture, starting from the pinky (figure 10).

YMSLs of all three villages have an interrogative (one-handed or two-handed) sign for how-much/how-many* derived from the fast articulation of counting from one to five from pinky to thumb.

The number three has two handshape variants (figures 11–13), formed by either index/middle/ring finger or pinky/ring/middle finger, the latter one being more frequent. The index variant is used more often in isolation, while the pinky variant can occur in isolation, in sequential compounds (e.g., ten^three “13”) or simultaneous combinations (e.g., five#three “8”).

Figure 9. YMSL numbers 1–10.

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Figure 10. List buoy “1” in YMSL.
One-handed sequential combinations for six to nine, as described by Zeshan et al. (2013, 369), were rare in our data, but we observed these forms in situations when signers were forced to sign one-handed (e.g., when holding something in the other hand).

The numbers one to nine exhibit variation in terms of palm orientation. When they stand in isolation, one to nine can be signed with the palm(s) facing either inward or outward (figures 12 and 13). In the final position of sequential compounds (e.g., fifty ^ twenty ^ ten ^ three “83”) the palm-out variant is preferred.

In Chicán, there are three variants for ten, all of which involve two five-handshapes. The palms can be directed outward, with the hands either held apart or with the tips of the thumbs touching (figures 14 and 15). In the third variant, the palms face each other and contact is made at the wrists (figure 16*).

The feature thumb contact seems to be a matter of individual preference. Certain signers (including the youngest ones) consistently use the thumb-contact variant, while others switch between thumb contact and no contact. The wrist contact variant cannot stand in isolation but exclusively occurs in compounds. Typically, it is used as the final constituent of a compound, such as fifty ^ ten (wrist) “609” but occasionally appears in initial position, for instance ten (wrist) ^ three “13.”

Additive Strategies and Lexical Numerals

10–19. In Chicán, the numbers 10–19 are expressed as a sequence, adding the numbers one to nine to the base 10, such as ten ^ two “12.” YMSL signers from Nohkop and Cepeda commonly use this strategy for quantities from 10–19 and start using digital numbers from 20 upward (see section on digital numerals).

20–99. The most noteworthy feature about numerals for 20–99 in Chicán was described by Zeshan et al. (2013). YMSL of Chicán has specific lexemes for twenty and fifty, both of which have an iconic source (ibid., 371). Twenty is produced by clapping both palms (or wrists) against the thighs, hinting at the combination of ten fingers and ten toes (figure 17*). The reference to fingers and toes for “20” is also common in other sign languages, for instance Adamorobe Sign Language (Nyst 2007, 104). No conventionalized gesture exists.
among Yucatec Maya speakers, but a hearing non-signer from a village in Quintana Roo spontaneously produced a similar form, holding up her hands and feet to describe “20” in a picture elicitation task (figure 18*). Note that in colonial Maya, the word *winik* (“man”) also stands for “20” (as in 10 fingers + 10 toes). The lexeme fifty in YMSL of Chicán is derived from the concept “half,” with the index of the dominant hand cutting diagonally across the index of the non-dominant hand (figure 19*). This gesture is also in use among Yucatec Maya speakers and all over Mexico.

Multiples of 10 are expressed through addition of the bases 10, 20, and 50; in this manner, numbers up to 99 (fifty^twenty^twenty^five#four) are constructed. The strategy is unique to YMSL of Chicán and is not used (or understood) in Nohkop and Cepeda.

An alternative way of signing “20” or “30” is through repeated articulation of ten, sometimes with alternating palm orientation. This strategy is common in Nohkop and Cepeda and was also attested in Chicán, but it is avoided for numbers higher than 30 (as in gestures; see section on numbers in Yucatec Maya gestures).

"half and Its Variants. Different variants and related forms of the sign fifty (half) (figure 19*) were found in Chicán. Handshape assimilation of fifty (half) to the handshape of the previous sign can occur. For
instance, in **two-hundred & fifty** "250," **fifty** (half) can be articulated maintaining the V handshape from the previous sign **two-hundred** (figure 20*). The weak hand, in this case, is frequently dropped.

**Fifty** (half) can be modified and obtain a diminutive meaning of "50 centavos" ("50 cents"). In this variant, the index of the dominant hand cuts over the tip of index of the nondominant hand (instead of the middle joint) and the movement is reduced (figure 21*).

