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Typological approach of meaningful components in several sign languages (SLs) with varying degrees of social integration

Consequences for SL typology and contribution of a first phylogenetic examination of Marajó Island SLs

(University Paris 8 Vincennes Saint-Denis, 2019)

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1. Introduction

The thesis examines variation among sign languages (SLs), which was initially viewed as more limited than the range of variation found across spoken languages (SpLs). This view is changing in light of recent studies in SL typology that take into account smaller-scale community SLs, which have been rarely studied in the past.

In this thesis, I consider the variation across the inventory of handshapes considered as sub-sign form-meaning units across several SLs. I explore this question by comparing data from national SLs, so-called emergent SLs (referred to here by the generic term ‘micro-community SLs’), and SLs used in a family setting. I hypothesize some invariance between SLs would be observable regardless of the degree of social integration or the sociolinguistic context of the SL.

1.1 Foundations of typology as a discipline and implications for SL typology

Chapter 1 of the dissertation highlights the fact that less well studied languages (also SpLs) have been analyzed by comparison with better studied languages, historically Latin and Greek, and thus with respect to grammatical categories (e.g. morphological agreement) defined with reference to phenomena found in these languages (Haspelmath 2010). For SLs, the comparison with better studied languages is doubly difficult because SLs are less well studied as well as different from SpLs with respect to modality. This is the subject of Chapter 2, which shows that these minority and unwritten languages have been, and still are, most often described through the written form of the surrounding SpLs. Thus, SLs are described through the filter of concepts developed for these SpLs (Garcia 2016).

The combined review of the literature in linguistic typology and SL linguistics suggests that to this day, we have not yet acquired the appropriate analytical tools to consider SLs in a typological approach that would take into account their specificities. For this reason, this thesis follows a theoretical approach that tries to understand SLs based on accurate categories.

Historically, confrontation with linguistic diversity has sustained advances and issues in typology. As visual-gestural languages, SLs have the potential of making a significant

contribution within the framework of a typological reflection, in general. However, they are currently largely left out of the major works on typology (Cormier et al. 2010). Furthermore, a typology specific to SLs should be developed using descriptive concepts specific to these languages that would complement the current categories of analysis. This goal has not yet been reached despite the growing number of studies. The present thesis constitutes a first step in this direction.

1.2 Theoretical approach on SL emergence and SL variation

This thesis follows the Semiological Approach that proposes to shift the focus away from SpLs to approach SLs in terms of concepts that are specific to them.¹ The Semiological Approach is an enunciative, cognitive and functional approach that considers SpLs as resulting in turn from the constraints and potentials imposed by the audio-phonatory modality. Since SLs rely essentially on the visual-gestural modality alone, the Semiological Approach proposes that they are structurally less marked than SpLs. SLs can display mental representations (Cuxac 2003), and handshapes used in high iconicity show some form concepts associated with referents. This is taken to simply be the consequence of the use of iconicity, afforded by the visual-gestural modality.

The Semiological Approach provides a strong hypothesis regarding the variation between SLs, represented as follows:

According to this hypothesis, transfer structures (highly iconic structures, TSs), located at the bottom of this schema, are shared by all SLs across the world. Several studies have confirmed this hypothesis, based on a comparison between various SLs, some of which are unrelated (see Russo 2005; Pizzuto et al. 2008; Sallandre 2014; Sallandre et al. 2016a, 2016b).

The Semiological Approach describes three basic TSs which are: Personal transfer (PT), where the signer embodies the individual or entity being discussed, Situational transfer (ST) which shows the movement of an agent with respect to a stable locative, and Size and shape transfer (SST), which shows the size or shape of an entity. These three main structures can be combined with each other and/or with other types of units, thus giving rise to a range of more complex and recurrent TSs in discourse (see Figure 2).

¹ Cuxac 2000; Sallandre 2003, 2014; Bonnal 2005; Fusellier-Souza 2006, 2012; Garcia 2010; Garcia & Sallandre 2020; among others.

