

Person and number in Catalan Sign Language pronouns

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Para o Leo

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Abstract

Languages use different resources to specify the numerosity of the referents and to denote the speech act participants. This thesis describes the morphophonological strategies used in Catalan Sign Language (LSC) personal pronouns to encode these distinctions. In a nutshell, I argue that the expression of person and number is achieved by using two interrelated strategies: person is expressed through spatial features (locations in the signing space which are defined in relation to the signer's body), number is grammatically marked by the path specifications of the sign (movements connecting spatial locations). Combining these two operations results in the formal marking of three person distinctions (with a further contrast between exclusive, minimal inclusive and augmented inclusive in the first person) and four number values (singular, dual, paucal and plural).

Resum

Les llengües utilitzen diferents recursos per a expressar el nombre dels referents i designar als participants en els actes de parla. Aquesta tesi descriu les estratègies morfofonològiques utilitzades als pronoms personals de la llengua de signes catalana (LSC) per a codificar aquestes distincions. En resum, es proposa que les categories de persona i nombre s'expressen utilitzant dues estratègies interrelacionades: la persona s'expressa a través de trets espacials (localitzacions a l'espai sígnic definides en relació amb el cos del parlant), el nombre es marca gramaticalment a través d'especificacions en la trajectòria del signe (moviments que connecten localitzacions espacials). La combinació d'aquestes dues operacions es tradueix en la codificació formal de tres distincions de persona (amb una oposició addicional entre exclusivitat, inclusivitat mínima i inclusivitat augmentada en la primera persona) i quatre valors de nombre (singular, dual, paucal i plural).

Resumen

Las lenguas utilizan diferentes recursos para expresar el número de los referentes y designar a los participantes en el acto de habla. Esta tesis describe las estrategias morfofonológicas usadas en los pronombres personales de la lengua de signos catalana (LSC) para codificar estas distinciones. En síntesis, se propone que las categorías de persona y número se expresan utilizando dos estrategias interrelacionadas: la persona se expresa a través de rasgos espaciales (localizaciones en el espacio sígnico definidas en relación con el cuerpo del hablante), el número se marca gramaticalmente a través de especificaciones en la trayectoria del signo (movimientos que conectan localizaciones espaciales). La combinación de estas dos operaciones se traduce en la codificación formal de tres distinciones de persona (con una oposición adicional entre exclusividad, inclusividad mínima e inclusividad aumentada en la primera persona) y cuatro valores de número (singular, dual, paucal y plural).

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List of glosses

1	first person	HUM	human
2	second person	INCL	inclusive
3	third person	IX	index sign
+	combination of participants	MIN	minimal
ACC	accusative	NOM	nominative
ANIM	animate	PAUC	paucal
ASSOC.PL	associative plural	PL	plural
AUG	augmented	PRES	present
DU	dual	PRO	pronoun
EMPH	emphatic	PUR	purpose
EXCL	exclusive	QUAD	quadral
GNR	general number	REC	reciprocal
GR.PAUC	greater paucal	SG	singular
GR.PL	greater plural	TOP	topic
HAB	habitual	TRI	trial
		U.AUG	unit augmented

Sign language acronyms

ASL	American Sign Language
Auslan	Australian Sign Language
DGS	<i>Deutsche Gebärdensprache</i> (German Sign Language)
DTS	<i>Dansk tegnsprog</i> (Danish Sign Language)
ESL	Estonian Sign Language
HZJ	<i>Hrvatski Znakovni Jezik</i> (Croatian Sign Language)
IPSL	Indo-Pakistani Sign Language
ISL	Israeli Sign Language
Libras	<i>Língua brasileira de sinais</i> (Brazilian Sign Language)
LIS	<i>Lingua dei segni italiana</i> (Italian Sign Language)
LSC	<i>Llengua de signes catalana</i> (Catalan Sign Language)
LSE	<i>Lengua de signos española</i> (Spanish Sign Language)
LSF	<i>Langue de signes française</i> (French Sign Language)
NGT	<i>Nederlandse Gebarentaal</i> (Sign Language of the Netherlands)
NS	<i>Nihon Shuwa</i> (Japanese Sign Language)
NSL	Nicaraguan Sign Language
RSL	Russian Sign Language
TİD	<i>Türk İşaret Dili</i> (Turkish Sign Language)
TSL	Taiwan Sign Language

CHAPTER 1

Introduction

This thesis is an in-depth study of the categories of person and number in Catalan Sign Language (LSC)¹ pronouns and, to a lesser extent, nouns.

The grammatical category of person expresses reference to the speech act participants, whereas number specifies the numerosity of the referents. In the world's languages, the cardinality and the role of the referents can be expressed even if a given language lacks certain distinctions within the person and the number categories. To give an example, while Catalan has no inclusive dual pronouns, it can nonetheless convey reference to two participants, such as the speaker and the addressee, by conjoining a second and a first person singular pronoun (*tu i jo* 'you.sg and I'). In this dissertation, I will only address the distinctions formally encoded in the grammar of LSC. Hence, I will not provide a systematic analysis of the full range of strategies existing in the language to specify the number of referents or to denote the participants in the speech act.

In this introductory chapter, I first lay out some terminological distinctions needed to talk about the expression of person and number. In Section 1.2, I set up the empirical problems and present the structure

¹For information on the demographics of the LSC signing community and the history and status of the language see Quer (2012a), Frigola & Álvarez (2018), Navarrete-González (2020b, 2020c) and references therein.

of the dissertation. Section 1.3 elaborates on the methodology used in this research and explains the source of the LSC examples presented throughout the text. Finally, the glossing conventions adopted in this thesis are described in Section 1.4.

1.1 Scope and terminology

The bulk of this dissertation is devoted to LSC personal pronouns, given that it is the domain in which more fine-grained person and number distinctions are encoded in the world's languages.² Since nouns are taken to come with an inherent third person value (Siewierska 2004, Corbett 2006), I restrict the analysis of person distinctions to pronouns only. However, in addressing the number category, I will consider both pronouns and nouns. This is due to the observation that, although the same number morphemes identified for other sign languages are attested in LSC, they are not equally distributed across the two domains. As I will show in this thesis, comparing the expression of numerosity in nouns and pronouns proves helpful to better understand the relation between the morphology and the semantics of number in LSC.

Although personal pronouns are claimed to be present in (almost) all languages, definitions of what a personal pronoun is are rather diverse. As Siewierska (2004) points out, the distinction between nouns and pronouns is scalar, meaning that pronouns might exhibit both nominal and pronominal properties. For example, unlike nouns, pronouns express grammatical person, they form a closed class paradigm and they lack specific semantic content other than the grammatical features they express. However, there are languages in which pronouns might take modifiers and share number markers with nouns (i.e., they have nominal properties).

In sign languages, personal pronouns are typically expressed through pointing, that is, through a sign performed with the index-finger

²Verb inflection, which is another such domain, will not be addressed in this research.

handshape which is directed towards a certain location in order to express reference to present and non-present entities. However, this should not be taken to imply that pointing signs are to be equated with a pronominal function only, nor that reference to the speech act participants is necessarily expressed through pointing. In fact, across a number of sign languages, pointing signs have been reported to display other functions, such as locatives, determiners, possessives and demonstratives (Pfau 2011; Cormier et al. 2013). The same can be said for LSC (cf. Veiga Busto 2020a). Moreover, although pointing signs typically select the index-finger configuration in many of the languages studied to date, other handshapes have been attested. Besides the manual component, pointing signs may also incorporate non-manual elements, such as eye gaze or body leans. In this dissertation, I will refer to such signs either as '(personal) pronouns' or, using a form-based description, as 'pointing (signs)'.

Categories and values

In this thesis, I refer to the grammatical expression of person and number as 'categories'. Yet, note that these might also be referred to as ' (ϕ) -features', particularly in the literature on agreement. Values, in turn, are paradigmatic alternatives (cf. Croft 2002). That is, the concept of value is used to refer to the set of distinctions made within a specific grammatical category. These distinctions, of course, might vary from one language to another, which is why this topic is interesting in the first place. For instance, while Catalan only codes a two-way distinction in the number category with the values singular and plural, other languages have dedicated markers expressing whether reference is made to one entity only, to exactly two, to a few or to a large number.

Note that in the characterization above I rely both on the meaning encoded by the forms and on the grammatical expression of such distinctions. Indeed, the values of number are often described in semantic terms (e.g., "the dual refers to two distinct real world entities" cf. Corbett 2000: 20). As Haspelmath & Karjus (2017) point out "[t]he terms singular and plural are typically used both in a semantic sense and in the sense of

a language-specific formal grammatical category”. Regarding the person category, there is a similar tendency to collapse forms and interpretations (e.g., first person “refers minimally to the speaker” cf. Kibort 2008). However, forms and functions do not always correlate with each other. As stressed by Zwicky (1977: 714) “there is a considerable tendency for the morphosyntactic categories to line up or correlate with the semantic ones, even though there are exceptions in both directions”. In the literature, these symmetries (and asymmetries) are commonly connected to the notion of ‘markedness’.

Morphological markedness

Typological studies on person and number often order the values of person and number in scales by appealing to markedness. To give an example, in most hierarchies the singular is the first (i.e., the leftmost) value of the scale (cf. Section 5.2). The reason for this is that in most languages the singular is morphologically less complex (i.e., marked) than the plural.³ Besides being understood as structural complexity/simplicity, markedness is equally tied to frequency and paradigmatic complexity (Moravcsik & Wirth 1986). Singulars, for instance, are not just morphologically simpler than plurals, but cross-linguistically more common in language use. Moreover, they mark more gender and case distinctions than their plural counterparts (in English, for example, gender is marked only on third person singular, but not on plural pronouns). An additional hallmark of markedness is neutralization (Trubetzkoy 1939; Greenberg 1966a; Croft 2002).⁴ That is, if an opposition between two paradigmatic alternatives (i.e., values)

³Strictly speaking, for a value to be considered unmarked, only being expressed by less morphemes than the marked value is central (Croft 2002). Therefore, unmarked values should not be equated with absence of overt morphology.

⁴These properties are not unanimously assumed to always hold, nor are they universally considered reliable tests for markedness. In fact, when referring to neutralization and structural complexity, Dixon (2010: 239) states “these have often been taken, erroneously, to be defining criteria [...] neither of these properties necessarily holds, although they often do”.

is neutralized, then it results in the unmarked category. This property (contextual neutralization) is presented in Greenberg (1966a: 29) as follows: "[i]n certain environments the opposition between two or more categories is suppressed, and it is the unmarked member which appears".

Form-meaning (a)symmetries

Morphological markedness has been traditionally paired up with semantic markedness on the assumption that (morphologically) unmarked forms correspond to unmarked meanings, while marked forms are associated with marked meanings. Central to the definition of semantic markedness is the idea that one member of the opposition is used in general, less specific contexts (Dixon 2010). In the semantic literature this form-meaning correlation is usually referred to as a *Horn pattern* or *Horn's division of pragmatic labor* (van Rooy 2004; Farkas & de Swart 2010; a.o.). Nonetheless, this idea is far from new. In fact, ever since the Prague School, morphological markedness is considered to be grounded in semantic markedness. As Horn himself pointed out (1989: 155):

Formally the key notion is that of Jakobson's *SIGNE-ZERO*: one member of an opposed pair is literally *MARKED* (overtly signaled) while the other is *UNMARKED* (signaled via the absence of an overt signal). Semantically, the marked category is characterized by the presence of some property **P**, while the corresponding unmarked category entails nothing about the presence or absence of **P** but is used chiefly (although not exclusively) to indicate the absence of **P**.

This idea has been of particular interest for research on number semantics, given that in certain languages the alleged symmetry between formal (i.e., morphological) and functional (i.e., semantic) markedness seems to be reversed. This is the case, for instance, of plural forms that denote both singular and plural entities, as *books* in 'I didn't buy books on the market'. In such cases, and against what would be predicted if morphological markedness were grounded on semantic markedness, it is assumed that it is the morphologically more complex member of the

singular-plural pair (i.e., the plural) the one with a less specific meaning (see Section 7.4.2 for further details).

Given the many interpretations the term markedness adopts in linguistic research, Haspelmath (2006) casts doubt on the need for such a notion. Indeed, he lists twelve different senses in which the term has been used in the literature and suggests other notions to replace it. With respect to formal markedness, Haspelmath proposes to use the expression ‘overt coding/uncoded’ instead of ‘marked/unmarked’. With respect to functional markedness, he argues that it “should be described with standard semantic concepts like hyponymy and polysemy, and that generalized conversational implicatures and their conventionalization are crucial for understanding the observed asymmetries” (Haspelmath 2006: 29). According to the author, most asymmetries can simply be explained by taking into account frequency effects.

In this dissertation I will be referring to both forms and functions. Hence, for the sake of clarity, I will avoid using the term ‘(un)marked’ without any indication of the domain it applies to. Therefore, I will use the expression ‘morpho(phono)logically/grammatically/formally marked’ or, alternatively, ‘(un)encoded’ or ‘(un)inflected’. As for the use of ‘markedness’ in the semantic domain, I will indistinctively use the expression ‘semantically (un)marked’ or the terms ‘denote/express (a certain value)’.

Further clarifications on the terminology used in this dissertation will be given, whenever necessary, throughout the text.

1.2 Motivations and outline

This thesis pursues two main goals. First, it aims at documenting which morphological strategies, if at all, are available in LSC to encode person and number distinctions in personal pronouns and nouns. As is the case of many sign languages, the grammar of LSC is not yet fully described. Thus, I am first interested in contributing to the linguistic description of these two interrelated aspects of the LSC grammar. Besides, I aim to analyze the connection between the morpho(phono)logy of number and

person and the expression of numerosity and discourse roles in LSC (i.e., the way in which forms and functions map onto each other).

Typological studies have extensively analyzed the distinctions drawn in the person and number categories in a vast array of languages, but comparison with sign languages is, for the most part, lacking. In this dissertation, I will examine the LSC data against the background of prior investigations on person and number in both sign and spoken languages. By doing this, I aim to check the extent to which LSC conforms with (and differs from) the general tendencies observed in these two categories across the world's languages. That said, this is a language specific research and, thus, no generalizations over other sign languages are intended. However, as I will show throughout this thesis, comparing both the data and the analyses carried out in different sign languages proves helpful not only for finding out similarities and differences, but also for a better understanding of the nature of variation across languages.

In the sign language literature, person and number have been unevenly studied. Research on the person category has been at the center of linguistic scrutiny for the last few decades, but whether sign language pronouns should be taken to display a grammatical distinction between first, second and third person is still open to discussion (both across and within languages). Besides, most studies tend to restrict the discussion to singular forms only or to singular and first person plural forms. Proportionally, the expression of person in second and third person non-singular pronouns has barely been studied. Considering this, I aim to contribute to the debate by describing the way person distinctions are expressed in a wider range of forms of the LSC pronominal paradigm. Hence, I explicitly integrate non-singular pronouns into the investigation (i.e., dual and plural forms). The specific research questions I aim to answer are the following:

- **Research question 1:** Does LSC encode person distinctions in the pronominal system? And if so, which ones and how? (Chapter 3)
- **Research question 2:** Is it possible to propose a unified system that accounts for the grammatical marking of person irrespective

of the number value of the pronoun? (Chapter 4)

The morphological expression of number in nouns has been documented in great detail for some languages, among which German Sign Language (DGS) (cf. Pfau & Steinbach 2005, 2006, 2021) and American Sign Language (ASL) (cf. Schlenker & Lamberton 2019, to appear). By contrast, the expression of number in personal pronouns has received far less attention in the literature. According to Berenz (1996: 212), “this is due, at least in part, to an assumption that plural pronouns are merely composites of a form of the singular plus a plural morpheme”. Despite this, prior research generally assumes the same array of number distinctions for a variety of languages and domains. In the pronominal domain, the list typically includes singular, dual, collective and distributive plural values (Sandler & Lillo-Martin 2006; Cormier 2012). By contrast, trial and other exact number pronouns (i.e., quadral, quintal, etc.) are usually analyzed as numeral incorporated forms, not as grammatical number (McBurney 2002). In view of the above, I seek to answer the following questions:

- **Research question 3:** What are the number distinctions grammatically encoded in LSC nouns and pronouns and which morphological strategies are used to express them? (Chapter 6)
- **Research question 4:** What is the status of exact number pronouns in LSC? Are they better analyzed as values of number or as numeral incorporated forms? (Chapter 7)

In addressing these questions, I will take on each category separately. Part I deals with the person category and Part II with number. Cross-linguistic analysis on the categories of person and number are a good starting point to set up the most relevant distinctions found in the world’s languages within each category and introduce the terminology used thereafter. Hence, **Chapter 2** starts by discussing the notion of pronominal person, its relation to number and the most common distinctions drawn in the world’s spoken languages. It additionally

reports on the main proposals to account for the expression of person in sign language pronominal forms. **Chapter 3** addresses the question of whether person distinctions are formally encoded in the grammar of LSC. In doing so, I provide a description of the morphophonological expression of person distinctions in LSC, focusing specifically on singular, dual and plural forms. To that end, I rely on Berenz's (1996) Body Coordinates Model, while I also argue for a simplification of the model to better account for LSC data. Ultimately, I argue that LSC encodes the distinction among first, second and third person in its pronominal system. In **Chapter 4**, I propose a new account of person marking in LSC personal pronouns. Like in Berenz's proposal, the analysis gets rid of the actual or assigned locations of the referents to account for the marking of person, as the phonological shape of the pronominal form proves sufficient to mark person distinctions. The proposal is based on the notion of spatial features, which allows us to account for the articulatory contrasts encoding person values in LSC presented in Chapter 3.

In Part II of this thesis, I turn to the expression of number distinctions in LSC nouns and pronouns. **Chapter 5** provides an overview of the variation found within the number category in the world's spoken languages, as well as the number distinctions claimed to be drawn in sign languages and the morphological strategies used to express them. **Chapter 6** focuses on describing the morphological expression of number in two domains in LSC: nouns and pronouns. Since pronouns and nouns differ on the strategies that count as candidates to express numerosity, I compare the morphological operations used in the two domains. First, I describe the simultaneous use of reduplication and modification of the path movement of the sign, which is possible for both pronouns and nouns. Then, I turn to the use of one strategy only. For nouns, both modification of the path movement and reduplication is possible; for pronouns, only path movement changes can express a plural meaning. I provide an explanation for this split and propose that the use of different strategies in the pronominal domain is due to the different number values associated with each morphological operation. **Chapter 7**, in turn, examines whether LSC is a language in which dual pronouns are to be granted a different status as that of other exact number

forms (trial, quadral, etc.), as it is assumed in many studies on sign language number systems. I specifically look at the arguments given in McBurney's (2002) work for ASL (handshape selection, movement and optionality of the forms) for teasing apart number values from numeral incorporation. I further suggest an additional piece of evidence, the referential behavior of the forms in LSC, which might be problematic for an analysis of the dual as a number value. The data presented in chapters 6 and 7 is the basis for the proposal offered in **Chapter 8**. I first suggest a correlation between number distinctions and the phonological features realizing number in LSC personal pronouns. Besides, I propose a unified treatment of person and number, taking into account the spatial features advanced in Part I of this dissertation and the number features presented in Chapter 8. In **Chapter 9**, I summarize the most relevant findings of the dissertation. I further point out some remaining questions and suggest future directions of this work.

1.3 Data sources and elicitation methods

For this research, I used data from three different sources: elicited productions, semi-spontaneous data and acceptability/grammaticality judgments. Given that the two parts in which this dissertation is divided are meant to answer rather different questions, so it is the data used to investigate each topic. Part I is mainly corpus-based, whereas Part II relies mostly in judgment tasks. Below, I describe the methodology used for the description and analysis of both person and number and I also explain the source of the LSC examples presented throughout the text.

Part I

Debates on the number of person distinctions expressed in sign language pronouns do not question the possibility for sign languages to denote reference to the participants and the non-participants in the conversation, but rather whether such distinctions are formally encoded in sign language grammars. Hence, in Part I of this thesis I will be

mainly looking at the form of personal pronouns with the aim of checking whether there are articulatory distinctions associated with reference to the different discourse roles. In doing so, I will rely heavily on data obtained from two LSC corpora. To a lesser extent, data from judgment tasks and elicited productions is also considered.

The primary source of empirical evidence is the LSC corpus, which is being developed by the *Institut d'Estudis Catalans* (Barberà et al. 2015). From this corpus, I used a sample of 11 videoclips. The total of participants in the clips was 16 (8 of which were women and 8 men). They were all native or near-native LSC signers from different areas of Catalonia. The total duration of the videoclips was 56 minutes and 26 seconds.

Additionally, I used 5 videoclips from the corpus of Aesop's fables of the LSC Lab, inspired by the ECHO Project (cf. Crasborn et al. 2007). Out of the 5 clips, 4 were fables produced by a woman and 1 by a man. The total duration of the clips was 10 minutes and 13 seconds.

The corpus data used for Part I contained few tokens of non-singular forms. With the aim of collecting more instances of dual and plural pronouns, I designed elicitation sessions with two deaf consultants, a woman and a man, both middle-aged, born and raised in Catalonia and native LSC signers. Considering that the actual or the assigned locations of the referents in space are given a central role in prior analyses of person marking (see Section 2.3.2), the spatial layout of the referents, including the relative position of the addressee with respect to the signer, was subsequently modified in order to check whether such changes had an effect on the articulation of pronominal forms. On top of that, I also designed judgment tasks so as to assess the acceptability of pronominal forms in different contexts and to establish their possible interpretations. Data obtained in these sessions was also considered for the analysis of number distinctions in LSC. For further details, see 'Part II' below.

From the elicitation sessions, I selected a recording of a task carried out together with the two consultants. It consisted in a role play activity in which they were asked to answer questions about present and non-present referents, most of which entailed reference to more than one entity. The total duration of the clip is 20:28.

Table 1.1 presents the total number of videos, their duration and the total number of participants. Since participants in the elicitation were the same two signers from the corpus of Aesop’s fables, they are excluded from the table.

	Vidoclips	Participants	Duration
LSC corpus	11	16	56:26
Corpus of Aesop’s fables	5	2	10:13
Elicitation	1	—	20:28
Total	17	18	87:07

Table 1.1: Participants and duration of video samples used for Part I

From this dataset, I analyzed a total of 1.295 pointing signs, which were annotated using the software ELAN (Eudico Linguistic Annotator), developed at the Max Planck Institute for Psycholinguistics in Nijmegen (The Netherlands). In the coding process, I excluded from the elicitation session clip all metalinguistic uses of personal pronouns (e.g., when discussing the articulation of a particular form, if modifications of some parameter were accepted or not, etc.).

In the LSC corpus and in the corpus of Aesop’s fables, the glosses of the dominant and the non-dominant hand were already annotated by deaf researchers. On top of that, I coded the following tiers for pointing signs only:

- Handshape
- Location
- Palm orientation
- Movement
- Frontal alignment hand-head
- Frontal alignment hand-upper body
- Horizontal alignment hand-head
- Eye gaze

- Eye gaze middle
- Mouth
- Production
- Midsagittal plane
- Semantic number
- Morphological number
- Semantic features
- ix type
- Spatial features
- Translation
- Comments

The annotation took into consideration previous claims about person marking in other sign languages. Hence, tiers such as ‘eye gaze’ are meant to test whether this non-manual component has a systematic association with the formal encoding of person values, as proposed in Berenz’s (1996) analysis of Brazilian Sign Language (Libras) pronouns (see Section 2.3.2.2). The tier ‘eye gaze middle’ accounts for the direction of the signer’s gaze when the pointing sign reaches the target (see Section 3.1.2.1 for an explanation for this double coding). On top of that, I coded other components of the sign to assess whether there were further elements that could impact the interpretation of person in LSC, although they were not given a central role in the grammatical marking of person in prior research. These included non-manual elements such as the mouth component (meant to account for mouthings and mouth gestures) and the midsagittal plane (with the values contact, proximal without contact, medial, distal). The tier ‘production’ accounts for differences in muscle tension and duration in the production of pronominal signs. The tier ‘movement’ was coded only in case the pronoun was non-singular and used for the analysis of number presented in Part II. Similarly, the tiers ‘morphological’ and ‘semantic number’ were added to compare the alignment of forms and functions in the expression of numerosity.

Besides descriptive tiers, in which I focus primarily on the articulatory characteristic of the signs, I also coded tiers which are more interpretative in nature, such as the ix type or the semantic features of

the referent (animate, inanimate, time, location...). Once the proposal of association of person values and spatial features offered in Chapter 4 had been delineated, I also added the tier ‘spatial features’, so as to directly code the string of features in the original data with the aim of verifying the extent to which they could be taken to account for the marking of person values in LSC. Similarly, the tiers ‘horizontal alignment of head and hand’ and ‘frontal alignment of hand and head/upper body’ were coded to explore whether alignment of articulators had a systematic role in encoding person values. Once the data was extracted, the values of these tiers were compared with that of ‘spatial features’, to ensure consistency.

Given that the objective of Part I of this thesis is to describe the morphophonological strategies used in LSC pronouns to grammatically mark person values, nearly all the pictures provided in Chapters 3 and 4 are given without indication of the context they appear in, as they are simply meant to show the way pronouns are articulated. The pictures presented in Part I were all taken from the LSC corpus or produced by the two consultants in elicitation sessions (whether prompted or produced in spontaneous conversations during the session).

Part II

Part II of this dissertation takes as a starting point the observation that, although the same number morphemes identified for other sign languages are also found in LSC, they are not equally productive in nouns and pronouns. Since for LSC is still not clear what the semantic contribution of each number marker is, I will primarily focus on analyzing the meaning each morphological operation (reduplication, modification of the path movement of the sign...) comes with when used with nouns vs. with pronouns. In doing that, I rely mostly in data obtained from judgment tasks.

Before data collection sessions, and depending on which the research questions were, I first prepared the contexts as to obtain judgments/ elicit a specific linguistic expression. The specific research questions addressed in the sessions were informed by prior research, my own intuitions as a

signer and observation of corpora data and spontaneous conversations.

As pointed out by Crain & Steedman (1985: 338) “[t]he fact that the experimental situation in question makes a null contribution to the context does not mean that the context is null. It is merely not under the experimenter’s control [...] the so-called null context is in fact an unknown context.” Hence, in most sessions, consultants were first presented a context, constituted either by explanations about the situation and the speaker’s goals or by the prior linguistic context. The context was followed by a sentence containing the linguistic expression under analysis (a pronoun or a noun). In most cases, I explicitly avoided questions of the form ‘do you find this sentence correct?’, especially when investigating the possible readings of the linguistic expression or whether the sentence truthfully described the situation according to the speaker’s intention. Instead, consultants were asked to evaluate the acceptability of the form to pick up the intended referent, to discuss its possible interpretations and to provide other forms they considered more acceptable/natural. Alternatively, they were asked to go first in providing a sentence in accordance with the context and then discuss other alternatives I provided myself.

A method frequently used in the sessions involved testing minimal pairs. In (1), for instance, the context sentence is modified; in (2), it is the path shape of the pronoun in the target sentence that is altered to assess whether this has any effect on the interpretation of the form.

(1) *Context:*

a) At today’s comic play there are only 3 people in the audience.

To make fun of them, one performer says to the other:

b) At today’s comic play there are about 50 people in the audience.

To make fun of them, one performer says to the other:

Target:

IX₃-rep3 FOOLISH.⁵

⁵For details on the glossing conventions, see Section 1.4 below.

(2) *Context:*

After having problems with the exams schedule, the head of the department informs the professors:

Target:

a) FROM_NOW_ON IX_{1incl-straight} RESPONSIBLE HOUR ^ CALENDAR.

b) FROM_NOW_ON IX_{1incl-circ} RESPONSIBLE HOUR ^ CALENDAR.

Most elicitations were conducted individually, with one consultant at a time. When all the relevant data on a certain topic was collected, I generally designed an elicitation with the two consultants together. These sessions were aimed at (re)discussing the data and confirming their judgments.

The input for grammaticality/acceptability judgments was always given in LSC, in which I am fluent. In the study concerning the interpretation of dual forms presented in Chapter 7, I signed and recorded the sentences beforehand as to control that both consultants were judging the exact same production. Besides, after sessions (on dual forms or on other topics), I further recorded some of the examples discussed in order to have LSC stimuli signed by a native signer. These examples were presented in subsequent sessions for consultants to confirm their judgments.

For ease of presentation, most context sentences in the dissertation are given in English only. When the context sentence is relevant as to avoid losing information that would help understand the target sentence (as in the case of dual pronouns), glosses for the context and a signed production are also given in the example. The video samples presented in Part II of this dissertation are all stored in an online platform, ensuring their accessibility. They can be accessed by clicking into the camera symbol next to the example sentence.

1.4 Notation conventions

Following standard conventions, the meaning of signs is annotated using small caps. When a sign consists in more than one morpheme (e.g.,

compounds or numeral incorporated signs), it is glossed as SIGN^SIGN (e.g., HOUR^CALENDAR, meaning ‘calendar’). When more than one English word is needed, the approximate translation is separated by underscore (e.g., THERE_IS_NOT corresponds to one LSC sign only). Classifiers are glossed as CL: ‘meaning of the classifier’ (e.g., CL: ‘statue’).

The gloss IX (‘index’) stands for pointing signs. When relevant, the locations within the signing space to which personal pronouns or other linguistic elements are directed are represented using lowercase letters. Number subscripts, in turn, represent person distinctions.

- (3) IX_{3-a}
 ‘He’ (index sign formally marked for third person directed to location *a* in signing space)

Plural morphemes are represented as follows: ++ stands for in situ reduplication, the gloss ‘-rep2/3/4’ stands for reduplication with displacement (see Section 5.3.3 for further details and examples). Path movements are represented using the following subscripts: -*circ* stands for circular movement, -*arc* for arc-shaped, -*straight* for horizontal-line movement, -*triangle* for triangular movement and -*midsag* for a movement in which the end point of the sign is displaced outwards with respect to the signer.

- (4) IX_{3-rep3-straight}
 ‘They’ (index sign grammatically marked for third person and reduplicated three times in the horizontal plane)

The gloss THE_TWO, to which the same glosses and subscripts are attached, represents the so-called dual pronoun.

- (5) THE_TWO₁₊₂
 ‘Both of us (you.SG and me)’

Therefore, the glossing conventions used in this dissertation are the following:

SIGN	LSC sign
SIGN_SIGN	Sign that requires more than one English word in the glosses
SIGN^SIGN	Multi-morphemic sign
IX _{1/2/3}	First/second/third person pronoun
₁ VERB ₃	Agreement verb inflected for first and third person
SIGN- <i>a</i>	Sign produced in location <i>a</i>
SIGN++	In situ reduplicated sign
SIGN-rep	Sign reduplicated with displacement
CL: 'meaning'	Classifier construction and its interpretation

The examples given in this dissertation are preceded by the name of the language, either signed or spoken. Whenever the name of the language is not indicated, the example corresponds to LSC.

Part I
PERSON

CHAPTER 2

The person category

The category of person encodes the semantic distinction between discourse roles. It is typically expressed on pronouns and verbs, while nouns are generally assumed to have an inherent third person value (Corbett 2006). In Part I of this dissertation, I will focus on the expression of person in personal pronouns only.¹

The goal of this chapter is to present the most common distinctions drawn within the person category in the world's (spoken) languages. Since cross-linguistic studies only very rarely discuss the person distinctions encoded in sign language grammars, I will tackle this issue in the second part of the chapter.

In sign languages, reference to the participants in the speech act is deeply connected with the use of the signing space, but accounts of the association between spatial locations and referents are far from uniform. This translates into different analyses of the person category, as well as into diverging proposals regarding the number of person values claimed to be grammatically encoded in sign language grammars.

¹For detailed discussions on the grammatical marking of person in the verbal domain see Fischer & Gough (1978); Padden (1983); Janis (1995); Meir (1998); Cormier et al. (1999); Rathmann & Mathur (2002); Quadros & Quer (2008); Mathur & Rathmann (2010); Lillo-Martin & Meier (2011); Costello (2016); Hou & Meier (2018); Lourenço (2018); Lourenço & Wilbur (2018); Pfau et al. (2018); among many others.

The chapter is structured as follows. Section 2.1 introduces the notion of pronominal person, the most common distinctions drawn in the person category and their relation to the number category. Section 2.2 offers an overview of the cross-linguistic tendencies observed in the category of person in the world's (spoken) languages. In Section 2.3, I turn to sign languages and report on the main proposals that account for the association of spatial location and referents, as well as for the expression of person distinctions in sign language pronouns.

2.1 Person distinctions

2.1.1 Participants vs. non-participants

The grammatical category of person encodes, both in the verbal and in the nominal domain, reference to the participants in the speech act. First and second person express the conversational roles of the speech act participants: first person refers (minimally) to the speaker and second person to the addressee. The non-participants in the speech act, in turn, are associated with third person.

The participants vs. non-participants split is based on the observation that the third person is fundamentally distinct from the first and the second (cf. Forchheimer 1953; Benveniste 1971; Lyons 1977; a.o.). According to Benveniste (1971: 217) “[...] the ordinary definition of the personal pronouns as containing the three terms *I*, *you*, and *he* simply destroys the notion of ‘person’. ‘Person’ belongs only to *I/you* and is lacking in *he*”. Similarly, Lyons (1977: 638) notes that “[t]he term ‘third person’ is negatively defined with respect to ‘first person’ and ‘second person’: it does not correlate with any positive participant role”. This is why third person is also referred as ‘the non-person’, ‘third party’ or ‘the other category’ (Benveniste 1971; Cysouw 2001; Siewierska 2004; a.o.).

The first/second vs. third person distinction is borne out by considering both semantic and morphosyntactic evidence. For example, third person pronouns are more likely to show gender distinctions than first and second person pronouns. Number distinctions, by contrast, are more commonly neutralized in the third person (see Sections 2.2

and 7.4.2). Besides, some languages lack dedicated markers to express reference to the non-participants, which may translate into absence of specialized third person pronouns or into zero verbal agreement. For instance, the Nakho-Daghestanian language Lezgian, spoken in the Caucasus, uses the substantivized demonstrative *am* ('that one') instead of a third person pronoun, see (1). Alternatively, languages may express reference to the non-participant by using full noun phrases or zero forms (i.e., no overt expression whatsoever) (Siewierska 2004).²

(1) *Lezgian*

	SG		
1	<i>zun</i>	'I'	(personal pronoun)
2	<i>wun</i>	'you'	(personal pronoun)
3	<i>am</i>	'that one'	(demonstrative)

(Haspelmath 1993: 184)

Zero agreement in the third person is fairly common in the world's languages, unlike zero agreement in first and second person (Cysouw 2001). This is the case of the Mongolian language Buriat in (2). In the singular, overt agreement suffixes, which are derived from personal pronouns, are used in first and second person. Absence of a person suffix, in turn, is associated with reference to the non-participant. In the plural, the third person suffix is derived from the demonstrative *ede* ('these').

(2) *Buriat*

	SG	PL
1	-b	-bdi
2	-s	-t
3	∅	-d

(Poppe 1960, cited in Bybee 2015: 153)

²As Siewierska (2011) pointed out, lack of specific person markers for the third person is to be expected if the third person is regarded as a marginal member of the person category (a 'non-person').

An additional distinction between first and second person pronouns as opposed to the third is that the former are inherently deictic elements and, as such, their interpretation shifts with the speaker (i.e., they belong to the class of ‘shifters’, cf. Jespersen 1922; Jakobson 1971). By contrast, third person pronouns may have both indexical (i.e., deictic) and non-indexical (i.e., anaphoric) uses (Kaplan 1989).^{3,4} The interpretation of anaphoric third person pronouns does not shift, as they are bound to their antecedents, not to the extralinguistic context.

Notationally, the reference of person is labeled using either Arabic numbers (1 for speaker, 2 for addressee, 3 for other; cf. Zwicky 1977) or, in the tradition of Harbour (2016) and Ackema & Neeleman (2018), using letters (*i* for speaker, *u* for addressee, *o* for other). Here, I will follow the more widespread convention of representing the semantics of person with numbers. Whenever referential elements combine to create groups (or ‘referential sets’), they are represented in the form of a sum (e.g., *they* = 3+3(+3)). For ease of illustration, I will represent dual forms as sums of two referential elements (e.g., 1+3) and plurals as sums of three elements (e.g., 1+3+3).

2.1.2 Person in plurals: associative and additive readings

It has long been observed that the notion of person is far more complex in plural than in singular pronouns, given the alternative ways in which groups can be formed by combining participants and non-participants (Lyons 1968; Benveniste 1971; Corbett 2000; Cysouw 2001; Siewierska 2004; Daniel 2005).

³Kaplan (1989) further breaks down indexicals into two types: pure indexicals (i.e., *I* or *now*) and true demonstratives (i.e., *she*, accompanied by a pointing, or *that*).

⁴According to some analyses, there is no reason to posit a theoretical distinction between deictic and anaphoric uses of third person pronouns, as in both cases they are used to refer to the most salient element in the context. Saliency, in turn, might come either from the linguistic context, as in the case of anaphoric pronouns, or from the extra-linguistic context, as in the case of deictic pronouns (cf. Partee 1978; von Stechow 2002).

Moreover, number in personal pronouns is not to be equated with nominal number, as plural pronouns may lack both additiveness and referential homogeneity (Daniel 2005). That is, an additive plural noun such as *cats* refers to a set such that every member in the set is an individual cat. Hence, it is referentially homogeneous. This contrasts with the pronoun *we*, which only very rarely refers to a plurality of speakers (the so-called ‘choral-we’ or ‘mass-speaking’). Much more generally, *we* refers to a group conformed by the speaker and the addressee(s) (1+2(+2)), by the speaker and some other non-participant(s) (1+3(+3)) or by the speaker, the addressee(s) and the non-participant(s) (1+2+3). Similarly, second person plural pronouns can refer to more than one addressee (2+2(+2)) or to a set conformed by the addressee(s) and one or more non-participant(s) (2+2/3(+3)). In this respect, too, third person pronouns are distinct from first and second person. According to Benveniste (1971), first and second plural pronouns typically encode “amplified person”, that is, reference to more than one person category. Third person, by contrast, never encodes amplified person. A true plural (i.e., homogeneous), he claims, is only possible in the third person (3+3+3).

Considering these distinctions in the reference of plural pronouns (heterogeneous vs. homogeneous interpretations), some scholars establish a correlation between the semantics of first (and sometimes second) person forms and that of associative plural markers⁵ (Corbett 2000; Moravcsik 2003; Daniel 2005). Unlike ordinary (i.e., additive) plurals, which are referentially homogeneous, associative plurals refer to a group by naming only its most prominent member (the so-called ‘focal referent’ since Daniel 2000), see (3) and (4). That is, like first (and some second) person plural pronouns, they are referentially heterogeneous. In (3), for example, *Tanaka-tachi* does not refer to more than one person named Tanaka, but to a group of people of whom Tanaka is the focal referent, that is, the member of the group that is named (Daniel &

⁵Associative plurals are also referred in the literature as ‘elliptical dual’, ‘approximative plural’, ‘plural a potiori’ and ‘representative plural’ (Daniel & Moravcsik 2013).

Moravcsik 2013).

- (3) *Japanese*
 Tanaka-tachi
 Tanaka-ASSOC.PL
 ‘Tanaka and his family or friends or associates’
- (4) *Hungarian*
 Péter-ék
 Peter-ASSOC.PL
 ‘Peter and his family or friends or associates’

(Moravcsik 2003: 469)

Similarly, first person plural pronouns do not refer to a plurality of speakers, but to a group of people of whom the speaker is the only one that it is named (i.e., the focal referent). That is, their semantics is parallel to that of associative plurals. By contrast, the typical interpretation of third person plural pronouns is additive, while second person plural pronouns can receive both readings: they can refer to a plurality of addressees (2+2+2) or to the addressee and some other non-participants (2+3+3).

Additive (homogeneous group)	Associative (heterogeneous group)
3+3+3	1+2/3+2/3
2+2+2	2+2/3+3

Table 2.1: Typical interpretations of plural pronouns

2.1.3 Clusivity distinctions

Beyond the referential interpretations that first person plurals may have, there are languages which have grammaticalized clusivity distinctions. That is, they use different morphemes to express whether the reference of the pronoun includes or excludes the addressee from its denotation. The

inclusive/exclusive contrast is widely attested in the world's languages, but it is uncommon in the (spoken) languages of Africa and Eurasia (Cysouw 2013). In Catalan, for instance, the pronoun *nosaltres* (meaning 'we' in English) can either be used to refer to the speaker, the addressee and one or more non-participants, to the speaker and the addressee(s) or to the speaker and the non-participant(s). That is, Catalan is a non-inclusive or 'unified we' type of language (cf. Cysouw 2001; Siewierska & Bakker 2005), in which the same pronoun covers the three readings listed above. However, there are languages that have specific forms for the inclusive meaning and yet others that have dedicated forms for both the inclusive and the exclusive, as in the Oceanic language Motu in (5).