This process is comparable to what Zeshan et al. (2013) refer to as "spatial modification," even though our example might be better defined as *modification in place of articulation and size/manner of movement.* The sign **50-centavos** is accompanied by a nonmanual marker with diminutive function, namely squinted eyes. Note that the numerical value "50" itself does not change, but a general strategy for the diminution of nouns (i.e., change in size/manner of movement plus nonmanuals) is carried over to the number domain.

Three YMSL signers in Chicán also used a related sign for "500," derived from the same iconic source "half (of thousand)." It employs
two 5 handshapes, with the nondominant hand facing outward and the dominant hand cutting vertically downward (figure 22*).

In Cepeda, a one-handed, horizontally articulated variant for fifty (half) using the B handshape was attested, but unlike in Chicán it cannot be used as an additive base. In all three communities, the one-handed B handshape variant for half is used to specify time (e.g., two 'half for “14:30”).

**HUNDRED**(deer). The lexeme HUNDRED (deer) (glossed HUNDRED I in figure 1)—iconically related to the depiction of a deer on an old 100 peso bill (Zeshan et al. 2013, 389)—did appear in our elicited data but only with three signers from the interactional groups 1 and 2, who are members of one extended family. We rarely observed the sign in conversations and our research assistants hesitated how to transcribe it (glossing it as ONE THOUSAND). Because of this ambiguity, we interviewed many signers about the meaning and use of HUNDRED (deer). Those informants who used the sign during elicitation confirmed its reference to “100,” others stated it only describes the animal or the old currency. Some deaf signers suggested it was not an original YMSL sign but imported to Chicán by foreign researchers or the church.

**Digital Numerals**

Digital numerals are employed in YMSLs of Nohkop and Cepeda for numbers above 20, for instance THREE 'ZERO “30.” In Nohkop, they include fluid transitions between the individual number handshapes and a change in place of articulation from the signer’s left to the right, reflecting the written representation of the number (for a digital numeral used for the sign HUNDRED, see figure 4*). One Nohkop signer uses variants for multiples of 10 where both digits merge into a single continuous movement through wrist rotation (figure 23*).

Three deaf siblings in Chicán from interactional group 3, who are 17, 22, and 23 years old and do not have much contact with other deaf signers in the village, favored digital strategies over the above-mentioned additive ones.

The combination of digital and additive strategies is also permitted (even though less common), such as in FIVE 'ZERO'ZERO FIVE “505.”

**Simultaneous Morphology and Nonmanual Markers**

We found evidence for a strategy absent from the previous study, namely simultaneous morphology, used by thirteen of seventeen Chicán signers. For multiples of 100 and 1,000, the number handshape for ONE TO NINE can be simultaneously articulated with a tense
forward movement (figure 2*), often accompanied by a one-eyed squint or blink. Neither movement incorporation nor the nonmanual marker is obligatory for multiples of 100 and 1,000, but these features are never employed for one to nine or multiples of 10 and clearly mark a contrast between otherwise ambiguous numerals. Interestingly, the squint was noted by Johnson (1988) for "1,000," which indicates that this phenomenon has not entered the language recently. In our data, the nonmanual component occurred with both multiples of 100 or 1,000 and we suggest that it functions as an intensifier rather than marking a specific numeral (for APSL, see Zeshan et al. 2013, 380).

Context-Dependent Numerals

A feature mentioned in a footnote by Zeshan et al. (2013, 382) for APSL (but not in relation to YMSL) is the role of context to disambiguate between numerical values. It is common in YMSLs of Chicán and Cepeda that the numbers one to nine can equally refer to multiples of 10, 100, or 1,000. Signers usually do not encounter trouble deriving the exact meaning from context. There are additional options for disambiguation, for instance juxtaposition with the lexemes money/ expensive or a lot, typically accompanied by a nonmanual intensifier (figure 24*).

Repetition of a numeral sign can also serve an intensifying/augmentative function. In Chicán, thousand can be expressed through quickly repeated articulation of the thumb-contact variant for ten (figure 15).

Writing and Tracing

A further strategy, used in case of potential misunderstandings, is to first sign the number in question and then repeat it by writing it with a stick on the ground or tracing its shape with the finger in the air, on the palm, the forearm, or a wall (figures 25–26*) (see also McKe, McKe, and Major 2011 for NZSL). In Cepeda, this strategy has become conventionalized to an extent that tracing the number on the forearm is often the exclusive way of number expression (figure 26).