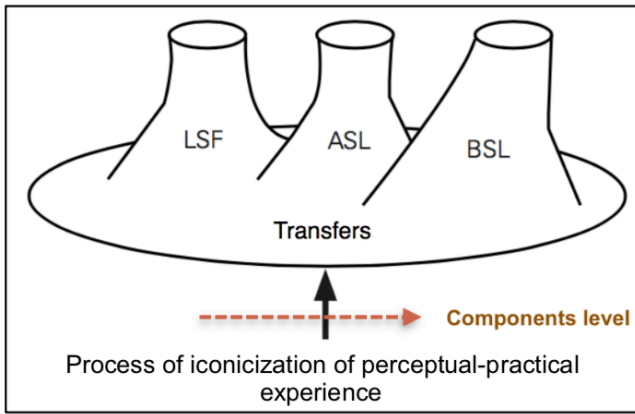


Figure 1. Common cognitive and structural core of SLs (from Cuxac & Antinoro Pizzuto 2010)



Figure 2. Examples of basic transfer structures; from left to right: Personal transfer, situational transfer, size and shape transfer (from Martinod 2019)²

In Figure 1, the ‘rising columns’ characterize the structures located outside the illustrative intent. These structures essentially are lexical units (LUs) which are specific to each SL. French SL (LSF), American SL (ASL), and British SL (BSL) are mentioned in Figure 1, but the lexicon of any SL in the world could be represented by yet another ‘rising column’. At least some of the LUs are hypothesized to be diachronically derived from transfer units (TUs).

The Semiological Approach assumes that all SLs are rooted in the perceptual- practical experience (or perceptual-haptic experience) of deaf individuals; in particular, according to this model no discontinuity between SLs practiced by communities of different sizes is expected. This implies, on the one hand, that each micro-community SL could potentially become a SL used by a larger community, and eventually become a national sign language. On the other hand, it also implies that each national SL would be the result of the pooling of SLs used by smaller communities, and even by deaf individuals interacting only with hearing, non-signing friends and family members (a homesign).

² Here, in the PT, the signer embodies a mouse; in the ST, the signer shows the location of a fan in relation to her bed, which is represented by her dominant hand; in the SST, she shows the shape of a bottle of milk.

1.3 Hypothesis and research questions

This thesis proposes to refine the assumption of the Semiological Approach concerning invariance between SLs. I hypothesize that this assumption of invariance exists based on the level of the sub-components of these structures, these components being also partly common to those of LUs. In this thesis, I am focusing specifically on the form-meaning handshape component. These components are assumed to be anchored in perceptual-practical experience. This is hypothesized to be the first invariant foundation shared by all SLs. This hypothesis leads to these two research questions:

- How much invariance is observable between SLs among form-meaning handshapes?
- What is the nature of observable variation between SLs with respect to these handshapes?

1.4 Data

The data examined in the present thesis are of two types: (i) SL data used in Soure (Marajó Island, Brazil), which was collected on-site during two fieldwork visits; (ii) inventories of meaningful configurations for nine SLs.³

1.4.1 Data from Soure

1.4.1.1 Context and specific research questions

The Soure SLs are interesting for two reasons: they have never been analyzed before, and they are used in a specific sociolinguistic context. Indeed, the home-sign (i.e., each family SL) of each deaf signer is influenced by the homesigns of other deaf signers of Soure, and the SLs are (still) in the process of becoming something that is used by a larger community. This process has been going on for about ten years. Also, these SLs are occasionally in contact with Libras, the national SL of Brazil (Martinod et al. 2020b). The following questions were addressed:

- Do the Soure signers use similar form-meaning handshapes?
- Concerning the possible form-meaning handshapes common to several signers: do they refer to the same form concepts?