(5) *Motu*

	SG	PL
1INCL		ita
1EXCL	lau	ai
2	oi	umui
3	ia	idia

(Lynch 1998: 100)

Clusivity distinctions are not limited to first person plurals.⁶ Languages with dual and trial number may encode, but they do not necessarily do, clusivity distinctions in those values as well.

2.1.4 Minimal-augmented systems

Some systems with an inclusive/exclusive contrast further distinguish whether the inclusive refers to the speaker and the addressee only or to a group that includes the speaker, the addressee and possibly others (Cysouw 2001). These are the so-called minimal-augmented systems since McKay (1978) (but see Thomas 1955 and Conklin 1962 for earlier

⁶Some scholars, such as Daniel (2005), treat the inclusive as a fourth person, which has a set of two elements as focal referents (the speaker and the addressee), rather than as subtype of the first person.

descriptions). ‘Minimal’ means the minimum number of individuals required to satisfy the meaning of the person value. For the minimal inclusive this is a group of cardinality 2, the speaker and exactly one addressee (i.e., the referential set 1+2); for the rest is one individual only. ‘Augmented’ denotes one or more than the minimum, which for the augmented inclusive is at least three and for the rest is two or more. This is illustrated in (6) with the pronominal system of the Philippine language Ilocano.

(6) *Ilocano* (minimal-augmented analysis)

	MIN	AUG
1INCL	ta	tayo
1EXCL	co	mi
2	mo	yo
3	na	da

(Cysouw 2001: 85)

As noted by Cysouw (2005: 239), the minimal inclusive in paradigms such as the one in (6) is necessarily dual, but it is not analyzed as such because “virtually all languages with a minimal inclusive have no other dual forms anywhere in the structure of the language”. Indeed, if one sticks to the traditional singular-plural description of such paradigms, the resulting analysis will contain a lot of empty cells, as in (7), which is the reason why an alternative analysis of such systems was proposed in the first place.

(7) *Ilocano* (singular-dual-plural analysis)

	SG	DU	PL
1INCL		ta	tayo
1EXCL	co		mi
2	mo		yo
3	na		da

(Cysouw 2001: 83)

If a language additionally has a trial value for the inclusive only, it is analyzed as unit-augment system. In (8), for example, which illustrates the pronouns of the Papuan language Weri, the unit-augmented inclusive *tëarip* selects the minimum number of participants plus one. Hence, it denotes exactly three persons ('I and you two'). For the rest, unit-augmented corresponds with two individuals, that is, with dual reference. The augmented pronoun *tëar*, in turn, adds one or more than one individual ('I and you.PL').

(8) Weri (unit-augmented analysis)

	MIN	U.AUG	AUG
1INCL	tepir	tëar-ip	tëar
1EXCL	ne	ten-ip	ten
2	në	ar-ip	ar
3	pë	pëar-ip	pëar

(adapted from Daniel 2005: 15)

Note that, unlike the case of Ilocano, unit-augmented pronouns in Weri all bear the same number morpheme *-ip*. This is considered additional evidence for a unit-augmented analysis, instead of a cardinality-based one (i.e., the traditional singular-plural).

2.2 Typological generalizations

The category of person has traditionally been considered universal (Forchheimer 1953, Greenberg 1966b; Zwicky 1977), as stated in Greenberg's (1966b: 96) universal 42:

(9) Universal 42: All languages have pronominal categories involving at least three persons and two numbers.

Yet, as pointed out in Section 2.1.1, not all person paradigms have specialized pronouns for all three person values. Regardless of this, if a zero form is invariably interpreted as referring to a non-participant, the opposition between first, second and third person is still taken to be

maintained in the system (Siewierska 2004). As pointed out by Harbour (2014b: 132) “[w]ith only two overt forms, one might be tempted to regard these as two-celled systems. But then one would incorrectly expect one pronoun to cover both, say, second and third person”. Hence, lack of specialized person markers is consistent with a three-person analysis of such systems.

On his typology of person marking, Cysouw (2001) identifies different kinds of person syncretisms in the singular (see below for syncretic patterns in non-singular forms). These include opposition between first person and the rest, opposition between second and non-second person, opposition between third person and the rest or no oppositions whatsoever. However, neutralization of an overt three-way opposition in the singular is only attested in inflectional paradigms, not in independent pronouns. This is presented in the form of the following homophony implications (Cysouw 2001: 50):

(10) Singular homophony \rightarrow inflectional marking

(11) Independent pronouns \rightarrow speaker \neq addressee \neq other⁷

The implicational universal in (10) states that if there is homophony in the singular, then it is found in the inflectional paradigm. The formulation in (11) states that, if a language has independent pronouns, then they are not syncretic as to person marking. Note, though, that some languages have been argued to lack ‘real’ independent pronouns. Typical examples include South Asian languages such as Thai, Burmese or Vietnamese, which tend to use proper names or nouns instead of

⁷Harbour (2014b) provides some counterexamples to the implication in (11), showing that pronouns in certain languages only distinguish first vs. non-first person (1 vs. 2/3) or participants vs. non-participants (1/2 vs.3). Hence, as it is common practice, the implication in (11) could be rather seen as a tendency (“universals are often conceded even by their proponents to be mere tendencies rather than categorial laws”, cf. Plank & Filimonova (2020)). Moreover, in his survey of rare structures in the marking of person, Cysouw (2005) considers some of the languages later mentioned in Harbour (2014b) and shows that homophony is only incidentally attested in singular independent pronouns. In fact, syncretic patterns were found only in 2 languages out of an *ad hoc* sample of 373 languages.

personal pronouns (Cooke 1965). Depending on the definition of what a person marker is, analyses vary as to whether such systems are considered to have real person markers or not. According to Wierzbicka (1996), specialized markers for first and second person are universal, even if their range of use varies across languages (e.g., if they are subject to cultural restrictions, as in Thai). By contrast, on Cysouw's (2001) and Harbour's (2014b) view, these constitute examples of languages without pronouns. On Cysouw's (1998, 2001) formulation, for a language to be considered to have pronominal marking as a linguistic category, person markers need to be specialized for person deixis. The fact that in languages like Thai there is no predominant way of referring to the speech act participants leads him to conclude that they lack specialized person markers. Whatever the analysis is, note that the implication in (11) still holds, because i) reference to the participants is not syncretic in the referred languages and ii) if person markers are considered not to exist, the antecedent of the implication is simply not met (cf. Cysouw 2001: 50).

According to Cysouw (2001), groups of participants are built on the basis of the three-way division of singular participants. Out of the seven logical possibilities, only five are attested in the world's languages (Table 2.2).

1+2 ⁸	'we', including addressee, excluding other
1+3	'we', including other, excluding addressee
1+2+3	'we', complete
2+3	'you-all', addressee(s) and others
3+3	'they'

Table 2.2: Groups of participants (Cysouw 2001: 70)

The remaining two groups of participants (1+1(+1) and 2+2(+2)), by contrast, seem not to be grammaticalized (Zwicky 1977; Cysouw

⁸Note that on Cysouw's notation the referential set 1+2 does not imply dual reference, but a group formed by the speaker and one or more addressees.

2001; Siewierska 2004). In fact, the use of specialized morphemes for ‘mass speaking’ (i.e., a ‘true first person’) has not been attested in any language so far. Similarly, the overwhelming majority of languages do not have different forms to refer to the present audience only vs. to the addressee(s) and the non-participants. That is, the inclusive/exclusive opposition in the second person (2+2(+2) vs. 2+3(+2/3)), if it exists, is extremely rare.⁹

That said, not all languages have person paradigms distinguishing all the possible combinations of participants in Table 2.2. As in the case of singular pronouns, there is considerable cross-linguistic variation in the expression of person distinctions. For instance, some languages show homophony between second and third person (Cysouw 2001; Siewierska 2004) and others between first and second (Cysouw 2005). Syncretism between first and third person in the non-singular has also been attested in inflectional paradigms (Cysouw 2005). Besides, many languages do not split the inclusive into augmented and minimal and yet others do not encode clusivity oppositions in the first person (and, if they do, they may do so in one value of the non-singular array only: e.g., if a language has both dual and plural pronouns, clusivity oppositions may be encoded in both the plural and the dual, in the plural only or in the dual only) (Cysouw 2001; Siewierska & Bakker 2005).¹⁰

Cross-linguistic studies have not only identified general tendencies in the domain of person morphology, but also correlations between the expression of various grammatical categories. For instance, Greenberg’s (1966b: 96) Universal 44 states the following:

- (12) Universal 44: If a language has gender distinctions in first person pronouns, it always has gender distinctions in the second or third

⁹For examples, see the collection of infrequent and rare grammatical traits “Das grammatische Raritätenkabinett” at the Konstanz Universals Archive (Plank & Filimonova 2020). For further discussion on this topic and arguments against the alleged inclusive/exclusive contrast in the second person, see Simon (2005).

¹⁰See Cysouw (2001, 2005) and Siewierska & Bakker (2005) for a complete overview of the variation found in the grammatical encoding of person distinctions in non-singular pronouns.

person, or in both.

Cysouw (2001, 2002) further establishes a correlation between the expression of clusivity, gender and person. Specifically, he suggests the following implications: i) if there is gender marking in first and second person, then clusivity distinctions are not attested in the paradigm; and ii) if a language encodes the inclusive/exclusive contrast, then there is no singular homophony at all. According to the author, paradigms that encode clusivity distinctions mark ‘pure person’, that is, they distinguish between all possible references to speaker and addressee and their different combinations. Since person reference is central in such paradigms, it cannot be fused, “[o]nly when the inclusive/exclusive opposition is not present, are other referential fusions possible” (Cysouw 2002: 53).

Another well-known tendency is for languages to mark number in accordance with the person hierarchy in (13), which ranks person according to their salience and predicts the distribution of syncretic patterns. As already mentioned, lack of person markers for the third person is fairly common in the world’s languages. Similarly, syncretism between second and third person in the dual is the most common type of homophony in the dual (Cysouw 2001).

- (13) Person hierarchy (Zwicky 1977: 718)
 $1 > 2 > 3$

Asymmetries in the expression of number distinctions are not restricted to personal pronouns. In fact, it has long been noted that in many languages number oppositions are restricted to some nominals (see Haspelmath 2005). In Fijian, for example, the expression of number is entirely optional for non-human referents, while it must be specified for human referents (Dixon 1988). It was precisely based on the observation of similar patterns in the morphological expression of number that Smith-Stark (1974) proposed that the degree of animacy of a given referent is related to the likelihood for it to express number distinctions. Smith-Stark’s claim is that when there is a plurality split (when number is relevant for some items but not for others), then lack of plural marking

affects those nominals that are lower in animacy. According to Corbett (2000: 70), the animacy hierarchy constraints number distinctions in the following way: “[a]s we move rightwards along the Animacy Hierarchy, the likelihood of number being distinguished will decrease monotonically (that is, with no intervening increase)”. Sometimes, the animacy hierarchy (human > animate > inanimate) is merged with Silverstein (1976) referential hierarchy, which also integrates proper names and pronouns. Given that animacy is only one part of the scale, Croft (2002) designate it as *Extended Animacy Hierarchy*. Take Dixon’s (1979: 85) nominal hierarchy as an example:

- (14) Dixon’s nominal hierarchy:
 first/second person pronouns > third person pronouns > proper nouns > human common nouns > animate common nouns > inanimate common nouns

As noted by Silverstein (1976), Dixon (1979), DeLancey (1981) and Comrie (1989), there is evidence suggesting that the first/second person ordering can be shifted in some languages. Filimonova (2002), for example, shows that in Aymara, the addressee is ranked higher than the speaker in the person hierarchy. For that reason, Dixon (1979) suggests that it may be enough to posit a three-way partition differentiating pronominal shifters (first/second person pronouns), other pronominal-type forms (third person pronouns, deictics, proper names) and common nouns.

2.3 Person distinctions in sign languages

Just like in spoken languages, sign language personal pronouns may express information about the entities they refer to. Prior research typically agrees that the categories of gender and case are not formally encoded in sign language grammars.¹¹ The situation is strikingly

¹¹Exceptions are Japanese Sign Language (NS) and Taiwan Sign Language (TSL), which use different handshapes for masculine and feminine referents (Smith 1990), and Israeli Sign Language (ISL), in which the emergence of a case-marked pronoun has been

different when it comes to the category of person. While it is the most widely studied category, no consensus has been reached as to whether sign languages have dedicated markers for first, second and third person.

Traditionally, it has been argued that the first person singular is encoded by directing the index sign towards the signer's chest. Second and third person singulars, in turn, are expressed by directing the sign towards a location in space –whether the actual location of the addressee and the non-participant or to a location previously associated with a non-present referent, in a process labeled as 'locus establishment' – (Friedman 1975; Meier 1990; Lillo-Martin & Klima 1990; Liddell 1995; a. o.).¹² Hence, referents and spatial locations are inextricably bound up with each other. However, analyses differ with respect to the status granted to the location component of personal pronouns (linguistic vs. non-linguistic).

In what follows, I review the two main proposals accounting for the association of spatial locations and referents in sign languages: the so-called 'spatial mapping' or 'iconic' view (Liddell 1995) and the 'R(eferential)-loci' perspective (Lillo-Martin & Klima 1990).

2.3.1 The status of spatial locations

2.3.1.1 The iconic view

Proponents of the iconic view claim that the location component of pronominal signs is not linguistic, but gestural. This approach is also known as 'spatial mapping view', since it considers the use of space in sign languages to be always topographic, meaning that the association of

reported (Meir 2003). Recent research has also argued that in several Nordic languages there is a dedicated object pronoun derived from the sign PERSON (Börstell 2017).

¹²Although it is widely assumed that the use of pointing signs is essentially uniform in sign languages, this assumption has been proven wrong by research on the so-called *village sign languages* –endangered languages of rural communities with a high rate of hereditary deafness used by the majority of people, either deaf or hearing (Zeshan 2007)–. Indeed, village sign languages show a preference for directing pointing signs to absolute locations, rather than to arbitrary ones. Absolute locations are anchored to the actual geographical locations of the referents or to cardinal locations associated with them (de Vos 2012; Bauer 2014; Schuit 2014).

locations and referents is not arbitrary. Besides, locations are conceived as representations of the referent in space. Hence, pointing towards a particular location is interpreted as pointing at the referent itself (Engberg-Pedersen 2003).

Liddell (1995) proposes a tripartite taxonomy of grounded mental spaces underlying the use of space in ASL: real, surrogate and token space. Central to this proposal is that pointing signs are claimed to be directed to those mental spaces, not to grammatical locations. Specifically, real space corresponds to one's conception of what is real in the perceivable physical environment. Hence, reference is made to conceptual entities that a person believes to be present, not to the physical entities themselves. Surrogate space refers to a mental space which contains entities not physically present, but which are conceived as if they were. Due to their existence in a grounded mental space, they are assigned a location and can be referred to by using pronouns or verbs. Finally, token space refers to conceptual entities that are grounded in the physical signing space by establishing an index, and subsequently making reference to them by pointing to the same location. Due to their existence in a grounded mental space, Liddell argues that reference to real, token and surrogate entities is grammatically deictic, not anaphoric.

On Liddell's account, a pointing sign can be directed to a virtually infinite number of locations in space, depending on the actual location of the referent in real, surrogate or token space. Hence, the location component of that pointing sign is non-linguistic (i.e., non-dependent on any linguistic category) and, therefore, cannot be phonologically described. The solution he suggests reads as follows: in pronouns there exists a single morpheme PRO, where some phonological features (handshape, types of movements, and aspects of the orientation) are lexically specified, but where location is not realized as a linguistic feature.

To exemplify the difficulty posed by the alleged unlimited number of locations in space (which has become known as the 'listability issue'), Liddell claims that if signer and addressee are in a room with fifteen other individuals, the signer would have to use fifteen different pointing signs to refer to them, one for each individual. Given that all of them are third

person referents, but the pronoun has a different form on each occasion because of location, it follows that pointing signs do not mark person distinctions. Yet, if this analysis were on the right track, one would expect subsequent mentions to the same individual to match the exact same location. Besides, under Liddell's analysis, it would be necessary to assume an analogous level of accuracy in perception on the addressee's side. However, as Wilbur (2013) notes, even if an infinite number of locations are available, the number of points and the choices of spatial locations are conversationally dependent and usually not above four. In fact, even proponents of the iconic analysis have noted that there are articulatory and perceptual motivations that constrain the number of locations actually used in the discourse (McBurney 2002).

Moreover, Quer (2011b: 190) argues against the listability problem by making a parallelism between spatial locations and phonemes in spoken languages. As he notes, phonemes may be subject to variation in their acoustic realization (e.g., depending on the speaker, the speech conditions, the influence of neighboring sounds), but they are however perceived categorically as phonemes. In sign languages, the specific physical points in space are considered irrelevant as such: "what counts for the linguistic system is how they can be interpreted categorically as referential locations or loci". Wilbur (2013: 251) additionally questions the claim that functional elements should be listable as follows:

The listability issue is based on a mistaken assumption that functional morphemes must be listable in spoken languages and that therefore non-listability in sign languages would constitute a distinctive modality difference. Languages with morphological processes such as reduplication and metathesis serve as illustrations that this assumption is unfounded.

A further problem raised by Barberà (2015) is that pointing signs are not always iconic. In many cases, they are used to refer indirectly (e.g., when directed to an object to refer to an idea linked to it), so no relation of contiguity between the sign and the object exists. Therefore, the referent is retrieved by context, not due to a contiguity relation.

2.3.1.2 The formal approach: R-loci

The so-called R-loci approach gives a grammatical explanation for the association of referents and spatial locations (Friedman 1975; Lillo-Martin & Klima 1990; Meier 1990; Berenz 1996; Lillo-Martin & Meier 2011; Quer 2011b; Wilbur 2013; Barberà 2015; Kuhn 2016, 2021; a.o.).¹³ Contrary to the iconic perspective, the R-loci account considers spatial locations to be arbitrary: loci are not dependent on the noun phrase, but on constraints such as the number of referents or the order in which they are introduced (Kuhn 2021).

The analysis suggested by Lillo-Martin & Klima (1990) is that spatial locations are the overt morphological expression of referential indices, something that does not hold for spoken languages, in which referential indices are not expressed. In line with this proposal, Lillo-Martin & Meier (2011) draw attention to the distinction between the target spatial location of the pointing sign from the notion of R(eferential)-index, which is an abstract grammatical device used to indicate reference within and across sentences.

In a similar vein, Wilbur (2013) emphasizes the need of distinguishing the R-locus (i.e., the specific spatial location) from the referential index (i.e., the geometric point in space). The latter is considered a clitic, not a variable (“there is a morpheme, that it is the geometric point (not any actual point with x, y, z coordinates) which can be placed anywhere but always provides the same semantics, namely than an individual exists”, op. cit: 213). The fact that the function performed by the pointing sign can be carried out by other articulators (e.g., the eye gaze) and that the same form may also be associated with different functions (cf. Section 1.1) is considered as additional evidence of its linguistic status by Alibašić & Wilbur (2006) and Wilbur (2013).

As pointed out by Barberà (2015: 37), the primary difference between these two lines of analysis is that only the R-loci perspective takes the

¹³Analyses differ with respect to the status of loci in sign languages. They have been analyzed as clitics (Fisher 1975; Wilbur 2008; Barberà 2015; a.o.), as morphosyntactic features (Kuhn 2016), as variables (Lillo-Martin & Klima 1990) and as both features and variables (Schlenker 2016).

signing space to be a linguistic construct: “[w]ithout a conversation and without the use of referring expressions directed to it, sign space does not exist. It is in fact made evident by means of signs directed to it”. Hence, the R-loci account distinguishes real space, which is unlimited and continuous, from linguistic space, which is limited and discrete.

An additional outcome of this distinction concerns the function each approach ascribes to pointing signs. When analyzed from the iconic perspective, the relation between spatial locations and referents is considered to be always deictic. Under the R-loci perspective, by contrast, the formal association between loci and referents can be considered either deictic (dependent on the physical context) or anaphoric (dependent on the linguistic context).

2.3.2 Number of person distinctions

The conceptions of the signing space reviewed in the previous section motivate, at least to a certain extent, the existence of different proposals regarding the formal marking of person distinctions in sign languages. For instance, following Liddell’s analysis, McBurney (2002) argues that ASL pronouns lack the category of person. That is, if locations cannot be phonologically specified, it follows that they cannot be part of the lexical marking and, in consequence, person distinctions in ASL are not lexically marked either. In McBurney’s opinion, pointing signs would be better described as demonstratives than as pronouns, because their function is to localize discourse referents, whether present or non-present, in space.

Other scholars assume that pointing signs may function as personal pronouns, but they disagree with respect to the person oppositions taken to be formally marked in sign language grammars. For example, Lillo-Martin & Klima (1990) argue that in ASL there is no grammatical distinction between first, second and third person, but a single pronominal that does not mark person distinctions. In Wilbur’s opinion (2013: 229): “such a position could be maintained if one took the grammatical *point* as the only linguistically relevant morpheme (ignoring handshape and orientation), since this is what all person marking has in common”. In what follows, I review the two most influential analyses

of person markers in sign languages: the so-called ‘first vs. non-first person’ analysis (Meier 1990) and the Body Coordinates Model (Berenz 1996), which argues in favor of a three-way opposition.

2.3.2.1 First vs. non-first person analysis

The most widely accepted proposal, first developed by Meier (1990) for ASL and subsequently adopted for other sign languages (e.g., Engberg-Pedersen (1993, 2003) for Danish Sign Language (DTS); Meir (1998) for ISL), argues for a distinction between first and non-first person –either the addressee or the non-participant–. This split is based on the observation that the location component of pronouns referring to the addressee and to the non-participant systematically depends on the real or the assigned location of the entity it refers to and, hence, it cannot be phonologically described. First person pronouns, by contrast, do have a systematic location (the speaker’s chest), so their articulation can be fully specified. Besides, neither Meier (1990) nor Lillo-Martin & Meier (2011) found other distinctive phonological features (either manual or non-manual) distinguishing forms used for reference to the addressee vs. the non-participant. Therefore, they conclude that second and third person are not grammatically marked in ASL. Essentially, this means that ASL, as well as other sign languages for which the same two-way distinction has been posited, would counter-exemplify the universality of a three-person distinction in singular personal pronouns, as well as Cysouw’s homophony implication presented in (11) above.

Further arguments given by Meier to support the first vs. non-first person split come from evidence of the grammaticalization of first person singular and plural pronouns in ASL. These include the following:

- i) plural morphology: first person plurals have a set of idiosyncratic (lexicalized) forms, which are non-compositional (i.e., they do not incorporate an arc plural morpheme),
- ii) handshape selection: first person pronouns are the only ones that select handshapes other than the index,

- iii) contact: first person pronouns are the only forms that contact the body of the signer,
- iv) special behavior under role shift: points to the signer in the context of role shift are not interpreted as referring to the actual signer, but to the signer of the reported context.

Taking over the idea that reference to the addressee and the non-participant is not grammatically encoded, Sandler & Lillo-Martin (2006) and Lillo-Martin & Meier (2011) further claim that pronouns in sign languages pick out referents, not classes of referents. Hence, they are referentially unambiguous, as illustrated in (15).

- (15) ASL
_a-MARY _a-INFORM-_b _b-SUE _a-IX PASS TEST
 ‘Mary_i inform Sue_j that she_i passed the test.’

(Lillo-Martin & Meier 2011: 104)

However, this claim is challenged by cases of pronominal ambiguity in a number of sign languages. For example, it has been shown that pronouns allow both strict and sloppy readings –Cecchetto et al. (2015) for Italian Sign Language (LIS)– and that the same location can be used for more than one individual –Kuhn (2016) for ASL–. Besides, personal pronouns might be used for impersonal reference, showing that despite the iconicity of the form (e.g., index point to the signer’s chest for first person singular), pronouns can also be used to convey impersonality –Barberà & Costello (2017) for LSC and Spanish Sign Language (LSE)–. Similarly, pronouns in reported discourse are used to refer to an entity other than the one pointed at –Quer (2011b); Cormier et al. (2013)–.

Finally, note that the labels ‘two-person’ or ‘first vs. non-first person’ analysis, although widespread in the literature, are not entirely accurate. What this proposal claims is that only the first person is grammatically marked, so it does not oppose first vs. non-first person, but rather person

vs. non-person.¹⁴ Yet, to avoid confusion, I will stick to the traditional designation ‘two-person’ analysis when referring to this proposal.

2.3.2.2 Three-person analysis

In her analysis of Libras pronouns, Berenz (1996, 2002) proposes the Body Coordinates Model, which accounts for the formal distinction of all three person values. According to Berenz, what is relevant to describe the phonological form of pronominal signs is not the location component, but the ‘articulatory array’ presented by the signer, which consists in the following coordinates: chest, eye gaze, handshape and head. On Berenz’s account, reference to the speaker and to the addressee is formally marked by aligning the four articulators along the midline of the signer’s body. That is, in first and second person the angle of the coordinates approaches zero. Reference to the non-participant, by contrast, is grammatically marked by misaligning some of the coordinates, such that the angle of the coordinates in disjunction is significantly larger than zero.

Furthermore, Berenz points out that third person pronouns avoid the midline of the body in order to keep third person maximally distinct from second person. As a consequence of this ‘midline avoidance’ principle, pronouns referring to the non-participant are preferably directed to the ipsilateral side (which corresponds to the side of the dominant hand), at least in Libras elicited data.

Unlike most descriptions of sign language pronouns, which narrow down the analysis to singular forms only or to singular and first person plurals, Berenz provides a detailed description of the morphophonological articulation of non-singular forms as well. Yet, the most noteworthy aspect of Berenz’s proposal is that, in order to describe the phonological marking of person, she explicitly disregards the entities and the locations pronominal signs refer to. In Berenz’s (1996: 215) terms: “[p]roduction and perception of the personal pronoun signs are independent of their referential objects”. Hence, according to her proposal, the form and the meaning of personal pronouns can both be

¹⁴For related arguments, see Berenz (1996) and Liddell (2000).

described without recourse to loci. This is in sharp contrast with Meier's approach to the phonological description of person markers, for which the real or assigned location of entities is claimed to play a crucial role. However, note that each author is focusing on quite different phenomena: Meier on reference resolution and Berenz on person marking. The following example illustrates this distinction. Say someone enters a room in which two friends are having a conversation, one of which utters 'He is so lucky'. In such a situation, the person entering the room would not be able to resolve who the intended referent is, but he would know either way that they are talking about a male individual. That is, he would be able to recognize the person marker and assign it a person value (i.t., third person), but he would not be able to identify the referent, given lack of access to the previous context. Hence, the question I am interested in is the following: is there something in the phonological makeup of personal pronouns in LSC that, like in the case of English and Libras, make them distinguishable even if further linguistic or extralinguistic information is missing (i.e., when neither the entities nor their real or assigned locations are known)? The next chapter aims at finding an answer to this issue. But before moving on, I will first review a further distinction not commonly addressed in the sign language literature: the grammatical marking of the inclusive/exclusive opposition.

2.3.3 Clusivity distinctions

Many descriptions on person distinctions assume that the inclusive/exclusive contrast is encoded in a number of different sign languages. However, clusivity marking has not been extensively described in most of them. In what follows, I review some notable exceptions to this general rule.

According to Berenz (1996), clusivity distinctions in Libras dual and plural pronouns are encoded by virtue of their relation to the midline. For instance, exclusive duals are performed near the shoulders, whereas inclusive duals are articulated at the midline of the signer's body. In plural pronouns, the inclusive/exclusive contrast is expressed by opposing forms that cross the midline of the body (for the inclusive)

with forms that do not cross it (for the exclusive).

Similarly, Cormier (2002, 2005) argues that inclusive pronouns in ASL are performed in the center of the chest, while the exclusive meaning is encoded by a slight movement to one of the sides of the space. However, these distinctions are found only in plurals, trials and quadrals, not in dual pronouns. In Cormier's (2005: 253) terms: "it seems inappropriate to posit any sort of inclusive/exclusive distinction [for the dual]. These forms include all and only the referents that they point to [...]. Other referents are 'excluded' only in the sense that they happen to be not included". Hence, dual pronouns are claimed not to have specific forms for the exclusive nor the inclusive.

Finally, in their study of Croatian Sign Language (HZJ) pronouns, Alibašić & Wilbur (2006) consider the inclusion/exclusion of the speaker instead of the addressee's, but the grounds for that move are not explicitly stated. Since the analysis of the inclusive/exclusive contrast is extended to second and third person, they rather offer a description of the markers of first person (movement to/forward from the signer's body), not of clusivity distinctions. That is, in their description, the inclusive/exclusive opposition contrasts reference to the speaker with reference to the rest. However, since the speaker is not the focal referent of second and third person pronouns, the speaker is, by definition, excluded from the denotation of the pronoun.

Berenz's and Cormier's results on clusivity marking in Libras and ASL are, unexpectedly, fairly uniform. That is, they do not only assume that the inclusive/exclusive contrast is grammatically encoded, but they do also agree that this distinction is marked by opposing forms that are misaligned/displaced with forms that are not. This is quite unexpected, especially taking into account that they differ in the number of person distinctions taken to be marked in the language. As has just been presented, Berenz argues for a grammatical contrast between first, second and third person in Libras pronouns. Cormier, in turn, argues for a first vs. non-first person analysis of ASL pronouns.¹⁵ Crucially,

¹⁵In subsequent work she further claims that pronominal signs share properties with both pronouns and pointing gestures (Cormier et al. 2013).

the inclusive/exclusive opposition would be unexpected if second and third person singular pronouns were homophonous (cf. Section 2.2), as claimed in Cormier's work. On Berenz's account, on the other hand, the grammatical marking of clusivity is consistent with her description of the formal distinction between second and third person. In fact, the strategies used to express clusivity coincide with the ones suggested for the marking of second and third person pronouns (i.e., (mis)alignment of coordinates with respect to the midline of the body).

A remarkable distinction between clusivity marking in spoken languages and ASL, according to Cormier, is that in spoken languages the inclusive is the unmarked category, whereas in ASL it is the exclusive. In spoken languages, inclusives are claimed to be the unmarked member of the inclusive/exclusive pair because, in general, they are morphologically less complex than the exclusive. Following Jacobsen (1980),¹⁶ Cormier (2005) further states that if the inclusive/exclusive contrast is lost, the inclusive is the form that remains as the general first person non-singular pronoun. Finally, if a language has a special form for the exclusive, then it also has a special form for the inclusive (see Cormier (2005) and Section 1.1). The exclusive, in turn, is taken to be the unmarked category in ASL based on the observation that central forms are grammatical in both inclusive and exclusive contexts, whereas forms marked by displacement are grammatical in exclusive contexts only. Hence, according to Cormier, in ASL there is no special form for the inclusive meaning, but a neutral pronoun which is no distinct from 'regular' first person plurals. The exclusive, in turn, is formally different and ungrammatical in inclusive contexts. Given the tendency for languages to have either dedicated markers for both the inclusive and the exclusive or for the inclusive only, Cormier proposes that in ASL the exclusive is the unmarked member of the pair.

¹⁶According to Jacobsen (1980: 222), if the inclusive/exclusive distinction is lost, "it will be the inclusive form that remains to take over the combined first-person plural reference". For examples, see Lichtenberk (2005).

CHAPTER 3

Person in LSC personal pronouns

This chapter aims at exploring whether LSC personal pronouns encode person distinctions (Research Question 1). To that end, I will describe the morphophonological person markers that were systematically found in the analysis of LSC personal pronouns. In doing so, I will also discuss Meier's (1990) and Berenz's (1996) arguments to account for the grammatical marking of person, with the aim of checking whether or not they hold for the case of LSC. As already mentioned, the person category may also be expressed in verb inflection, yet the description presented here is restricted to personal pronouns only. Given that few studies consider the expression of second and third person in non-singular pronouns, I also address the question of whether in LSC reference to the participants in the speech act is encoded differently in singular vs. non-singular forms. The description presented in this chapter is primarily based on the analysis of two LSC corpora, and it is further complemented with data obtained in elicitation sessions (cf. Section 1.3). Ultimately, I argue that it is possible to distinguish first, second and third person markers in LSC personal pronouns by using a simplified version of Berenz's (1996) Body Coordinates Model.

This chapter is structured in the following way. Section 3.1 describes the expression of person distinctions in LSC singular forms. It additionally discusses whether the arguments given for a two- vs. a three-person analysis hold for the case of LSC. Section 3.2 turns to

non-singular pronouns, where I examine the grammatical expression of person in dual and multiple plural forms. In Section 3.3, I propose that in LSC there is a correlation between the morphophonological markers of person and the assignment of person values and that such correlation is equally observed in singular and non-singular forms. Section 3.4 summarizes the main results and concludes the chapter.

This chapter builds on Veiga Busto (2021), with minor changes. Two sections have been expanded to better account for the encoding of first person in singular forms and to discuss the role of the eye gaze coordinate in the expression of the second person value in LSC. They correspond, respectively, to Sections 3.1.1 and 3.1.2.1 in the present chapter.

3.1 Person in singular pronouns

3.1.1 First person

In LSC, just as in other documented sign languages, there are two main morphophonological markers signaling first person. These are backwards orientation of the hand (i.e., palm facing the signer's chest) and contact (or nearly contact) with the body of the signer. These two markers are used irrespective of whether the sign refers to the actual speaker or to the speaker of a reported discourse, just as claimed in both Meier's (1990) and Berenz's (1996) proposal.

However, neither backwards orientation nor contact with the body of the signer are obligatory morphophonological markers of the first person in LSC. In fact, while 91,5% of the forms were found to take a backwards orientation, sideways and downwards orientations are also attested in the data. Besides, about 5% of the forms were found not to contact the body of the signer. That is, although first person pronouns were produced with a trajectory movement targeting the body of the signer, they end up not reaching it.

As for the handshapes selected in LSC singular pronouns, the most common is the index. However, in first person pronouns the use of the index configuration is notably lower than in second and third person. This appears to be the result of coarticulation with previous or following

signs, which is more common in the first person. As a consequence of this, certain handshapes are either rare or unattested in the production of second and third person, but they are fairly common in first person forms. Examples include the use of the bent-B handshape (Figure 3.1), selected by almost 27% of first person pronouns, and the flat-O handshape (Figure 3.2), picked up in slightly more than 5% of the cases.

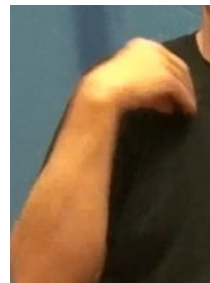
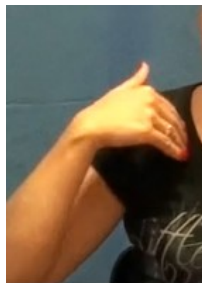


Figure 3.1: Bent-B handshape **Figure 3.2:** Flat-O handshape

Additionally, given that first person pronouns are generally produced with a backwards orientation, the handshape selected is not always easy to perceive. In fact, a significant proportion of hand configurations (10,43%) were coded as 'not visible'. This is in sharp contrast to what observed in second and third person, for which the handshape was always clearly perceptible. Yet, orientation of the hand does not seem to be the only reason for this notable distinction. A potential explanation is that the saliency of the trajectory movement, which only in the first person moves inwards to the signer, makes the sign easily identifiable. Hence, the handshape parameter may play a secondary role in encoding reference to the speaker.

A further parameter subject to assimilation processes is location. Recall that the first vs. non-first proposal crucially relies on the invariability of the location component in first person pronouns, which are described as always taking the same location (i.e., the center of the speaker's chest). However, about 18% of first person pronouns were produced either on the signer's shoulders (generally the ipsilateral one) or in locations midway between one of the shoulders and the center of

the chest.

The fact that the location and the handshape parameters of first person pronouns are more prone to assimilation with neighboring signs may be further explained by the fact that first person pronouns were found to be produced in a more attenuated fashion. That is, unlike second and third person, first person pronouns were predominantly articulated with less muscle tension and they tended to have a shorter duration. According to Ariel (1990), the more attenuated a form is, the higher the accessibility of the referent. Accessibility depends on factors such as the competition with different antecedents, the relative salience of the antecedent or the distance between the antecedent and the referring expression. In many sentences involving first person pronouns, the forms were highly accessible, as they were no competitors (no other possible antecedents for the pronoun), the signer was salient in the linguistic context and, against expectation, first person pronouns were often not dropped. Hence, the forms were also expected to be more susceptible to attenuation, leading to more variation in their production.

Although the specific location towards which the sign is directed may vary depending on the place of articulation of preceding or following signs, first person pronouns are consistently directed to the torso. In LSC, if directed towards the face, the forms no longer denote reference to the speaker. Indeed, changing this parameter entails a highly specific meaning, namely that the speaker reproduces an event in which he/she was being addressed by other(s) that were pointing at him/her.

For instance, the forms in Figure 3.3 were produced by the signer when explaining how he got his name sign. He said that he did not understand the meaning of the sign and that his peers repeatedly told him: ‘That’s you’. This form can alternate with a second person in reported discourse, as in Figure 3.4, and may also be used in role shift constructions to encode the perspective of a third person when pointed by other(s). However, the facial expression does not shift, as it still reproduces the attitude of the person referred to, as in Figure 3.3.

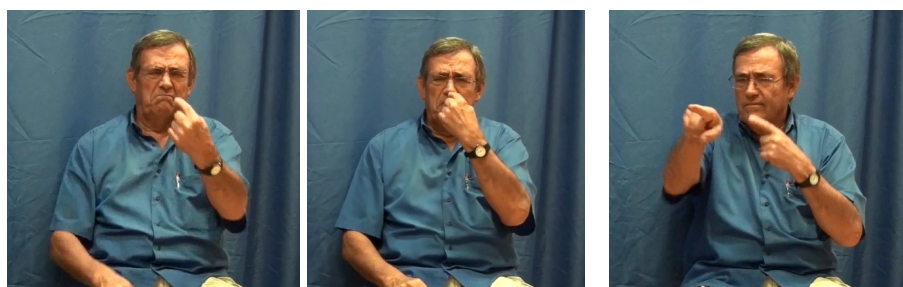


Figure 3.3: Pointing sign oriented towards the speaker's face

Figure 3.4: Second person under role shift

3.1.2 Second vs. third person

Considering that much of the discussion on the person category revolves around whether or not second and third person singulars are formally distinguishable, it is useful to examine to what extent some of the features proposed by both Berenz's (1996, 2002) and Meier's (1990) analyses are also applicable to the LSC case. I will specifically consider the role of the eye gaze and chest coordinates, the so-called 'midline avoidance' principle and the handshapes selected in singular reference.

3.1.2.1 The eye gaze coordinate

In Berenz's model, eye gaze is a crucial component to distinguish second from third person. Meier (1990), by contrast, challenges the role of the eye gaze in coding second person by claiming that eye gaze might not be a defining property of deictic signs, but of the signed conversation.

In order to investigate whether gaze to the addressee when the addressee is being referred to exceeds what would be predicted from baseline gaze behavior, Lillo-Martin & Meier (2011) compared gaze produced during points to the speaker, the addressee and the non-participant ("the non-addressed participant", in the terminology used by the authors). Gaze patterns during the production of points to the signer was used as the baseline for comparison. Their results are presented in

Table 3.1.

		Gaze to		
		Addressee	Non-addressed referent	Other
Point to	Self (=35)	.60	.06	.34
	Addressee (n=9)	.67	.00	.33
	Non-addressed referent (n=16)	.63	.31	.06

Table 3.1: Eye gaze direction during production of pointing signs in ASL (Lillo-Martin & Meier 2011: 103)

Since Lillo-Martin & Meier did not find systematic differences in the proportion of gazes to the addressee when the addressee is being referred to vs. when it is not, they do not consider gaze direction to be a grammatical marker of second person. However, as Wilbur (2013) notes, the distribution of gazes to directions other than to the addressee is not random, as it would be expected if there were no distinctions between second and third person. In fact, during points to the addressee the signer gazes either to the addressee or to other locations, but there are no gazes to the non-participant. During points to the non-participant, the signer gazes either to the addressee or to the non-participant, but gaze to other locations is very restricted. As Wilbur points out, these results would remain unaccounted for under a view according to which there is no distinctions between second and third person.

Lillo-Martin & Meier's findings on the direction of the eye gaze in ASL during points to the addressee differ significantly from Johnston's (2013) results on Australian Sign Language (Auslan). In particular, Johnston claims that Auslan second person pronouns are almost always accompanied by gaze to the addressee (in 97% of the cases). By contrast, just like in the case of ASL, first person pronouns split gaze between the addressee and other locations, whereas third person pronouns split gaze between the addressee, the non-participant and other locations.

Importantly, the proportion of gazes to the non-participant in third person is almost identical in Auslan (32%) and ASL (31%). As Wilbur notes, Johnston's findings exhibit once again a non-random distribution of gaze towards locations other than that of the addressee during pointing signs to the non-participant. By contrast, Lillo-Martin & Meier interpret the conjunction of point and gaze to the non-participant as a case of alignment in third person and, hence, as evidence that gaze is not a sufficient grammatical marker to differentiate between second and third person in Auslan.