Discussion

From Yucatec Mayan Number Gestures to YMSL Number Signs

In YMSL numeral systems, certain features of Yucatec Mayan counting gestures are preserved, namely the opposition of counting from the pinky for ordinal numbers and from the index for cardinal numbers. Others are innovations, such as the lexemes twenty and fifty as additive bases in Chicán, and we can see that distinct number paradigms in different YMSL communities transcend their common gestural and iconic roots. Once numerals have become language-specific in YMSLs, their variation becomes increasingly systematic. Variation
in handshape and palm orientation can be conditioned by linguistic constraints, such as distinct variants for three or ten in isolation versus in compounds, or handshape assimilation of fifty (half) to the previous sign. Furthermore, sociolinguistic factors such as region, age, education, and family membership can trigger the preference for a certain variant or strategy.

Regional and Intracommunity Distribution

Table 2 summarizes the regional distribution of YMSL numerals and their intracommunity variation.

![Figure 26. Arm writing.](image)

<table>
<thead>
<tr>
<th></th>
<th>Chicán</th>
<th>Nohkop</th>
<th>Cepeda</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Numeral bases</strong></td>
<td>10, 20, 50</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td><strong>Additive numerals</strong></td>
<td>Unlimited</td>
<td>Up to 19</td>
<td>Up to 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(seldom up to 30)</td>
<td></td>
</tr>
<tr>
<td><strong>Digital numerals</strong></td>
<td>Interactional group 3</td>
<td>All signers</td>
<td>All signers</td>
</tr>
<tr>
<td></td>
<td>twenty (thigh), fifty (half); all interactional groups hundred (deer); interactional groups 1 &amp; 2</td>
<td>Not attested</td>
<td>Not attested</td>
</tr>
<tr>
<td><strong>Simultaneous morphology</strong></td>
<td>Multiples of 100/1,000</td>
<td>Not attested</td>
<td>Not attested</td>
</tr>
<tr>
<td><strong>Context-dependent numerals</strong></td>
<td>Multiples of 10, 100, and 1,000</td>
<td>Multiples of 10, 100, and 1,000</td>
<td>Multiples of 10, 100, and 1,000</td>
</tr>
<tr>
<td><strong>Writing/tracing</strong></td>
<td>Unlimited</td>
<td>Unlimited</td>
<td>Unlimited</td>
</tr>
<tr>
<td><strong>Spatial modification</strong></td>
<td>fifty (half)</td>
<td>Not attested</td>
<td>Not attested</td>
</tr>
</tbody>
</table>

According to the table, signers can deliberately select or repress the use of certain variants or strategies to secure understanding beyond community borders.

The Impact of Literacy

The accessibility of digital numerals depends upon certain sociolinguistic preconditions. The different levels of literacy in Chicán, Nohkop, and Cepeda as well as the point in time and the material culture where their sign languages emerged, influence the availability of this strategy.³

Deaf signers in Chicán belonging to the age group over 40 attended, if at all, only a few years of primary school and had little exposure to writing. They came to create a number system totally independent from written numbers. The situation is different with YMSL signers in their teens, twenties, and thirties: several of them attended secondary school for at least some years and had longer exposure to formal education. Importantly, and in contrast to the previous generation, they also have access to communication technology, smartphones, and social media. The omnipresence of written numbers...
in signers' daily lives makes them an available resource to incorporate into their sign languages, in the form of digital numbers and writing/tracing strategies.\(^6\)

A digital system is widely used in the YMSLs of Nohkop and Cepeda; note that all participants from these communities are no older than 35. They constitute the first generation of users of their sign language and, unlike in Chicán, did not acquire an already established signed number system. Interestingly, the young signers from interactional group 3 in Chicán, who had less contact with Chicán's widespread additive strategy but have high exposure to written numbers and access to modern technology, fall back on a digital strategy just as signers in Cepeda and Nohkop do.

**Familylects and Language Attitudes**

As demonstrated for **hundred**(deer), variation in YMSL numerals can be linked to family membership. This sign forms part of the familylect of one extended family, who have been the preferred informants for linguists that previously worked in Chicán. Within this interactional group, signers also developed lexemes for weekdays and months, which are unknown to other deaf people in the village. Their familylect even extends beyond the lexicon, including for instance, the frequent use of size-and-shape specifiers as nominal markers (Safar and Petatillo Chan forthcoming). Other Chicán signers do not have **hundred**(deer) in their lexicon and even formulate strong attitudes against it, mainly because it originates from a different family. It is inadequate to state that in young, microcommunity languages, the preference for certain variants over others cannot be an “act of identity” (Meir et al. 2012, 282). Even a tiny community like Chicán consists of subcommunities, whose members delimit themselves from others by the use of specific linguistic forms and have clear opinions which signs are “theirs” and which are not. These patterns are not as easily discernible as in larger linguistic groups because the nature of the very community did not allow them to expand over space and time. Nevertheless, linguistic ideologies, and with them the preference for certain variants deemed to be more correct, beautiful, or authentic, evolve already on a small scale in young village sign languages (see also Haviland 2016 for Zinacantán family homesign).