Soure SLs provide a source of possible gestural variations in competition before conventionalization for the expression of a given form concept (i.e., meaning value) occurs. When compared with form-meaning handshapes used in other SLs, the data from our field work are thus particularly valuable. In addition, the situation in Soure is of interest regarding our understanding of the phylogenesis of SLs. The review of the literature on SL typology highlights different types of SLs that are currently considered in most works. These types are based on characteristics such as the size of the signing community or the

³ Vicars (2012) for ASL; Johnston (1989) for Auslan; Brennan (1990) for BSL; Cuxac (2000) for LSF; Zwitserlood (2003) for NGT; Kubuş (2008) for TID; Schuit (2014) for IUR; De Vos (2012) and Marsaja (2008) for KK; Fusellier-Souza (2004) for three Brazilian homesigns.

time depth of the SL, i.e., the number of generations that have used the SL. In contrast, the Semiological Approach considers SLs in terms of structural bifurcation. This is assumed to be the process during which iconicity of the first productions of a deaf individual reaches a high level of structuring. According to the Semiological Approach, this leads to the emergence of two types of linguistic structures: TSs and Standard Structures (such as LUs). Once the bifurcation occurred, both units co-exist in SL, depending on the signer's intention. An advanced degree of bifurcation, as observed in national SLs, is taken to consist of a large number of LUs.

The second research question addressed in this thesis concerns the diachronic development of SLs and asks the following questions specifically:

- What can Source SLs tell us about the phylogenesis of SLs, and particularly about the process of structural bifurcation in SL?
- Concerning variation between signers in terms of bifurcation: Are all signers of Source at the same stage of bifurcation? Since their sociolinguistic background may vary, what elements have an impact on the degree of advancement?

1.4.1.2 Data gathering

The first period of fieldwork took place in July–August 2015 and the second in March–April 2017. The total corpus consists of eight hours and thirty minutes, using data from ten signers (cf. pp. 208–219 of the thesis for metadata). The corpus analyzed in this thesis work has been limited to twenty-six minutes and fifty seconds of different types of data (elicited and spontaneous data).⁴

2. Existence of a common core of form-meaning components between SLs

2.1 Methodology

Form-meaning handshapes across several SLs were examined. To evaluate the impact of culturally diverse experiences or specific sociolinguistic characteristics, meaningful handshape inventories from SLs used in different geographical areas and by differently sized communities were compared.

2.1.1 Analysis of Source's data with ELAN

The analysis focused both on the type and number of units and the sub-unit components (form-meaning handshapes). To this end, an annotation scheme for identifying the LUs and Transfer units (TUs) was developed. The distinction between LUs and TUs was made according to two criteria: (i) the generic (LU) or specific (TU) meaning of the unit; (ii) the direction of the gaze (towards the interlocutor, LU, or elsewhere, TU). Data were annotated

⁴ The selected sequences can be used in future comparative research since the stimuli are frequently used in SL linguistics. In addition, in the context of our research goals, it seemed important to examine elicited and spontaneous data to observe a possible influence of the type of discourse on the results.

in collaboration with three Brazilian researchers, who were signers of variants of Libras from the South or the North of Brazil.

The annotation identified 2,122 units (LUs, TUs, pointing units, dactylogy units, phatic units, cultural gesture reuses, and ‘unclassifiable units’, whose type I could not determine). The form-meaning handshapes of these units were then analyzed: each handshape was associated with a specific form concept from a list of 48 shape concepts of geometric type.⁵

2.1.2 Analysis of handshape inventories

Handshape inventories from nine SLs, as reported in the literature, were used for comparison. This sample of SLs was chosen for two reasons: first, the descriptions of these languages provide detailed inventories of handshapes, and secondly, the sample enabled comparison between national SLs (ASL, Australian SL (Auslan), BSL, LSF, SL of the Netherlands (NGT), and Turkish SL (TİD)), micro- community SLs (Inuit SL (IUR, Nunavut, Canada) and Kata Kolok (KK, Bali, Indonesia), and a homesign. Since each of these inventories was put together by different authors, with their own descriptive tools, the different schemes were harmonized using the list of geometric concepts before comparison.