Against this background and in order to test whether eye gaze shows a different pattern in LSC during the articulation of first, second and third singular pronouns, I coded the direction of the signer's gaze when the sign pointed to the signer, to the addressee and to the non-participant (see Table 3.2). It should be noted, though, that annotating the eye gaze behavior is a challenging task. A potential issue is that the exact direction of the eye gaze is not always easily perceptible. This was indeed the case of 5,17% of the forms. However, what is more problematic is that the starting and end point of the eye gaze and that of manual signs do not always coincide. In fact, the proportion of singular pronouns that were accompanied by an eye gaze directed to more than one location was, on average, 24,36%. This percentage was similar to the one observed during points to the signer, but it was much higher during points to the non-participant(s) (38,59%) and significantly lower during points to the addressee (15,78%). For this reason, in the coding process, I added a separate tier in which the direction of the eye gaze was coded taking into account where the signer was looking at when the manual sign reached the target (i.e., at the end point of the inward/outward trajectory movement).

In Table 3.2, 'gaze to addressee' includes both gazes directed to the actual addressee as well as to the addressee of a reported context. The label 'other' refers to gazes to directions other than that of the addressee and the non-participants, which includes looking at one's own hands, to unspecified locations, as well as eye blinks. Finally, the label 'non-perceptible' was added as to code those forms for which, given the position of the signer, it was unclear what the direction of the eye

		Gaze to			
		Addressee	Non-particip.	Other	Non-percept.
Point to	Signer (n=623)	.46	.05	.47	.02
	Addressee (n=133)	.78	.01	.07	.14
	Non-participant (n=114)	.41	.28	.19	.12

Table 3.2: Eye gaze during production of singular pronouns in LSC

gaze was. If the forms for which the direction of the eye gaze was not perceptible are excluded, we get the picture in Table 3.3.

		Gaze to		
		Addressee	Non-particip.	Other
Point to	Signer (n=610)	.47	.05	.48
	Addressee (n=115)	.90	.02	.08
	Non-participant (n=100)	.46	.32	.22

Table 3.3: Eye gaze during production of singular pronouns (non-perceptible occurrences excluded)

As Table 3.3 shows, gaze patterns in LSC during the production of singular personal pronouns are analogous to Johnston's findings on Auslan. Specifically, pronouns referring to the signer split gaze between the addressee and other locations, with only a limited proportion of gazes directed to the location of the non-participant. Second person pronouns are predominantly accompanied by gaze to the addressee. Gaze to the non-participant or to other locations, by contrast, is remarkably restricted. Finally, third person pronouns split gaze between the addressee, the non-participant and other locations.

These results differ from Lillo-Martin & Meier's in a crucial aspect. If the direction of the eye gaze during the production of first person pronouns is considered as the baseline for comparison, there is an almost identical proportion of gazes to the addressee when the pronoun refers to the non-participant (i.e., when it gets a third person value). Unlike the case of ASL, second person pronouns show a much higher proportion of gazes to the addressee than first and third person pronouns do.

The LSC data just presented shows a pattern consistent with the one described in Berenz's analysis. In particular, in second person pronouns, the eye gaze is aligned with the other articulators and tends to be longer. In third person, by contrast, the eye gaze is either i) not aligned with the direction of the pointing sign, or ii) if oriented towards it, the length of the gaze is usually short and does not spread over the entire pointing sign. In Figure 3.5, for example, the signer first looks at the location of the referent and then changes the direction of the eye gaze towards the camera. This might well explain the high proportion of third person pronouns in which the eye gaze is directed to more than one location during the production of the sign.

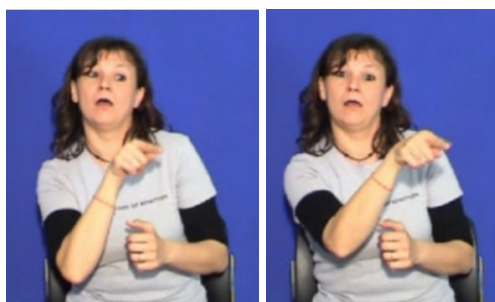


Figure 3.5: Eye gaze direction during production of a third person pronoun

Note that while Lillo-Martin & Meier consider the combination of point and gaze to the non-participant as a case of alignment in third person and, as such, as a counterargument for the second vs. third person proposal, such combinations are indeed predicted in Berenz's account. In fact, she explicitly divides third person pronouns according to their

function in the discourse. Specifically, she splits forms used to introduce a referent from those used for subsequent mentions. According to her analysis, only the forms used for first mention of a referent require co-occurring gaze. By contrast, forms used for subsequent mention do not generally combine with gaze to the non-participant. LSC third person pronouns fit quite nicely with this description. Indeed, introduction of a referent is usually preceded by a glance towards the location of the referent, as in Figure 3.5. Subsequent mentions to the same referent, by contrast, were found to almost always drop the eye gaze component. Note also that in Figure 3.5 only the eye gaze and the handshape are temporarily aligned (i.e., during the first fraction of the articulation of the sign). Unlike the case of second person pronouns, though, the head coordinate does not align with the direction of the handshape.

Before leaving this topic, I will now take a closer look at Meier’s (1990) claim that gaze at the addressee is not a grammatical marker of second person, but a feature of the signed conversation.¹ In order to explore whether this is the case of LSC, I used two clips from the LSC corpus and compared the gaze behavior of four signers, two women and two men, during their interaction. I compared the proportion of gazes to the addressee in three situations: i) when the participant was producing a second person pronoun; ii) when the participant was signing (i.e., when in the sender’s role); iii) when the participant was not signing (i.e., when in the recipient’s role). The results are shown in Table 3.4.

Gaze to addressee		
When producing ix_2	When signing	When not signing
90,9%	56,13%	93,48%

Table 3.4: Gaze to the addressee in three different contexts

¹Lillo-Martin & Meier’s (2011: 102) study makes similar assumptions regarding the direction of the signer’s gaze when claiming that “the signer is likely to gaze at the addressee throughout much of an interaction”.

On average, the proportion of gazes to the addressee was similar during the production of second person pronouns and when the participant was not signing. However, when the participant was signing, the rate of gazes to the addressee was significantly lower. What this preliminary analysis suggests is that the function of gaze to the addressee throughout the conversation is not analogous to gaze to the addressee during the production of second person pronouns. In fact, it rather seems that in LSC gaze to the addressee is a defining property of being the receiver of a signed conversation, not of the interaction on its entirety. Had that been the case, a much higher proportion of gazes to the addressee would also have been observed when the participant was signing.

That said, I am not claiming that the eye gaze should be given a grammatical status in coding person distinctions. Indeed, the results of this study inform us about the proportion of gazes to the addressee, but they do not tell us anything about their function, nor whether they have the same or a different function in the two conditions with the highest proportion of gazes. That is, just like it seems unlikely that gazing to the signer (by the participant in the receiver's role) has a grammatical status, gazes to the addressee during production of second person pronouns may also happen to have a function not directly related to the coding of person distinctions (e.g., the signer may be expecting a reaction from the addressee). Hence, further research is needed to better understand what the status of the eye gaze coordinate is in LSC (and in other sign languages more generally).

3.1.2.2 The chest coordinate

In the Body Coordinates Model, the role of the chest coordinate is deemed crucial to distinguish second from third person. According to Berenz (2002: 208), deviations from the alignment/misalignment pattern, which is used to overtly encode second and third person respectively, can be justified on the basis of “exigencies of particular communicative situations which distort articulation in predictable ways”. For instance, in a three-party conversation, the signer would alternatively align gaze

and head when addressing each of the interlocutors, while the chest coordinate would be oriented midway between the locations of the addressees. However, one can easily find many everyday situations in which reference to the addressee does not involve alignment of the chest (when signing while walking, when sitting side by side...). As stressed by Jungbluth (2003), linguistic analyses have generally focused on face-to-face conversations when studying contextually dependent expressions. However, in natural contexts, two interlocutors can occupy other positions relative to each other, such as side-to-side or face-to-back.

In the case of LSC pronouns, if those different spatial arrangements are taken into account, it becomes more evident that the chest coordinate plays no consistent role in differentiating second and third person. In such contexts, only the gaze and the head coordinates are aligned. Indeed, according to the analysis presented here, alignment of the chest rather appears as an accidental property of second person, since it is often the case that the two interlocutors are facing each other during a signed conversation. However, facing each other, although typical in sign language interactions, it is not a requirement. Indeed, in the data analyzed for this research, it is far from common. For instance, in the LSC corpus, although the two participants in each session are sitting in a 90-degree angle with respect to each other, they never rotate the body to align the chest with the other articulators, as in Figure 3.6.



Figure 3.6: Second person (LSC corpus)

The exact same pattern applies in role shift constructions that depict the actual position of the interlocutors with respect to each other during

the conversation, as well as in cases in which speaker and addressee are sitting side by side, as in Figure 3.7.



Figure 3.7: Second person (elicitation session)

Considering this, and as previously suggested by Alibašić & Wilbur (2006) and Almeida-Silva (2019) in their analyses of HZJ and Libras pronouns, the chest coordinate is excluded from the set of relevant coordinates as originally proposed in Berenz's model.

3.1.2.3 The 'midline avoidance' principle

An additional difference regarding both Berenz's (1996) and Alibašić & Wilbur's (2006) analyses concerns the relevance assigned to the midline of the signer's body for the grammatical marking of second person, which translates in a 'midline avoidance' principle in third person forms. In Berenz's account, the fact that third person pronouns are predominantly performed on the ipsilateral side of the signer's body (in Libras elicited data at least) is taken as evidence of the salience of the midline for the formal marking of second person. Moreover, it is argued that signers prefer not to cross the midline of the body in order to keep second and third person maximally different.

LSC data, by contrast, does not show a clear preference for placing the non-participants on the ipsilateral side as opposed to the contralateral (i.e., the area corresponding to the opposite side of the dominant hand). In fact, if we take into account the overall production of third person singular pronouns, the percentage of forms placed on the contralateral side (38,59%) is slightly higher than the proportion of pronouns located

in the ipsilateral area (29,82%).² Besides, partly derived from including less conventional space orientations of the interlocutors in the analysis of person markers, it follows that a pointing sign directed to the midline of the signer's body may not necessarily align with the position of the addressee (e.g., if the interlocutors are not located in front of one another). Therefore, in such situations, and contra Berenz, no restrictions are imposed in using the midline of the body to refer non-participants, as shown in Figure 3.8.



Figure 3.8: Third person by pointing to the midline



Figure 3.9: Third person by pointing downwards

If speaker and addressee are facing each other, a pointing towards (or near to) the midline to refer to a non-participant is also allowed, and misalignment in this case is signaled by directing the pointing sign downwards, as in Figure 3.9, or upwards. However, as the central part of the signing space is the default area in LSC for reference to second person and to non-entities (facts, propositions and events; cf. Barberà 2015), consultants generally reject using it to refer to non-participants. Yet, if presented a context with more than two discourse referents, they may naturally assign them locations falling along a line on the horizontal

²Given that the point in question is whether the pronoun crosses the midline of the body, the ipsilateral-contralateral contrast was coded considering this variable only. Hence, forms articulated in the contralateral area but performed with reverse dominance were coded as if they were produced on the ipsilateral side. If absolute locations are taken into consideration instead, the amount of forms produced in the contralateral side would be substantially higher.

plane. When the entities are referred back, directing a pointing sign to them is allowed and, if the location corresponds to the central part of the space, it is consistently marked by pointing downwards. By contrast, second person pronouns are directed to the central space and frequently articulated at the mouth level.

Altogether, these differences suggest that it is not the midline, but rather the central space what determines whether the signer refers to the addressee or to a non-participant. In terms of person marking, this means that the signer may displace the center, i.e., the grammatical space itself, to encode reference to the (non-)participants. That is, once the signer changes the orientation of the head (and the eye gaze) in order to encode second person, the grammatical space rotates in tandem with it, and the chest coordinate has no contribution in marking this shift. For the very same reason, the midline of the body does not impose any constraint on the person values that may be associated with it, as pointing to the midline needs not correspond to the central space.

In the grammatical marking of second and third person in LSC, all that seems to matter is whether the gaze, the head and the handshape coordinates are oriented towards the center of the grammatical space (aligned in the case of second person) or not (misaligned for third person). From this perspective, both the chest and the actual spatial locations the pointing sign is directed at are irrelevant to distinguish second from third person. Indeed, Figures 3.10 and 3.11 show that the exact same spatial location can be used for both reference to a non-participant and to the addressee. In Figure 3.10 the informant is addressing the interviewer while referring to the person next to him, whereas in Figure 3.11 he is inviting the other informant to go first answering the interviewer's question. This change is simply signaled by (mis)aligning the direction of the hand with respect to the head and the eye gaze. For second person to be encoded, all three articulators are required to be oriented in the same direction, whereas third person is indicated by directing the handshape towards a non-central location, that is, to a location that is not conjoined with the direction of the head and the eye gaze.

Further evidence that alignment of the coordinates presupposes reference to a second person is provided by the fact that if such a



Figure 3.10: Third person (misalignment) **Figure 3.11:** Second person (alignment)



pointing sign is directed to a position other than the addressee's, the presupposition that the signer is addressing someone else holds, even if no possible addressee is located in that position. Indeed, consultants' judgments indicate that it feels like if the speaker were addressing an imaginary friend. Therefore, the pronoun would be interpreted as failing to refer, not as failing to presuppose an addressee in the context.

This closely connects with the grammatical marking of second person in role shift constructions. The fact that second person in this type of constructions shows the same articulation as in non-shifted contexts is taken by Berenz as evidence of the grammaticalization of the second person pronoun. Arguing against Meier's proposal on the special behavior of first person in this type of constructions, Berenz (1996: 174) states that "[i]n both cases, the form-meaning relationship is constant and independent of the individual who happens to be in the sender or receiver role". In LSC, just like in the case of first person, the same second person markers are found in reported discourse (see Figure 3.4). The fact that role shift is commonly indicated by a change in head position and a shift in the direction of the body and the eye gaze (Quer 2011a) further supports the claim that the signer slightly displaces the grammatical space and directs the second person pronoun to the center of it. In that sense, there is no distinction whatsoever in the grammatical marking of second person to refer to the actual addressee or to the addressee of the shifted context.

3.1.2.4 Additional handshapes used in singular reference

Some authors have argued against the special status of first person pronouns, as sustained by the first vs. non-first person proposal, by providing evidence that in other sign languages the generalization that only first person pronouns allow other manual configurations than the index handshape does not apply. For LSE, Costello (2016) pointed out that handshape alternations are possible for all forms, regardless of reference. This fact does not invalidate the two-person proposal *per se*, but it shows that, at the very least, variation can be found in the way sign languages have grammaticalized and express person marking.

In LSC, the most common handshape in singular pronouns is the index, but quite often the configuration of the hand undergoes assimilation with previous or following signs. This means, as stressed by Johnston (2013) in his analysis of Auslan pointing signs, that there is more variation in the spectrum of handshapes adopted by pronouns than what it is generally assumed. Indeed, he reports as much as 18 different handshapes used in pointing signs in the Auslan corpus. Similarly, in the LSC data used for this research, I coded almost 30 different hand configurations as used with personal pronouns. These include the (bent) index handshape, the (bent) L-handshape, the flat/bent B-handshape, the G-handshape, the thumb handshape or the (bent) V-handshape. As noted earlier, variation in the handshapes selected by personal pronouns is substantially higher when the pronoun refers to the speaker. Yet, note that many of the above configurations are simply variants of the index-handshape, which may include other finger(s), a bent articulation, or both. Indeed, the variation found in the annotation process can, for the most part, be reduced to three handshapes only: the index, the thumb and the B-handshape.

The three manual configurations, the index, the B-handshape (used to encode politeness³) and the thumb (when used for shielded reference) are

³Here, I follow Costello (2016: 253) in considering that the B-handshape is not a grammatical feature encoding respect (i.e., an honorific form), but part of a polite register. As he argues, in LSE this configuration may also refer to the speaker and given that “respect marks the perceived social relationship between the speaker and

possible in all three person values. By contrast, the non-shielded thumb and the shielded index (i.e., the derived third person, see below) are not attested in all three person values. In particular, the shielded index is only found in the third person. The non-shielded thumb, in turn, is more common in the third person, but it may also be used when referring to the addressee of the conversation.

According to Berenz, Libras has derived forms for third person, namely the so-called “shielded third person”. This two-handed sign, which consists of a pointing that makes contact with the palm of the other hand as a way of hiding the act of reference, is also possible in LSC (see Figure 3.12). However, differently from the third person index, this covert form is always deictic, as it is used to signal the position of the referent, making it possible to direct the sign towards the signer’s body to indicate reference to someone placed behind the speaker, as well as towards the addressee, to refer to someone located behind him/her, like in Figure 3.13. This fact shows that, no matter the direction the pointing is oriented to, a shielded form will always be interpreted as referring to a present non-participant. If the intended referent is placed on the ipsilateral side, the signer must apply dominance reversal, that is, the dominant and the non-dominant hand would reverse their dominance roles (the dominant hand becomes non-dominant and the non-dominant one becomes dominant), so that the non-dominant hand performs the pointing sign. As the sign also conveys the information that the speaker wants to hide his/her assertions from the referred person (and, eventually, from others), it naturally follows that its use is limited to refer to human non-participants.

Shielded forms are accompanied by specific non-manual markers, namely: a short glance directed to the location of the referent or to the hand, raised eyebrows and pulling the corners of the mouth down or, alternatively, stretching the lips.

In LSC, as noted by Barberà (2015), the thumb configuration is mostly used to refer anaphorically to a non-present non-participant. However, it may also be used deictically to refer to the addressee of the conversation

the referent, it makes little sense to have a respect form to refer to oneself”.



Figure 3.12:
Shielded third
person



Figure 3.13: Shielded reference to a
non-participant placed behind the speaker/the
addressee

or to present non-participants. When compared to the index, the thumb configuration is more restricted, as it cannot be inflected for plurality by incorporating a circular movement to signal that the pronoun refers to more than one entity. Using this handshape has an additional restriction: namely, that the thumb cannot cross the central part of the space. Therefore, if the pronoun targets the contralateral side, the signer must reverse dominance so as to produce the sign with the non-dominant hand (Figure 3.14). When the thumb handshape is used deictically, such requirement is no longer observed.

Interestingly, the thumb handshape can convey a similar meaning to that of the shielded form if accompanied by the same non-manual markers. For this specific use, the thumb configuration does not impose any restriction on the person value it may be associated with, as it can be used to hiddenly refer to the speaker, to the addressee and to present non-participants. In this case, the movement is usually limited to the thumb, and it does not extend to other articulators that are more proximal to the body, such as the hand or the arm, as in Figure 3.15.

The form in Figure 3.15 appeared spontaneously during an elicitation session in which one of the consultants was trying to indicate that he wanted the other consultant to go first in producing a sentence. She replied by intentionally producing a form too overtly marked (Figure 3.16) to be considered shielded reference, as a way of signaling that she had noticed.



Figure 3.14: Third person, thumb of non-dominant hand



Figure 3.15: Shielded third person with thumb handshape



Figure 3.16: Overt version of a shielded form with a thumb handshape

3.2 Person in non-singular pronouns

The expression ‘non-singular pronouns’ is used to refer generically to number values other than singular. Although English or Catalan only show an opposition between two number values (i.e., singular and plural), other languages convey more fine-grained distinctions in the category of number, which can include values such as dual, trial, quadral or paucal (cf. Corbett 2000 and Chapter 5 of this dissertation).

Besides having singular forms, the LSC pronominal paradigm may also differentiate whether reference is made to two or to more than

two participants.⁴ Additionally, clusivity distinctions are also encoded in LSC grammar. In the remainder of this section, I will report on the morphophonological markers of person in dual and multiple plural forms.

3.2.1 Person in duals

Dual pronouns are used to refer to two distinct entities (Corbett 2000). In LSC, dual forms select a v - or a κ -handshape, which moves between two locations. The movement is generally back and forth, but it may also consist in a single straight-line movement. Similarly to the case of plural pronouns, as presented in Section 2.1.2, duals can have an additive interpretation –reference to a duality of addressees (2+2) or to a duality of non-participants (3+3)– or a heterogeneous interpretation (1+2; 1+3; 2+3). Additionally, if the aggregates 1+2 and 1+3 show a different morphophonological marking, that will be associated with having clusivity distinctions in the system.

In LSC, if the dual moves close to the signer's torso, shoulder or mouth, the pronoun encodes first person. Unlike first person singulars, first person dual forms involved contact with the signer's body only in 57% of the cases. Depending on the direction of the movement, the sign is articulated with small variations:

- i) when moving from the ipsilateral side, the handshape (usually the v -configuration) approaches the ipsilateral side of the signer's body, generally the shoulder,
- ii) if the line traced by the movement of the pronoun goes towards the contralateral side, the handshape reaches the upper part of the contralateral signer's chest (close to the shoulder) and invariably uses the κ -handshape,

⁴In this chapter, only the mechanisms used to encode reference to the participants is addressed. For a more detailed discussion of the number distinctions encoded in the LSC pronominal paradigm, see Part II of this dissertation.

- iii) if the sign moves between the central space and the signer, its proximal point is either the speaker's torso or the mouth and both v- and κ -handshape are possible.⁵

The inclusive dual meaning (1+2) is formally expressed by aligning the line traced by the movement of the sign with the direction of the head and the eye gaze, as in Figure 3.17. Note that if the head and the eye gaze are oriented towards one of the sides, so is the trajectory movement of the sign. Hence, the inclusive interpretation is encoded by aligning the three coordinates already described in singular forms. Again, the chest does not need to be oriented in the same direction followed by the head, the handshape and the eye gaze.

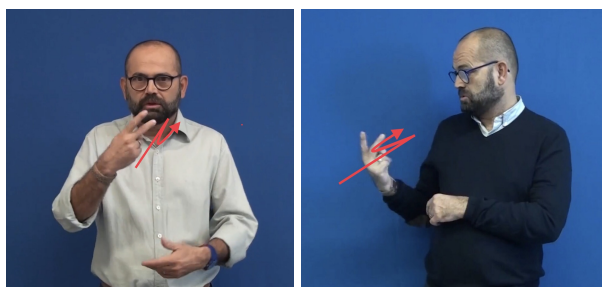


Figure 3.17: Dual inclusive forms (1+2)

The exclusive dual interpretation (1+3), in turn, is formally marked by not aligning the direction of the head with the handshape, as in Figure 3.18. The sign may be preceded by a short gaze towards the location of the handshape at the onset of the sign, as in the case of third person singular pronouns (cf. Section 3.1.2.1). Although the head does not rotate in the same direction, exclusive duals are sometimes accompanied by a head tilt towards the same side of the space.

In second and third person duals, the sign targets a location other than the signer's body. For the aggregate 2+3, the pronoun generally

⁵For further details on v-/ κ - alternations in LSC, see Section 7.1.



Figure 3.18: Dual exclusive forms (1+3)

moves between one of the lateral sides and the central space (Figure 3.19); while for the additive meaning (two addressees), the pronoun moves within the central space, generally in a higher position (Figure 3.20). However, these distinctions are not systematic enough to postulate a one-to-one correlation between different forms and interpretations (additive vs. associative) in second person duals.

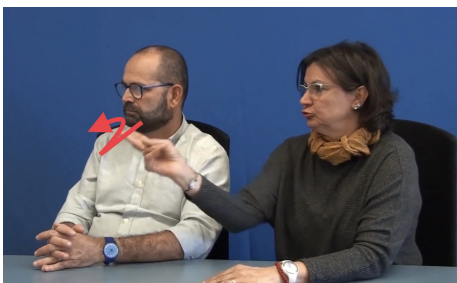


Figure 3.19: Second person dual (2+3)

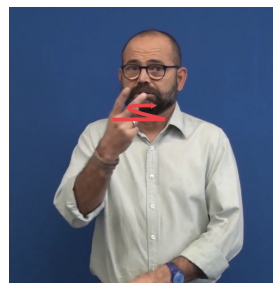


Figure 3.20: Second person dual (2+2)

Third person is usually misaligned, moving between two locations on one of the sides of the signing space, as in Figure 3.21, or between a lateral location and the center. However, this is not always the case, since if two referents are assigned a contralateral and an ipsilateral location, the pronoun may either stop at the central space or move between the two sides of the space. Given that dual forms are articulated with the palm facing either the signer or upwards, when articulated in the central space,

they cannot be misaligned by pointing downwards. This contrasts with what was observed in the case of singular and plural forms (see below). For this reason, the articulation of third and second person duals (either 2+2 or 2+3) may overlap. In fact, most of the pronouns that out of context were formally indistinguishable correspond to instances of second and third person duals.



Figure 3.21: Third person dual (3+3)

A notable distinction between dual and singular forms has to do with the mouthing component. In the singular, only a small fraction of the signs (16,8%) were accompanied by the corresponding Catalan/Spanish (voiceless) word. In dual forms, by contrast, there was a much higher proportion of forms (80,7%) articulated with the corresponding Catalan/Spanish counterpart. Besides, the mouthing component does not correlate with a spoken language pronoun, unlike what was observed in singular forms. Instead, it generally corresponds to the numeral *dos*, meaning ‘two’ in Catalan and Spanish. Alternatively, the numeral may undergo truncation, which results in removing either the initial or the final consonant of the word (i.e., [os] or [do]).

3.2.2 Person in plurals

As is the case in nominals and verbs, plurality in LSC pronouns can be expressed by using two main strategies: by incorporating an arc movement in the index sign or by reduplicating the pointing sign. Multiple plurals, which are also described as collective plurals, are

expressed by incorporating a circular or an arc-shaped movement in the pointing sign. The so-called ‘exhaustive’ or ‘distributive’ plural forms, by contrast, are produced by reduplicating the pointing sign, which is successively repeated at different locations within the signing space. In this section, I will only address the expression of person values in multiple plural pronouns, as they were far more common in the data used for this research.

Contrary to the case of ASL, there is no difference regarding the morphological marking of multiple plurality in the first person with respect to the second and the third, as in LSC all three persons encode plurality compositionally (see Figures 3.22, 3.23 and 3.24). Hence, Meier’s claim that first person plural pronouns are different from second and third person in terms of plural morphology does not hold for the case of LSC.

As for person marking, if the pronoun is articulated closer to the signer’s body, the set includes the referential element ‘speaker’ (Figure 3.22); if it is articulated in line with the signer’s head and less proximal to the body, the set includes the addressee and it does not include the speaker (Figure 3.23); and when laterally displaced or when directed downwards/upwards (if aligned with the direction of the signer’s head), the set does not include the referential elements ‘speaker’ nor ‘addressee’ (Figure 3.24).

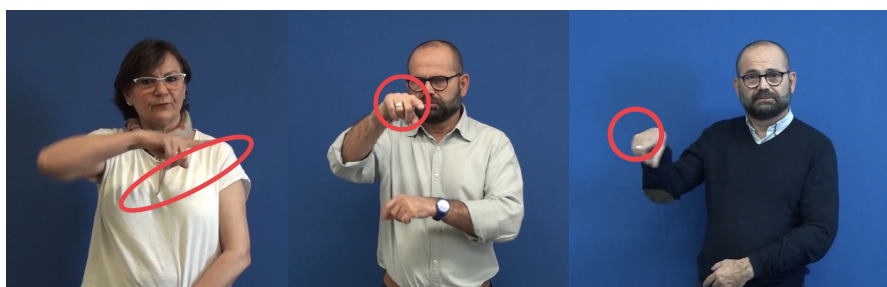


Figure 3.22:
First person
multiple PL

Figure 3.23:
Second person
multiple PL

Figure 3.24:
Third person
multiple PL

First person multiple plurals can conveyclusivity distinctions. If the pronoun excludes the addressee, it is performed laterally displaced (i.e., it does not cross the central space), as in Figure 3.25. There is a different set of plural pronouns that do not involve a circular movement, but a straight-line motion. In the first person, if the trajectory movement performed by the handshape is misaligned in relation to the head and the eye gaze, this form encodes the exclusive interpretation (‘me and others, not you’), as shown in Figure 3.26.

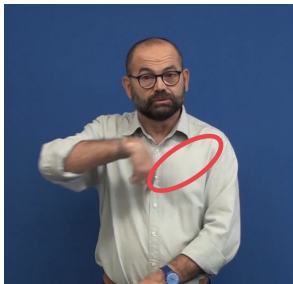


Figure 3.25: Exclusive PL,
circular movement



Figure 3.26: Exclusive PL,
straight movement

If the pronoun includes the addressees, the circular movement crosses the central space and it is usually bigger than in the case of exclusives, just like in Figure 3.22 above. No difference was observed depending on whether the pronoun also includes the non-participant(s) in addition to the addressee(s) (1+2+3).⁶

Note that the strategy used to express whether the addressee is included or excluded in the denotation of both dual and plural forms is exactly what would be expected if one considers how reference to the addressee and to the non-participant is formally marked in LSC singular pronouns. That is, the alignment vs. misalignment pattern reported

⁶This claim holds only for pronouns performed with a circular movement. If the pronoun is articulated with a straight-line movement instead, the form does indeed exclude the other participants. That is, it is interpreted as referring to the speaker and the addressee only (1+2). Additional information on the use and interpretation of this form is provided in Section 6.2.1.2.

for singular pronouns matches the one described for the expression of clusivity distinctions in both dual and plural forms. The (mis)alignment mechanism is broadly equivalent to the pattern described for ASL clusivity marking in Cormier's (2002, 2005) work. Recall from Section 2.3.3 that, according to Cormier, if the form includes the addressee in its denotation, the sign is performed in the center of the signer's chest. Exclusive forms, in turn, are associated with displacement of the sign towards one of the sides of the signer's body. Yet, two differences need to be further clarified. First, as with singular forms, the description offered here relies on the involvement of three coordinates (head, eye gaze and handshape), not on the chest. Second, and more importantly, the expression of clusivity distinctions is expected following our analysis of singular forms, just like it was in Berenz's proposal. However, Cormier's account of the inclusive/exclusive opposition runs against expectations, as such contrast would be unpredicted if second and third person are homophonous (cf. Cysouw (2001, 2002) and Sections 2.2 and 2.3.3), as she claims.

As for second person plural forms, no regular distinctive pattern was found depending on whether the pronoun had an additive ($2+2+2$) vs. a heterogeneous interpretation ($2+2/3+2/3$). This is in line with what has been described for dual forms. Hence, irrespective of whether the second person plural pronoun refers to multiple addressees or to a set containing the addressee and a plurality of non-participants, the forms are not articulated differently.

Third person multiple plurals show the same behavior as singulars in that a short eye gaze precedes the direction of the movement of the handshape. According to Berenz's analysis of Libras plural pronouns, the third person multiple cannot cross the midline. This constraint, as in the case of third person singular and dual pronouns, is not observed in LSC. If needed, multiple plurals can cross the central space, as third person is already marked by orienting the pronoun downwards, as in Figures 3.27 and 3.28.

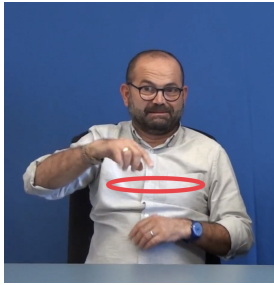


Figure 3.27: Third person
PL, circular movement



Figure 3.28: Third person
PL, straight movement

3.3 Proposal: form and meaning correlation

Based on the description presented so far, I propose that in LSC the distinction between first, second and third person is indicated by the morphophonological person markers in Table 3.5.

Person values	Morphophonological person markers
First person	Path movement towards the signer (SG: contact) Backwards orientation
Second person	Hand/head/gaze alignment Outward movement (away from the signer)
Third person	Hand/head/(gaze) misalignment by: -displacing the hand laterally (SG/DU/PL) -pointing downwards/upwards (SG/PL) Outward movement

Table 3.5: Summary: morphophonological markers of person in LSC pronouns

First person is signaled by the path movement of the sign, which targets the body of the signer. The handshape is directed towards the signer's torso in singular and plural forms and may be directed to the mouth in duals. Therefore, first person is morphophonologically marked by proximity to the speaker, which in the singular generally results in making contact with the signer's torso, as well as and a change in the orientation parameter, but neither marker is obligatory. These markers presuppose reference to the speaker, be it the actual speaker or the speaker of a reported discourse.

Second person is signaled by conjoining the direction of the handshape, the head and the eye gaze. In all three number distinctions, the pronoun is articulated in the center of the signing space, but distal to the body of the signer if compared to first person. Alignment presupposes reference to the addressee, be it the actual addressee or the addressee of a reported discourse.

Third person, in turn, is formally marked by misaligning the eye gaze, handshape and head coordinates. Misalignment can be achieved in singular and multiple plurals by displacing the handshape laterally in relation to the head, by pointing downwards/upwards or by a combination of both mechanisms. Since dual pronouns do not point downwards, the pronoun only indicates misalignment by lateral displacement. Misalignment is interpreted as reference to a non-participant.

The above description suggests that the most relevant articulatory contrasts in the expression of first, second and third person are: i) the distinction between inward movement (path movement towards the signer) vs. outward movement; ii) the contrast between alignment vs. misalignment of handshape and head; and iii) the opposition between parallel vs. perpendicular (downwards/upwards) direction of the handshape in relation to the signer's upper body. The next chapter expands on these distinctions and provides a unified analysis of person markers in LSC personal pronouns.

3.4 Summary

According to the articulatory description presented above, in LSC there is no second/third person homophony, in contrast to what has been proposed for other sign languages following the first vs. non-first person analysis. Besides, unlike Meier's proposal for ASL, in LSC the first person pronoun is not different from the rest in terms of possible handshapes, plural morphology or behavior under role-shift.

Although LSC personal pronouns fit better with Berenz's Body Coordinate Model, some discrepancies are to be mentioned. In particular, while the head and the handshape coordinates are consistently involved in the grammatical marking of second and third person, the chest coordinate is not. Additionally, the midline of the signer's body is used for reference to the non-participants more commonly than described by Berenz. That is, (mis)alignment of coordinates is relevant for encoding person values in LSC, but whether there is alignment or not is determined by the direction of the signer's handshape with respect to the head and gaze. Despite these differences, LSC favors a three-way person analysis, since there are consistent formal distinctions in the morphophonological expression of first, second and third person. Besides, the same morphophonological person markers were found regardless of number values. The expression of clusivity distinctions, which follows the same (mis)alignment pattern described for second and third person pronouns, constitutes additional evidence for the articulatory description offered in this chapter.

The fact that LSC can convey clusivity distinctions and the three-person analysis proposed here is in line with typologies of person marking in personal pronouns and with Cysouw's generalization, as presented in Chapter 2: "paradigms with an inclusive/exclusive opposition do not show any singular homophony at all" (Cysouw 2002: 51). From this angle, LSC follows the general tendencies observed in other spoken languages, as well as in certain sign language analyses, in terms of the distinctions formally marked in the pronominal paradigm to denote the participants and the non-participants in the conversation.

CHAPTER 4

Featural analysis of person markers

The goal of this chapter is to provide an analysis of the morphophonological markers of person presented in the previous chapter (Research Question 2). In a nutshell, I claim that in LSC personal pronouns the articulatory distinction between first, second and third person can be captured by using a limited set of spatial features. Like in Berenz's Body Coordinates Model (1996, 2002), the analysis presented here gets rid of the actual or assigned locations of the referents to account for the grammatical marking of person, as the phonological shape of the sign proves sufficient to encode person distinctions. To formalize the proposal, a set of three binary spatial features ([proximal], [central], [mid]) is put forth. The opposition between positive and negative values in this featural system is claimed to be grammatically relevant in the expression of person distinctions, proving that spatial locations are incorporated into the pronominal system, just like they are into other aspects of sign language grammars. The main contribution of this proposal is that it provides a unified account of person marking that makes it possible to straightforwardly capture person distinctions not only in singular forms, but, crucially, in non-singular values as well.

In order to substantiate this proposal, I start by presenting the notion of 'spatial features' and describing how it relates to the combination of person markers described in the previous chapter. In Sections 4.2 and 4.3, I provide an interim analysis in which the notion of spatial

features is implemented. The proposal is further refined in Section 4.4 by suggesting a simpler system that accounts for the relevant articulatory contrasts encoding person values in LSC. Section 4.5 gets back to the question of whether second and third person singular forms are formally distinguishable and presents further data supporting a three-way analysis of person distinctions in LSC. Section 4.6 concludes the chapter and Part I of this thesis.

This chapter borrows, with slight modifications, from Sections 4, 5 and 6 in Veiga Busto (2020b). Section 4.1 has been expanded with respect to that work and Section 4.5 has been added to further discuss the usefulness of the spatial featural analysis in accounting for person distinctions in LSC.

4.1 Person markers and spatial features

The morphophonological person markers presented in Chapter 3 can be captured by using a unified system composed by a set of three spatial features: [proximal], [central] and [mid]. These features are closely tied to the use of the grammatical space. Indeed, the contrasts they are meant to illustrate directly correspond to the three spatial planes as described, among others, by Liddell & Johnston (1989) and Brentari (1998). In particular, the feature [\pm central] opposes the lateral areas of the horizontal plane with the central space; [\pm mid] pairs up with the distinction between upper, (medial) and lower locations on the frontal plane; and [\pm proximal] correlates with the binary opposition between distal and proximal locations on the midsagittal plane. However, the set of features suggested here slightly differs from other proposals in terms of how to identify the values (positive vs. negative) each feature takes.

4.1.1 [\pm proximal]

Unlike other studies, the value of the [proximal] feature is not determined by the angle of the elbow (cf. Liddell & Johnson 1989), but rather by considering whether the path movement of the sign targets the signer's

body at some point. This means that the body of the signer can be the only target, as in singular forms; or that the sign can alternately/sequentially target the signer in addition to some other location, as in dual and plural pronouns. The positive value [+proximal] is hence associated with an inward movement that targets the signer, while outward movements are associated with the negative value [-proximal].

This distinction is relevant as it allows to account for first person pronouns that do not contact the signer's body or that do not even reach a position close to it. Recall that in the LSC corpus, about 5% of first person singular pronouns fall under this description. That is, they are produced with an inward movement, but they do not reach the body of the signer (cf. Section 3.1.1). The same can be said of dual and plural pronouns, as they typically do not make contact with the signer's body. Regardless of this, if the articulatory distinction inward vs. outward movement is considered, they all take a positive value ([+proximal]) when the pronoun (minimally) refers to the speaker.

Second and third person singular, by contrast, are articulated with an outward movement. In the corpora data used for this study, only three exceptions to this generalization were identified, all of them in singular forms. The first two correspond to two pronouns which were directed towards the face of the signer. In LSC, the morphological expression of first person is generally associated with a location on the signer's torso. Yet, there are sign languages, such as NS and TSL, which allow first person pronouns to be directed towards the signer's nose. For those, the opposition between inward and outward movement just described seems enough to account for the morphological encoding of first vs. second and third person. In LSC, pointing signs directed towards the signer's face have a slightly different function, though. As pointed out in Section 3.1.1, these forms are not used to convey that the speaker is referring to himself, but to denote an event in which someone else was addressing him (i.e., pointing at him).

The second case corresponds to a third person pronoun which points to a position next or behind the signer, as in Figure 4.1a. Similar instances, articulated with a flexion of the finger and/or the wrist, were also found in elicitation sessions. This is shown in Figure 4.1b, in which the signer

is referring to the consultant sitting next to him. As these examples show, although the signs do not move outwards, they do not constitute an exception, as pronouns clearly fail to target the body of the signer.



Figure 4.1: Third person, inward movement

Finally, recall that shielded forms might point towards any direction that fits the position of the referent (cf. Section 3.1.2.4). This includes pointing inwards if the referred person is placed behind the speaker. However, given that the sign is directed towards the palm of the other hand, rather than to the body of the signer, the proximal feature has no contribution in expressing person values. In fact, the presence of the second hand already imposes a reading according to which the entity that is being referred is necessarily a present non-participant.

4.1.2 [\pm central]

As mentioned in Chapter 3, the value of the [central] feature is not defined by considering whether the handshape is in line with the chest. Instead, it is resolved by taking into account whether the handshape aligns with the direction of the head. The negative value [-central] is associated with displacement of the hand relatively to the head. In the singular, it is also associated with wrist or elbow movements, such as extension (particularly when pointing to the ipsilateral side, as in Figure 4.2) or flexion (when the sign is directed towards the contralateral area).

In third person singular pronouns, misalignment through wrist and elbow movements results in four different orientations of the palm: backward, sideward, downward and forward. Second person singulars, by contrast, typically take either a downward or a sideward orientation. However, whenever the thumb handshape is selected, they can also take a backwards orientation (Figure 4.3).