**Methodological Challenges to Studying Variation in Rural Sign Languages**

YMSL numerals in all three communities are characterised by the coexistence of a range of strategies, which raises the issue of “how much variability to include in a cross-modal study and in what way” (Zeshan et al. 2013, 392). This is a difficult question because sublexical and lexical variation is abundant in rural sign languages (e.g., Meir et al. 2012). We can raise doubts whether features like context-dependent numerals or writing/tracing strategies are genuine structural parts of a language and should be included in typological accounts. In YMSLs, in any case, these are prominent strategies, which can hardly be ignored. Context as a pragmatic means of disambiguation is powerful in every language (Duranti and Goodwin 1997) but especially in small, tight-knit communities. Meir et al. (2012, 282) suggested that—as opposed to established sign languages of larger Deaf communities—variation in emerging village sign languages occurs mainly on an individual level and does not reflect social identities because solid linguistic norms are still lacking at this stage. Their claim is surprising, as other studies (e.g., Shuman 1980; Washabaugh 1986) have reported sociolinguistic variation in young village sign languages—but without drawing clear relations between social features and linguistic structures. Revealing such patterns in rural sign languages proves to be challenging, mostly for methodological reasons, as the small community size does not allow for large statistical analyses from a socially balanced sample. Our study demonstrates that, through careful qualitative analysis, the seeds for systematic sociolinguistic variation are observable already in young microcommunity sign languages, and stresses the importance of including this variability in typological surveys.

**Conclusion**

This article provided a first account of numerals in YMSLs of Nohkop and Cepeda Peraza and discussed inter- and intracommunity variation in YMSL numerals. As previously demonstrated for other institutional sign languages, YMSL numerals exhibit patterns of non-random variation as a result of linguistic and sociolinguistic factors. These patterns are still in the process of becoming solidified, and a high level of individual variation persists. Comparative analyses should be extended to other lexical domains in order to shed more light on
the extent of similarities and variation between YMSL communities, to explain how sociolinguistic variation crystallizes on a microlevel, and to show how rural sign languages create a lexicon from and beyond gesture.

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Notes

1. All examples marked with an asterisk are available as supplementary video files at https://hdl.handle.net/1839/f6e0e359-96b6-4bed-8f86-3d1672ed9449. Descriptions of the content of each file are provided in the appendix (table 3).

2. Nohkop is a pseudonym for a neighborhood in the outskirts of Chemax, Yucatán.


4. Speakers of other languages (e.g., French) start with the thumb.

5. Zeshan et al. (2013, 383) mention age-related variation in the use of digital numbers in APSL but not in relation to YMSL.

6. An interesting case is reported from the spoken language Munji in Afghanistan, whose speakers within the past few decades have replaced Dari loans for numbers over nine by a system of digital numbers (Henrik Liljegren, pers. comm.).

References


Comparing Body-Part Size and Shape Constructions in Village Sign Languages with Cospeech Gesture

Abstract

This article presents a comparison of constructions used to express size and shape in cospeech gesture and in two village sign languages. The analysis focuses on body part size and shape constructions found in the gestures of speakers of Anyi (Côte d’Ivoire), in the emerging sign language of Bouakako (Côte d’Ivoire), and the older, well-established sign language of Adamorobe (Ghana). An analysis in terms of diversity in forms and in combinatorial properties is indicative of grammaticalization and lexicalization taking place over time.

Elements depicting size and shape (S&S) are found in many parts of the structure and lexicon of a sign language (henceforth, SL). An example of such a sub-sign size and shape element (i.e. that is part of a lexical sign) is presented in figure 1, where the flat hands of building in Malian SL depict the walls of a building. Thus, size and shape elements can occur in lexical signs referring to objects, activities, or other concepts unrelated to the semantic domain of size and shape.

Size and shape elements may also occur in independent, so-called “productive” size and shape constructions. Confusingly, both sub-sign size and shape elements and independent size and shape constructions (henceforth, S&Ss) are referred to by the term SASS (size and shape).

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