2.2 Results and Discussion

2.2.1 A common core of form-meaning components

The analysis shows that a common core of form-meaning handshapes is observed in more than half of the examined SLs (Table 1). This shows the existence of an invariant part from the level of the minimal components of SLs units. These components could be considered as icons of cognitive primitives shaped by the human perceptual-haptic experience and would represent the gestural realization of basic form concepts.

In the frame of SL typology, the observation of this core of common form-meaning units across several SLs means that differences in geographical or sociolinguistic context (such as signers’ community size) seem to have little impact on the form-meaning associations of the analyzed handshapes. The visual-gestural modality and its affordances seem to effectively constrain the possible associations.

⁵ This list was adapted from Cuxac’s (2000) work on LSF.







Meaningful handshapes shared across SLs	Form concept
	Flat shape
	Rounded shape
	Grasp of a rounded shape
	Thin and elongated shape
	Grasp of a thin and elongated shape
	Shape with protrusion

Table 1. Common core of form-meaning handshapes between SLs

2.2.2 The impact of methodology on inventories

The analysis of inventories, as well as the process of developing my inventory from Soure's data, highlights the consequences of some methodological choices in the elaboration of inventories. Indeed, even if the nature of the used data seems to be similar for each author (elicited stories and more spontaneous discourses), different methodologies for processing these data produce conceptual categories that differ from mine. I present here two cases illustrating this: the number of form-meaning handshapes per SL and the (apparent) multiple gestural possibilities to represent the same form concept.

First, the analysis of inventories invalidates several assumptions made in previous work concerning variation between SLs. One of these assumptions was that micro-community SLs would use fewer configurations representing entities⁶ than national SLs (Zeshan 2003; Marsaja 2008). However, the analysis of the inventories of form-meaning handshapes for national SLs, micro-community SLs, as well as for Soure SLs shows that this is not always the case (Tables 10 and 11, p.240 of the thesis): TĪD, a national SL uses 10 entity handshapes, whereas IUR, a micro-community SL, uses 11, and the analyzed homesign uses 16. However, even though some micro-community SLs use more of these handshapes compared to some national SLs, inventories also show that the SLs with the largest inventories are indeed national SLs (54 for ASL, and 39 for LSF). Thus, the influence of the size of the signing community on the number of handshapes representing entities remains to be determined.

An idea developed in the thesis concerns the methodology of elaboration of inventories. Size of handshape inventory depends on details of description, and is therefore plausibly, at least to some extent, an artifact of the description. Indeed,

SLs for which a large number of handshapes representing entities is reported are also those for which the inventory takes into account the finest categories of meaning. This would therefore lead to a greater number of different form-meaning handshapes. A detailed description of Soure SLs handshapes reveals that Soure SLs rank fourth among

⁶ For example, to represent a car through a synecdoche, since the salient feature 'flat shape' referring to the roof of the vehicle is used to refer to the entire vehicle.

the SLs we compared with respect to the size of their handshape inventory (30 entity handshapes), ahead of several national SLs.

Second, I observed several cases where the same form concept can be represented by different handshapes. Thus, if there are variants for the same form concept, the amount of invariant meaningful handshapes across SLs might be higher. For instance, in LSF, the representation of a ‘two-dimensional square or rectangular shape’ can use the following handshapes: ‘𐤁’ (x2 – both hands horizontally facing each other, palms towards the signer) or ‘𐤂’ (x2 – both hands vertically facing each other, palms towards the interlocutor). This seems to be a case of possible variation, where two distinct handshapes can express the same form concept. However, personal observations and knowledge of LSF allow me to add that ‘𐤂’ (x2) seems to be used preferably when the entity is fixed (a board, for instance), while ‘𐤁’ is used when the entity is mobile (e.g., a window that is opened). According to this, one may ask whether it is the same general form concept that is expressed through these different handshapes, or rather two quite distinct specific concepts, namely, ‘fixed square or rectangular two-dimensional shape’ and ‘mobile square or rectangular two-dimensional shape’, respectively.