Figure 4.2: Third person, wrist extension



Figure 4.3: Second person, thumb handshape & backwards oriented

As we will see below, for first person singular pronouns, the value of [central] is less relevant.¹ The pertinence of this feature becomes more evident once the production of second and third person is taken into consideration. In fact, only 2,3% of second person singular pronouns were found not to align handshape and head, whereas all second person plural forms were grammatically marked by aligning the two coordinates (i.e., they all took a positive value [+central]). By contrast, third person singular pronouns which did not align the direction of the handshape and that of the head (i.e., which took a negative value [-central]) increase up to almost 76% of the total, whereas plural pronouns were found to either align or misalign the coordinates in equal proportion. For discussion on the values of the [central] feature on dual forms see Section 4.3 below.

¹Indeed, as pointed out in Section 3.1.1, around 18% of the forms in the data were produced in locations somehow proximal to the shoulders of the signer, instead of in the center of the chest.

4.1.3 [\pm mid]

Recent studies dealing with the semantics of the signing space consider different oppositions within the frontal plane, such as [up] and [low] (cf. Barberà 2015) or [low], [mid] and [high] (cf. Davidson & Gagne 2014). Such divisions are defined taking into consideration different body parts; for instance, in Barberà's (2015) work, the height of the shoulder and upwards is taken to be the upper part, and below that, the lower area. Although absolute locations appear to play a role in the articulation of personal pronouns (e.g., second person pronouns are usually articulated somewhere between the upper chest and the mouth level), in the proposal presented here, the value of [mid] is determined instead by considering whether the handshape is directed parallel or perpendicular to the signer's upper body. The negative value [-mid], which in this system includes both downward and upward pointing, is associated with elbow, wrist or finger movement, such as flexion or extension. Conversely, whenever the hand is articulated perpendicular to the signer, no wrist/finger movement is observed and the [mid] feature takes a positive value [+mid].

Such opposition allows us to distinguish [+central] forms like the ones in Figure 4.4 (referring to the addressee) and 4.5 (referring to a group of non-participants). For first and second person singulars, [mid] was found to take a positive value [+mid] in slightly more than 95% of the pronouns, whereas second person plurals invariably took a positive value in the [mid] feature. For third person singular pronouns, slightly more than 26% of the forms took a negative value [-mid], whereas third person plurals selected a negative value in 75% of the cases. Recall that third person pronouns can align the direction of the head and the handshape (i.e., they might be produced in the central space). In such cases, misalignment is signaled by pointing downwards or upwards (i.e., by selecting [-mid]). Hence, the combination of these two features allows us to further distinguish forms articulated in central areas.

What is crucial to the proposal of person marking presented here is that the value taken by the features is invariably defined by considering the direction of the handshape in relation to the signer's upper body



Figure 4.4: Second person pronoun [+mid]



Figure 4.5: Third person pronoun [-mid]

and head, not to the location of the referents. That is, the value of the features is determined by considering the way the sign is projected into the signing space, the signer himself/herself being the reference point. Figure 4.6 illustrates the binary distinctions drawn within each feature, where the red arrow corresponds to the positive value and the blue arrow to the negative one.

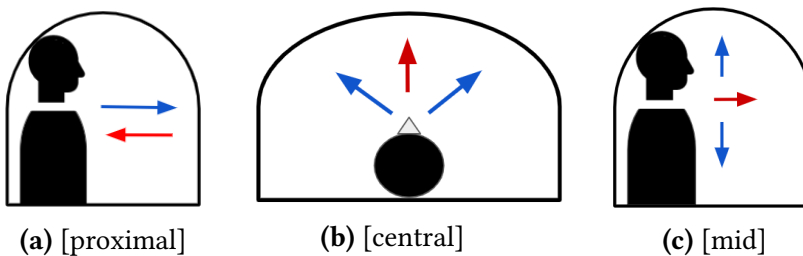


Figure 4.6: Spatial features

4.2 Implementing the analysis: singular and plural pronouns

The oppositions between positive and negative values for the features presented in the previous section prove grammatically relevant in the expression of person distinctions in LSC. Indeed, for singular and plural forms, the feature matrices in Table 4.1 allow us to characterize the articulatory contrasts described in Chapter 3.

Number value	Person value/ reference set	Spatial features
Singular	1	[+prox,+cent,+mid]
	2	[-prox,+cent,+mid]
	3	[-prox,-cent,±mid]
		[-prox,+cent,-mid]
Plural	1+2+2/3	[+prox,+cent,-mid]
	1+3+3	[+prox,-cent,-mid]
	2+2/3+2/3	[-prox,+cent,+mid]
	3+3+3	[-prox,-cent,±mid]
		[-prox,+cent,-mid]

Table 4.1: Feature matrices for singular and plural pronouns

First singular and plural forms (Figures 4.7, 4.8 and 4.9) all share the [+proximal] property, as the pronoun targets at some point the body of the signer. The rest of the features vary: only the singular and the inclusive plural (1+2+2/3) are [+central]. The exclusive form (1+3+3) takes the negative value [-central], as the movement of the sign does not cross the central space (i.e., the hand is displaced relatively to the head). Finally, since the pronoun is projected perpendicularly to the signer only in the singular, the [mid] feature takes a negative value in plural forms.

Unlike first person, second person pronouns (Figures 4.10 and 4.11), irrespective of their number value, all take the same features, namely



Figure 4.7:
First person SG

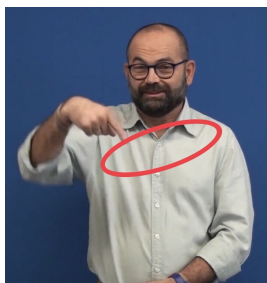


Figure 4.8:
Inclusive PL



Figure 4.9:
Exclusive PL

[-proximal, +central, +mid]. Additionally, second person pronouns show no articulatory distinction depending on whether the plural pronoun refers to multiple addressees (2+2+2) or to a set containing the addressee(s) and one or multiple non-participants (2+2/3+3). The forms are [-proximal], as the path movement goes outwards; on the horizontal plane they are aligned with the direction of the head, so they are [+central]; and with respect to the vertical axis, they are directed to the signer's body perpendicularly, so they take the [+mid] feature.



Figure 4.10:
Second person SG



Figure 4.11:
Second person PL

For third person there are two options, which represent the two ways in which a third person pronoun might be misaligned. Again, the number value does not change the sequence of features a third person pronoun

takes. That is, third person plural pronouns simply generate a copy of the same spatial features observed in their singular counterparts.

The first constellation of features in Table 4.1 represents the most common articulation of third person (Figures 4.12 and 4.13). The pronoun is [-proximal], as it does not target the signer; since it is directed to the lateral sides of the horizontal plane, it is [-central], and both [+mid] and [-mid] values are possible.



Figure 4.12: Third person
SG [-prox, -cent, -mid]



Figure 4.13: Third person
PL [-prox, -cent, +mid]

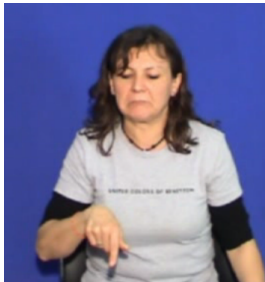


Figure 4.14: Third person
SG [-prox, +cent, -mid]



Figure 4.15: Third person
PL [-prox, +cent, -mid]

The second row in Table 4.1 stands for attested, but less frequent third person forms (Figures 4.14 and 4.15). The forms in question are [+central], that is, aligned with the head, and [-mid], as the pointing is projected either downwards or upwards in the vertical axis. Either way, in both cases third person pronouns are directed to peripheral locations:

they are pushed to the edges of the horizontal plane (i.e., to the lateral sides), or to the upper and lower extremes of the vertical one (i.e., parallel to the signer).

4.3 Dual forms and implications for the analysis

Unlike what is observed in singular and plural pronouns, some person oppositions may go missing in dual forms. This is not typologically surprising, as it is not uncommon for the dual value to encode less distinctions than singular and plurals do. Besides, dual pronouns only very rarely point downwards,² so it is not possible to draw a distinction with the [mid] feature, as there is no opposition at play.³ As a result, the

²Some isolated cases were found in which second and third person forms took a downwards orientation of the hand, making it easier to point to the lower part of the vertical plane and, hence, allowing contrast with forms which are typically oriented upwards or backwards. However, there seems to be no systematic association of a downwards orientation with specific contexts of use. Consultants mentioned that these forms might be used when the referents are present, but examples were found in which the forms were used to refer to absent entities. Besides, consultants treat some of the forms as some sort of 'slips of the hand'. Indeed, in some of the observed cases, the palm was already facing downwards in previous signs, so for certain instances at least, it might be simply a question of coarticulation. Be as it may, the forms never appeared in elicitation sessions nor in the corpora data used for this study, so I am leaving aside this issue for the time being.

³Whether or not dual forms are projected parallelly or perpendicularly to the body of the signer may indeed be observed. However, unlike what could be seen in the case of singular and plural pronouns, the contrast between positive and negative values does not account for the expression of person distinctions in the manner described before. In fact, most first person pronouns, both inclusive and exclusive, were found to take a negative value [-mid]. Most of the exceptions seem to be due to articulatory reasons, as the positive value [+mid] generally occurs in forms produced on the contralateral side of the body. Second and third person duals, by contrast, typically take a positive value [+mid]. Yet, when they orientation of the palm faces backwards rather than upwards, the negative value [-mid] is selected instead. Although one might think that these oppositions could well sustain a first vs. non-first person analysis, it must be noted that

constellations of features for dual pronouns would look like in Table 4.2.


Number value	Reference set	Spatial features
Dual	1+2	[+prox, +cent]
	1+3	[+prox, -cent] [+prox, +cent]
	2+2/3	[-prox, +cent]
	3+3	[-prox, -cent] [-prox, +cent]

Table 4.2: Feature matrices for dual pronouns

Since [mid] does not seem to play any role in the grammatical marking of person values in dual forms, we would predict the inclusive/exclusive opposition to be marked by the value of the [central] feature. However, since on top of the articulatory distinctions described before, discourse referents may be assigned locations in the signing space, we would also predict some contrasts to be neutralized when the exclusive takes the [+central] feature. The constellation of features in Table 4.2 already captures this. That is, the fact that no possible oppositions can be drawn within the [mid] feature, results in having the same selection of features for inclusive and exclusive first person duals when the forms are articulated in the central space. In the data analyzed in this dissertation inclusive pronouns were found to always select the [+central] feature and exclusive forms systematically took the negative value [-central]. However, examples were found in different data sets and spontaneous conversations showing that whenever a third person referent is assigned a central location, the articulation of a first person inclusive (1+2) and that of a first person exclusive (1+3) may indeed coincide. These results contrast with Cormier's (2005) description of clusivity distinctions in ASL (see Section 2.3.3) in an important aspect. In LSC the unmarked form of the inclusive/exclusive pair does not seem

the patterns described are merely tendencies, contrary to what was discussed in the case of singular and plural forms. Besides, such tendencies seem to find a motivation in ease of production, rather than on the grammatical encoding of person distinctions. Hence, further research is needed in order to detect contrasts that may have gone unnoticed in the present investigation.

to be the exclusive, but the inclusive one.⁴ This is shown by the fact that neutralization of clusivity oppositions results in using the inclusive form. Besides, the articulation of the exclusive can be taken to be more complex (i.e., marked) than that of the inclusive, since it requires a location other than the space in front of the signer (i.e., the neutral space). Hence, unlike Cormier's suggestion for ASL, the inclusive in LSC is not argued to lack a specific form, but rather to take over the exclusive meaning whenever reference to non-participants is made by selecting the [+central] feature. That is, forms that align the direction of the movement with that of the head are not compatible with exclusive interpretations across the board in LSC. In contexts such as (1) below, only an inclusive reading is possible.

- (1) IX₂-IX₁-IX₃ TOMORROW GO CONFERENCE. THE_TWO₁₊₂ PREPARE. 
 'You, I and he/she have a conference tomorrow. We ('you and I')
 will prepare it.'

(reproduced from Veiga Busto 2020a)

Neutralization of oppositions is even clearer in the case of second and third person duals. When dual forms referring to two non-participants are articulated in a [+central] location (Figure 4.16), some distinctions cannot be drawn, as they cannot be formally differentiated from second person duals (Figure 4.17). The interpretation of the forms is typically made clear in actual discourse, but when taken out of context, some forms become undistinguishable. This reveals that the features [-proximal, +central] do not force a second person reading, as they are compatible with both second and third person duals. In other words, every second person dual is associated with the features [-proximal, +central], but not every dual that takes these features is necessarily a second person dual. In fact, in the data considered for this investigation, every second person dual, irrespective of whether it referred to two addressees or to one addressee and some other non-participant, was found to always select the [+central] feature. By contrast, third person dual forms took a negative value [-central] only in half the cases.

⁴Strictly speaking, Cormier proposes that the exclusive is the unmarked category in number values other than the dual (for the dual no clusivity distinctions are posited).

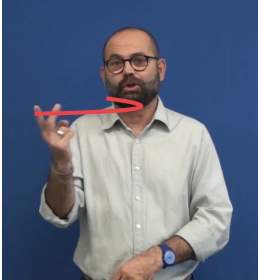


Figure 4.16:
DU (3+3)



Figure 4.17:
DU (2+2)



Figure 4.18:
DU (3+3)

Importantly, despite the fact that dual pronouns appear to be counterexamples to the analysis proposed so far, it is not suggested that they cannot encode person oppositions, but rather that they are more likely to neutralize distinctions otherwise widespread and systematic in the grammar. This is confirmed by the fact that whenever a dual form is articulated in a non-central location, the distinction between second and third person (Figure 4.18), as well as the distinction between inclusive and exclusive first person are present in the system. Hence, whenever the forms are laterally displaced, overlaps are not possible.

4.4 Proposal: association of features with semantic values

The case of dual pronouns presented in the previous section evidences the fact that some features might be unspecified. In other cases, certain specifications might seem trivial or redundant. Hence, in order to obtain a more efficient system, we need to isolate the basic distinctive features of each person value by getting rid of the non-essential ones (see Table 4.4 at the end of the section).

The [central] feature for first person singular pronouns in one such example of redundancy, since there are no forms that contrast only by

changing the value of that feature. In fact, as it was pointed out in Section 4.1.2, a portion of first person singular forms was found to take locations proximal to the signer's shoulders and, thus, to be non-central (see Figure 4.19). Similarly, [mid] might take a negative value whenever the pronoun targets the body of the signer from a high location (see Figure 4.20).



Figure 4.19: First person singular [-cent]



Figure 4.20: First person singular [-mid]

What this essentially means is that the forms show a certain degree of variation in their phonological makeup. As pointed out in Section 3.1.1, this might be due to several reasons, such as assimilation with previous or subsequent signs or to phonological attenuation. The variation found in the spatial features selected in the 623 tokens of first person singular pronouns analyzed in this dissertation is presented in Table 4.3. Note that in the graph, [-central] corresponds to slightly less than 5% of the forms, instead of the 18% mentioned in Section 3.1.1 and Section 4.1.2, as only those forms clearly not produced in line with the head of the signer were coded as taking a negative value. Hence, [+central] includes signs articulated on the signer's chest (and also the throat or the belly), as well as those slightly displaced towards one of the lateral sides of the body, but not entirely misaligned with the head (e.g., on the shoulders).

Despite some degree of variation, the saliency of the [+proximal] feature, which first person singular pronouns invariably select, makes the pronouns easily recognizable, even when the movement ends in a point far from the body of the signer. Besides, the [+proximal] feature is enough to distinguish first person from the second and the third. Hence, for

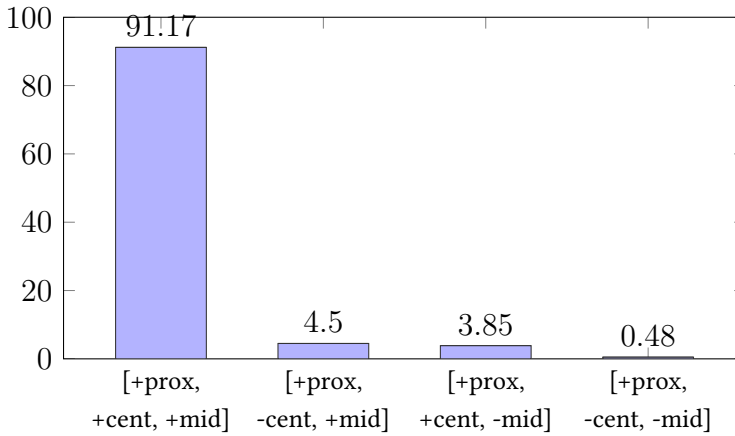


Table 4.3: Spatial features selected by first person singular pronouns

the first person singular, the only relevant feature we need to specify is [+proximal]. This feature is observable in the articulation of first person pronouns by the path movement of the sign, which moves towards the signer.

The [+proximal] feature is also true for any set containing the referential element speaker (i.e., first person dual and multiple plurals), but in these cases we might want to detail the features further if we were to capture the distinction between the inclusive and the exclusive interpretation, as the forms contrast by changing the value of the [central] feature. In fact, since inclusive and exclusive first person dual and plural pronouns involve reference to at least two distinct person values, it comes as no surprise that we would need at least two features to account for their grammatical marking. That is, referentially heterogeneous sets result from combining the distinctive features of the person values they integrate. As it could be predicted, sets containing the referential elements speaker and addressee, take the [+proximal] and [+central] features (i.e., the features corresponding to first and second person). In articulatory terms this means that inclusive pronouns involve alignment of the head with the line traced by the movement of the sign (as in second person). Moreover, the forms are produced with an inward

movement (as in first person), which does not generally contact the body of the signer. Sets containing the speaker and a non-participant, on the other hand, take the [+proximal] and [-central] features (i.e., the features associated with first and third person). Hence, exclusive forms are produced by misaligning the direction of the head and the handshape. This is commonly preceded by a short eye gaze towards the direction of the movement (as in third person) and an inward movement (as in first person). Again, in the dual, if the exclusive selects a [+central] articulation, no distinction with the inclusive form is observed.

The second person is consistently defined by taking the [+central] feature, and no further distinctions are needed. This holds true for all three number values under investigation. The selection of the [+central] feature is made visible by aligning the direction of the handshape, head and eye gaze. The fact that the [+proximal] feature is not active implies that the sign is articulated with an outward movement.

Finally, third person pronouns present us with two alternatives. The first one ([\emptyset]), which corresponds to its most common articulation, reveals the fact that third person pronouns are not only negatively defined in their semantics (as being the ‘non-person’, i.e. whoever or whatever is not the speaker nor the addressee), but also in their articulation (as being what is neither proximal nor central, i.e. by the absence of the features of first and second person). In articulatory terms, this means that the sign takes an outward movement and that it is laterally misaligned, meaning that the directions of the head and the hand do not coincide. Besides, when the pronoun takes the [-central] articulation, the value of the [mid] feature does not need to be specified, as the pronoun can take any direction on the vertical axis (i.e., it can either take a positive or a negative value) without impacting its interpretation, as misalignment is already signaled by the [-central] feature. Even if additional semantic interpretations or constraints on the direction a pronoun might take could be posited (cf. Barberà 2015), the assignment of the person value (reference to the non-participant(s), i.e., third person) would remain constant.

The second sequence of features for third person stands for [+central] forms that are misaligned by being projected towards the extremes of the

vertical axis (i.e. [-mid]). As dual pronouns do not point downwards (cf. Section 3.2.1 and footnote 2), when [+central], a third person dual would take the same features as the second person.

Person	Number	Features
1	SG	[+prox]
2	SG, DU, PL * DU (3+3)*	[+cent]
3	SG, DU, PL	[Ø]
	SG, PL	[+cent, -mid]
1+2(+2/3)	DU, PL * DU (1+3)*	[+prox, +cent]
1+3(+3)	DU, PL	[+prox, -cent]

Table 4.4: Association of distinctive features and person values

4.5 Back to the second vs. third person distinction in singular forms

Given the feature specification I have proposed, one may wonder how accurately it can account for the distinction between second and third person in LSC singular pronouns. Recall that under some analyses (e.g., Meier (1990) for ASL), the location component of pronouns referring to the addressee and to the non-participant cannot be formally described, as they systematically depend on the location (real or assigned) of the entities they refer to.

Here, I am claiming that the location of the entities, while relevant to resolve who the intended referent of a pronoun is, has no role in assigning person values. Indeed, if we consider the selection of spatial features of pronouns referring to the addressee vs. to the non-participant presented in Table 4.5, we can observe that they rightly account for over 93,8% of second person singular pronouns and over 91,2% of third person singular pronouns. Hence, the percentages of variation are on a par with the ones found in the production of first person singular pronouns as presented in the previous section. The crucial difference is that while variation in first

person pronouns does not lead to overlaps with the articulation of other pronominal forms, changes in the production of pronouns referring to the addressee and to the non-participant do result in forms that overlap with each other.

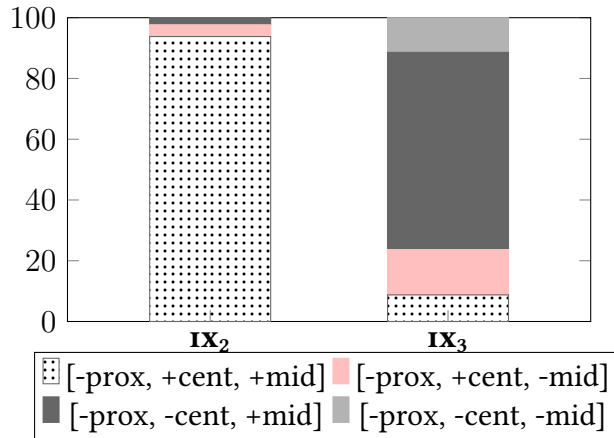


Table 4.5: Articulatory variation of second and third person singulars

When the pronoun refers to the addressee, there are two alternatives that make the form potentially undistinguishable from the forms used to refer to the non-participant. These represent 6,2% of the total. However, second person pronouns that took the features [-prox, -cent, +mid] were all produced with the thumb handshape, not with the index. In the forms that took the features [-proximal, +cent, -mid], the handshape was directed slightly in parallel to the signer (see Figure 4.21), instead of clearly downwards or upwards, as in the case of third person (see Figure 4.22).

With respect to third person, almost 8,8% of the forms were found to overlap in their production with second person singular pronouns, namely when they took the features [-prox, +cent, +mid]. In most cases, the handshape, the head and the gaze are aligned only during the first portion of the sign, though. Crucially, the forms were all produced when referring to present non-participants (see Figure 4.23) or to objects associated with them, such as pictures. However, this does not mean

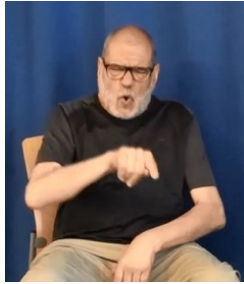


Figure 4.21: Second person
[-mid]

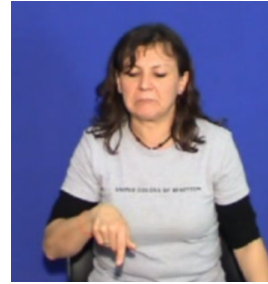


Figure 4.22: Third person
[-mid]

that reference to present non-participants was systematically found to take the features associated with the second person, but rather that, when overlaps were identified, they were often associated with contexts of deictic reference or with deferred ostension by pointing to present objects.



Figure 4.23: Third person [+/-cent, +mid]

Considering that these results cannot merely be attributed to chance, I claim that a two-person analysis is not to be considered the best account of LSC data. While cases of overlap deserve further exploration, these results show that second and third person are distinguished in LSC personal pronouns and that they can be phonologically accounted for by using standard tools of linguistic analysis.

4.6 Conclusion

In LSC, accounting for the different marking of first, second and third person is possible by using a modified version of Berenz's (1996) Body Coordinates Model. In Chapter 3, I suggested two refinements of the model to better account for the expression of person distinctions in LSC. Specifically, I proposed to reduce the set of coordinates and to rule out the existence of the so-called 'midline avoidance' principle for third person. The proposal presented in this chapter further differs from Berenz's in that it simplifies the system by providing a limited set of features ([proximal], [central], [mid]) that account for the relevant articulatory contrasts found in the grammatical marking of person values in LSC.

The features argued for in this chapter stand for the way pronouns are projected into the signing space. Under this view, the problem of incorporating the location component of second and third person in the phonological description simply disappears, as the value of every feature is resolved by taking into consideration the signer's upper body and head, not the actual or the assigned location of the referents. For the canonical forms of the pronouns in LSC, the opposition between positive and negative values in these featural system is enough to account for person distinctions in both singular and non-singular forms.

According to this proposal, first and second person singular pronouns can be described by using only one feature and they have constant and predictable forms. To account for the articulation of inclusive and exclusive pronouns, by contrast, two features need to be specified. Yet, the articulation of clusivity distinctions is already predicted by the description presented in Chapter 3 and the featural analysis suggested in Chapter 4. That is, since the inclusive/exclusive contrast follows the same (mis)alignment pattern described for second and third person, accounting for clusivity distinctions directly follows from combining the corresponding features of the person values each set combines. Crucially, this proposal does not face the problem of positing unattested combinations of grammatical distinctions (e.g., second/third person homophony in the singular along with clusivity distinctions, as proposed by Cormier 2005).

Finally, third person pronouns show more variation, as they not always select the same sequence of features. As a result, the form of a third person pronoun is recognizable and can be described, but it cannot be predicted. Besides, when third person is central, the distinction between second and third person might be neutralized, as in the case of dual pronouns.

All in all, this study supports a grammatical analysis of the signing space, as claimed in the R-loci perspective, given that spatial locations have proved to be grammatically relevant in the marking of person distinctions. In particular, this analysis suggests that in LSC selecting a feature (which is made ‘visible’ by modifying the articulation of the sign, i.e., by the use of different person markers) has an impact on the expression and interpretation of personal pronouns. More precisely, in LSC different regions within the signing space are associated with reference to different discourse roles: [+proximal] locations presuppose reference to the speaker, [+central] locations are associated with reference to the addressee(s) and otherwise ([\emptyset] or [+central, -mid]) they are interpreted as denoting the non-participant(s) in the speech act.

[+prox]	refers minimally to the speaker
[+cent]	refers minimally to the addressee(s)
[\emptyset] or [+central, -mid])	refers to the non-participant(s)

Table 4.6: Summary: spatial features and the semantics of personal pronouns in LSC

Part II
NUMBER

CHAPTER 5

The number category

The grammatical category of number specifies the cardinality of the referents. It can be formally marked on different linguistic elements, such as verbs, nouns, determiners, adjectives, pronouns, and classifiers. Morphologically, number can be encoded by different grammatical processes. English, for instance, typically makes use of inflection—as the plural morpheme *-s* in *cat-cats*—and apophony, which involves a sound change within a word (such as vowel alternation), as in *foot-feet* or *man-men*. Additionally, many world’s languages use reduplication, which involves repetition of phonological material—such as *amigo-amimígo* ‘friend-friends’ in Pangasinan (Rubino 2001)—or suppletion, a process in which there is no morphological relation between the paradigmatic forms—as in Russian *rebenok-deti* ‘child-children’ (Corbett 2007)—.

Sometimes, number morphology is absent on the noun and it appears on the verb instead. In the chapters that follow, I will concentrate on the expression of nominal number only.¹

¹Given their dual life, classifiers are left out in this study. Predicate classifiers, for instance, use a handshape that represents a referent, but they always occur with verbs of motion, handling or location. As pointed out by Benedicto & Brentari (2004: 247), “classifiers in ASL are generally taken to be verbal in nature”. In fact, some researchers propose to use the label ‘polycomponential verbs’ to better describe these structures (Schembri 2003). Size-and-Shape-Specifiers, on the other hand, combine with nouns and function in a way similar to adjectives. For an overview on the problems of

The goal of this chapter is to provide an overview of the typological variation found within the number category in the world's languages. Since most typological research has been carried out considering spoken language data only, I address separately the number distinctions that sign languages are claimed to draw, as well as the morphological strategies used to express them.

This chapter is structured as follows. Section 5.1 establishes the terminological distinctions used in the chapters that follow. It additionally reports on the number distinctions attested in the world's languages, along with some basic information on their meaning and their distribution. Section 5.2, in turn, focuses on the limits of variation in the expression of number. I will present the most relevant implicational universals and Corbett's number hierarchy, which is meant to represent the organization of number distinctions and facultative number values. Finally, Section 5.3 reviews the distinctions made within the number category in sign languages. I will mainly focus on the two morphological operations that are claimed to be used to express number in the nominal domain: reduplication and modification of the path movement of the sign.

5.1 Number distinctions

5.1.1 Singular-plural opposition

Languages differ greatly in the distinctions they make in the number category. The minimal number system is made up of the values singular and plural (Kibort & Corbett 2008). Only a few languages have been reported not to formally mark this basic opposition. The most well-known example is that of the Brazilian language Mura Pirahã (Everett 1986). Pirahã is argued to lack a system of grammatical number, and even personal pronouns lack plural forms. Thus, the same form is used regardless of the number of referents denoted by the pronoun. In (1), for

categorization of classifiers in sign languages, see Zwitserlood (2012).

instance, *hiapióxio* is used for both third person singular and third person plural. Despite lacking plural markers, a common strategy used in Pirahã to express plurality is through conjunction, as in (2).

- (1) *Pirahã*
 Hiapióxio soxóá xoóxio.
 3.PRO already jungle
 ‘He/they already went to the jungle.’

- (2) *Pirahã*
 Ti gíxai pío ahápii.
 1.PRO 2.PRO also go
 ‘You and I will go (we will go).’

(adapted from Everett 1986: 281-282)

In languages with a singular-plural contrast, the singular is usually associated with the marking of one referent and the plural with more than one. If a language distinguishes other number values, such as dual or trial, the plural may, but need not, have a different meaning and become restricted to refer to more than two/three entities (Corbett 2000). If a language additionally distinguishes the value paucal (‘a few X’), the plural may, but need not, be referred to as ‘multiple’ (‘many X’) (Kibort & Corbett 2008).

Recall from Chapter 2 that the so-called plural pronouns do not encode plurality in the sense a nominal does. That is, *we* does not refer to a plurality of speakers, but rather to a group that contains the speaker. For this reason, Cysouw (2001) considers the label ‘plural’ inappropriate and proposes the use of ‘group’ marking instead, which may be further divided according to the members of the group. According to Cysouw, two basic properties of plurals (or ‘unrestricted groups’) are that i) they have to refer to multiple entities and ii) they are unmarked for the specific number. Conversely, those forms that do indicate the cardinality of the denoted referents, such as duals or trials, are referred to as ‘restricted group/restricted non-singular’. As it will become important to classify number distinctions into larger groups, I will follow Cysouw in using the

expression ‘restricted group’ when denoting the set of number values for which the specific amount of referents is relevant. To prevent confusion, when only one value of the ‘restricted group’ is intended, I will adhere to the more conventional terms used in research on number (e.g., ‘dual’ instead of ‘minimally restricted group’).

5.1.2 Dual

On top of the singular-plural opposition, many languages also mark a dual value, which "refers to two distinct real world entities" (Corbett 2000: 20). Dual number is extremely common among the world's languages. In some languages, both nouns and pronouns inflect for the dual, in others only pronouns do. Much more rarely, only nouns have forms for the dual. In a sample of 205 languages, Plank (1996) found that only 5.9% of the languages mark the dual exclusively on nouns. Among these languages, those that inflect for the dual in a restricted set of nouns, as in the case of Maltese, are highly unusual.

Besides, having a dual in the number system does not imply that it must necessarily be used whenever reference to two entities is made. In his survey, Plank shows that, overall, duals prefer to be used obligatorily, especially if they are used in personal pronouns only (in 66 out of 107 languages). When duals are not used, plurals and paucals become the preferred alternative. Under certain circumstances (e.g., when in the scope of the numeral *two* or the quantifier *both*), singular and number neutral forms are also appropriate (Plank 1996).

In personal pronouns, the dual can have different forms for first (inclusive and exclusive), second and third person, as in the Austronesian language Maori (see (3)), or it may show some degree of homophony, for instance if the same marker is used for both the plural and the dual of the same person value.²

²For a comprehensive comparison of dual marking and the different kinds of homophony found across a wide range of languages see Cysouw (2001).

(3) *Maori*

	SG	DU	PL
1INCL		tāua	tātou
1EXCL	au	māua	mātou
2	koe	kōrua	koutou
3	ia	rāua	rātou

(Cysouw 2001: 258)

5.1.3 Trial

The trial specifies that exactly three entities are referred to. Compared to the dual, the trial value is cross-linguistically rare, but it is commonly described across the Austronesian languages (Cysouw 2001). The Malayo-Polynesian language Larike, for instance, marks singular, dual, trial and plural in free pronouns, pronominal affixes and possessives (Laidig 1993). Differently to the case of possessives and pronominal affixes, there are no third person pronouns for non-human referents. Besides, trial is facultative in Larike. This seems to hold true for every language with morphological trials, though for some languages there is no information as to whether trials are obligatory or optional (Corbett 2000).

In Larike, the dual and the trial come historically from the numerals *two* and *three*, and the plural comes from the numeral *four* (Corbett 2000). Cysouw (2001) and Corbett (2000) point out that most instances of so-called ‘trials’ are in fact paucals. According to Cysouw, in the grammaticalization process, the meaning of the morphemes changes very frequently. Therefore, what can start its life as the numeral ‘three’ can end up meaning ‘a few’ (i.e., changing from trial to paucal). Thus, the referential value of the morpheme might not be ‘exactly three’, but a relatively small group whose cardinality can be greater than that. This is not the case of Larike, though, as its trial is used strictly for three (Corbett 2000).

(4) *Larike* (free pronouns)

	SG	DU	TRI	PL
1INCL		itua	itidu	ite
1EXCL	aʔu	arua	aridu	ami
2	ane	irua	iridu	imi
3.HUM	mane	matua	matidu	mati

(Laidig 1993: 321)

5.1.4 **Quadral**

The quadral is used to refer to exactly four entities. According to Corbett, it is unclear whether there exists a language with a ‘pure’ quadral: “[i]f such languages exist, they are rare and all the claims come from within the Austronesian family” (Corbett 2000: 26). One such language is Sursurunga, in which the quadral is used in personal pronouns (Hutchisson 1986). Yet, in Sursurunga, the quadral is used not only to refer to four entities, but, most generally, to a minimum of four (for kinship pairs) or to relatively small groups, that can be greater than four, in the first person inclusive, as in (5).

(5) *Sursurunga*

Gamhat	til	main	gam	han	suri	tártár
2.QUAD	from	here	2.PL	go	PUR	chop
on	á	kakau	káián	Himaul	viles,	honin
it	TOP	cacao	its	Himaul	village	today
dihat	má	lu	tangkabin	sirai	má...	
3.QUAD	EMPH	HAB	begin	selling	now	

‘You all from here (i.e. from this village) went to slash (for burning, then planting) Himaul village’s cacao, which already they (i.e. people from Himaul) have begun to sell...’

(Corbett 2000: 28)

In (5) the quadral is used to refer to a minimum of four, rather than exactly four. Given this, Corbett (2000: 27) points out that “[i]f our terminology is based on meaning”, the quadral should be best considered as a greater paucal in Sursurunga.

5.1.5 Paucal

The paucal, also referred as ‘limited plural’ (Schütz 1985) or ‘plural of paucity’ (Ferrando 2006), is used to refer to a plurality with a relatively small cardinality. In principle, there is no upper-bound for the number of entities referred to by the paucal, whereas its lower bound depends on whether the system also marks dual or trial values (Corbett 2000). To illustrate, in Bayso, an Afro-Asiatic language spoken in Ethiopia, the paucal is used to refer to groups of two up to six individuals, in Arabic the paucal denotes three to ten (Ojeda 1992), while in the Austronesian language Fijian, the paucal can refer to groups significantly larger (Dixon 1988; Schütz 1985). According to Dixon (1988: 52), in Fijian “[t]here is no fixed number of people below which it is appropriate to use a paucal pronoun and above which a plural should be employed [...] The only constraint is that plural must refer to more participants than paucal”. Schütz (1985: 287) further claims that in Fijian “there is no explicit dividing line between paucal and plural; contrast seems to be the key”. Given these, choosing between paucal and plural largely depends on the context.

(6) *Paamese* (free pronouns)

	SG	DU	PAUC	PL
1INCL		ialue	iatelu	iire
1EXCL	inau	komalu	komaitelu	komai
2	kaiko	kamilu	kamiitelu	kamii
3	kaie	kailue	kaitelu	kaile

(Crowley 1982: 80)

There are languages with a singular, plural and paucal opposition, but systems that also distinguish the dual in addition to the singular, plural

and paucal are more common. This is the case of Paamese in (6). Languages like the Austronesian Lihir, which distinguish five number values (singular, dual, trial, paucal and plural) are statistically less frequent.

5.1.6 Greater numbers

Additional number distinctions that have been described in typological studies are the so-called greater paucal and the greater plural. The greater paucal is used to refer to groups larger than the ones covered by the paucal and smaller than the ones covered by the plural. Consequently, the greater paucal is only attested in languages that do also have a paucal. Its meaning can be paraphrased as ‘several’.

The greater plural is used to refer to an unusual number of entities or events (also called ‘plural of abundance’) or to all possible instances of the referent (similar to a universal quantifier, also described as ‘global plural’). Following the abundance/global distinction, Harbour (2014a) “tentatively” uses the labels ‘greatest plural’ and ‘global number’. Yet, as he himself notes, these distinctions may be grounded on (in)definiteness rather than number: “[i]t is, therefore, possible that global plural is not a different number, but the definite counterpart of (greater) plural” (Harbour 2014a: 199).

Languages with a plural-greater plural split are rare, but more common than those with a paucal-greater paucal split (Corbett 2000). Lack of sufficient descriptions makes it harder to analyze the nature of these distinctions. In fact, what is analyzed as a plural/greater plural opposition may also be understood as a paucal-plural or even a plural-general number distinction.

5.1.7 Distinctions outside the number system: general number

According to Cysouw (2001: 23), the meaning of the singular-plural contrast “may seem self-evident”, but in many languages number is not obligatory, so the same marker can be used to refer to either one or more

than one referent. Corbett (2000), following Andrzejewski (1960), uses the term ‘general number’ to refer to these semantically number neutral forms, but as he notes, other labels are used in the literature, such as ‘transnumeral’ (Biermann 1982; Acquaviva 2005; a.o.) or ‘unit reference’ (Hayward 1979). Here, I will use the term ‘general number’.

In Corbett’s analysis, general number is outside the number system, rather than being one of its possible values. This is so because general number expresses the meaning of the noun without any commitment about the number of referents. For this reason, general number is semantically equated with number neutrality (Hayward 1979; Biermann 1982). In reference to the use of general number in the Afro-Asiatic language Borana, Andrzejewski (1960: 71) states: “when such forms are used, only the context can provide us with information about the NUMBER that is denoted”. Using ambiguity tests, Rullmann & You (2006) convincingly show that in Mandarin Chinese general number is not semantically ambiguous, but rather compatible with both singular and plural reference (see Section 7.4.2.1 for further details).

General number is attested in a number of different languages. In most of them, general number is realized by the same morphological markers used for the singular, but there are languages in which it may take the plural for some nominals and the singular for others. No language has been reported to always take the plural form for general number. Importantly, languages such as Japanese only have plural and general number, but no singular forms (Corbett 2000). In fact, while plurality can be expressed on some nouns by using the suffix *-tachi* or by reduplication, to express singularity, only classifiers can be used (Sudo 2017). Therefore, general number may also exist in a language with no morphological singular.

Less commonly, languages may have an independent form to mark general number. In Bayso, for instance, nouns have separate forms for singular, plural, paucal and general number. Singular, plural and paucal are expressed by dedicated suffixes, while nouns lacking such markers (i.e., bare stems) express that number is not relevant, thus general number.

(7) *Bayso*

GNR	SG	PL	PAUC
lúban	lubán-titi	luban-jool	luban-jaa
‘one or more lions’	‘a lion’	‘(many) lions’	‘a few lions’

(adapted from Corbett 2000: 11)

5.2 Typological generalizations

5.2.1 Implicational universals

The cross-linguistic typology of number systems is incontestably varied, but certain combinations of values are not attested. For instance, there seems to be no language that distinguishes only singular from trial, while not having a dual or a plural in the system. This generalization is presented in Greenberg’s (1966b: 94) universal 34 as follows:

- (8) Universal 34: No language has a trial number unless it has a dual.
No language has a dual unless it has a plural.

Following Greenberg (1966b) and Corbett (2000), Harbour proposes the following set of implications:

- (9) Harbour’s implicational universals (2014a: 186)

TRI → DU	Trial requires dual.
DU → SG	Dual requires singular.
SG → PL	Singular requires plural.
PL → SG/MIN	Plural requires singular or minimal.
U.AUG → AUG	Unit augmented requires augmented.
MIN → AUG/PL	Minimal requires augmented or plural.
AUG → MIN	Augmented requires minimal.
GR.PAUC → PAUC	Greater paucal requires (lesser) paucal.
PAUC → PL	Paucal requires plural.
GR.PL → PL/AUG	Greater plural requires plural or augmented.