The role of the movement is to be underlined here since ‘𐤁’ (x2) is associated, for example, with a movement of opening either towards the outside or towards the signer, depending on the orientation of the window-opening that is shown. We can thus assume that there are other similar cases related to the combinatorial potential of parameters in other SLs. Finally, this example also highlights the inextricable nature of handshape, movement, and orientation.

3. A phylogenetic and ontogenetic approach to Soure SLs: The structural bifurcation

3.1 Methodology

To provide insight into the status of structural bifurcation in these SLs, the type of each produced unit was classified. The tally for different types of units – shown in Figure 3 – was calculated both for the whole group of signers, as a linguistic micro-community in the making, and for each signer individually.

3.2 Results and discussion

3.2.1 Variation between signers

The thesis includes a description of the lexicon shared by the signers (39 LUs). More than half of them come from Libras (25 LUs). This is because these signers all attended Libras courses for different lengths of time. They may therefore deliberately try to preferentially use LUs from this SL since Libras is granted a certain form of social prestige. Signers with little exposure to Libras rather use Soure LUs but produce fewer LUs in absolute terms. Exposure to Libras, a national SL, could thus have an impact on the number of LUs produced, and thus on the degree of bifurcation since a large number of LUs corresponds to a more advanced degree of bifurcation.

Two signers produced more LUs than the others. The bifurcation would therefore be more advanced for them. These signers are also those who use the most TUs, and with the greatest diversity of structures. Thus, the analysis seems to reveal different signer profiles: on the one hand, signers producing relatively few LUs, few TUs, and few different TSs, and on the other hand, signers producing more LUs, more TUs, and more diversified TSs. Moreover, we can see that only the following TSs are common to all signers: classic Personal transfer, Situational transfer, and Size and shape transfer. These are the three TSs previously described as the main ones. Among these three TSs, the Situational transfer and the Double transfer (a combination of Personal transfer and Situational transfer) are probably the most complex structures to realize since they require a significant control of signing space but also of one's own body. Future studies are needed to further investigate this construction. Indeed, it may be argued that these TSs were simply rarely produced in the limited corpora that we studied.

These observations contribute to refining what is known about the process of structural bifurcation. This process would indeed be characterized not only by a large number of LUs but also by a diversified use of TSs. Some structures would be observable from the early stages of bifurcation while others would take longer to emerge. This is also in line with the conclusions of some studies on the acquisition of LSF by deaf children (Sallandre 2014; Schoder 2019). This could point to an important phylogenetic and ontogenetic developmental similarity across SLs.

Finally, signers with a profile corresponding to a greater diversification and a large number of produced units (LUs and TUs combined) have the most frequent social interactions. This suggests an influence of these interactions on the structural bifurcation.

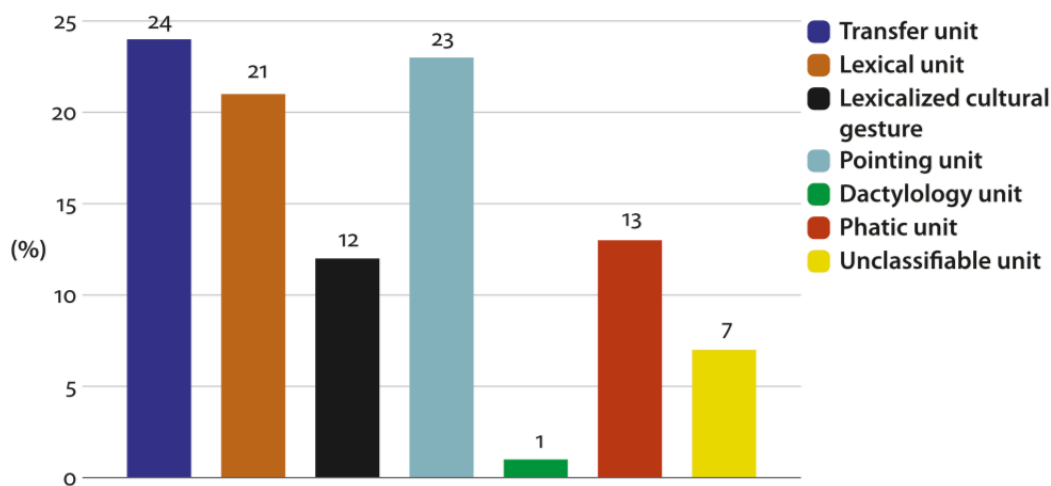


Figure 3. Quantification of unit types for the ten signers 3.2.2 The issue of units of lexicalization/stabilization

In the data, several cases of stabilization in discourse were observed. This phenomenon corresponds to the process during which a TU acquires a generic meaning and form (i.e., becomes conventionalized) during the specific setting of an exchange (see Figure 4 for an example).



Figure 4. An example of stabilization in discourse: ‘The milk bottle’ [SST 0:43; PT 0:53; LU 1:19]

In the Semiological Approach, two criteria for determining whether a unit is lexicalized are (i) the gaze, directed towards the interlocutor in the case of the production of a LU, and (ii) the frequency of use, an LU being produced frequently in discourse (see also Johnston & Schembri 1999). However, these two criteria are often not easy to apply. Another issue for the linguist is that a unit that seems to be stabilized might be used only during an exchange with a given signer and not with another, as the latter might not understand it.

This is a crucial question since many of the observed units in the data had to be categorized as ‘unclassifiable units’. Most of them might be examples of stabilizations in progress. The question of whether or not to include these units in the lexicon remains.

4. General conclusion

Comparing the form-meaning handshapes used in nine SLs and Soure SLs revealed a shared core of form-meaning units. Overall, differences in geographical or sociolinguistic context, especially in the size of the signers’ community, seem to have little impact on the form-meaning association of handshapes. The visual- gestural modality and its affordances restrict these possible associations.

These results contribute to refining what we know about the invariant part that is shared between SLs. They open the way to a relevant typological reflection for these languages which could lead to a typology that does justice to both SLs and SpLs, where the latter would no longer constitute the tertium comparationis. One can consider these results in a broader perspective than the sole typological description.

4.1 Human conceptual primitives

The Semiological Approach, in considering languages as the result of their conditions of emergence, leads to a shift in the focus of SpLs in the analysis of SLs. SLs would inform us about the functioning of human cognition. Similarities observed between SLs at the level of the form-meaning sub-components of units reveal the mechanisms of perception and categorization of the human mind. The analysis of these components, extended from

handshapes to movement and location, should allow us to question what also happens in SpLs.

In SLs, these elements indeed refer directly to image schemas, such as trajectories or various shapes, forged from the experience of the world (Lakoff & Johnson 2008; Occhino 2016). These schematic image patterns are cognitive semantic tools that allow concepts to be encoded in all languages, based, in part, on similarities between form and meaning.

4.2 Toward a SL (and micro-community SL) typology

The thesis highlights the need for less glottocentric concepts of analysis in SL typology. The process of structural bifurcation could be a relevant tool to analyze variation between SLs and to situate them within an ontogenetic and phylogenetic approach. This approach has been developed from and for the analysis of SLs but needs to be further refined. For example, a key element is the number of LUs.

On this subject, my observations for Soure SLs highlight the frequent difficulties in identifying these LUs with certainty, due to the possibility in a given SL of a temporary lexicalization/stabilization that is strongly dependent on the context (a particular interlocutor and the existence of shared knowledge). This seems to be a specificity of SLs, which would benefit from being explored based on larger corpora.

Furthermore, this work shows that the bifurcation progress can be measured not only by quantifying LUs, but also TUs, as well as by assessing the diversity of TSs. This thesis has also underlined the influence of the signers' level of social integration on this progress. These specific elements should be further taken into account in SL typology.

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