The aforementioned implications are meant to account for the fact that, for some distinctions to be active in a given system, other number values must also be attested. As mentioned earlier, the singular-plural opposition is the most basic, on top of which other number values might be added. The dual is widely attested among the world's languages. The paucal is less frequent and it usually appears in number systems that also mark dual. Comparatively, the trial is less common than the dual and the paucal. The quadral is infrequent and it is even contested whether there are languages with genuine quadral. Finally, the quintal has not been attested in any spoken language.

Crucially, the languages considered in cross-linguistic surveys do matter when it comes to accounting for the relative frequency of a number value. As Cysouw (2001: 233) emphasizes: “[o]nly because the trial, quadral and paucal happen to be found in one of the most extended and widespread linguistic families of the world (the Austronesian language family), do these categories appear to be common. Typologically speaking, they are not”. When it comes to sign languages, this becomes even more evident, as the vast majority of cross-linguistic studies are based on spoken language data only. As pointed out in the Konstanz Universals Archive (Plank & Filimonova 2020): “[w]e cannot here broach the issue of whether universals which do not hold for sign languages are to be considered substantive (and invalid) or definitional”.

As with any universal, the implications above are to be understood as tendencies. In fact, even Greenberg's (1966b: 96) unconditional universal 42 (“All languages have pronominal categories involving at least three persons and two numbers”), comes with exceptions. As discussed earlier in this chapter (see Section 5.1.1), Pirahã is a well-known counterexample, given that it lacks plural pronominal forms and, to express plurality, uses conjunction instead.

5.2.2 Corbett's number hierarchy

The implicational relations between number distinctions in (8) can be presented in the form of the following hierarchy:

- (10) Number hierarchy:
Singular > plural > dual > trial

Corbett (2000) mentions at least two problems for the scale in (10). The first is that it does not account for systems which also have a paucal; the second is that it makes wrong predictions for facultative number.

As for systems with a paucal, the main problem is where to place it in the scale. If used along the lines proposed by Foley (1986) (singular > plural > dual > trial/paucal), the hierarchy does not account for systems which distinguish singular, paucal and plural, but with no dual value, as in the case of Bayso in (7).

Regarding facultative number, the hierarchy in (10) predicts that if a number value is facultative, the less marked value is used instead. This predicts, for instance, the use of the plural when the dual is facultative. However, the occurrence of the plural if the trial is facultative is not predicted in the hierarchy.

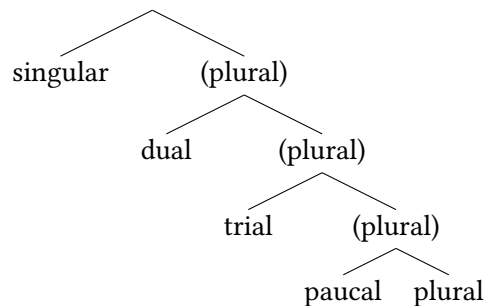
To solve these issues, Corbett proposes to substitute the linear representation for the tree structure in (12). Since the basic opposition is between singular and plural, a first split is made between the two values. Note that the reason for the singular to be placed on the left side of the hierarchy is that in most languages the singular is morphologically less marked (i.e., morphologically complex) than the plural (cf. Section 1.1). In fact, number scales are related to a well-known generalization about the morphological expression of number, which is presented in Greenberg's (1966b: 94) universal 35 as follows:

- (11) Universal 35: There is no language in which the plural does not have some non-zero allomorphs, whereas there are languages in which the singular is expressed only by zero. The dual and the trial are almost never expressed only by zero.³

³Singulatives (forms derived from plurals which are semantically singulars) constitute a counterexample to the generalization above. Since they carry an additional number marker, they are morphologically more complex than the plural (Corbett 2000). Additional 'markedness reversals' are discussed in Cysouw (2001) (e.g., pronominal plurals morphologically derived from duals). As the author notes: "[t]hese examples

Additional number distinctions are represented as a subdivision within the plural node (dual, trial, paucal, greater paucal and greater plural are all dominated by the ‘plural’ node, i.e., they are all non-singular values).

(12) Tree structure for number hierarchy (Corbett 2000: 42)

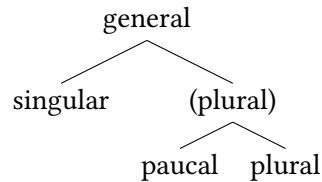


Under this representation, the presence of a paucal is independent of whether a language also distinguishes dual and trial. In fact, if a language makes less distinctions or it opposes number values other than the ones presented in (12), the representational hierarchy can be modified accordingly.

The representation suggested by Corbett also captures the fact that certain number values may be facultative. This is represented by drawing a little arc between the optional number value and its sister. Finally, since general number is considered outside the number system, it is represented on the top node of the hierarchy, as in the Bayso number system in (13). This stands for the fact that number is optionally expressed but, whenever it is expressed, the appropriate value (singular, paucal or plural) must be selected. In languages in which general number is expressed using the same form of the singular, both the singular and the general number are surrounded by a circle.

once again highlight the fact that general tendencies among the world’s languages are never to be interpreted too rigorously as universal characteristics” (Cysouw 2001: 229).

- (13) Bayso number system (Corbett 2000: 48)



5.3 The expression of number in sign languages

Unlike what was described for person, most descriptions of number in sign languages appear to assume the same range of distinctions for a variety of different languages and domains (nominal and verbal). This is somehow unexpected, given the variation attested cross-linguistically in the number category.

In the pronominal domain, for example, most sign languages have been described as encoding the following number values: singular, dual and plural (distributive and collective) (Sandler & Lillo-Martin 2006). Zeshan (2003) reports an interesting exception. In her study on Indo-Pakistani Sign Language (IPSL), she shows that there is also a ‘transnumeral’ (i.e., general number) pronoun, consisting in a pointing sign produced with the index-finger that can be used to refer to one or more than one entity. Additionally, in IPSL pronouns do not change the handshape in order to convey that the group referred to has three or four members (no trials or quadrals).

In contrast to the case of IPSL, where no separate forms to refer specifically to three entities have been reported (and, as a result, no trial pronouns), discrepancies about the number values encoded in sign languages are generally motivated by the analysis, rather than by the actual forms attested on the language under examination. In fact, depending on the analysis, the same language has been described as either having or lacking certain number values. Let us take the case of

ASL restricted group marking as an illustration.

5.3.1 ASL restricted groups

According to Baker-Shenk & Cokely (1980), ASL distinguishes seven different number values, four of which coincide with the ones commonly described for other sign languages (singular, dual and two plurals). Moreover, trial, quadral and quintal forms are given an identical status as number values in the pronominal domain. These forms consist, respectively, in a '3', '4' and '5' handshape which incorporates a circular movement (with the palm facing up). While the use of these forms is not described in detail, for quintal forms, Baker-Shenk & Cokely (1980: 214) claim that "[s]ome signers will also use the '1' handshape index when talking about five people since not all Signers are comfortable using the '5' handshape for pronominal reference". Note that under this analysis, ASL would constitute a typological rarity, as the largest systems (as attested in spoken languages) distinguish at most five number values.⁴

By contrast, McBurney (2002) argues that exact number forms other than the dual are not instances of grammatical number, but rather of numeral incorporation. As a result, she considers such forms as "existing outside the core of the pronominal system" (McBurney 2002: 354). The arguments given for excluding trial, quadral and quintal forms as possible number values in ASL are the following. First, the dual uses a handshape different from the one used in the cardinal numeral 'two', while the trial, the quadral and the quintal use, respectively, the same handshape as the numerals 'three', 'four' and 'five'. Secondly, dual marking is obligatory in most contexts in ASL, while the trial, the quadral and the quintal might be substituted by plural forms. An additional difference between dual and numeral incorporated forms is that the former use a back-and-forth

⁴Sursurunga, for example, encodes a five-way opposition in the number system. According to Hutchisson (1986) these values are: singular, dual, trial, quadral and plural. Under Corbett's (2000) analysis, the trial should be best considered a paucal and the quadral a greater paucal. Whatever the analysis is, Sursurunga is one of the few systems in which five number values are distinguished.

movement, while the latter are generally performed with a small circular motion.

While McBurnery's analysis has been adopted by many scholars for a number of sign languages, Cormier (2002) puts forward a slightly different proposal. Against McBurney, she claims that the forms in question are part of the pronominal system while, at the same time, she agrees with McBurney that they are not grammatically marked for trial, quadral and quintal. Cormier's claim is that the forms are plurals that come with a specification of cardinality (they are 'cardinal plurals'), as opposed to lexical plurals such as *WE* or *OUR*. Additionally, Cormier shows that the dual is not always obligatory in ASL, given that reference to two entities can also be made by using a plural pronoun. The rationale behind the dual vs. other cardinal numbers distinction is that, according to Cormier, dual pronouns have an idiosyncratic handshape.

5.3.2 Plural morphology

An additional difference that deserves further discussion has to do with the distinctions drawn in plural forms.

Most scholars differentiate between two morphological strategies to convey plurality in both pronouns and verbs: reduplication and modification of the path movement of the sign (e.g., by adding an arc movement). The resulting forms are described as follows: forms that convey plurality by repeating the sign are usually associated with a distributive or exhaustive semantics; forms that encode plurality by incorporating a circular/arc-shaped movement are described as either collective or multiple plurals.

Nouns, on the other hand, have been claimed to express plurality by using three strategies: simple (or 'in situ') reduplication, sideways reduplication and zero marking (Pfau & Steinbach 2005, 2006, 2021).

5.3.2.1 Reduplication

Reduplication is a pervasive morphological process in sign languages, given that most linguistic elements (numerals, verbs, classifiers, nouns,

pronouns, etc.) can be reduplicated. However, reduplication is not a distinctive morphological strategy of sign languages, as the same mechanism is attested in many spoken languages. For example, according to Rubino's (2013) survey, 313 out of the 368 spoken languages considered in his sample use reduplication. Although most Western European languages are considered not to have productive reduplication (e.g., English in Rubino's survey), they do use repetition, for instance, for emphasis or intensification. Take the following example:

- (14) *English*
This house is really, really big.

According to Moravcsik (1978: 312), the hallmark of reduplication is repetition ("for a construction to be reduplicative one, it has to include at least two instances of the same form"). As the author further points out, the expressions 'reiteration' or 'repetitive construction' would be more appropriate, considering that reduplication is not limited to forms that are copied only twice. The same can be said for sign languages. In fact, it is often noted that this process would be better described as 'triplication', given that the base is generally repeated three times (cf. Pfau & Steinbach 2005 for DGS).

Although I am using the terms 'reduplication' and 'repetition' interchangeably, most studies on reduplication in sign languages highlight that they are to be treated as two different phenomena. Wilbur, for instance, makes the following distinction: repetition is "generally composed of a single repetition of a lexical movement with a (non-meaningful) return/transition movement in between" (Wilbur 2005: 596), whereas reduplication concerns "occurrences that serve derivational or inflectional morphological purposes" (Wilbur 2009: 331).

As for the material that is reduplicated, some languages use full repetition (reduplication of an entire word or root), as in (15), while others additionally employ partial repetition (e.g., via vowel lengthening, consonant gemination, etc.), as in (16) and (17).

- (15) *Indonesian* (full reduplication)
anak 'friend'

anak-anak ‘children’

(Dalrymple & Mofu 2012)

- (16) *Panganisan* (partial reduplication)
 amigo ‘friend’
 amimigo ‘friends’

(Rubino 2001: 540)

- (17) *Alabama* (partial reduplication)
 loca ‘to be black’ (covered in soot)
 lóoca ‘to be a black person’

(Hardy & Montler 1988)

In sign languages, reduplication does also come in various shapes. While different types of reduplication have been described at length for nouns and verbs, most studies on sign language pronominal number fail to specify what exactly the reduplicated pronoun is like.⁵ In what follows, I will present the case of reduplicated nouns, as it is one of the domains in which more detailed descriptions can be found.⁶

With nouns, reduplication is usually analyzed in terms of whether the sign is repeated sequentially or simultaneously —if the two hands simultaneously repeat a sign which is normally one-handed (Kimmelman 2018)—. Both sequential and simultaneous reduplication can be further subdivided in simple/in situ and sideways reduplication. In situ reduplication is produced by repeating the sign in the same location (without displacement). Sideways reduplication involves repetition by displacing the sign from the contralateral to the ipsilateral side of the signing space. That is, the sign is repeated while the hand moves sideways. The repeated material is reduced and articulated faster (with shorter movements).

⁵Cormier (2002) is an exception, as she explicitly distinguishes different types of repetition in the pronominal domain.

⁶For studies of verbal reduplication and its functions see Fischer (1973); Klima & Bellugi (1979); Bergman & Dahl (1994); Wilbur (2008, 2009); Kuhn & Aristodemo (2017); Quer (2019); a.o.

For DGS it has been argued that whether a noun can be pluralized or not by means of reduplication and the type of reduplication strategy used crucially depends on the phonological properties of the base noun (Pfau & Steinbach 2005, 2006, 2021; Steinbach 2012). Four noun types are distinguished: i) body-anchored nouns (B-nouns), which are specified for a place of articulation on or related to the signer's body; ii) midsagittal nouns (M-nouns), produced in front of the signer's body; iii) lateral nouns (L-nouns), articulated laterally; and iv) nouns with complex movement (C-nouns), which involve repeated, circular and/or alternating movements.

According to Pfau & Steinbach, in DGS reduplication is possible with non-body anchored midsagittal nouns, which are pluralized via in situ reduplication, and lateral nouns, which use sideways reduplication instead. By contrast, body-anchored nouns and nouns with an inherent complex movement cannot be reduplicated in DGS. The plural form of these nouns is argued to be realized by zero marking instead. Importantly, Pfau & Steinbach (2006) further show that while the constraints observed for DGS are similar across sign languages, they are not to be taken as universal. For instance, there are languages for which sideways reduplication with midsagittal nouns is possible, as well as those that allow body-anchored nouns to be pluralized by means of reduplication. In Sign Language of the Netherlands (NGT), for instance, van Boven et al. (2021) show that body-anchored nouns and nouns with a complex movement can be pluralized, contrary to the case of DGS. Besides, they considered an additional pluralization strategy, simultaneous sideways reduplication, which is possible for lateral nouns only. The NGT and DGS results are summarized in Table 5.1.⁷

A further distinction drawn in some studies is between unpunctuated and punctuated repetitions (Coppola et al. 2013; Horton et al. 2015; Schlenker & Lamberton 2019, to appear). Unpunctuated repetitions are iterations “produced in rapid succession with no clear break between them” (Coppola et al. 2013). Punctuated repetitions, on the other

⁷For nominal pluralization patterns in other sign languages, see Pfau & Steinbach (2005, 2006) and references therein.

	DGS				NGT			
	B	M	L	C	B	M	L	C
Zero marking	✓	*	*	✓	✓	✓	✓	✓
In situ reduplication	*	✓	*	*	✓	✓	*	✓
Sidewards reduplication	*	*	✓	*	*	✓	✓	*
Simultaneous sidewards reduplic.	-	-	-	-	*	*	✓	*

Table 5.1: Pluralization strategies in DGS and NGT

hand “are made of discrete, clearly separable iterations of the same nominal sign in different parts of signing space” (Schlenker & Lamberton to appear). In Horton’s et al. (2015) study, punctuated repetitions are understood as those in which “the full path of the movement was repeated for each iteration, and the hand returned to approximately the same initial position for each path.” In contrast, in unpunctuated repetitions “the full path of the first iterated movement was not fully repeated in subsequent iterations but was significantly abbreviated, without the hand returning to the initial starting position each time”.

5.3.2.2 Modification of path movement

An additional way in which sign languages convey plurality is by modifying the path movement of the sign. In the verbal domain this is usually referred to as ‘plural sweep’ (Johnston 2006) or ‘sweep arc displacement’ (Padden 1983).

With pronouns, however, the array of path shapes goes beyond the mere arc movement. As Cormier (2002) points out, number on pronouns cannot be equated with a specific movement pattern. In her view, positing an arching movement as an obligatory marker of plural is problematic if one considers duals, numeral incorporated plurals and reduplicated plurals. Indeed, in ASL the dual has a repeated back and forth movement, whereas numeral incorporated plurals are produced with a small repeated circular movement. For reduplicated plurals, Cormier considers the different arcing movements as transition

movements between each individual pointing.

Similarly, sign language studies on the so-called multiple or collective plural pronouns reflect the availability of several path shapes to convey plurality (such as circular, arc-shaped, straight or sweeping), both within and across languages. Yet, the terminology is not always clearly defined, nor it is used homogeneously. As a consequence, different labels are used to refer to the same type of movement and the same label is applied to seemingly different path shapes. In the Turkish Sign Language (TİD) description presented in Saral & Kelepir (2020), for instance, circular movements are claimed to be used with first and third person plurals. The arc movement, in turn, is restricted to express plurality in second person pronouns. For LIS, Mantovan (2020) describes straight and circular movements as two ways to encode collective plurality in second and third person pronouns, while first person pronouns are claimed to typically take a circular movement. While these descriptions seem to suggest that each language use a different movement besides the circular path shape (arc in TİD and straight in LIS), on closer examination of the examples presented in both grammars, this initial intuition proves to be wrong. As a matter of fact, the terms ‘arc’ and ‘straight’ are used to denote the same movement, which corresponds to the one represented in Figure 5.1.

Hence, in order to avoid confusion, a representation of the path movement types referred to in this dissertation is presented in Figures 5.1, 5.2, 5.3 and 5.4. As shown in Figure 5.2, I am taking arc movements on a par with circular movements, as they differ only in whether the circular shape is fully completed or not.



Figure 5.1: Straight horizontal

Figure 5.2: Arc/circular



Figure 5.3: Straight midsagittal

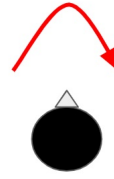


Figure 5.4: Triangular

Notice that reduplication and modification of the path movement of the sign should not be considered as two mutually exclusive operations. As mentioned in the previous section, the so-called ‘sideways reduplication’ strategy is produced with a lateral displacement of the sign and, as such, with a modification of the path movement (see Figure 5.5).

For personal pronouns, reduplication is necessarily produced with a modification of the path movement of the sign (in LSC pronouns at least, in situ reduplication cannot be used to convey plurality). While reduplication requires a modification of the path shape, the reverse is not true, given that pronouns can be produced with a sideward movement but no reduplication (see Figure 5.6).

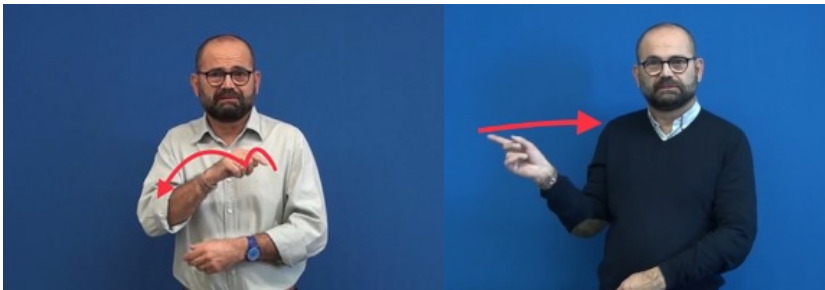


Figure 5.5: IX₃-rep3
(path movement
+reduplication)

Figure 5.6: IX₃-straight
(path movement, no
reduplication)

This is also true of some LSC nouns. Although neither Pfau &

Steinbach (2005, 2006) nor van Boven et al. (2021) found path movement changes as an available strategy to convey nominal plurality in DGS and NGT, it is worth noting that in LSC some nouns may express the plural meaning by changing the path shape of the sign only (see Figure 5.7). In such cases, nouns are produced with sideways movement but with no reduplication (Engberg-Pedersen 1993). This is a topic to what I turn in the next chapter.

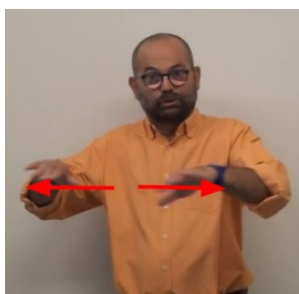


Figure 5.7: CHILDREN

5.3.3 Summary

The different morphological mechanisms used to express number in sign language nominals are presented in Table 5.2. Note that the list does not include simultaneous reduplication, since I will not investigate the sequential/simultaneous distinction in this study. For the sake of clarity, the chart includes the glosses used in this dissertation and a signed example of each type of operation using the LSC sign *TEXT*, which allows for all types of inflection.

For ease of comparison, the list also includes forms not overtly modified to express number. In LSC, as in other sign languages, these forms can be used to encode that the sign refers to one or multiple entities. Yet, strictly speaking, they do not undergo any morphological process; they are simply uninflected—or ‘zero-marked’ in Pfau & Steinbach’s (2005, 2006) terminology—.







	Glosses	Video
Uninflected forms	TEXT	
Redupl. In situ	TEXT++	
Sidewards Unpunctuated	TEXT-rep3 ⁸	
	Punctuated	
	TEXT-TEXT	
	TEXT-TEXT-TEXT	
Movement without reduplication	TEXT _{-straight/circ...}	

Table 5.2: Nominal number inflection

⁸Sidewards unpunctuated repetition is usually transcribed as SIGN + > + > + > for three repetitions and SIGN + > + > for two. For ease of comparison between forms iterated twice vs. three times, I will follow Schlenker & Lamberton (2019) in indicating the amount of repetitions by using numbers. Note that the base is included in the number given after ‘rep’. For instance, the gloss TEXT-rep3 indicates that, after the base, there are two reduplicants. Thus, the sign TEXT is produced a total of three times.

CHAPTER 6

Number in LSC nouns and pronouns

The goal of this chapter is to describe the association of number morphemes and meanings in LSC pronouns and nouns (count nouns only) (Research Question 3). Recall, though, that number can be expressed even if a language has no category of number, for instance, by using conjunction, numerals or quantifiers (cf. Corbett 2000; Cysouw 2001; Siewierska 2004 and Chapter 5). In this chapter, I will be focusing on the expression of morphological number only, rather than describing the full set of strategies that LSC employs to convey whether an expression applies to one or more than one entities.

The hallmark of singular morphology is that, on top of the inherent movement of the sign, no further additional movements are incorporated. In her discussion on number marking on ASL verbs, Padden (1990: 121) states that “[t]he form of singular or unmarked number agreement is a single point in neutral space; plural agreement involves displacement, that is, movement away from a single point”. What this essentially means is that singular forms do not carry additional number morphology. As in Padden’s description, these forms are usually referred to as ‘unmarked’. However, to avoid confusion with semantically unmarked interpretations (cf. Section 1.1), I will refer to these forms as either singulars or simply uninflected.

Besides using uninflected forms, sign language nouns can overtly express numerosity by reduplicating the sign (see Section 5.3.2). Since

reduplication can combine with modification of the path shape of the sign in the form of sideways reduplication, it has been proposed that sign language nouns use three operations to realize the plural morpheme on nouns (see Pfau & Steinbach 2005, 2006 for DGS). Note that ‘zero-marking’ is considered one such pluralization strategy. Since uninflected forms will be addressed in more detail in the next chapter, I leave open for now the question of whether LSC uses ‘zero-marking’ as a pluralization strategy.

On top of these three operations, LSC can also express the plural morpheme through path movement changes only, which translates in adding an additional strategy to the list (Table 6.1). This holds true not only for pronouns but, crucially, for nouns as well. This contrasts with what observed in other sign languages, such as DGS (Pfau & Steinbach 2005, 2006) and NGT (van Boven et al. 2021), in which the use of path movement with nouns appears to be unattested.

	DGS/NGT ¹	LSC	
	nouns	nouns	pronouns
Zero marking	✓	?	?
In situ reduplication	✓	✓	*
Reduplication + path movement	✓	✓	✓
Path movement	*	✓	✓

Table 6.1: Nominal pluralization strategies

As pointed out in Chapter 5, changes in the path movement of pronouns cannot be reduced to one specific pattern. Since I am treating on a par modifications of the path movement of both nouns and pronouns, which crucially involve path shapes other than lateral displacement, I refer to ‘sideways reduplication’ as either ‘reduplication

¹For NGT, van Boven et al. (2021) consider an additional strategy to express the plural morpheme, simultaneous sideways reduplication. I will not address this operation here.

+ path movement' or 'reduplication with displacement/movement' and to 'sideways movement' as 'path movement'.

In LSC, the morphological operations in Table 6.1 are not evenly distributed in the two domains. For nouns, the combination of path movement and reduplication is a very productive process. Far less commonly, only one operation is used: either reduplication or modification of the path movement of the sign. For pronouns, the reverse is true. That is, while the combination of path movement and reduplication is possible, pronouns are generally inflected by modifying their path shape only. In situ reduplication (i.e., repetition of a pronoun without displacement), by contrast, does not get a 'more than 1' interpretation in LSC. Therefore, a question this chapter intends to answer is what the basis for this split is. That is, why do nouns prefer to combine reduplication and path movement whereas pronouns opt to encode plurality by modifying the path movement only?

To answer this question, in Section 6.1 I will first compare the use and interpretation of the two strategies (reduplication + modification of the path movement of the sign) in LSC nouns and pronouns. Section 6.2 turns to the use of one strategy only, either reduplication or modification of the path movement of the sign. Since modification of the path movement is the preferred operation to express plurality in pronouns, but it is far less common in nouns, I will look at both the interpretation of the forms and at whether there are phonological constraints that inhibit the realization of the plural morpheme in LSC nouns. Section 6.3 contrasts the results and concludes the chapter.

6.1 Reduplication + path movement

As in other sign languages, reduplication in LSC is a pervasive phenomenon, given that most linguistic elements can undergo the reduplication process. Although both pronouns and nouns can be modified by reduplication + path movement, pronouns that combine the two strategies were barely attested in the corpora data used for this study. Moreover, when a pointing sign appears reduplicated with

displacement, it is usually used as a locative, not as a personal pronoun.² Therefore, for the description below I rely mostly on elicited productions and grammaticality/felicity judgments (cf. Section 1.3).

To compare the use of reduplication with displacement in pronouns and nouns, I will follow a different path from the one undertaken in the NGT and DGS studies mentioned in Chapter 5 (Pfau & Steinbach 2005, 2006; van Boven et al. 2021). That is, instead of asking what are the phonological properties of the base noun that can impact the realization of the plural morpheme, I will mainly look at the possible interpretations of the pluralized signs. There are several reasons for doing this. To start with, it seems clear that scarcity of pronominal signs taking the two features is not due to phonological blocking effects, given that the forms, even if less common, are indeed attested in LSC. On the other hand, no previous study has addressed the question of what the number distinctions encoded in LSC are, so it is still not clear what specific semantic contribution (if any) each strategy might come with.

To my knowledge, Schlenker & Lamberton's (2019, to appear) studies on nominal plurality in ASL are the only ones that provide a detailed account of the impact that different reduplication strategies have on the semantics of the pluralized noun. They specifically take into account the number of times the noun is iterated, different types of reduplication (punctuated vs. unpunctuated) and path movements other than the horizontal one. In the description below, I consider two aspects discussed in their work that were found to be relevant in the interpretation of reduplication + path movement in LSC. I start by addressing the question of whether punctuated and unpunctuated forms are to be treated in a unified way in LSC. I do so by taking into consideration if they can freely combine with numerals and what their interpretation is when they appear modified as opposed to when they appear bare. Additionally, I consider whether different path movement modulations come with iconic inferences that affect the interpretation of the pluralized nouns

²Indeed, Barberà (2015) already observed that locatives in LSC express plurality by reduplicating the pointing sign in the upper part of the space, rather than by modifying the path shape of the sign only.

and pronouns.

Besides, I discuss several properties of reduplicated pronouns in LSC that challenge an account of the forms as simply distributive, as described in most sign language studies. Specifically, they have an approximative semantics (i.e., they have an upper bound cutoff), they are non-exhaustive and they are always used in specific contexts.

6.1.1 Reduplication types: plural morphology vs. coordination

In prior literature, reduplicated forms have been considered as instances of coordination. Rathmann & Mathur (2005), for instance, consider repeated forms as conjoined elements, although they do not explicitly state the way in which the form is repeated (e.g., in a punctuated vs. unpunctuated fashion).

Regarding verbal reduplication, some researchers have argued that, in ASL at least, a difference needs to be made between different reduplication types. Padden (1983), for instance, differentiates between the exhaustive inflection (i.e., repeated) on verbs from what she describes as ‘seriated verb constructions’. In her analysis, inflected forms involve repetition of the verb stem, while seriated sequences consist in repetition of the entire verb. Hence, the former is made up of one predicate only, while the latter consists in a string of more than one verb. Crucially, while exhaustive forms are produced by repeating the stem three times, they may be used to express any number greater than two. Therefore, the number of iterations of the verb needs not correspond to the number of objects.

In the pronominal domain, Cormier (2002) makes a similar split between pronominal plural forms that consist in a ‘concatenation of pointing signs’ from plural reduplicated pronouns (i.e., ‘composite forms’ in Cormier’s terminology). Regarding their production, Cormier (2002: 49) describes reduplicated plural pronouns as those “produced in quick succession, with dampened movement (i.e., each path movement is shorter than the one before it)”. That is, composite forms would be articulated with unpunctuated movements. As for their reference, the

same distinctions drawn in Padden’s study are at play. In particular, the number of iterations of reduplicated pronouns does not need to correspond to the number of referents. This, in turn, is taken to show that the meaning these forms express is plural, not cardinal plural (i.e., plurals that come with a specification of cardinality).

By contrast, in their study on iconicity on ASL plural nouns, which crucially includes different reduplication types, Schlenker & Lamberton (2019) give arguments against considering punctuated repetitions as coordinated elements. In particular, they do not treat discrete nominal iterations as coordinated indefinites because such a view would predict a restriction in the numerals that can co-occur with the nominal, depending on the number of times the sign is iterated. For instance, if a sign is repeated three times it should not combine with numerals higher than three. However, this is not what their data revealed. Take the following sentence:

- (1) *ASL*
 MUSEUM HAVE 10 TROPHY TROPHY TROPHY.
 ‘The museum has 10 trophies spread out.’
 (Schlenker & Lamberton 2019: 87)

In (1), against what would be expected if the three iterations of *TROPHY* were to be considered three conjoined nouns, the combination of the sign with the numeral *TEN* is judged acceptable. Therefore, the cardinality of the numeral and that of the iterations of the noun does not need to coincide. Moreover, as Schlenker & Lamberton (2019: 86) point out, if punctuated iterations are to be considered conjunctions of singular indefinites, “we wouldn’t expect any numeral to co-occur with it”.

In order to check whether in LSC different types of repetition (punctuated vs. unpunctuated) impose the same constraints on the numerals that can co-occur with them, I tested similar examples as the ones provided in Schlenker & Lamberton’s study.

As for the way the nominal is reduplicated, punctuated repetitions are produced by successively repeating the full motion of the sign in each iteration, as in (2). Unlike Horton et al. (2015), for punctuated





repetitions to be considered as such, whether the hand returns to the initial starting point each time is not considered a requirement in this study. Moreover, whenever the sign is accompanied by a mouthing, the very same mouthing is also repeated in each punctuated iteration of the noun.

In unpunctuated repetitions, by contrast, the path movement of the first iteration is significantly shorter in each subsequent iteration (cf. Horton et al. 2015). Hence, the repeated material is produced with no clear intervening break between each iteration (Coppola et al. 2013). Besides, if the noun contains a mouthing, this is not iterated, see (3).





- (2) CAT-CAT 
- (3) CAT-rep2 

6.1.1.1 Punctuated repetitions

Unlike Schlenker & Lamberton's results for ASL, punctuated repetitions in LSC do indeed impose a restriction in the numerals than can appear with the iterated noun. In particular, if the noun is repeated twice, it can only combine with the numeral TWO. This is why examples (4) and (6) are judged incoherent by my consultants, while (5) and (7) are not.


- (4) *TODAY MEETING, PERSON-PERSON 5. 
Intended: 'At today's meeting, there were five people.'
- (5) TODAY MEETING, PERSON-PERSON 2. 
'At today's meeting, there were two people.'
- (6) *IX₁ IDEA-IDEA 3. 
Intended: 'I have three ideas.'
- (7) IX₁ IDEA-IDEA 2. 
'I have two ideas.'

Similarly, whenever the noun is repeated three times, it can only co-occur with the numeral THREE. This is illustrated in the examples below:

- (8) *TODAY MEETING PERSON-PERSON-PERSON 5. 
Intended: ‘At today’s meeting, there were five people.’
- (9) TODAY MEETING PERSON-PERSON-PERSON 3. 
‘At today’s meeting, there were three people.’
- (10) *IX₁ IDEA-IDEA-IDEA 2. 
Intended: ‘I have two ideas.’
- (11) IX₁ IDEA-IDEA-IDEA 3. 
‘I have three ideas.’

Therefore, the number of punctuated iterations impose an exact reading of the noun, that is, ‘three X’ for nouns iterated three times; ‘two X’ for nouns repeated twice (or, to be more precise, ‘x (and) y (and) z’ for nouns iterated three times; ‘x (and) y’ for nouns repeated twice). Crucially, sentences (5), (7), (9) and (11), while not ungrammatical, are judged to be unnatural when they incorporate a numeral, just as we would expect if repeated nouns were understood as coordinated elements.



A potential explanation for the different judgments in this study with respect to Schlenker & Lamberton’s may be due to the different ordering of the numeral-noun construction. In ASL, the numeral generally precedes the noun, whereas in LSC the numeral tends to follow the noun it modifies. From our results, it seems that LSC signers pay careful attention to the number of punctuated repetitions, particularly if they are produced at a slow speed. If there is a clash between the number of repetitions and the numeral, the sentence is judged contradictory and, therefore, not accepted. As mentioned earlier, what characterizes punctuated repetitions is that the repetitions are clearly separated from each other, making it easier to track the exact quantity of iterations. In fact, for a sentence such as the one presented in (12), a usual comment goes along the following lines “you missed four/I only counted three, where are the other four?”.

- (12) *MUSEUM SCULPTURE-SCULPTURE-SCULPTURE 7. 
Intended: ‘the museum has seven sculptures.’


Alternatively, it might be that differences in judgments follow from slight differences in the way the signs were iterated in the two languages. Hence, it may be that what I am comparing is in fact not fully equivalent. A further possibility is that LSC and ASL crucially differ in this aspect, just as they do in other aspects of their grammars.

6.1.1.2 Unpunctuated repetitions

Contrary to what has been described for punctuated iterations, whenever the sign is repeated in an unpunctuated fashion, there is no restriction in the numerals that can combine with it, irrespective of whether the sign is repeated twice or three times. In this, LSC seems to differ from other sign languages, in which triplication has been found to be the most common option when a noun is reduplicated. Indeed, when combined with numerals, the two alternatives (i.e., duplication and triplication) are equally observed in elicited and corpus data and they are both considered acceptable in judgment tasks. Crucially, the number of times the noun is iterated does not enforce a different interpretation (i.e., ‘at least two’ for duplication; ‘at least three’ for triplication). This is why a noun repeated three times can combine with the numeral TWO, just as a noun repeated twice can co-occur with the numeral THREE.

- (13) a. TODAY MEETING, PERSON-rep3 2. 
 b. TODAY MEETING, PERSON-rep2 3. 
 ‘At today’s meeting, there were two/three people.’

In fact, the number of iterations may even vary in the same sentence. In (14), for instance, the pronoun IX₃ is repeated three times, matching the number of discourse referents and the numeral previously introduced, but RELATIONSHIP contains only two iterations. Importantly, this apparent mismatch has no effect on interpretation.

- (14) IX₁ UNTIL_NOW WORK BOSS ALREADY THREE, TEN^YEARS^AGO-a
 FIVE^YEARS^AGO-b NOW-c. IX₃-rep3-a-b-c RELATIONSHIP-rep2-a-b
 GOOD. 
 ‘Up to now, I have worked with three different employers: one

ten years ago, (another) five years ago, and now (my current employer). I have had a very good relationship with (the three of) them.’

(reproduced from Veiga Busto 2020a)


The claim that the exact number of iterations does not restrict the interpretation of the noun is compatible with previous analyses of reduplication in other sign languages. Pfau & Steinbach (2006), for instance, claim that while in DGS pluralized nouns are typically repeated three times, there is no functional distinction between duplication and triplication. However, in LSC this seems to hold true only for reduplicated nouns that co-occur with numerals. By contrast, when unpunctuated nouns do not combine with numerals, the number of iterations might constrain the lower bound interpretation of the reduplicated noun. In particular, nouns reduplicated twice are read as ‘two or more’ (≥ 2), whereas nouns reduplicated three times are preferably interpreted as referring to a minimum of three entities (≥ 3). Yet, judgments are not entirely uniform, given that for some nouns, triplication might still be read just like duplication (≥ 2). In this respect, the judgments obtained partially match the ASL results presented in Schlenker & Lamberton (2019), who claim that the number and the speed of iterations provides information about the size of the denoted plurality. Hence, duplication gets an ‘at least two or three’ interpretation, triplication an ‘at least three or four’, quadruplication and ‘at least four or five’ and so on.

On top of the number of iterations, non-manual markers in LSC may also play a role in expressing numerosity.³ Moreover, the addressee’s expectations and the world knowledge may also have an effect in assigning an approximate cardinality to the number of repetitions of the iterated noun.⁴ Take the following example:


³The interaction of non-manual modulations and the number of nominal repetitions has not been thoroughly investigated in this study, so I refrain from drawing any conclusions at this point on the matter.

⁴LSC is not different from other languages in this respect, as we would expect similar results in other spoken and sign languages. In fact, the importance of the addressee’s

(15) Context: The speaker knows that the addressee enjoys sculpture and that the Museum of Contemporary Art of Barcelona is featuring a temporary exhibition which includes a selection of contemporary sculpture.

a. MUSEUM SCULPTURE-rep3 NEW THERE_IS. 

‘The museum has new sculptures.’

b. MUSEUM SCULPTURE-rep3 NEW THERE_IS 2. 

‘The museum has two new sculptures.’

According to my consultants’ intuitions, it would be rather uncommon for a temporary exhibition to bring only three or four new sculptures. Hence, (15a), in which SCULPTURE is iterated three times, while compatible with a ‘three or four’ interpretation, is preferably read as referring to a higher number of entities. However, the same noun reduplicated three times can still felicitously combine with the numeral two (15b).

6.1.1.3 Iconic contribution of the path movement

Studies on pluralization in sign languages have noted that the locations where the sign is performed may be semantically meaningful. That is, besides expressing numerosity, the repetition of the sign in different areas of the signing space may also convey information about the spatial distribution of the entities themselves. Zwitterlood & Nijhof (1999), for instance, found that in NGT this additional function is generally undertaken by classifiers and pointing signs.


The iconic contribution of reduplicated nouns is precisely at the core of Schlenker & Lamberton’s investigation. According to the authors, “unpunctuated repetitions with movement may come with a rich iconic component whereby the geometric arrangement of the repeated occurrences provides information about the arrangement of the denoted

expectations and contextual knowledge in the interpretation of reduplicated nouns is also raised in Schlenker & Lamberton’s (2019) study on ASL.


plurality” (Schlenker & Lamberton 2019: 46). This is shown in the following example:

- (16) *ASL*
 MUSEUM HAVE 7 BOOK- $\text{rep}_3^{\text{horizontal}}$.
 ‘The museum has 7 books arranged in a row.’
 (Schlenker & Lamberton 2019: 61)




Unlike the ASL sentence in (16), unpunctuated repetitions in LSC, whenever performed with the straight-line movement typical of sideways reduplicated forms (which Schlenker & Lamberton transcribe as ‘horizontal’), do not provide any information regarding the arrangement of the denoted plurality. The interpretation of sentence (17), for instance, is that there are seven sculptures in the museum, but the horizontal movement does not yield a reading on which they are arranged in a row (i.e., no inference is drawn about their spatial distribution).

- (17) MUSEUM SCULPTURE- $\text{rep}_3^{\text{straight}}$ 7. 
 ‘The museum has seven sculptures.’

Of course, this is not saying that there is no way of conveying that the denoted entities are spatially distributed in such a way that they are forming a horizontal line. Yet, for that interpretation to be accessible, reduplicating the nominal in the horizontal plane does not suffice and further information is required. This is shown in sentence (18), in which this additional meaning is contributed by a reduplicated classifier.



- (18) MUSEUM SCULPTURE- $\text{rep}_2^{\text{straight}}$ CL: ‘statue’- rep_3 7. 
 ‘The museum has seven sculptures arranged in a row.’

On the other hand, if the usual straight horizontal line trajectory is modified (e.g., by drawing a circular shape), the resulting form is no longer interpreted neutrally as to the spatial distribution of the denoted entities. Compare (19a), where no information about the arrangement of the plants is conveyed, with (19b,c).

- (19) a. IX₁ HOUSE PLANT-*rep3*_{-straight} THERE_IS. 
 ‘In my house, I have (two or more) plants.’
- b. IX₁ HOUSE PLANT-*rep3*_{-circ} THERE_IS. 
 ‘In my house, I have (three or more) plants all around (possibly in different rooms or in a patio).’
- c. IX₁ HOUSE PLANT-*rep3*_{-midsag} THERE_IS. 
 ‘In my house, I have (two/three or more⁵) plants arranged in a row.’

Crucially, the degree of certainty of the consultants’ judgments regarding the physical distribution of the objects is influenced by the different movement types incorporated by the noun. Triangular and circular shapes, for instance, are regularly interpreted more vaguely, as either ‘all around’, ‘maybe forming a triangle/a circle’ or simply ‘certainly not in a line’. By contrast, signs produced with a midsagittal line movement (i.e., those in which the end point is displaced outwards with respect to the signer) invariably yield the meaning ‘in a row’.

Another relevant observation about the possible readings of the reduplicated nouns in (19) is that straight-line movements on the horizontal and on the midsagittal plane may be compatible with any number of entities equal or greater than two, as in (19a) above, or three, as in (19c) and (20a,c) below. By contrast, circular and triangular movements require a minimum of three entities for them to be acceptable (see (19b) and (20b)). Note that I considered only triplicated nouns, given that for circular and triangular-shaped repetitions to be produced, the noun must be iterated a minimum of three times.

- (20) Context: I received a postcard today.
- a. DESIGN HOUSE-*rep3*_{-straight}. 
 ‘It had (two/three or more) houses.’
- b. DESIGN HOUSE-*rep3*_{-triangle}. 

⁵One consultant prefers the ‘two or more’ interpretation, the other gets the ‘three or more’ reading more naturally.

‘It had (three or more) houses all around/forming a triangle.’

c. DESIGN HOUSE-rep3_{-midsag}.



‘It had (two/three or more) houses in a row.’

6.1.2 Reduplicated pronouns

As with nouns, reduplicated pronouns produced in a punctuated fashion involve successive repetitions of the full motion of the pronoun, as in (21). By contrast, unpunctuated repetitions are produced with no clear breaks between each iteration, as in (22).

(21) IX₂-IX₂-IX₂



(22) IX₂-rep4



6.1.2.1 Punctuated repetitions

Before going into the actual interpretation of different reduplication types in LSC pronouns, a note must be made with respect to pronominal forms involving successive index pointing signs directed to different discourse participants. Given that reduplication requires repetition (Moravcsik 1978: 312) and in light of the results presented in Chapter 3, I do not consider these forms as instances of reduplication. This is because they do not involve *bona fide* sign repetition. If we assume the person analysis presented in Part I of this thesis to hold, then pronouns denoting different discourse roles and, hence, involving considerable articulatory changes, do not qualify as repeated material. In the case of unpunctuated repetitions, this is further confirmed by the fact that the order in which the different pointing signs appear seems not to be relevant, as shown in (23a,b). Similar examples involving variations in the order of the pronouns were spontaneously produced during discussions in the elicitation sessions.



(23) a. IX₂-IX₁-IX₃



b. IX₃-IX₁-IX₂



Additionally, pronouns referring to non-participants can be substituted by another constituent, such as a proper name (a name sign). In that case, changes in the order in which the referents appear is again deemed irrelevant.

- (24) a. ALEXANDRA GEMMA IX₁ 
 b. ALEXANDRA IX₁ GEMMA 

Therefore, if we take reduplication to be restricted to iterations of the same sign, then it should only appear if the same person value is copied. Considering that first person pronouns cannot encode reference to more than one speaker at the same time, this leaves us with the reduplication strategy reduced to second and third person in LSC. If we now apply a similar test to punctuated pronominal repetitions, we find that, as with nouns, the number of repetitions constrains the interpretation of the pronoun. This is shown in (25):

- (25) Context: I work as a teacher. During class, I am explaining the next activity to my students, which consists of several parts.
- a. * IX₂-IX₂-IX₂ RESPONSIBLE FIRST PART. FINISH, THE_TWO/
 THE_FOUR a-GIVE-b SECOND GROUP.
 ‘You, you (and) you are in charge of the first part. Once you (two/four) finish it, you give it to the second group.’
- b. IX₂-IX₂-IX₂ RESPONSIBLE FIRST PART. FINISH, THE_THREE
 a-GIVE-b SECOND GROUP.
 ‘You, you (and) you are in charge in charge of the first part. Once you (three) finish it, you give it to the second group.’
- c. * IX₂-IX₂ RESPONSIBLE FIRST PART. FINISH, THE_THREE/
 THE_FOUR a-GIVE-b SECOND GROUP.⁶
 ‘You (and) you are in charge in charge of the first part. Once you (three/four) finish it, you give it to the second group.’
- d. IX₂-IX₂ RESPONSIBLE FIRST PART. FINISH, THE_TWO a-GIVE-b

⁶This sentence might become acceptable in certain circumstances (e.g., if the students are grouped in twos). See Section 7.4 for further examples and discussion on the topic.

SECOND GROUP.

‘You (and) you are in charge in charge of the first part. Once you (two) finish it, you give it to the second group.’

In light of these data and given the results on reduplicated nouns, I consider punctuated repetitions of pronouns (i.e., when each pronoun is clearly separable from each other), as coordinated elements. This idea is consistent with the results presented above as well as with the distinction drawn in Cormier’s (2002) study, according to which a concatenation of pointing signs is to be differentiated from what she calls ‘composite’ plural forms; that is, unpunctuated repetitions of pronouns.

6.1.2.2 Unpunctuated repetitions

Unpunctuated repetitions of pronouns, on the other hand, got less stable judgments than the punctuated ones. For one consultant (Consultant A), pronouns iterated twice are read as ‘two’, whereas for the other (Consultant B) a pronoun repeated twice is generally interpreted as ‘two’, but it may also be read as ‘two or more’. Judgments about the interpretation of pronouns iterated three times are not uniform either. For Consultant A they are read as ‘two or more’, whereas for Consultant B they are interpreted as ‘three or more’. These slight differences in judgments are illustrated below:

Consultant A:


- (26) Context: I work as a teacher. During class, I am explaining the next activity to my students, which consists of several parts.
- a. IX₂-rep2_{-straight} RESPONSIBLE FIRST PART. FINISH, THE_TWO/
*THE_THREE/ *THE_FOUR_{a-GIVE-b} SECOND GROUP.
‘You.PL you are in charge of the first part. Once you (two/
*three/ *four) finish it, you give it to the second group.’
- b. IX₂-rep3_{-straight} RESPONSIBLE FIRST PART. FINISH, THE_TWO/
THE_THREE/ THE_FOUR_{a-GIVE-b} SECOND GROUP.
‘You.PL you are in charge of the first part. Once you (two/ three/
four) finish it, you give it to the second group.’

Consultant B:

- (27) a. IX₂-rep₂-straight RESPONSIBLE FIRST PART. FINISH, THE_TWO/
THE_THREE/ THE_FOUR_a-GIVE-_b SECOND GROUP.
'You.PL you are in charge of the first part. Once you (two/ three/
four) finish it, you give it to the second group.'
- b. IX₂-rep₃-straight RESPONSIBLE FIRST PART. FINISH, *THE_TWO/
THE_THREE/ THE_FOUR_a-GIVE-_b SECOND GROUP.
'You.PL you are in charge of the first part. Once you (*two/
three/ four) finish it, you give it to the second group.'

6.1.2.3 Iconic contribution of the path movement

When it comes to spatial modulations of pronouns, a difference needs to be made between second and third person. In referential uses of second person pronouns, the direction towards which the reduplicated sign is directed to is supposed to (roughly) match that of the intended addressees. However, what a succession of punctuated pointing signs that take the [+cent] feature conveys is that the speaker is addressing more than one person, not their spatial arrangement. That is, the function of a reduplicated second person pronoun in sentences like (28) is to single out the addressees and “express that the content of the sentence is intended as a message from the speaker to that addressee” (Eckardt 2014: 247).

- (28) Context: I work as a teacher. During class, I am explaining the next activity to my students, which consists of several parts.
- IX₂-rep₃-straight RESPONSIBLE FIRST PART. 
'You.PL you are in charge of the first part.'

Similarly, third person reduplicated pronouns typically match the location of the referred entities (whether present or absent) in order for them to get an interpretation. Nonetheless, horizontal and circular movements do not necessarily give rise to an iconic reading. In fact, circular-shaped reduplicated pronouns can be used even if the entities are forming a line (29), just as horizontal movements can be used if the

entities are distributed in a circle.

- (29) Context: At today's comic play there are only five people in the audience, all of them are sitting in the first row. To make fun of them, one performer says to the other:

IX₃-rep4_{-circ} FOOLISH.



'They are foolish.'

By contrast, reduplication of pronouns along the midsagittal plane is either associated with a temporal reading or with the location of the entities ('in a line', 'in a row'). This is shown in the example below. Given that the sentence incorporates temporal coordinates that are associated with each of the three discourse referents, they might be assigned a location on the midsagittal plane, rather on the horizontal one.

- (30) IX₁ UNTIL_NOW IX₁ WORK ALREADY DIFFERENT BOSS THREE:
TEN^YEARS^AGO_{-a} FIVE^YEARS^AGO_{-b} NOW_{-c}. IX₃-rep3_{-c-b-a}
RELATIONSHIP++ GOOD.






'Up to now, I have worked with three different employers: one ten years ago, other five years ago, and now (my current employer). I have had a very good relationship with all of them.'

If the temporal coordinates are not overtly expressed/part of the common ground or else, if the context does not provide information regarding the distribution of the entities, repetition of pronouns along the midsagittal plane is not accepted.

Similarly, the triangular shape generally yields a reading on which the entities are distributed in three different vertices (i.e., forming a triangle). Thus, for triangular shapes to be accepted, the proper scenario needs to be established. This is why (31a,b) are not felicitous as a continuation of the context in (31), which does not provide any information regarding the location of the speaker's friends.

- (31) Context: I usually spend the summer break with seven friends. Last year, because of the pandemic, we had to suspend our holidays.

- a. ?IX₃-rep3_{-triangle} MAD. 
 ‘Some of them (most likely three), arranged in a triangle, were mad.’
- b. ?IX₃-rep3_{-midsag} MAD. 
 ‘Some of them (possibly three or four), standing in a row, were mad.’
- c. IX₃-rep3_{-straight} MAD. 
 ‘Some of them (possibly three or four) were mad.’

Moreover, pronouns that incorporate a triangular movement, when iterated three times, are typically interpreted as denoting three entities, as opposed to pronouns produced along a line or a circle, which do not get an ‘exactly three’ reading.

6.1.3 Interim summary

From what we have seen so far, both pronouns and nouns get and ‘exactly n ’ interpretation when repeated in a punctuated fashion. This reading is systematically derived from the actual number of iterations of the relevant reduplicated item. Hence, they are read as ‘exactly two’ (=2) when the nominal is iterated twice and ‘exactly three’ (=3) when it contains three copies of the sign. Moreover, punctuated repetitions fail to combine with numerals other than those coinciding with the number of iterations of the sign. What these results essentially mean is that this type of reduplication has a dual/trial-like semantics, as it encodes reference to two/three entities. However, since punctuated repetitions do not involve an inflectional process, but rather a coordinated-like construction, I do not consider them as morphological markers of dual and trial number.

Unpunctuated repetitions of nouns, when combined with a straight-line movement, are interpreted as ‘two or more’ (≥ 2) if duplicated and ‘two/three or more’ ($\geq 2/3$) if triplicated. Duplicated pronouns are generally interpreted as ‘exactly two’ (=2), but for one consultant they may also be read as ‘two or more’ (≥ 2). Triplicated pronouns, on the other hands, are interpreted as ‘two or more’ (≥ 2) or ‘three or more’ (≥ 3), depending on the consultant (see Table 6.2).

Duplication	SIGN-rep2	≥ 2
	IX-rep2	$=2/ \geq 2$
Triplication	SIGN-rep3	$\geq 2/ \geq 3$
	IX-rep3	$\geq 2/ \geq 3$

Table 6.2: Meaning of reduplication + path in nouns and pronouns

The reading of triplicated forms might be further constrained by the path movement of the sign. For example, circular and triangular shapes systematically impose a lower bound of three. Nouns repeated along a line (midsagittal or horizontal) can be read as either ‘at least two’ (≥ 2) or ‘at least three’ (≥ 3). Pronouns reduplicated along the midsagittal line are read as ‘at least 3’ (≥ 3), whereas triangular-shaped repetitions typically get an ‘exactly three’ (=3) interpretation.

	Straight horizontal	Circular	Triangular	Straight midsagittal
Nouns	$\geq 2/ \geq 3$	≥ 3	≥ 3	$\geq 2/ \geq 3$
Pronouns	$\geq 2/ \geq 3$	≥ 3	=3	≥ 3

Table 6.3: Path shapes and the meaning of triplicated forms

Finally, the modification of the path movement may or may not come with an iconic reading. That is, depending on the path shape that the sign incorporates, it may be interpreted as expressing information with respect to the spatial arrangement of the denoted entities. In the case of nouns, straight-line movements do not convey information regarding the distribution of the entities in space. Hence, the path movement is simply read as plural. Circular and triangular shapes, on the other hand, may come with a vague iconic inference, whereas straight-line midsagittal movements are systematically interpreted as expressing the meaning ‘in a row’.

With reduplicated pronouns, midsagittal and triangular movements are invariably interpreted as expressing information about the physical distribution of entities in space. Alternatively, midsagittal reduplicated pronouns may come with a temporal reading. Therefore, using these two shapes is degraded if the context does not provide the relevant information or the proper scenario has not been clearly defined by the speaker. Horizontal and circular-shaped reduplicated pronouns, by contrast, do not give rise to iconic inferences.

Thus, out of the four conditions considered in both the pronominal and the nominal domain, only horizontal reduplicated nouns and horizontal and circular-shaped pronouns come with no implication about the location of the entities (Table 6.4).

	Straight horizontal	Circular	Triangular	Straight midsagittal
Nouns	no	vague	vague	yes
Pronouns	no	no	yes	yes

Table 6.4: Iconic contribution of the path movement in triplicated forms

On top of these considerations, it must be noted that while reduplicated pronouns are generally described as distributive plural forms, they might fail to refer exhaustively to the entities previously introduced in the discourse. This, *per se*, may well explain the low frequency of the forms in contexts of plurality. However, this does not really tell us what the interpretation of reduplicated pronouns in LSC is. The next subsection aims to shed light on this issue.

6.1.4 Further distinctions: functions of reduplication + path movement with personal pronouns

In the spoken language literature, reduplication is known to convey a vast array of meanings. Rubino (2013), for example, lists the following functions of reduplication: indefiniteness, intensification, limitation,

attenuation, plurality, collectivity, distributivity, case, size (augmentation and diminutiveness), tense, aspect, transitivity and reciprocity. Besides, reduplication is also used to alter word classes, e.g., deriving nouns from verbs. Given the many senses of reduplication, Moravcsik (1978: 325) claims that “no explanatory or predictive generalization about the meanings of reduplicative constructions can be proposed. All we may note is that such constructions often express meanings related to increased quantity, intensity, diminutiveness and attenuation”.

In sign languages, reduplication, either *in situ* or with modification of the path shape, is generally claimed to denote plurality, aspect and reciprocity (Klima & Bellugi 1979; Pfau & Steinbach 2005). Nominal reduplication is assumed to convey plurality, irrespective of the way in which the noun is iterated. Traditionally, verbal reduplication has been claimed to express distributivity/exhaustivity (Klima & Bellugi 1979). Nevertheless, recent analyses of sign language reduplicated verbs cast doubt on the status of reduplication with displacement as a grammatical marker of distributivity over participants only (Kuhn & Aristodemo 2017 for French Sign Language (LSF); Quer 2019 for LSC). They propose instead that the reduplication morpheme is a morphological marker of pluractionality – i.e., plurality of actions or events (Newman 1980; Lasersohn 1995) –, which can either imply a plurality of participants, times or locations. Besides, Quer (2019) further shows that in LSC verbal reduplication with displacement does not necessarily trigger an exhaustive reading either.

In the sign language literature, pronominal number marking has typically been compared with verbal number marking, not with number marking on nouns. There are good reasons for the comparison, given that pronouns and verbs are the classes which prototypically encode person and number distinctions in the world’s languages. Besides, the fact that the same strategies used for pluralization with verbs (i.e., reduplication and modification of the path movement) are also used with personal pronouns is probably what has led many researchers to consider that the meaning conveyed by these markers also coincides. That is, if reduplication is equated with distributivity in the verbal domain, pronominal reduplication should also convey a distributive reading. The


following excerpt is one example of this assumption: “[t]here is also an alternative instantiation of plural marking when a distributional reading is intended, involving a reduplicated pointing gesture (analogous to the reduplication previously described for verbs) along a sweeping arc” (MacLaughlin et al. 2000: 88). This is why in the literature these forms are commonly described as distributive plurals (or, alternatively, as exhaustive plurals). In turn, pronouns that encode plurality only by modifying the path movement of the sign are commonly referred to as collective plurals (or, alternatively, as multiple plurals).

The downside of the verb-pronoun comparison is that, in LSC at least, the traditional view of reduplication with displacement as a morpheme of distributivity/exhaustivity fails to account for the interpretation of reduplicated pronouns. In fact, in LSC using the so-called ‘distributive’ plural pronoun does not force the reading that the individuated members of the set act individually, nor that each member of the set is being exhaustively referred to. In order to motivate these claims, I will now take a closer look at the interpretation of reduplicated pronouns in LSC.

6.1.4.1 Upper bound interpretation


In Section 6.1.2, I showed what the lower bound reading of reduplicated pronouns is when they incorporate different path movements. Here, we will see that reduplicated pronouns do also come with upper bound cutoffs. In fact, a major difference between reduplicated nouns and pronouns is that the latter fail to express plurality when used to refer to a large number of entities. Compare (32) with (33):

- (32) Context: At today’s comic play there are only three people in the audience. To make fun of them, one performer says to the other:

IX₃-rep3 FOOLISH. 

‘They are foolish.’

- (33) Context: At today’s comic play there are about 50 people in the audience. To make fun of them, one performer says to the other:

IX₃-rep3 FOOLISH. 

‘Some of them are foolish.’

In (32), the reduplicated pronoun is used to exhaustively refer back to the three entities in the context. In (33), by contrast, the reduplicated pronoun is interpreted as referring to a subset of the 50 present entities, not to all of them. This constraint on the interpretation of reduplicated pronouns is not restricted to deictic uses of the third person. In sentence (34), for instance, a group of 50 students is first introduced in the context sentence. The subsequent reduplicated third person pronoun is read again as ‘some (students)’.

(34) Context: This academic year I have 50 LSC students.

IX₃-rep3 SIGN_LANGUAGE LOVE. 


‘Some of them love Sign Language.’

Importantly, this is not saying that a reduplicated pronoun cannot recover larger amounts of entities. Yet, for that option to be possible, the entities need to be clustered in sets. In turn, such sets need to be salient in the extra linguistic context, as in (35), or they must be explicitly introduced in the linguistic context, ideally by using the sign GROUP, as in (36). As it will be explained in greater detail in Chapter 7, uninflected forms in LSC can be used to refer back to non-singular referents. As sentences (35) and (36) show, reduplicated pointing signs may also be used to pick up several groups of non-participants. In (35), the third person reduplicated pronoun functions as a free variable whose value is pragmatically determined by contextual information. In (36) the sign GROUP is overtly expressed and repeated at different locations in the signing space. The reduplicated third person pronoun is directed at those locations in order to refer to the three groups previously mentioned.

(35) Context: At today’s comic play there are very few people in the audience (approximately 15 to 20, sitting in three different areas). To make fun of them, one performer says to the other:





IX₃-rep3_{-triangle} FOOLISH. 

‘They are foolish.’

(36) IX₁ STUDENT THREE GROUP-rep3_{-a-b-c}. IX₃-rep3_{-a-b-c} LANGUAGE ^ SIGN_
LANGUAGE LOVE. 

‘I have three groups of students. They love Sign Language.’
 (reproduced from Veiga Busto 2020a)


If entities are not clearly divided into contextually salient groups or if the groups are not clearly introduced in the discourse, the reduplicated pronoun fails to recover entities whose cardinality is greater than five. Compare the following examples:

- (37) YEAR IX, STUDENT COURSE LANGUAGE^SIGN_LANGUAGE 4. IX₃-rep3 SIGN_LANGUAGE LOVE. 
 ‘This academic year I have 4 students in the Sign Language class. They (3 or 4 of them) love Sign Language.’
- (38) YEAR IX, STUDENT COURSE LANGUAGE^SIGN-LANGUAGE ENROLL 5. IX₃-rep3 SIGN_LANGUAGE LOVE. 
 ‘This academic year I have 5 students in the Sign Language class. They (4 or 5) love Sign Language.’
- (39) YEAR IX, STUDENT ENROLL COURSE SIGN_LANGUAGE 6. IX₃-rep3 SIGN_LANGUAGE LOVE. 
 ‘This academic year I have 6 students in the Sign Language class. Some of them (3 to 5) love Sign Language.’
- (40) YEAR IX, STUDENT COURSE SIGN_LANGUAGE ENROLL 10. IX₃-rep3 SIGN_LANGUAGE LOVE. 
 ‘This academic year I have 10 students in the Sign Language class. Some of them (7 or 8) love Sign Language.’

Note that in (37) and (38) the reduplicated pronoun does not fail to pick up the whole plurality, but it also does not exclude non-maximal interpretations. That is, like plural definite descriptions (Brisson 1998), the reference of plural pronouns is non-maximal, to the effect that it allows for exceptions. In (39) and (40), by contrast, the reduplicated pronoun always picks a subset of the students previously introduced, meaning that it entirely fails to refer exhaustively. Hence, the meaning of reduplicated pronouns in LSC depends on the size of the referred group. They may yield a plural interpretation if the cardinality of the entities

is equal or lower than five. Alternatively, they may be interpreted as picking up more than five entities, but in such cases, they also come with a reading in which only some members of the set are being referred to.

As stated at the beginning, most uses of reduplicated pointing signs in the data do not function as personal pronouns. When used as locatives or determiners the upper bound mentioned above is no longer observed. Hence, if a noun reduplicated three times co-occurs with the numeral TWENTY, both the noun and the reduplicated pointing sign are read as referring to twenty entities (41). The same is true for cases in which the noun does not co-occur with a numeral, but the exact cardinality of the referred entities is part of the common ground, nine in the case of (42).

(41) ALEXANDRA TRAVEL LOVE QUITE_A_LOT. 20 CITY-rep3_{-circ} IX-rep3_{-circ} DONE TOUCH-rep_{-circ}. 

‘Alexandra loves to travel. She has already visited 20 cities.’

(42) (Talking about the Catalan leaders sentenced to prison after the independence referendum)

PRISONER POLITICAL IX₃-rep4_{-circ} RECENTLY RELEASE. 

‘The (nine) political prisoners were released recently.’

In line with what has been described before, if a reduplicated pronoun is used to anaphorically refer to the nine political prisoners, as in (43), it yields the interpretation that only certain members of the set of prisoners are going to be released.

(43) BEFORE IX₃ PRISONER POLITICAL LOCK. SAY IX₃-arc WEEK NEXT IX₃-rep4_{-circ} RELEASE. 

‘The political prisoners are locked up (in prison). They say next week some of them are going to be released.’

6.1.4.2 Reduplication and exhaustivity

In prior literature, reduplicated pronouns have been associated with exhaustive interpretations. For ASL, Cormier (2002: 49) claims that the so-called ‘composite’ first person plural form consists “of several pointing

signs which refer exhaustively to each member of some set". As it follows from the examples provided in the previous section, reduplicated pronouns in LSC yield the opposite meaning, that is, their interpretation is typically non-exhaustive and it is somehow parallel to that of the partitive reading of the quantifier *some*.

Ever since Horn (1972, 1989), the quantifiers *some* and *all* are considered to form a scale ordered by entailment, which might further contain intermediate items such as *most* and *many*. Going from the strongest to the weaker value, the set of alternatives is ordered in the following form:

(44) Quantificational scale: <all, most, half, many, some>





Picking the weaker alternative in the set in (44) triggers the scalar implicature that using a stronger item in the same context would yield a false statement. Scalar implicatures are a type of quantity implicatures (Grice 1975) which are organized by informativity. Hence, uttering *some* gives rise to the inference that *all* does not hold, or else, the speaker would say so (i.e., the speaker would utter a stronger/more informative expression). In (45), for example, the use of *some* implies that not all the entities in the context have the property of being foolish. According to Horn (1972: 72-73) "all quantifiers other than universals (for which the implicature would be vacuous) are upper-bounded by implicature".

(45) Some of them are foolish → Not all of them are foolish.

As further shown in Horn (1972, 1984, 1989), scalar implicatures can be cancelled in environments such as 'P_i, in fact P_j', where P_i is the weaker member of the set and P_j is the strongest. The upper-bounding implicature of *some* may also be suspended in environments of the form 'P_i, and possibly/and perhaps even P_j'.⁷ Using these standard tests allows





⁷When a scalar implicature is suspended the speaker leaves open the possibility of its negation; when it is cancelled, there is a contradiction between the scalar implicature and the assertion that a higher value of the scale is known to hold (Horn 1972; Gazdar 1979).

us to ascertain that reduplicated pronouns and existentials give rise to analogous inferences in LSC.

- (46) a. IX₃-rep3 FOOLISH, POSSIBLY EVEN ALL. 
 b. SOME FOOLISH, POSSIBLY EVEN ALL. 
 ‘Some of them are foolish, and possibly even all of them are.’
- (47) a. IX₃-rep3 FOOLISH. NO, ALL FOOLISH. 
 b. SOME FOOLISH. NO, ALL. 
 ‘Some of them are foolish. In fact, all of them are foolish.’

As the examples show, the upper-bounded reading of the pronoun and the quantifier undergo suspension (46) and cancellation (47) in the very same environments.

Besides, according to Horn, determiners like *some* or *many* are logically consistent with the conjunction of their inner negation (i.e., $[P(p) \wedge P(\neg p)]$), whereas *all* and *most* are not. As shown in (48a), this test confirms that reduplicated pronouns in LSC are compatible with their negation, just like the existential quantifier in (48b). By contrast, the plural pronoun in (49) and the universal quantifier in (50) are not tolerant to their negation.

- (48) a. IX₃-rep3 FOOLISH, IX₃-rep3 NOT. 
 b. SOME FOOLISH, SOME NOT. 
 ‘Some are foolish, and some are not.’
- (49) #IX_{3-circ} FOOLISH, IX_{3-circ} FOOLISH NOT. 
 ‘They are foolish, and they are not foolish.’
- (50) #ALL FOOLISH, ALL NOT. 
 ‘All of them are foolish, and all of them are not.’


Note that in all four examples, the first and second occurrence of the quantifier and the pronoun are produced in slightly different areas of the ipsilateral side. For (49) and (50) this is not relevant, as the sentences are not felicitous, but for (48a,b) to be coherent, the second occurrence needs to be somewhat displaced with respect to the first one.

6.1.4.3 Reduplication and distributivity

The notions of distributivity and collectivity adopt many senses in the literature. Hence, it is not always clear what the intended meaning is when they are used to describe the number interpretation of personal pronouns in a particular sign language.


Under the most extended view, the collective-distributive distinction refers to whether a predicate holds true for every atom (i.e., individual member) in the extension of a plurality –distributive interpretation– or to the members of a plurality as a whole –collective interpretation– (Link 1983). Besides being conceived as a property of predicates and constructions (Champollion 2010), distributivity is also commonly associated with universal quantifiers such as *each* or *every*. Most sign language descriptions of plural pronouns do not provide examples illustrating the distributive interpretation of reduplicated forms. However, they tend to show instances of the forms accompanied by translations involving distributed quantifiers such as ‘each of them’ (cf. Sandler & Lillo-Martin 2006). From what we have seen so far, the meaning of reduplicated pronouns in LSC does not seem comparable to that of the quantifier *each*. If so, the distributive interpretation should be available when reduplicated pronouns combine with inherently distributive predicates, contrary to the fact. By contrast, the so-called collective plural pronoun can felicitously combine with such predicates, see (51) and (52a,b).


- (51) Context: In a comic play, to make fun of the audience, one performer says to the other:

IX_{3-straight} FOOLISH. 

‘They are foolish.’

- (52) Context: Last night, the kids were playing games until late.

a. TODAY IX_{3-straight} TIRED. 


b. TODAY IX_{3-circ} TIRED. 

‘Today, they are tired.’

In (51) ‘be foolish’ is true of each member of the audience and in (52)


‘be tired’ is true of each member of the plural antecedent ‘children’. Of course, it could be argued that the distributive inference is triggered by the lexical meaning of the predicates. Yet, what is relevant for the issue at hand is that if the so-called distributive pronoun is picked up instead, the interpretation it yields is that the predicate applies only to some specific members of the audience (53) or to some of the children previously mentioned (54).

- (53) Context: In a comic play, to make fun of the audience, one performer says to the other:

IX₃-rep3 FOOLISH. 

‘Some of them are foolish.’

- (54) Context: Last night, the kids were playing games until late.

TODAY IX₃-rep3 TIRED. 

‘Today, some of them are tired.’

The interaction between the meaning of verbs and pronouns modified by reduplication + path movement can be further observed with predicates like *give (a present)*. In (55), for example, the reduplicated predicate is interpreted distributively, in the sense that there is more than one ‘giving a present’ event. However, the predicate does not apply to each individual member of the set of students, but to each member of a subset of them.



- (55) Context: I work as a teacher and today was the last school day. I am not going to see last year students again.

FAREWELL, IX₃-rep3 IX₁ GIFT-rep2. 






‘As a farewell, to some of them, I gave each a present.’

These observations are not limited to distributive predicates. With mixed predicates, like *push (a car)* or *carry (a piano)*, using a reduplicated pronoun does not yield a distributive interpretation either.⁸


⁸Similarly, if reduplicated pronouns encode distributivity in LSC, we would predict some reciprocal predicates (e.g., relational verbs such as *marry*, cf. Winter 2018) to get a distributive interpretation whenever combined with a reduplicated pronoun. However,

- (58) WOMAN TWO IX₃-rep2, CAR PUSH. 
 ‘Two women (together) pushed a car.’
- (59) BOY THREE IX₃-rep3 PIANO CARRY. 
 ‘Three boys (together) carry a piano.’


For the distributive reading to be accessible, it is necessary to reduplicate other linguistic elements, such as the predicate, as in (60a) and (61a), the quantifier, as in (61b), or both the predicate and the quantifier, as in (60b) and (61c).⁹

- (60) a. WOMAN TWO, CAR PUSH_{-a}-PUSH_{-b}. 
 b. WOMAN THE_TWO, CAR EACH-rep2 PUSH_{-a}-PUSH_{-b}. 
 ‘Two women pushed a car each.’
- (61) a. MAN THREE, PIANO CARRY_{-a}-CARRY_{-b}-CARRY_{-c}. 
 b. BOY THREE IX₃-rep3, PIANO EACH-rep3 CARRY. 
 c. MAN THREE, PIANO EACH-rep3 CARRY_{-a}-CARRY_{-b}-CARRY_{-c}. 
 ‘Three boys/men carry a piano each.’

the pronominal form fails to yield such reading and, in fact, using a reduplicated form is ambiguous between a collective (56a) and a distributive interpretation (56b). In the former, there is only one marry event, in the latter, there are two.



- (56) Context: I have two very good friends. 
 LAST_YEAR, IX₃-rep2 MARRY.
 a. ‘They married (each other) last year.’
 b. ‘They married (another person) last year.’

If the verb is reduplicated, as in (57), the preferred reading of the sentence is that it applies to the members of the set separately (e.g., distributively).


- (57) LAST_YEAR IX₃-rep2/THE_TWO MARRY_{-a}-MARRY_{-b}. 
 ‘They both marry (other person) last year.’

⁹For Russian Sign Language (RSL), Kimmelman (2018) shows that distributivity can be expressed by reduplicating not only predicates and quantifiers, but also nouns, pronouns and numerals.

The facts are more interesting when it comes to collective predicates. If reduplicated pronouns encode distributivity in LSC, verbs like *scatter*, which apply to groups, would be predicted not to combine with reduplicated pronouns. Sentence (62a) shows that this is indeed the case. Yet, the infelicity of (62a) is not motivated by the distributive interpretation of the pronoun, but rather because the predicate entails its application to the whole flock of birds, whereas the pronoun implies reference to a subset of the birds only. According to my consultants, while combining the two forms is somehow contradictory, the reading according to which all the birds scattered in a unique ‘flying away’ event is stronger than the reading according to which some of the birds flew off and others did not. Hence, the natural interpretation of the pronoun is overridden to accommodate the collective inference of the predicate. This is why (62b) is preferred over (62a), as there is no conflict between the meaning of the pronoun and that of the predicate.

- (62) Context: This morning, there was a flock of birds on my deck.
- a. #WINDOW CLAP_HANDS, IX₃-rep3 SCATTER. 
- b. WINDOW CLAP_HANDS, IX₃-circ SCATTER. 
- ‘I clapped through the window, and they scattered.’

Reduplicated pronouns can co-occur with other inherently collective predicates. For example, in (63a), combining a reduplicated pronoun with the verb *agree* yields the interpretation that slightly more than half of the representatives voted in favor of the law. The meaning of the reduplicated pronoun is assigned under the assumption that, for a parliamentary agreement to take place, at least half of the votes are necessary. If a non-reduplicated pronoun is used instead, as in (63b), the interpretation that obtains is that (almost) all the representatives voted in favor of passing the law.

- (63) Context: Today, at the Spanish congress, it was debated whether to pass a law legalizing euthanasia. You don’t know what the outcome was, so you ask a friend. She tells you:
- a. IX₃-rep3 AGREE ALREADY. 

b. IX_{3-circ} AGREE ALREADY.

‘They reached an agreement.’



So far, I considered the collective-distributive opposition as referring only to whether a predicate denotes separate vs. joint action (cf. Kemmer 1996). However, in the nominal domain, distributive marking has been claimed to display other functions, namely, to spread entities over various locations and over various sorts (Boas 1911; Corbett 2000).

As described in Sections 6.1.1.3 and 6.1.2.3, the first function (i.e., distribution of the members of a group over space), was observed neither in nouns nor in pronouns in LSC when the path movement is horizontal-straight. By contrast, nominals that incorporate path shapes other than horizontal lines may come with the inference that the entities are distributed in different spatial locations. Hence, under this view, both nouns and pronouns may be considered to involve distributivity in LSC.

The second function (i.e., distribution of entities over different types) was not attested in LSC. However, it was found as a possible interpretation of nouns reduplicated in a punctuated fashion, as in (64).

(64) IX₁ HOUSE PLANT-PLANT THERE_IS.

‘In my house, I have two plants/two types of plants.’



In light of the above, I do not consider reduplicated pronouns to come with a distributive reading. This claim is supported by several facts. First, they do not trigger the inference that the predicate applies to every member of the set referred to by the pronoun. Besides, in their most common form (when combined with a horizontal movement), they do not come with iconic inferences regarding the distribution of the entities in space. Finally, while reduplicated forms might distribute entities over different sorts, this reading seems to be restricted to punctuated repetitions, which I did not consider as a morphological strategy to convey plurality in LSC (see Section 6.1.1.1).

6.1.4.4 (Non-)specificity

Finally, it must be pointed out that reduplicated forms seem to always come with a specific reading. In fact, reduplicated determiners cannot be used to convey genericity, as they are understood as denoting concrete individuals. This is shown in the following sentences:

(65) Context: The speaker is in a playground with a friend and his daughter. While she was playing, she fell on the ground and started crying. The speaker's friend is making a big deal out of it, so to play the situation down the speaker says:

a. CHILDREN BE_LIKE_THAT. 

'Children are like that.'


b. CHILDREN IX₃-rep3 BE_LIKE_THAT. 

'Those children are like that.'


In (65b) the speaker is taken to have some specific individuals in mind who use to fall and cry in the playground. Hence, using a reduplicated form is out if a generic use is intended. This is in line with Quer's (2012b) and Barberà's (2015) observation that in LSC generic nouns are not assigned a location in space. Indeed, whenever a discourse referent is assigned a location in space is understood as referential. As the example above shows, the same effect applies to reduplicated determiners.

The same effect is also found in pronouns. For instance, if a second person plural pronoun is used to make a generic statement (in (66), about the Spaniards), then the non-reduplicated form must be used (i.e., a pronoun with either a straight-line or a circular movement (66a)). The reduplicated second person, as shown in (66b), fails to encode the generic interpretation.

(66) Context: Two people (one from Catalonia, one from Madrid) are arguing about the repression after the Catalan referendum. One of them says it is the Catalan people's fault. The other replies:

a. IX₂-circ GUILTY. 

'You (the Spaniards) are to be blamed.'

b. IX₂-rep3 GUILTY. 

‘Some people (some specific Spaniards), including you, are to be blamed.’

6.1.4.5 The meaning of reduplicated pronouns in LSC

Taking into account that the interpretation of reduplicated pronouns in LSC is neither distributive nor exhaustive and that reduplicated pronouns impose an upper cutoff on the number of entities the pronoun can refer to, their meaning seems to correspond more closely to that of paucals, not to (distributive) plurals.

As in other languages with a paucal value (see Section 5.1.5), the range of reduplicated pronouns in LSC is not clearly predetermined, as it can either refer to a small number of entities or to a subset of a previously introduced plurality. Recall that according to Schütz (1985) contrast is more important than specific number and that the range of the paucal varies according to the situation. Similarly, Crowley (1982: 81) stresses that the basic factors governing the use of the paucal are the absolute and the relative size of the referred group:

The conditions governing the use of the paucal and the plural are rather more complex. The basic factor that is involved is the absolute size of the group being referred to. Intersecting with this parameter however is the question of relative size, i.e. whether the group being referred to is contrasted with some larger group within which it is subsumed. When the absolute number is low (say between three and about half a dozen), the paucal is generally used, whether or not there is any contrast with a larger group. (However, the plural will still very occasionally be used even with these low numbers when there is no such contrast.)

As pointed out by Corbett (2000), the paucal is an approximative number, with a meaning similar to the quantifier *a few* in English. In the same vein, Martí (2020: 41) claims that, given the approximate nature of the paucal, the number of entities “may vary slightly from speaker to speaker or from situation to situation (e.g., for some speakers, the upper bound may not be six but five, etc.; cf. English *a few*)”. Likewise, Dixon (2012) highlights the distinction between number values with absolute

reference, such as the dual or the plural (e.g., in systems with singular, dual and plural values, the plural always means ‘more than two’) and those with ‘relative reference’, such as the paucal or the plural (e.g., in systems with singular, paucal and plural values, the paucal and the plural are relativized with respect to each other). That is, the paucal has a contrastive interpretation, since its reference depends on the size of the group.

Note that this is exactly what was observed in LSC reduplicated pronouns. Sentences (34) and (39), repeated below as (67) and (68), show that the interpretation of the forms not only varies according to the size of the group, but it also has an approximative meaning.

(67) Context: This academic year I have 50 LSC students.

IX₃-rep3 SIGN_LANGUAGE LOVE. 

‘Some of them (probably 10 or 20) love Sign Language.’

(68) YEAR IX, STUDENT ENROLL COURSE SIGN_LANGUAGE 6. IX₃-rep3

SIGN_LANGUAGE LOVE. 

‘This academic year I have 6 students in the Sign Language class. Some of them (3 to 5) love Sign Language.’

Finally, notice that the fact that reduplicated pronouns are not used in generic contexts is not incompatible with a paucal analysis. Indeed, there are languages such as the Austronesian language Biak, in which subjects of dual and paucal verbs are required to be specific (Dalrymple & Mofu 2013). In Biak, number distinctions are not marked on nouns, but on determiners and demonstratives; for subjects, number is marked by verbal agreement prefixes. Since bare noun subjects are non-specific, they are not acceptable as subjects of verbs with dual and paucal agreement.

To the best of my knowledge, no previous sign language study has considered the existence of a paucal value in the pronominal domain. There are, however, scattered references to markers of paucity in the sign language literature. For NGT classifiers, for instance, Zwitserlood (2003) considers the five-handshape as a marker of paucal. Yet, ‘paucal’ is used in a rather loose way, as it does not imply reference to a few items, but to

multiple referents with a non-exact cardinality (as opposed to classifiers denoting two, three and four entities). Besides, the examples provided in the text seem to correspond better with a plural interpretation (e.g., ‘many persons are in a line’/‘many people are moving forward’, cf. Zwitserlood 2003: 112-113) than with a paucal meaning.

More interestingly, Kubuş (2008) shows that TİD classifiers tend to use different morphological operations depending on the number of referents. To express paucity (strictly in the sense of ‘some’/‘a few’) the most common strategy is to use reduplication with displacement. Alternatively, paucity may be conveyed by using quantifiers. Modification of path movement, by contrast, is used to denote plurality, but it is virtually unattested in contexts of paucity.

Hence, the association of reduplication + path movement with a paucal meaning might not be restricted to LSC nor to personal pronouns. Yet, lack of detailed descriptions of reduplicated pronouns in other sign languages hinders a comprehensive comparison of the possible interpretations that this strategy might come with. Indeed, most descriptions of non-singular forms in sign language pronouns limit themselves to a few examples. These generally present the forms in isolation or in contexts involving reference to a small amount of entities. As far as I am aware, Cormier (2002) is the only exception, as she does analyze the use of reduplicated pronouns in ASL in contexts in which reference to more than three entities is made. Contrary to what I suggested, reduplicated forms in ASL do come with a ‘many X’ interpretation. Hence, it could be the case that reduplication with displacement has a different meaning across sign languages. Alternatively, it may be that, once a wider variety of contexts is considered, the forms could yield a paucal interpretation in other sign languages as well (though, reportedly, not in ASL). On the basis of the data available, all I can ensure at this point is that LSC reduplicated pronouns show significant functional differences with reduplicated pronouns as previously described for other sign languages.

6.2 One strategy: reduplication vs. path movement

6.2.1 Pronouns

As pointed out in Chapter 5, reduplicated personal pronouns in LSC require a modification of the path movement if reference to more than one entity is intended. That is, simple reduplication (i.e., repetition of a pronoun without displacement) does not get a ‘more than 1’ interpretation in LSC. While reduplication requires a modification of the path shape, the opposite is not true, since pronouns can be produced with a sideward movement but no reduplication (see Figure 6.1). Hence, in this section, I focus on the use and interpretation of modification of the path movement in LSC pronouns.

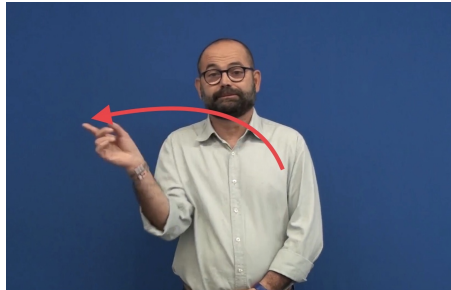


Figure 6.1: IX₃-straight (path movement, no reduplication)

As described for other sign languages (see Section 5.3.2.2), LSC pronouns standardly allow for two different path movement shapes: straight and arc/circular. Below, I review the main differences between the two.

6.2.1.1 Articulation

The first distinction is articulatory and depends on the movement performed by the articulator. Straight-line movements are produced by a wrist or elbow movement of flexion/extension (Figure 6.2) or,

alternatively, by radial/ulnar deviation (Figure 6.3). Wrist pronation, on the other hand, results in a circular or an arc-shaped motion (Figure 6.4). The difference between circular and arc path movements concerns whether the articulator fully performs pronation or not.

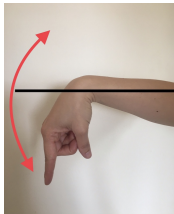


Figure 6.2:
Flexion/extension

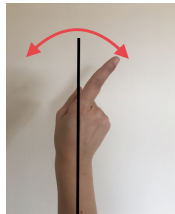


Figure 6.3:
Radial/ulnar deviation



Figure 6.4:
Pronation

Circular movements typically rotate inwards (in a counterclockwise direction if the signer is right-handed; clockwise for left-handed signers). Straight-line shapes, by contrast, can either move from the contralateral to the ipsilateral side or the other way round. Both circular and straight path movements can be repeated, but this does not result in changing the number information of the pronoun. If the path movement is a straight-line, repetition results in a back-and-forth movement (Figure 6.5).

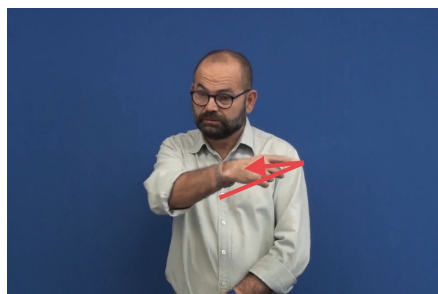


Figure 6.5: First person exclusive, back-and-forth movement




6.2.1.2 Interactions of person and number

Besides presenting articulatory distinctions, circular and straight path movements also differ in their contexts of use. It appears that for some

sign languages choosing between circular and straight path shapes is influenced by whether the pronoun minimally refers to the speaker, to the addressee or to neither of them (see Section 5.3.2.2). In TID, for instance, second person pronouns are claimed to take straight movements only (SaraI & Kelepir 2020). While similar restrictions are not observed in LSC (circular and straight shapes can be used with first, second and third person), the choice of the plural morpheme is restrained in at least two ways:




- i) each path movement requires a minimal number of referents for it to be acceptable,
- ii) path shapes differ in the maximal number of person values they allow to combine (i.e., not every possible combination of group of participants can be referred back by straight-line shapes).

As for the minimal number of participants, straight shape movements come with a specification that there are at least two entities that are being referred to (≥ 2), whereas circular movements always impose a lower bound of at least three entities (≥ 3). This is in line with the contrast observed in reduplicated nouns and pronouns when they incorporate circular vs. horizontal path shapes. Hence, pronouns which take a circular path motion are rejected to pick up two discourse referents only, as in (69a). By contrast, dual forms (69b) and pronouns that incorporate a straight-line movement (69c) are both equally acceptable.

- (69) Context: [My parents]_{-a} and [my boyfriend's parents]_{-b} are planning to visit me during the spring break, but given the restrictions...
- a. #IX_{3-circ-a} CANNOT. IX_{3-circ-b} CAN, BECAUSE CLOSE. 
 - b. THE_TWO_{3+3-a} CANNOT. THE_TWO_{3+3-b} YES, BECAUSE LIVE CLOSE. 
 - c. IX_{3-straight-a} COME CANNOT. IX_{3-straight-b} YES, BECAUSE LIVE CLOSE. 
- 'They (my parents) cannot come. They (my boyfriend's

parents) can, because they live close-by.’





Besides, when pronouns that incorporate the referential element ‘speaker’ are performed with a horizontal movement, they are understood as denoting either the speaker and the addressee, as in (70), or the speaker and the other participant(s), as in (71). As a result, straight-line forms are ruled out whenever the pronoun picks up three different person values. Hence, if the intended referents of a first-person pronoun are the speaker, the addressee and some other present or non-present individual(s) (1+2+3), circular path shapes are required, see (72).

- (70) THE_TWO₁₊₂ WAIT. BOSS COME, IX_{1-incl-straight} GO EAT. 
 ‘We (1+2) wait until the boss arrives and then we (1+2) go have lunch.’
- (71) THE_TWO₁₊₂ WAIT. BOSS COME, IX_{1-excl-straight} GO EAT. 
 ‘We (1+2) wait until the boss arrives and then we (1+3) go have lunch.’
- (72) THE_TWO₁₊₂ WAIT. LATER BOSS COME, IX_{1-incl-circ} GO EAT. 
 ‘We (1+2) wait until the boss arrives and then we (1+2+3) go have lunch.’





On top of that, clusivity distinctions may also impact the number interpretation of the pronoun, depending on whether the form takes a straight or a circular path shape. Inclusive pronouns, whenever performed with a straight motion, typically have a dual reading (1+2), as in (73a). Only when the path shape is circular, the pronoun can get an ‘at least three’ (i.e., plural) interpretation (73b). By contrast, the exclusive plural meaning (1+3+3) can be expressed by using either a straight shape (74a) or a circular movement (74b).¹⁰

- (73) Context: After having problems with the exams schedule, the head of the department informs the professors:

¹⁰As it would be expected considering the description of person marking in Part I of the thesis, if the exclusive pronoun takes the [+central] feature, the reading it yields is dual-like as well (i.e., 1+3).

- a. FROM_NOW_ON IX_{1incl-straight} RESPONSIBLE[^] CALENDAR. 
 ‘From now on, we (you.SG and I) are in charge of the calendar.’
- b. FROM_NOW_ON IX_{1incl-circ} RESPONSIBLE HOUR[^] CALENDAR. 
 ‘From now on, we (you.PL and I) are in charge of the calendar.’
- (74) Context: At the end of class, the students (approx. 20) are preparing to go to the recess. The teacher approaches one of them, who was misbehaving during class, and says:
- a. IX_{1excl-straight} RECESS OUT PLAY, IX₂ REMAIN. 
 b. IX_{1excl-circ} GO RECESS OUT, IX₂ STAY REMAIN. 
 ‘We (the other students and I) are going to the recess and you stay here.’

If pronouns do not include the referential element ‘speaker’ (i.e., if they take the [-proximal] feature), straight and circular movements are equally acceptable. Besides, unlike what was observed for reduplicated pronouns, pronouns performed either with a circular or with a straight path motion can both pick up a plurality of entities. That is, they can refer to large groups of addressees or to groups of non-participants without imposing an upper bound cutoff.



- (75) Context: The professor noticed that the students look sleepy. She asks:
- a. IX_{2-straight} TIRED? 
 b. IX_{2-circ} TIRED? 
 ‘Are you.PL tired?’
- (76) Context: In between classes, one professor warns the colleague teaching after her that the students all look sleepy:
- a. IX_{3-straight} TIRED. 
 b. IX_{3-circ} TIRED. 
 ‘They (all/most of them) are tired.’

The interpretation of pronouns that modify the path movement in (76a,b) might also be non-maximal. That is, they can either refer exhaustively to all the students in the context or they can allow for exceptions.

Indeed, circular and straight-line forms are reported by my consultants to truthfully describe the situation even if a small fraction of the students is not tired (or if the professor does not know whether all of them are actually tired). For (76), if the class has 20 students, the forms are understood as referring to at least 15 to 18 students.


6.2.1.3 Iconic information

With respect to iconicity, circular forms, in all three person values, simply denote ‘three or more’. That is, the circular movement yields a plural interpretation, but no further information regarding the distribution of the entities can be inferred. Again, this is consistent with what was observed in reduplicated circular pronouns. Horizontal lines, by contrast, typically come with an iconic reading. This is particularly true for first person pronouns. When referring to present non-participants, for exclusive pronouns (1+3+3) with a horizontal movement to be used, the speaker and the non-participants need to be (roughly) forming a line. In (77a), for instance, the form is accepted as long as the speaker and the non-participants are sitting next to each other. If a circular form is used instead, as in (77b), no such requirement is observed.

- (77) Context: A group of friends is at a restaurant and one of them does not know what to order. One of his friends says to her:
- a. IX_{1excl-straight} AGREE ALREADY READY, WANT JOIN? 
 - b. IX_{1excl-circ} AGREE ALREADY, IX₂ WANT COME JOIN ALSO? 
 ‘We have already decided, do you want to join us (in sharing the food)?’

For combinations of first person and non-present third person, using a pronoun performed with a horizontal movement would also trigger the inference that the entities are forming a line. This holds true even if the context does not provide information about their physical arrangement, as in (78a). This contrasts with circular movements, which do not come with iconic inferences. Therefore, they can be used even if in the reported situation the speaker and the non-participants were sitting/ standing in a row (78b).

(78) Context: During class, a professor informs the students of a decision adopted at the teachers' meeting:

a. IX_{1excl-straight} TALK AGREE FROM_NOW_ON EXAM THERE_IS_NOT NOTHING. 

'We, which in the reported context were sitting/standing in a row, decided that, from now on, there will be no exams.'

b. IX_{1excl-circ} AGREE FROM_NOW_ON EXAM WITHOUT. 

'We decided that, from now on, there will be no exams.'

Typically, pronouns referring to the addressees and the non-participants do not yield an iconic reading when performed in front of the signer's body. However, if the distribution of the entities is part of the common ground, a horizontal movement may also come with an iconic interpretation. For instance, in (79a) the path shape of the sign is interpreted as either 'the ones in the first row', given that students are usually lined up in rows, or, alternatively, as 'the students, which were forming a line'.

Midsagittal movements are typically read as 'forming a line/in a row', as in (79b); whereas triangular path motions are interpreted as 'arranged in a triangle', as in (79c). However, as observed by Schlenker & Lamberton (2019), if the triangular shape is articulated smoother, the form can be seen as an arch instead of a triangle. This is also the case of LSC. As a consequence, the iconic condition of the triangular shape fades away in such contexts. Hence, the pronoun is read as a circular/arc-shaped pronoun (i.e., simply as plural), as in (79d).

(79) Context: This academic year I have 50 LSC students.

a. IX_{3-straight} SIGN_LANGUAGE LOVE. 


'They, maybe arranged in a line/the ones in the first row, love Sign Language.'

b. IX_{3-midsag} LANGUAGE^SIGN_LANGUAGE LOVE. 

'They, forming a line/the ones sitting on the right side of the class, love Sign Language.'

c. IX_{3-triangle} LANGUAGE^SIGN_LANGUAGE LOVE. 

‘They, which are forming a triangle, love Sign Language.’

d. IX_{3-arc/circ} SIGN_LANGUAGE LOVE. 

‘They love Sign Language.’

6.2.2 Nouns

Besides using reduplication with path movement, LSC nouns may express plurality by changing the path shape of the sign only, that is, with no reduplication of the inherent movement of the sign. Hence, plurality may be encoded by incorporating a straight path motion, as in (80). Alternatively, signs may encode numerosity by using in situ/simple reduplication (with no displacement), as in (81).

(80) CONFERENCE ADDRESS TOPIC_{-straight} 3. 

‘The conference addresses three topics.’

(81) CITY_COUNCIL BARCELONA FUND BUILDING++ RESTORE++. 

‘The city council of Barcelona funds the reparation of several buildings.’

As stated in the introduction of this chapter, while the use of these strategies is possible, they are far less frequent than using reduplication with displacement. Below, I briefly reviewed the two options and give some potential arguments for these strategies not to be more commonly used in LSC.

6.2.2.1 Reduplication only

For DGS, it has been claimed that the plural morpheme cannot be realized by reduplication (with or without displacement) in body-anchored nouns and nouns with a complex movement (Pfau & Steinbach 2005, 2006, 2021), whereas for NGT both types of nouns can be pluralized by means of in situ reduplication (van Boven et al. 2021). Besides, in situ reduplication is claimed to be ungrammatical in both DGS and NGT lateral nouns. Hence, in situ reduplication is more extensively used in NGT than in DGS nouns. In LSC, only body-anchored nouns and midsagittal nouns seem to allow

the use of simple reduplication.¹¹ Table 6.5 provides a comparison of the use of in situ reduplication in DGS, NGT and LSC nouns.

	DGS	NGT	LSC
B-nouns	*	✓	✓
M-nouns	✓	✓	✓
L-nouns	*	*	*
C-nouns	*	✓	*

Table 6.5: In situ reduplication in DGS, NGT and LSC nouns
(B-nouns: body-anchored nouns; M-nouns: midsagittal nouns; L-nouns: lateral nouns; C-nouns: nouns with complex movement)

In LSC, in situ reduplication is possible for some body-anchored nouns. However, unlike NGT, reduplicated nouns with complex movement do not yield a ‘more than 1’ interpretation, irrespective of the times they are iterated. Notice, though, that for NGT it is claimed that nouns with complex movement can be pluralized if the sign is repeated with brief pauses between each of the repetitions. In the previous section, I considered such iterations as coordinated-like constructions (although the forms I considered always involved a modification of the path movement as well), so I am not treating this strategy as a plural morpheme in LSC.

In LSC, similarly to the case of NGT, body-anchored nouns may be subject to simple reduplication. However, not all body-anchored nouns admit this type of reduplication. For DGS, Pfau & Steinbach (2005: 117) claim that “[f]or body-anchored signs, it makes no difference whether

¹¹These results should be taken with caution since the present study is based on a limited amount of data (less than 50 lexical items). Besides, the data was elicited with two native deaf signers only. By contrast, van Boven et al. (2021) study is based on both corpus and data elicited with five signers. In addition to that, they consider a greater number of forms (almost 500). Pfau & Steinbach (2005, 2006) do not report on the amount of forms they took into consideration in their DGS studies. Hence, future research should consider a wider variety of forms in LSC to determine whether the patterns described here are robust enough.

they have movement or not”. By contrast, in LSC the acceptability of reduplication with body-anchored nouns seems to be influenced by the movement of the underlying noun. Indeed, reduplication of the noun is deemed acceptable if the noun is not repeated in the base form (82). The impact of the movement of the base sign in allowing in situ reduplication is not restricted to body-anchored nouns. In fact, midsagittal nouns lacking a repeated movement in the base form, as in (83) and (84), do also allow for reduplication.

- (82) IDEA+++ 
 ‘ideas’
- (83) BOTTLE++ 
 ‘bottles’
- (84) TABLE+++ 
 ‘tables’

By contrast, in (85) reduplication of the body-anchored noun HORSE, which is articulated with a local movement of the fingers (i.e., with a hand-internal movement, cf. Sandler 1993; Brentari 1998), is interpreted as repetition of the sign, not as a pluralization.

- (85) HORSE++ 
 ‘horse’

The case of (85) seems to be the most common scenario in LSC. That is, although the base sign does not actually block repetition, reduplication does not yield a multiplicity inference (i.e., the forms are not read as plurals), irrespective of the times the sign is iterated. This was observed not only in body-anchored nouns, but also in midsagittal nouns (86), lateral nouns (87) and nouns with complex movement (88).

- (86) PLANT+++ 
 ‘plant’
- (87) COUNTRY+++ 
 ‘country’

- (88) BICYCLE++
 ‘bicycle’



Thus, the fact that in situ reduplication is not the preferred strategy in LSC nouns might be due to the fact that many nouns have an inherent repeated movement. Hence, adding additional iterations might hardly be perceived as a plural morphological marker. Besides, for some nouns it is not entirely clear what the movement of the base form is. This was made evident during discussions in elicitation sessions, where consultants were asked to produce the non-reduplicated form of certain signs. For some items, it was dubious if the sign contained lexical repetitions and, hence, what the base sign looked like.

If movement is indeed responsible for restricting the use of in situ reduplication, this explains why no noun with complex movement in LSC was found to allow in situ reduplication as a pluralization strategy. Similarly, the fact that in NGT reduplication of nouns with complex movement requires pauses between each iteration can also be understood as a strategy to indicate that the sign is not merely repeated, but that a multiplicity reading is intended.

For both DGS and NGT, simple reduplication with lateral nouns is considered ungrammatical. The same holds for LSC, see (89).

- (89) *PERSON+++
 Intended: ‘persons’



It remains as an open question why in LSC lateral nouns with no (repeated) movement in the base form are considered ill-formed when reduplicated to express plurality. According to Pfau & Steinbach’s (2006) analysis, triplication does not only increase the phonological weight of the sign, but it is also used to distinguish inherent lexical repetition of a sign from inflectional movement. As mentioned above, this does not seem to hold for LSC, given that nouns that already contain lexical repetitions do not allow for simple reduplication (nor triplication or quadruplication). Likewise, Kimmelman (2018) also considers questionable the claim that using triplication would help distinguish lexical repetition from inflectional movement. Additionally,

he challenges the status of such pluralized forms as instances of triplication in the following terms: “if a nominal sign in its single form contains a repeated movement, and in its plural form it contains three movements of this kind, then only a part of the sign is actually reduplicated, and one can speak of partial reduplication, rather than triplication” (Kimmelman 2018: 98).¹²

I hypothesize that the non-availability of simple reduplication in lateral signs might be related to the way the signing space is used for reference. Many signs can be spatially modulated in order to introduce or refer back to a discourse referent. In doing that, the lateral sides of the signing space are typically exploited. Hence, if a sign produced on the ipsilateral side contains several iterations, it is interpreted as repeatedly referring to the same entity, not to several entities of the class denoted by the noun. This is shown in the following example.

(90) YEAR++ VISIT COUNTRY+++.



‘I visit the same country every year.’

Yet another motivation for in situ reduplication not to be the preferred option to convey plurality in LSC could be due to the role that repetitions play in encoding information structure notions. In particular, focused constituents have been found to have a longer duration, a higher velocity and, crucially, to involve more repetitions of the sign than the unfocused counterparts (see, among other studies, Wilbur 1999 for ASL; Crasborn & van der Kooij 2013 for NGT; and Kimmelman 2014 for NGT and RSL). Similar results were also reported by Navarrete-González (2019) for LSC. Specifically, focused signs were associated with faster movements and more repetitions than the unfocused signs. Besides, in contrastive contexts, repetition of the movement was also found to add a more intense stress (Navarrete-González 2021).

¹²In later work, Pfau & Steinbach (2021) do also consider such instances of triplication as partial reduplication (see Section 8.3).

6.2.2.2 Modification of path movement only

As mentioned earlier, modification of the path movement is not part of the inventory of nominal pluralization strategies discussed by Pfau & Steinbach (2005, 2006) for DGS, nor by van Boven et al. (2021) for NGT. In LSC, this strategy is attested, but it is far less common than reduplication with displacement, given that not every noun for which reduplication with movement is used allows for modification of the path motion only.

The availability of this operation seems to be influenced, at least partially, by the phonological properties of the base sign. For example, no noun with complex movement has been found to allow for modifying the path movement only. However, the properties of the remaining noun types proposed by Pfau & Steinbach (2005, 2006) cannot account for the likelihood of using this operation. For instance, some lateral (91), midsagittal (92) and body-anchored nouns (93) allow for expressing the plural morpheme by modifying the path shape of the sign without also involving reduplication.

- | | | |
|------|--|---|
| (91) | PERSON _{-straight}
'persons' |  |
| (92) | BUILDING _{-straight}
'buildings' |  |
| (93) | DOCTOR _{-arc}
'doctors' |  |

Moreover, unlike what was described for in situ reduplication, no particular feature of the base sign was found to (dis)allow using this operation. Notice, for instance, that the sign HORSE, which did not permit in situ reduplication, can express plurality by modifying the path movement only.

- | | | |
|------|--|---|
| (94) | HORSE _{-straight}
'horses' |  |
|------|--|---|

Besides the potential effect of phonological constraints, yet another

reason for path movement modification not to be used with nouns is that the horizontal movement may express information regarding the spatial arrangement of the entities denoted by the noun. This contrasts with what has been observed in the case of reduplication with movement. In (95a), for instance, the standard straight-line movement is interpreted as expressing the relative position of one house with respect to the other(s). If the path movement is modified as to incorporate a path shape other than a horizontal straight motion, it may be understood as representing the arrangement of the entities in space (95b,c) or it may even lose its plural interpretation (95d).

(95) Context: I received a postcard today.

a. DESIGN HOUSE_{-straight}.

‘It had (two or more) houses forming a line.’



b. DESIGN HOUSE_{-circ}.

‘It had (three or more) houses all around.’



c. DESIGN HOUSE_{-triangle}.

‘It had (three or more) houses all around/forming a triangle.’



d. DESIGN HOUSE_{-midsag}.

‘It had one large house/two or more houses forming a line.’



Interestingly, for certain nouns, pluralization might fall somehow in between the movement only strategy and the combination of movement and reduplication. In such cases, only local movements are reduplicated, but they are more prominently abbreviated than in regular unpunctuated reduplication, see (96). This strategy, while unattested for DGS, has been also described for ASL (Wilbur 1987). In their study on nominal plurality in ASL, Schlenker & Lamberton (2019) designate this operation as “continuous repetition” of a noun (glossed as ‘cont’). According to their description, in continuous repeated signs, “the hand does not go down at all between the iterations, and these are faster, more numerous, and very hard to count” (Schlenker & Lamberton 2019: 49).

(96) TOPIC_{-cont}
‘topics’



Most nouns which entirely dropped hand-internal movements are produced in rapid signing. Yet, for other signs, pluralization by means of modification of the path movement is used irrespective of the signing speed. This is the case of the plural pronouns presented in this section, as well as other lexical signs such as CHILDREN. These observations seem to point towards a grammaticalization process, according to which displacement as a marker of plurality would be rooted in full reduplication and, over time, only movement would be retained. I will come back to this question in Chapter 8. Before concluding the chapter, I will first review the results presented so far in this section.

6.2.3 Interim summary II

The contrast between circular and straight-line shapes in pronouns is not merely a question of free alternation, as the two movements are used in different contexts, and they give rise to different interpretations. In particular, the horizontal shape specifies reference to ‘at least two’ entities (≥ 2). Besides, it cannot be used when combining three person values nor when referring to the speaker and more than one addressee. Given that circular shapes already come with an ‘at least three’ (≥ 3) condition, they are not used to refer to two entities only, irrespective of the person values that are combined.

	Straight	Circular
1+2/3	✓	*
2+2/3	✓	*
3+3	✓	*
1+2+2/3	*	✓
1+3+3	✓	✓
2+2+2; 2+3+3	✓	✓
3+3+3	✓	✓

Table 6.6: (Non-)accepted person combinations with straight and circular path shapes

For nouns, both in situ reduplication and modification of the path movement might fail to yield a plural reading, just like in situ reduplication of pronouns systematically does. The availability of these operations depends, at least partially, on the phonological properties of the base sign. However, it remains to be determined whether or not using the path movement operation is constrained by a unique phonological factor in LSC.

On top of this, modification of the path movement is also restricted by the iconic contribution that different path shapes might come with. Indeed, nouns that modify the path movement may result in being interpreted as conveying information regarding the spatial arrangement of the denoted entities (even when a straight-line shape is used) or in losing the plural reading. This contrasts to what was observed in nouns pluralized by reduplication with displacement, in which straight-line movement were simply read as plurals, but they did not convey information regarding the distribution of the entities in space.

For pronouns, only the circular shape has been found not to express information about the distribution of the referents. For ease of comparison, Table 6.7 shows the iconic contribution of different movement types with pluralized nouns and pronouns, taking into account if plurality is expressed by reduplication and displacement or by movement only. Note that in situ reduplication is not included in the chart, as items pluralized by using this operation do not combine with the path movement feature.

		Straight horiz.	Circ.	Triang.	Straight midsag.
Nouns	Red+path mov.	no	vague	vague	yes
	Path mov.	y/n	yes	yes	yes
Pronouns	Red+path mov.	no	no	yes	yes
	Path mov.	y/n	no	y/n	yes

Table 6.7: Iconic contribution of the path movement in plural nominals

6.3 Conclusion

This chapter started by asking what the basis for the split is for the preferred morphological operations used in nouns and pronouns. After comparing the use and interpretation of reduplication with movement vs. path movement only and reduplication only in the two domains, I conclude that the selected alternative is always the one with the more general meaning.

From what we have seen, nouns pluralized by means of reduplication with a straight-line movement are the most neutral in terms of the iconic information they provide. By contrast, when path shapes other than the horizontal one are selected, these may trigger iconic inferences (vague in the case of circular and triangular shapes, strong in the case of midsagittal movements). Besides, circular and triangular movements have an impact on the lower-bound reading of the iterated noun, which is systematically read as ‘at least three’.

On the other hand, nouns modified by one morphological operation only are more likely to lose the plural interpretation and, in the case of modification of the path movement, to convey information regarding the physical distribution of entities in space. In addition to that, some phonological blocking effects were identified that could inhibit the realization of the plural morpheme by using one strategy only.

Hence, reduplication + straight-line movement is the strategy with the less specific meaning. That is, it is the operation which may cover more contexts of use, as it does not come with iconic inferences and, depending on the number of iterations of the noun, it may be compatible with reference to minimum of either two or three participants.

Unlike nouns, pronouns modified by reduplication + path movement do neither give rise to iconic effects when produced along a straight-line shape nor when they incorporate a circular movement. However, it has been shown that the semantic contribution of reduplication with displacement in LSC personal pronouns is not exhaustivity nor distributive plurality, but rather paucity. This alone could be enough to explain the low frequency of the forms. Besides, the fact that the paucal value is commonly optional in the world’s languages may

further explain why the forms were not systematically found in contexts in which reference to a small quantity of entities was made. What these results suggest is that the very same strategy, (i.e., reduplication with displacement) can encode different meanings across domains and, hence, that a biunivocal correlation between forms and functions is not supported by LSC data. At this stage, it is unclear whether this analysis could hold for other sign languages or if this is rather a distinctive feature of LSC reduplicated pronouns. Be that as it may, the data presented throughout the chapter does show that more detailed descriptions on the possible interpretations of number morphemes are needed in order not to assume distinctions which may hold under very specific conditions only (e.g., when the number of referents is somewhere between 2 and 5).

On the other hand, modification of the path movement by drawing a straight-line in personal pronouns may be used to refer to either exactly two entities (in the case of first person inclusives) or to at least two (if first person exclusive or if second or third person), but they cannot be used when referring to three person values. Besides, for the first person at least, they typically yield an iconic reading according to which the referred entities are forming a line. Circular movements, by contrast, are less restrictive, since they are compatible with reference to the speaker, the addressee(s) and the non-participant(s) and they do not yield any iconic inference whatsoever. The only requirement they impose is that they always denote reference to at least three entities.

All in all, these results support the claim that nouns and pronouns in LSC differ in the strategies used to convey plurality because they both select the operation than can be used in more general contexts (i.e., the less semantically marked, cf. Section 1.1). In the case of pronouns, this is the circular path shape movement, in the case of nouns, it is reduplication with horizontal movement instead.

CHAPTER 7

Restricted groups

In this chapter I discuss whether LSC is to be considered a language that makes a formal distinction between dual and other exact number pronouns¹ (Research Question 4). As noted in Section 5.3.1, many descriptions of sign language nominal number assume that only the dual value is part of the number system, while other possible values such trial, quadral or quintal are analyzed as instances of numeral incorporation. In this chapter, I first look at the claims put forward in McBurney's (2002) influential study in relation to LSC data. Then, I provide a description of the singular-plural contrast and the use of the dual in LSC.

The chapter is structured in the following way. Sections 7.1, 7.2 and 7.3 consider, respectively, whether differences in handshape selection, movement and optionality might serve as reliable diagnosis for teasing apart possible number values from numeral incorporated forms in LSC. Section 7.4 further explores the referential behavior of dual forms, with the aim of shedding light on the possible nature of the markers. Section 7.5 concludes the chapter.

¹I will mainly refer to pronouns that change their handshape in order to convey that the sign refers to a specific amount of entities (two, three, etc.) as 'exact number pronouns' or 'restricted groups' (terminology from Cysouw 2001). To avoid repetition, I will also use the labels 'dual', 'trial', 'quadral' and 'quintal'. However, I remain agnostic for now as to their status as number values or numeral incorporated forms.

7.1 Handshape selection

One piece of evidence offered by McBurney (2002) is that in ASL the dual uses a handshape different from the one used in the cardinal numeral two. Specifically, while the numeral uses the v-configuration (Figure 7.1), the dual takes the κ -handshape (Figure 7.2). By contrast, the trial, the quadral and the quintal use, respectively, the same handshape as the numerals THREE, FOUR and FIVE. In a similar vein, the rationale behind the dual-other cardinal numbers distinction drawn in Cormier's (2002) work is that only dual pronouns have an idiosyncratic handshape in ASL.



Figure 7.1: v-handshape



Figure 7.2: κ -handshape

Related to this argument, McBurney also points out that in most spoken languages, dual and trial number are not etymologically related to numerals. According to the author, the fact that ASL trial, quadral and quintal forms use the same handshapes as the numerals, further sustains her claim that only the dual is to be considered a number value in ASL. While I do not entirely reject McBurney's claim, it must be pointed out that there are indeed spoken languages in which duals and trials are historically derived from the numerals *two* and *three* (cf. Section 5.1.3). I do agree, however, that the fact that all sign languages in which exact number pronouns have been reported derive these pronouns from numerals does represent a substantial distinction. However, whether the use of a κ -configuration (which as we shall see is known to be allophonic in other contexts in ASL) is enough to sustain a different analysis of the dual pronoun is, at the very least, open to discussion. In what follows, I give some arguments that challenge the validity of the handshape argument for LSC.

Unlike ASL, LSC dual pronouns can either take the v-handshape, which is identical to the one used in the numeral two (see Figure 7.3),

or the κ -handshape. These two configurations are not used contrastively in the language, that is, there are no minimal pairs distinguished only by whether they select the v - or the κ -handshape. Strictly speaking, the v - and the κ -handshape are not in complementary distribution. However, dual pronouns produced in the contralateral side invariably take the κ -handshape. Dual pronouns articulated on the central and on the ipsilateral side, in turn, can either take the v -handshape or the κ -handshape.



Figure 7.3: Cardinal numeral two (v -handshape)
(reproduced from Navarrete-González 2020a)

The fact that in LSC the κ -handshape is most often used when the sign takes a contralateral location may be because such a configuration requires less anatomic effort to produce it. In fact, previous studies on ASL (Eccarius 2008; Eccarius & Brentari 2010) have shown that v - and κ -handshape alternations may be explained by the addition of a [stacked] feature that enhances ease of articulation. According to Eccarius & Brentari (2010), [stacked] is a distinctive feature in the ASL foreign lexicon (i.e., the fingerspelled letters v and κ), but it does not create minimal pairs in the core component. As a result, they analyze the distribution of [stacked] as a case of modest asymmetry, according to which the alternation is allophonic in one part of the lexicon (the core) and contrastive in another (the foreign). In their analysis, [stacked] is active in core signs, meaning that it occurs in certain phonological contexts (though not always obligatorily), such as:

- i) when the palm faces inward towards the midline,

- ii) when the middle finger contacts another body part,
- iii) when the sign has an underlying palm-up orientation and/or when it involves wrist rotation to a palm-up orientation.

Crucially, [stacked] is obligatory in the first context, whereas in the latter two it is an optional feature.

Therefore, in spite the distribution of the v - and κ -handshapes in LSC seems to point towards a free variation analysis (i.e., the two configurations are not in complementary distribution), the allophonic rules suggested by Eccarius & Brentari may well explain the alternations observed in LSC data. In particular, in LSC, pronouns articulated in the central space may optionally take a κ -handshape when the palm is oriented upwards and when the pronoun makes contact with the body of the signer. Interestingly, pronouns that include the referential element 'speaker', which is morphologically marked by taking the [+proximal] feature, sometimes use the κ -configuration as well, even when there is no actual contact with the body of the signer. In fact, some first-person duals show an alternation between the κ -configuration, when the handshape moves inwards, and the v -configuration, when the handshape moves outwards. However, [stacked] is active only if the sign reaches a location close to the body of the signer. In fact, no central dual pronoun in the data is performed with a κ -handshape if the endpoint is far from the body of the speaker. This configuration may be motivated by the fact that, in order for the hand to reach a position near the body, the wrist needs to perform a movement of flexion. Finally, whenever the palm is oriented towards the midline, the sign is also performed with a κ -handshape.

Dual pronouns articulated in the ipsilateral side of the body function in a similar way. That is, they take the κ -handshape whenever there is contact, or nearly contact, with the body of the signer. When the handshape moves inwards but stops at a location far from the body of the signer, the pronouns take the v -handshape instead.

Finally, contralateral dual forms, unlike central and ipsilateral forms, always take the κ -handshape. Here, the same rules apply. That is, if the pronoun refers to the speaker and, hence, takes the [+proximal] feature or if performed with the palm oriented upwards, it takes the κ -handshape.

However, the fact that the κ -configuration seems to be mandatory even if no midline orientation was observed in the data, points to additional motivations for the activation of [stacked]. Given that contralateral dual pronouns are produced with a backwards orientation, the κ -handshape configuration may also be used to facilitate its perception. In fact, according to Eccarius & Brentari, [stacked] is motivated by both articulatory and perceptual reasons. Regarding articulation, when the middle finger contacts another part of the body, stacking the fingers eases articulation “by bringing the middle finger closer to its contact point” (Eccarius & Brentari 2010: 167). Also, orienting the palm towards the midline allows for least strain of the forearm and the wrist. In such context, stacking the fingers “enhances the perception of the fingers being spread apart” (op. cit.). I suggest that both principles (minimizing the effort and making the sign easily perceptible) may also play a role in contralateral dual pronouns. Besides, contralateral pronouns may also involve flexion of the wrist. Hence, I propose that in LSC not only rotation movements, but also those of flexion, particularly when performed to achieve a position closer to the body of the signer, may result in a [stacked] configuration.

For pronouns that convey the ‘exactly three’ meaning, two handshapes are used. Note, though, that in LSC there are two versions of the cardinal numeral THREE (see Figure 7.4), which are the very same two possible configurations adopted by the pronoun when referring to three entities (Figure 7.5).



Figure 7.4: Handshape variants of the cardinal sign THREE (reproduced from Navarrete-González 2020a)



Figure 7.5: Handshape variants of pronouns with an ‘exactly three’ meaning

Note, additionally, that the handshape used for the trial might also be produced with a stacking middle finger (Figure 7.6), just as described for ASL classifier handshapes by Eccarius & Brentari (2010). For ASL, though, I am not aware of any study that considers variation in the configuration of pronouns referring to three entities.



Figure 7.6: Trial with a stacked configuration

Similarly, the handshapes used with the numerals FOUR and FIVE do also coincide with the ones adopted by the pronoun when referring to four and five entities. LSC pronouns may also modify their handshape in order to encode reference up to ten entities. In such cases, the hand configuration is the same as the one use for the cardinal numbers.

In light of the above, I conclude that the handshape argument, while not entirely flawed, seems too weak to support a different analysis of

the dual vs. the other exact number pronouns. Even if in ASL dual pronouns always take the κ -handshape, the configuration itself may hardly be deemed unrelated to the ν -handshape (i.e., the numeral TWO handshape). As pointed out, the fact that the handshape of the dual in LSC does not always exactly match that of the numeral may result from a combination of ease of articulation and ease of perception. Frequency effects, which would be considered in Section 7.3, may further explain the κ - ν alternation in LSC. Hence, in LSC the claim that the handshape adopted by the dual is different from the one used in the numeral TWO is not sustained (not even for pronouns that take the κ -configuration).

7.2 Sign movement

According to McBurney (2002) an additional distinction between dual and numeral incorporated forms is that the former use a back-and-forth movement, while the latter are performed with a small circular movement. In LSC, however, this claim needs to be contextualized within the bigger picture of how path shapes are used with non-singular forms.

In LSC only the dual has a fixed straight movement. That is, dual pronouns, unlike the rest of exact number pronouns and multiple plurals, do not accept the incorporation of a circular movement. Yet, in light of the results presented in Chapter 6, this is exactly what we would expect, as arc/circular shape movements always come with an implication that at least three entities are being referred. Similarly, we would predict both straight and arc/circular shapes to be possible for the rest of exact number pronouns, which is exactly what we find in LSC (see Figures 7.7, 7.8, 7.9 and 7.10). Hence, the claim that forms referring to more than two referents are always performed with a circular movement does not hold in the LSC case.

As pointed out before, in LSC adopting a straight (i.e., back-and-forth) or a circular movement is part of a more general pattern which is systematically followed in plural and paucal forms. This is further supported by the fact that the same restrictions observed in non-singular forms which take a straight-line shape are also identified in the case of



Figure 7.7: Trial
(back-and-forth movement)

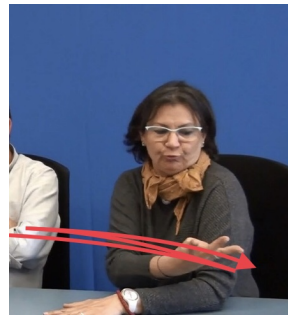


Figure 7.8: Quadral
(back-and-forth movement)




Figure 7.9: Trial
(circular movement)



Figure 7.10: Quadral
(circular movement)

exact number pronouns. Specifically, straight movements are not used to refer to three different discourse roles. For instance, a trial performed with a straight-line movement and proximal to the signer is only accepted to refer to the speaker and to two non-participants, as in (1). If used to refer to the speaker, the addressee and a non-participant, a trial that takes a straight-line movement is entirely rejected. By contrast, no such constraints are imposed whenever the trial adopts a circular movement.

- (1) IX₁ WAIT GEMMA ALEXANDRA COME, THE_THREE_{1+3+3-straight} GO
THEATER. 

‘I am waiting for Gemma and Alexandra. When they arrive, we (Gemma, Alexandra and I) will go to the theater.’

Similarly, straight-line movements are also ruled out if the intended referents of a trial form are the speaker and more than one addressee, as in (2). Again, this follows the pattern described for plurals performed with straight-line movements (cf. Section 6.2.1.2).

(2) Context: I met two friends earlier. We decided to do something together. I suggested:

*THE_TREE_{1+2+2-straight} GO THEATER.

‘We (you two and I) could go to the theater.’

Besides, I argue that in LSC what is generally described as a back-and-forth movement is better understood as a straight-line shape. In this respect, restricted group pronouns function just like plural pronouns performed with a straight-line movement. That is, they may incorporate repetitions (the so-called back-and-forth movement), or they may simply draw a single non-repeated line. Similarly, circular movements may be repeated, unrepeated or not fully completed. In the latter case, just as described for plural pronouns, the resulting form is an arc-shaped motion. In all three cases, just as in plural forms, the circular shape takes an inward direction.²

²Notice, though, that while the movements are similar to those used in plural pronouns, they are not necessarily achieved by the same means. In particular, straight-line movements are generally performed by a movement of the elbow and the wrist, particularly if it is a dual pronoun and it includes the referential element ‘speaker’. That is, the wrist is flexed in order for the handshape to reach a location close to the body. Flexion of the wrist, as mentioned in the previous section, co-occurs with a κ -handshape. Other exact numbers considered for this study did not involve wrist movements of flexion/extension. That is, trial, quadrals and quintals, when performed with a straight-line movement (whether repeated or unrepeated), were performed only via movements of the elbow. Contrary to what would be expected, though, restricted group pronouns performed with a circular shape do not involve a wrist movement of rotation. In order for exact numbers to modify the path shape, they perform the circular motion by movements of the elbow and the shoulder instead. Hence, incorporating a circular shape does not result in a change in the orientation of the hand,

All in all, this suggests that in LSC the differences observed in the motion taken by exact number pronouns is not grounded in a fundamental distinction between the dual vs. the trial, the quadral and the quintal. Rather, the contrast straight-line vs. circular motion is part of a more general phenomenon equally observed in plural forms. As a consequence, I do not take path movement patterns as reliable evidence for distinguishing dual from other exact number pronouns.

7.3 Obligatory vs. optional number

Regarding the optional vs. obligatory expression of number, McBurney (2002) argues that while dual marking in ASL is obligatory in most contexts, the trial, the quadral and the quintal are not (i.e., they are facultative). When a number value is facultative, it means that it may be substituted by other values. In the case of ASL trial and higher exact number pronouns, McBurney states that they might be substituted by plural forms. Recall, though, that according to Cormier (2002) reference to two entities in ASL might also be made by using a plural pronoun, showing that the dual is not always obligatory in ASL either.

The forcefulness of McBurney's argument is further minimized if one considers the expression of number in spoken languages. In many languages with two or more number oppositions, the expression of certain values might be facultative. Hence, for a system to have a certain number value does not necessarily mean that it must be used whenever appropriate. According to Corbett (2000), the trial seems to be always optional: "it may be that trials are always facultative" (Corbett 2000: 22). The same would also extend to paucals and greater numbers. Importantly, even the dual number may be optional in certain languages (cf. Section 5.1.2 and Plank 1996). Crucially, in languages in which the dual is facultative and the plural is obligatory, the dual is still considered

as opposed to what observed in plural forms. That is, restricted group forms preserve the same orientation (generally palm-up or backwards) when they incorporate a circular movement. No pronoun considered in this study was performed with a downwards orientation of the hand (neither complete nor partial).

a value of the number category. Similarly, there are languages in which specification of the plural value might be entirely optional. In such circumstances, we still do not treat the plural as falling outside the number system nor the language as lacking number distinctions.

Considering the above, one could simply argue that the dual is mandatory, while trial and other exact number pronouns are facultative. In fact, this is exactly the solution suggested by Miljan (2003: 208) for Estonian Sign Language (ESL). That is, trials and quadrals are part of the number system just like duals are, the relevant distinction being that trial and quadral are optional, whereas dual number is not.

In LSC, restricted group pronouns may all be replaced by plural forms. However, the dual pronoun can only be substituted by straight-line plural forms (3b), not by plural pronouns performed with a circular/arc-shaped movement (3c). Trial, quadral and quintal, by contrast, can be replaced by pronouns performed with either a circular or a straight-line movement. Depending on the referential elements referred to by the pronoun, exact number pronouns may also be replaced by uninflected forms, as in (3d) (cf. Section 7.4.2.4 for further details on the impact of person values on the expression of number).

(3) Context: [My parents]_{-a} and [my boyfriend's parents]_{-b} are planning to visit me during the spring break, but give the restrictions...

a. THE_TWO_{3+3-a} CANNOT. THE_TWO_{3+3-b} YES, BECAUSE LIVE CLOSE.



b. IX_{3-straight-a} CANNOT. IX_{3-straight-b} CAN, BECAUSE CLOSE.



c. #IX_{3-circ-a} CANNOT. IX_{3-circ-b} CAN, BECAUSE CLOSE.



d. IX_{3-a} CANNOT. IX_{3-b} YES, BECAUSE LIVE CLOSE.



'They (my parents) cannot come. They (my boyfriend's parents) can, because they live close-by.'

Restricted group pronouns referring to entities of a cardinality equal or higher than four did not appear in the corpus data analyzed for this study, nor are they common in LSC. Besides the fact that reference to pluralities was overall scarce in the corpus (cf. Section 1.3), the question

remains as to whether there is an additional motivation for restricted group pronouns higher than four or five not to be frequent in the data (and, consequently, to be replaced by plural forms). A related issue is why no spoken language has been found to have quintal forms nor to encode more than five distinctions in the number category.

Research on experimental psychology has long been concerned with the perception of discrete (i.e., exact) numbers and their relation with visual quantification (e.g. Bourdon 1908). Studies have revealed that quantifying objects whose cardinality is greater than three not only takes more time, but it also results in more errors in estimating their cardinality: “[i]t takes less than half a second to perceive the presence of one, two, or three objects. Beyond this limit, speed and accuracy fall dramatically [...] The numbers 1, 2, and 3 seem to be recognized without any appearance of counting” (Dehaene 1996: 67-68). This ability is generally referred to as ‘subitization’ (cf. Kaufman et al. 1949).

What characterizes exact number pronouns is precisely their exact interpretation.³ That is, unlike approximative numbers, which have inexact upper and/or lower bounds (Harbour 2014a), exact number pronouns do constrain the precise cardinality of the denoted referents. Since quantifying the cardinality of entities greater than three may require counting, speakers could avoid using exact number pronouns if the cardinality of the denoted entities is not contextually salient. Hence, if the numeral information is not part of the context (or else if specifying the concrete number of entities is not judged relevant), signers may use approximate forms or general number instead. That way, instead of expressing a commitment with regard to the exact cardinality of the denoted referents, they may simply express that there are a few/multiple entities (if paucal or plural forms are used) or choose not to specify number information (if general number is used instead).

It remains as an open question whether trial forms are preferred

³To be precise, exact number pronouns, just like numerals, may come with non-exact readings. See Spector (2013) for discussion on the interpretation of numerals and Dvořák & Sauerland (2006) and Marušič et al. (under review) for discussion on the interpretation of the (Slovenian) dual.

over plurals in LSC spontaneous discourse, just like dual forms are preferred over straight-line forms. Corpora data did not allow for such a comparison given the low frequency of the ‘exactly three’ condition. However, the fact that in elicitation sessions trial forms were easily prompted points to a possible explanation. The overall low frequency of trials might hypothetically be due to the low frequency of appropriate contexts of use. That is, it might be that there are less situations in which speakers introduce and refer back to three discourse referents (and even less to four or five) than to one, two or to an undefined amount. Hence, the rarity of the forms could crucially depend on frequency effects (cf. Haspelmath 2006). Similarly, dual pronouns were also not common in the corpora data, but they did appear frequently in spontaneous conversation and in elicitation sessions. The fact that their contexts of use are more common may also explain why they are more prone to language change.

The aforementioned considerations may well explain why specification of the cardinality of entities equal or greater than five is not found in spoken languages. Additionally, the fact that sign languages can express the number of referents simply by modifying the handshape results in no increased complexity of the number morphology. That is, since the specific number of referents is expressed by the very same handshapes used with numerals, it comes with no cognitive effort to produce and comprehend the numeral information. Since spoken languages tend not to derive exact number forms from numerals and given the low frequency of contexts in which using the forms would be appropriate (or even relevant), it is expected for languages not to have dedicated, complex markers to express highly infrequent and restricted meanings (“distinctions are harder to remember in rare categories” (Haspelmath 2006: 59)).

To conclude, the obligatoriness argument seems undermined by the fact that number values are often optional in both signed and spoken languages. Additionally, optionality of the forms may well be motivated by independent reasons, such as frequency effects, limitations of the cognitive system and the desire to avoid inaccuracies. Therefore, I do not consider that the obligatoriness argument supports a different analysis of dual pronouns as opposed to other exact number forms.

7.4 Additional arguments: referential possibilities

From what we have seen so far, there appears to be no argument solid enough to support a distinction between dual pronouns vs. other exact number forms in LSC.⁴ Hence, if we consider exact number pronouns as falling within the same category, the question remains as to whether they should be better considered number values or numeral incorporated forms. Before tackling this issue, I will first try to establish a dividing line between what constitutes a number value and what is it that characterizes numeral incorporation.

According to Kibort & Corbett (2008) “for a language to be considered to have a value of grammatical number, it has to be possible for that value to be recognised, either on nominal elements or through agreement, in the absence of a numeral or other quantifier”. Numeral incorporation, on the other hand, is generally described as the morphological process by which a numeral is combined with a base form (Liddell 1997).

The obvious problem is that both definitions crucially rely on the presence/absence of numerals. That is, since in LSC the handshapes used in exact number pronouns and numerals are coincident, the question is precisely whether the forms contain a numeral or not. Yet, whether or not a restricted group already comes with an incorporated numeral should also not be taken too strictly. As mentioned earlier, there are spoken languages in which exact number pronouns are derived from numerals. For instance, Slovenian nominative dual pronouns are formed by concatenating a plural pronoun *mi* (‘we’ masc.)/*me* (‘we’ fem.) and the numerals *dva/dve* (‘two’), which yields the forms *midva* (‘the two of us’ masc.), *midve/medve* (‘the two of us’ fem.) (Uhlik & Žele 2019). Hence, it is not obvious why this process or the status of the pronoun as a number value is to be considered essentially distinct from what we observe in sign language exact number pronouns.

⁴I do not assume, though, that these arguments cannot count as evidence in other sign languages for distinguishing number values from numeral incorporated pronouns.

A potential solution to solve this puzzle involves testing whether exact number forms are referentially fixed. To my knowledge, this question has not been addressed in the sign language literature. However, typological research on exact number forms in spoken languages has frequently raised the issue of whether the referential possibilities of number values such as dual, trial or quadral are limited to two, three and four entities respectively or, by contrast, if they might be used to refer to a greater amount of referents. The following quote from Cysouw (2001: 235) illustrates this: “[t]he exact referential possibilities for the dual and trial are taken for granted in most grammars. Only in a few descriptions is the usage of these categories extensively described. In those cases, it turns out that it is possible to deviate from the exact number of participants”.

The following subsection takes a closer look at the use of exact number forms in LSC. I will confine the discussion to dual forms, as they are the ones considered to have a different status as number values in other sign languages.

7.4.1 Reference of the dual

The dual is used to refer to exactly two persons or two objects (cf. Slobodchikoff 2019) or to pairs of things that usually appear together (natural pairs such as ‘eyes’ or *dualia tantum* nouns like ‘trousers’). The first use of the dual is usually referred to as arbitrary dual, the second as paral or pseudo-dual.⁵

At first sight, dual pronouns in LSC appear to be used to refer to two individual entities, just as described for ASL (McBurney 2002) and for many spoken languages (Corbett 2000) and, as a result, the plural may be restricted to refer to three or more entities. The last point is beyond discussion, at least with respect to plural forms that take a circular movement (cf. Section 6.2.1.2). Regarding the first claim, the situation

⁵Other labels used in the literature to designate the arbitrary dual include ‘duopaucal’, ‘enumerative-dual’, ‘arithmetic dual’, ‘countable-dual’ or ‘analytic dual’. The paral, in turn, is also referred to as ‘ambal’ or ‘synthetic dual’ (Benítez Burraco 2005).

is not so straightforward, though. In fact, positing a constraint on the nature of the entities a dual can refer to (i.e., ‘individual entities’ or ‘real world entities’), faces the problem that it cannot account for the fact that in LSC the dual can felicitously pick up two plural antecedents, see (4) and (5).

- (4) [CHILDREN]_{-a} SCHOOL START TODAY. [UNIVERSITY STUDENT
IX_{3-circ}]_{-b} START WEEK NEXT. THE_TWO_{-a-b} HAPPY. 🎥
‘Children started school today. Undergraduate students will start
next week. They (the children and the undergraduates) are happy.’
- (5) [PERSON-rep2 WOMAN]_{-a} [PERSON-rep2 MAN]_{-b} THE_TWO_{-a-b}
HAPPY. 🎥
‘The women and the men are happy.’

Interestingly, Dvořák & Sauerland (2006) discuss similar examples involving the use of dual number with coordinated elements. In Slovenian, the dual is obligatory when conjoining two singulars that refer to pairs of entities, as in (6).

- (6) *Slovenian*
Janez in Tone sta srečn-a.
John and Tony be.DU happy-DU
‘John and Tony are happy.’ (Dvořák & Sauerland 2006)

However, if the coordination contains a singular and a plural subject (7) or a singular and a dual (8), the plural is used instead of the dual.

- (7) *Slovenian*
Janez in gospodje so srečn-i.
John and gentleman.PL be.PL happy-PL
‘John and the gentlemen are happy.’ (Dvořák & Sauerland 2006)
- (8) *Slovenian*
Midva in Andrej smo šli v kino.
we.DU and Andrej be.1PL go.PL in cinema
‘We went to the cinema with Andrej.’ (Uhlik & Žele. 2019: 119)

According to Dvořák & Sauerland (2006), this shows that Slovenian dual pronouns do not contain an elided NP containing either *both* or *two*. Indeed, should this be the case, conjoining a singular and a plural should also result in using the dual number. This is not the case of Slovenian, but it is exactly what we observe in LSC when two plural antecedents are referred back to by means of a dual pronoun, as in (4) and (5) above.

To better understand this use of the dual pronoun, I will first go back to the singular-plural contrast, as well as to the use of uninflected forms when referring to pluralities in LSC and in other sign and spoken languages more generally.

7.4.2 Back to the singular-plural opposition

As pointed out in Section 5.1.1, in languages with a morphological opposition between singular and plural, the distinction between the two seems a rather simple one: the singular is used to denote one entity and the plural to entities of a cardinality greater than one. In a mereological framework, Link (1983) reformulates this opposition as follows: singular nominals refer within the domain of atomic entities (i.e., ordinary individuals), and plural nominals refer within the domain of sums of entities (i.e., collections of more than one atom). This distinction is illustrated in the diagram in Figure 7.11 assuming a model that contains three atoms and where \oplus corresponds to the sum operator.

Yet, cross-linguistic studies on the semantics of number have revealed that, despite the number distinctions a language has, some nominals have a number neutral interpretation. Number neutral forms do not restrict the cardinality of the entity they refer to, so they can be interpreted as either singular or plural. For example, bare plurals have been shown to be verified by both atomic and non-atomic individuals in downward entailing contexts. What this essentially means is that, in certain contexts (e.g., when in the antecedent of a conditional or under negation), the plural form loses its plurality inference. For example, ‘Arthur didn’t see dogs in the park’ is interpreted as ‘Arthur didn’t see one or more dogs’, instead of ‘Arthur didn’t see multiple dogs in the park’. These facts led researchers to postulate that the plural is semantically number

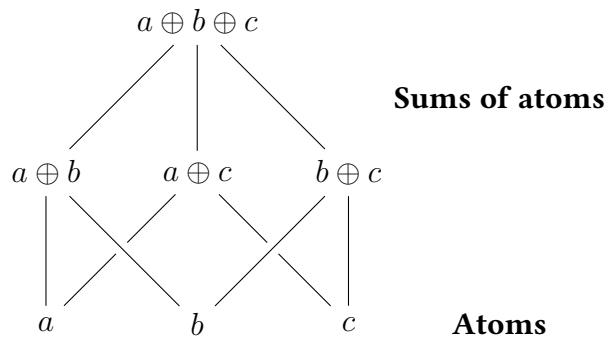


Figure 7.11: Join semi-lattice with three atomic elements (a , b and c)

neutral. Against the exclusive view of plurals (Link 1983; Chierchia 1998), according to which plural nouns exclude atoms of its denotation, inclusive analyses (Sauerland 2003; Sauerland et al. 2005; Spector 2007; Zweig 2009; a.o.) assume that the plural includes both atoms and sums in its denotation (i.e., the entire semi-lattice structure).⁶

⁶The inclusive interpretation of plural nouns in downward entailing environments has been documented in several languages, but there are languages in which plurals are always interpreted exclusively. For example, in Western Armenian (Bale et al. 2011b) or ASL (Schlenker & Lamberton 2019; Koulidobrova 2021), plural nouns range strictly over sums. That is, plural expressions in ASL do not allow for singular readings. This is why the entailment pattern shown in (9) for English is reversed in ASL, see (10).

- (9) *English*
 Do you have children?
 a. Yes, I have one child.
 b. #No, I have one child.
- (10) *ASL*
 $\frac{\text{HAVE CHILDREN}}{\text{y/n}}$
 ‘Do you have children?’
 a. #YES, HAVE ONE DAUGHTER.
 ‘Yes, we have one daughter.’
 b. NO, ONLY ONE DAUGHTER.
 ‘No, only one daughter.’

(adapted from Koulidobrova 2021: 221)

The following denotations exemplify the distinction between exclusive (11a) and inclusive interpretations (11b) for a plural noun such as *dogs*:

- (11) Denotation of the plural noun $\llbracket \textit{dogs} \rrbracket$:
- a. Exclusive interpretation $\llbracket \textit{dogs} \rrbracket = \{a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$
 - b. Inclusive interpretation $\llbracket \textit{dogs} \rrbracket = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$

An alternative analysis to inclusive theories is proposed in Farkas & de Swart (2010). They argue that it is the singular, and not the plural, the semantically weaker form. In their account, the morphologically unmarked form (i.e., the singular) is number-neutral and the atomic reading of the singular comes about a result of the competition between singular and plural forms. The marked form (i.e., the plural), in turn, is ambiguous between the exclusive interpretation, which forces reference to sums, and the inclusive, which may refer either to atoms or to sums of atoms. Farkas & de Swart's proposal reconciles the alleged correlation between semantic and morphological markedness (the so-called *Horn pattern*, cf. Section 1.1), according to which morphologically less marked expressions (i.e., the singular, in the case of the number system) express less marked meanings. By contrast, under inclusive analyses, it is the morphologically marked form (i.e., the plural) the one that expresses the more general meaning.

7.4.2.1 Bare nouns in languages with general number

While number neutrality might be typical of plural forms in some languages, for others it is the bare (singular-looking) form the one that is compatible with both singular and plural interpretations. Bare nouns should be understood here in the sense of Corbett's (2000) 'general number', as discussed in the Section 5.1.7. That is, in certain languages, nouns might be unspecified for number, meaning that they are neither singular nor plural. This is exemplified in (12).

- (12) *Mandarin Chinese*
 Zuotian wo mai le shu.
 yesterday I buy ASP book
 ‘Yesterday, I bought one or more books.’

(Rullman & You 2006)

According to Rullmann & You’s (2006) analysis, the main distinction between singular nouns in languages like English and in languages such as Mandarin Chinese is that the English singular denotes sets of atoms, while in Mandarin Chinese the extension of a noun with general number includes both atoms and sums. This distinction is illustrated in the denotations below: (13a) for the English singular noun *book*; (13b) for the unmarked noun *shu* (‘book’) in Mandarin Chinese. Note that under this analysis, the denotation of a noun with general number coincides with the one provided for English inclusive plurals.

- (13) a. Denotation of singular nouns in English-type languages:
 $\llbracket book \rrbracket = \{a, b, c\}$
 b. Denotation of a noun with general number in Chinese-type languages:
 $\llbracket shu \rrbracket = \{a, b, c, a \oplus b, a \oplus c, b \oplus c, a \oplus b \oplus c\}$

Unspecification of number, either optional or obligatory, is taken as evidence that these bare nouns are number neutral⁷ (Krifka 1995; Rullmann & You 2006; Wilhelm 2008; Farkas & de Swart 2010). Indeed, as mentioned in Section 5.1.7, Rullmann & You (2006) show that general number in Mandarin Chinese is not semantically ambiguous, but rather compatible with singular and plural reference (i.e., unspecified for number). One of the tests they use, following Zwicky & Sadock (1975)

⁷Besides, there are languages which, despite having a singular-plural opposition, do not mark the noun for plural when in the scope of numerals or quantifiers. Examples include Turkish (Bale et al. 2011a), DGS (Steinbach 2012) and ASL (Koulidobrova 2021). Other languages, such as Western Armenian (Bale et al. 2011a), ESL (Miljan 2003) and LIS (Pizzuto & Corazza 1996) have been found to optionally use nominal pluralization in the same contexts. This is also the case of LSC, where nouns in the scope of numerals and quantifiers might appear either uninflected or marked for plural (e.g., reduplicated).

and Cruse (1986), involves conjoined sentences with object deletion in the second conjunct (the Mandarin equivalent of VP deletion in English). Whereas ambiguous nouns, when deleted in the second conjunct, are always interpreted with the same sense as the first occurrence of the noun in the first conjunct, unspecified nouns can be read differently. For instance, sentence (14) can either mean that both John and Mary saw a writing implement or an enclosure, but not that each saw a different object. That is, *pen* is ambiguous in English. By contrast, sentence (15) can mean that both the speaker and John bought one book, that they both bought more than one, that the speaker bought one book and John more than one or the other way round. Hence, the form *shu* ('book') in Mandarin Chinese is not ambiguous, but rather unspecified for number.

(14) *English*

John saw a pen and Mary did too.

(15) *Mandarin Chinese*

Zuotian wo mai le shu. Yuehan ye mai le.
yesterday I buy ASP book John also buy ASP
'Yesterday, I bought one or more books. So did John.'

(Rullman & You 2006)

7.4.2.2 Optional number marking in sign language nouns

Previous research in different sign languages has highlighted the fact that nominal number morphology is often optional. For example, for ASL it has been shown that number is generally not encoded in the noun phrase and the interpretation of bare nominals is influenced by the context, pragmatic plausibility and by the verb type (Petronio 1995). Neidle & Nash (2012) further argue that reduplicated forms are more likely to appear in prosodically prominent positions, such as when the noun is sentence-final or when it receives stress associated with pragmatic focus.

For NGT, Zwitserlood & Nijhof (1999) found that reduplication is not systematically used to express plurality. In fact, in about half of all nouns they elicited, the articulation of nominals referring to plural objects did not show any difference from nouns referring to singular objects. In

an elicitation task of nominal plurality, van Boven (2020) contradicts this view when claiming that reduplication is a frequent pluralization strategy in NGT. Nonetheless, 38.1% of the nouns van Boven elicited were not inflected for number when a plural reading was intended (in the terminology used by the author, such uninflected nouns correspond to instances of ‘zero marked’ plurals).

As pointed out in Chapters 5 and 6, zero marking is referred to as a possible pluralization strategy in DGS (Pfau & Steinbach 2005, 2006) and NGT nouns (van Boven et al. 2021), which means that the plural morpheme is realized as zero. This line of analysis differs from Koulidobrova’s (2021) take on ASL uninflected nouns. Using the same tests reported above for Mandarin Chinese, Koulidobrova shows that nouns not overtly marked for plural in ASL allow for both singular and plural readings. The coordinated sentence in (16), for example, can mean that both John and Mary saw one ball, that they both saw multiple balls, that John saw one ball and Mary multiple balls and that John saw multiple balls and Mary one ball only.

- (16) *ASL*
 JOHN SEE BALL, MARY SAME.
 ‘John saw ball/balls, and Mary did too.’

(Koulidobrova 2021: 219)

Considering these results, Koulidobrova claims that ASL is best defined as a number neutral language, considering ‘neutral’ to mean that it does not force obligatory number morphology (i.e., akin to what Corbett (2000) calls ‘general number’). Hence, unlike Pfau & Steinbach (2005), who claim that when reduplication is blocked in DGS, the plural form is realized by zero marking, Koulidobrova (2021: 230) states that in ASL, when plurality is not marked, the form is number neutral (i.e., unspecified for number), not a zero-exponent “or any other ‘invisible’ value”.⁸ By contrast, when plural morphology is present, the noun can only denote

⁸For LSE, Costello (2016: 256) similarly claims that unmarked nouns have a general number value.

non-atomic individuals, irrespective of whether it appears in downward entailing contexts (see footnote 6) or in upward entailing ones. The only available interpretation of sentence (17), for example, is that John and Mary each saw multiple balls.


- (17) *ASL*
 JOHN SEE BALL+++ MARY SAME.
 ‘John saw balls; Mary did too.’

(Koulidobrova 2021: 219)

7.4.2.3 Optional number in LSC nouns

Just as it has been described for other sign languages, number is not obligatorily marked on LSC nouns, even when the phonological properties of the base noun allow for inflection.⁹ Hence, LSC nouns might not take any plural morphology whatsoever, but they might get either way a plural interpretation. The question is: are these forms zero marked, as proposed for DGS and NGT, or are they number neutral, as suggested for ASL?

As pointed out before, identity tests involving coordinated sentences with VP deletion in the second conjunct allows us to differentiate whether an expression is ambiguous vs. unspecified/vague.¹⁰ To see how this works in LSC, consider the two following sentences.

- (18) TODAY, IX₁ MEET ONE STUDENT, ALEXANDRA TOO. 
 ‘Today, I met one student; Alexandra too.’

⁹Two nouns have been found to always require number morphology if a plurality reading is intended. These are KID and PERSON. In fact, plural inflection is also required if the nouns appear in the scope of numerals or quantifiers. The tendency for nouns higher in animacy, such as nouns referring to humans, to express number obligatorily is cross-linguistically common (cf. Smith-Stark (1974) and Dixon’s hierarchy in Section 2.2).

¹⁰Other terms proposed in Zwicky & Sadock (1975) are ‘indefinite’, ‘unmarked’, ‘indeterminate’, ‘general’ and ‘neutral’.


- (19) Context: Alexandra and I conducted a program on cancer today.
I tell you:

TODAY IX₁ INTERVIEW PERSON DOCTOR/PATIENT, ALEXANDRA
TOO.


‘Today I interviewed a doctor/patient; Alexandra too.’ 

Sentence (18) has four possible readings: that both Alexandra and I met a female student, that we both met a male student, that I met a female student and Alexandra a male student or the other way round. Hence, in LSC the sign STUDENT is unspecified for gender, rather than ambiguous. By contrast, sentence (19), like the English example in (14) can only be true in two scenarios: one in which both Alexandra and I interviewed a doctor or one in which we both interviewed a patient. Hence, the sign DOCTOR/PATIENT is ambiguous in LSC, not vague/unspecified.


If uninflected nouns were instances of zero marking, we would expect the deleted material to be read as the first occurrence of the noun. Hence, they should be read as referring either to singularities only or to pluralities only. ‘Crossed understandings’ (Zwicky & Sadock 1975), by contrast, should not be available (i.e., getting a singular reading in the antecedent and a plural in the deleted phrase or the other way round). If uninflected nouns were unspecified for number instead, we would expect the same four readings in sentence (18) to obtain, as they do. As shown in (20) and (21), sentences with uninflected nouns can indeed be true in four different scenarios. For example, sentence (20) can mean that Alexandra and I each met multiple students, that we met one student each, that I met one student and Alexandra met multiple students and that I met multiple students and Alexandra met one student only. Similarly, sentence (21) can be true in a situation in which both the Spanish and the Catalan Prime Minister have more than one child, one in which they both have one child and one in which one has multiple children and the other one child only. Hence, the uninflected signs STUDENT and CHILD are vague in LSC (i.e., unspecified for number), not zero-marked.

- (20) TODAY, IX₁ MEET STUDENT, ALEXANDRA TOO. 

‘Today, I met student/students; Alexandra too.’


- (21) GOVERNMENT SPAIN PRESIDENT CHILD THERE_IS, IX₃
 GOVERNMENT GENERALITAT TOO. 
- ‘The President of the government of Spain has child/children; and so it has the President of the Generalitat (Catalan government).’

By contrast, nouns overtly marked for plural in coordinated sentences are necessarily read as plural in LSC.¹¹ The only possible reading of sentence (23), for example, is that both the Spanish and the Catalan Prime Minister have more than one child.

- (23) GOVERNMENT SPAIN PRESIDENT CHILD-rep2 THERE_IS, PRESIDENT
 GENERALITAT TOO. 
- ‘The President of the government of Spain has children; the President of the Generalitat (Catalan government) too.’

In view of these results, I conclude that uninflected nouns in LSC are unspecified for number (i.e., they have ‘general number’), in line with what has been previously proposed for ASL by Koulidobrova (2021). Hence, LSC nouns use three operations to convey plurality, two of which are also found in DGS and NGT, and one that is only attested in LSC. These results are summarized in Table 7.1.

¹¹However, unlike ASL, pluralized nouns in downward entailing environments do not impose an exclusive-only interpretation. That is, in such contexts, the interpretation of plural nominals in LSC is not ‘more than one’, but rather ‘one or more’. For this reason, sentence (22) is reported not to truthfully describe the situation, since the applicant has one paper published and the pluralized sign PAPER-rep ranges over both singularities and pluralities. The inclusive reading of plural nouns was found to be as robust when nouns are under the scope of negation as when they appear in questions or in the antecedent of a conditional.

- (22) Context: We are offering a job at our research group and we are reviewing the applicants CVs. One of them has one paper published. I tell you:
- IX₃ PERSON PAPER-rep3 THERE_IS_NOT. 
- ‘This person does not have (one or more) articles.’

	DGS/NTG	LSC
Zero marking	✓	*
In situ reduplication	✓	✓
Reduplication + path mov.	✓	✓
Path mov.	*	✓

Table 7.1: Pluralization strategies in DGS, NGT and LSC nouns


7.4.2.4 Uninflected pronouns in LSC

Optional number morphology in sign language nouns shows that forms and functions do not always trivially map onto each other, but when it comes to personal pronouns, most sign language analyses tend to assume a ‘straightforward’ correlation between forms and the meaning they express (McBurney 2002; Cormier 2012). For example, it is generally assumed that whenever a pointing sign is uninflected for number, its reference is always singular (that is, the reading of the sign corresponds to ‘exactly one X’). As mentioned in Section 5.3, IPSL does not pattern this way, as it has been reported to have a general number pronoun (Zeshan 2003), consisting in a pointing sign produced with the index-finger that can be used to refer to one or more than one entity. In IPSL, general number forms are used irrespective of the person value of the pronoun. Thus, a pointing sign directed to the signer can be interpreted as either ‘I’ or ‘we’. Regarding the use of general number in IPSL, McBurney (2002: 353) claims that “IPSL is clearly the exception (no other signed languages studied have patterned this way)”. However, it has long been noted that, even in ASL, reference to multiple non-participants may be achieved with pronouns lacking plural morphology (Friedman 1975).¹² Nonetheless, there is no information as to whether the forms are to be analyzed as


¹²Other studies referring the possibility of using uninflected forms are Barberà (2015) for LSC pronouns and Padden (1990) for ASL verbs. Both authors describe these unmarked forms as collective plurals (i.e., plurals that are viewed as collections or groups).

general number, as in the case of IPSL, or as phenomenon of a different nature.

In LSC as well, both corpus and elicited data suggest that using uninflected forms is by no means restricted to bare nominals or to nominal phrases containing numerals or quantifiers. In the pronominal domain, this is equally observed. In (24), for instance, a non-pluralized pronoun is interpreted as referring to a non-singleton set (the entire group of friends referred to in the previous sentence).

- (24) TODAY IX₁ START HOLIDAYS, COINCIDENCE [FRIEND IX_{3-circ}]_{-a} TOO.
 IX₁ STAY BARCELONA, IX_{3-a} GO TRAVEL. 
 ‘My holidays start today, and so do my friends’. I am staying in Barcelona, they are going on a trip.’

However, uninflected forms do not get a plural interpretation across the board. To better understand the use and distribution of optional number marking on LSC pronouns, the Person Hierarchy (cf. Section 2.2) needs to be taken into account, since the availability of the plural reading depends on the person value of the group the pronoun refers to. When referring to a plurality of non-participants, either non-present, as in (24), or present, as in (25), plural morphology may remain unexpressed. In such cases, the articulation of the pronoun is identical to one produced when the intended referent is singular. The crucial difference is that, since the uninflected third person pronoun in (24) is bound to its antecedent, it cannot yield a ‘one or more’ reading (i.e., it is not compatible with reference to one of the speaker’s friends only); whereas the pronoun in (25), given the proper context, might be interpreted as having either singular or plural reference.

- (25) Context: In a comic play, to make fun of the audience, one performer says to the other:
 IX₃ FOOLISH. 
 ‘They are foolish.’

On the other hand, when referring to the speech act participants (i.e., speaker and addressee), pronouns not marked for plural typically trigger

the presupposition that the entity to be recovered is singular, as in (26):

- (26) Context: IX₁ FRIEND IX_{1-circ} HOLIDAYS START TODAY, IX₂ IX_{2-circ} FRIEND GROUP ALSO.

‘My friends and I start our holidays today, and so do you and your friends.’

IX₁ GO TRIP, IX₂ STAY.



‘I am going on a trip and you.SG are staying.’

In judgment tasks, both consultants uniformly accepted the use of uninflected forms to refer to the non-participants. By contrast, forms not morphologically marked for plural were systematically rejected if the intended referent was a group containing the speaker. Hence, the likelihood for number to be expressed is explained in accordance with the Person Hierarchy, given that optionality affects the rightmost element of the scale (i.e., the third person), whereas number is obligatorily expressed in the leftmost element (i.e., the first person).

However, judgments were far less consistent when the forms were used to refer to the addressees. In fact, while a tendency was observed for uninflected second person pronouns to be read as referring to one addressee only, they may sometimes be interpreted as referring to multiple individuals, see (27). Hence, simply relying on the focal referent of the pronoun is not enough to account for the possibility for it to get a plural interpretation.

- (27) Context: During class, the professor noticed that her students look sleepy. She asked:

IX₂ TIRED?



‘Are you.SG/PL tired?’

From the data available, it seems that form-meaning mismatch is more likely to be accepted when the group the pronoun refers to is homogeneous and to be rejected when it is heterogeneous (for the distinction between homogeneous/additive vs. heterogeneous/associative plurals, see Section 2.1.2).

Although an analysis of these uses is still pending, I would like

to point a potential line of approach for the reported contrasts in acceptability by appealing to Landman's notion of 'group'. Following Link's (1983) analysis of singularities and pluralities presented in Section 7.4.2, according to which singularities refer within the domain of atoms and pluralities within the domain of sums, Landman (1989, 1996) introduces the notion of 'group'. Groups, according to Landman, are atoms derived from sums. This is why they are also referred to as 'atomic groups' or 'impure atoms'. Classical examples are collective nouns that denote groups as 'the team', 'the group' or 'the committee'. According to Landman's (1996) analysis, the group-forming operator \uparrow maps sums of individuals into impure atoms. For example, applied to the set $a \oplus c$, the group-forming operator returns the atomic group $\uparrow(a \oplus c)$. As Landman puts it "the noun phrase *the boys* can shift its interpretation from a plural interpretation, $\sigma(*\text{BOY})$, the sum of the individual boys, to a group interpretation, $\uparrow(\sigma(*\text{BOY}))$, the boys as a group" (op.cit: 427). The fundamental distinction between sums and groups is that, while the former have proper parts, the latter do not. Hence, atomic groups are conceived as entities in their own right.

What I am suggesting is that it would be plausible to assume that pronouns might undergo a similar operation, but for it to hold the referential set should contain individuals of a similar kind (i.e., homogeneous). What this essentially means is that for an uninflected pronoun to get a non-singular interpretation, it must refer to a group in which all the members are on the same discourse role (i.e., the same person value).¹³ This would explain why unmarked forms are allowed in (24) and (25) and blocked in (26). Yet, further research is needed in order to understand why, even if uninflected forms may be understood as having plural reference, the judgments obtained are less robust in the case of second person than in third and first person pronouns. Be that as it may, if these forms are of interest for the present discussion it is because the restrictions observed in the use of uninflected forms do also have an impact on the use of dual pronouns.


¹³Homogeneity of the set has also been assumed for collective and for mass nouns, among others, by Lønning (1987).

7.4.3 The dual in LSC


When dual pronouns are used to refer to groups in LSC, the same constraints described above for uninflected pronouns can also be observed. That is, the likelihood of using a dual pronoun to refer to groups decreases as we move leftwards in the Person Hierarchy. Besides, the use of the dual shows less consistency across consultants and contexts when used to refer back to second person plural antecedents. Hence, the following principles apply:

- i) a first-person plural does not qualify as a possible antecedent of a dual pronoun,
- ii) the dual can be used to pick up any third person form as antecedent,
- iii) the dual cannot take a second person with associative interpretation (2+3+3) as an antecedent,
- iv) the dual can take a second person with additive interpretation (2+2+2) as an antecedent.



Constraints i) and iii) were found to hold systematically in judgment tasks. Both consultants rejected the use of the dual to recover pluralities containing either the speaker and other (non-)participants (1+2/3+2/3) or the addressee and other non-participants (2+3+3). Crucially, the use of a dual form is not considered ungrammatical in such contexts, but rather ineligible to refer back to heterogeneous sets containing the speaker or the addressee. This is shown in the following example:

- (28) Context: LAST_YEAR [IX₁]_{-a} TRIP NOTHING [IX₂ GROUP IX_{2-circ} FRIEND NEITHER]_{-b}.
 ‘Last year, I made no trip, neither did you nor your friends.’
 NEXT CHRISTMAS THE_TWO_{-a-b} GO TRIP? 
 ‘Next Christmas, we (you.SG and me) (could) make a trip.’
 (Intended: ‘Next Christmas, we (me, you and your friends) (could) make a trip.’)

The acceptability of the dual in context ii) is confirmed by examples involving two third person plurals as antecedents, as in example (4), repeated below as (29). The combination of the sets (3+3+3)+(3+3+3) was systematically considered acceptable by the two consultants (both judging different sentences, as well as the same or similar sentences on different occasions).

- (29) Context: [CHILDREN]_{-a} SCHOOL START TODAY. [UNIVERSITY STUDENT IX_{3-circ}]_{-b} START WEEK NEXT.
 ‘Children started school today. Undergraduate students will start next week.’
 THE_TWO_{-a-b} HAPPY. 
 ‘They (the children and the undergraduates) are happy.’

However, when a third person plural is combined with singular antecedents, judgments are not uniform. Sentences of the form of (30), in which the dual pronoun has a third person singular and a third person plural as antecedents, are systematically judged felicitous by one consultant (Consultant A), but not by the other (Consultant B). Similarly, sentence (31), which has a first person singular and a third person plural as antecedents, is equally considered ambiguous for Consultant B.


- (30) Context: [ALEXANDRA HOLIDAYS START TODAY]_{-a} [IX_{3-circ} FRIEND TOO]_{-b}.
 ‘Alexandra’s holidays start today and so do their friends.’
 THE_TWO_{-a-b} GO TRIP HOLIDAYS. 
 Consultant A: ‘They (Alexandra and her friends) are going on a trip.’
 Consultant B: ‘They (Alexandra and her friends/Alexandra and one of her friends) are going on a trip.’
- (31) Context: TODAY [IX₁]_{-a} START HOLIDAYS. [IX_{3-circ}]_{-b} FRIEND TOO.
 ‘My holidays start today, and so do my friends.’
 THE_TWO_{-a-b} GO TRAVEL ITALY. 
 Consultant A: ‘We (my friends and I) will make a trip to Italy.’
 Consultant B: ‘We (my friends and I/one of my friends and I) will

make a trip to Italy.’

According to Consultant B, adding the sign TOGETHER (THE_TWO_{a-b} TOGETHER TRIP) suffices for sentence (30) to get the interpretation ‘Alexandra and her friends’. Similarly, Consultant A, while not considering the sentence ambiguous, prefers to drop the dual and use the sign TOGETHER instead. For Consultant B, sentence (31) would be unambiguously interpreted as referring to the speaker and her friends if either a first-person plural pronoun (IX_{1-circ}) or a first person singular and an uninflected pronoun (IX₁ IX₃) were used instead.


The dual pronoun is also accepted in scenario iv), that is, when a plurality of addressees is one of the antecedents of the dual. However, for the dual to be able to recover a second person plural as antecedent, it must be combined with a third person plural, as in (32), or with another second person plural with additive interpretation, as in (33). Crucially, the context (linguistic or extralinguistic) must provide the information that the referents are clustered in groups. However, just like it has been described for uninflected second person pronouns, the dual in sentence (33) is compatible with a reading in which it refers to two individuals only and one in which it refers to the six individuals in the context.

- (32) Context: Students are concerned about going on Erasmus. The professor tells them:

LAST_YEAR STUDENT IX₃ ERASMUS ALREADY TOUCH, IX₃
EXPERIENCE VERY_GOOD. IX₁ 1ADVICE₂ THE_TWO₂₊₃ TALK. 

‘Last year students have already gone on Erasmus. They had a very good experience. You (last year students and you.PL) should talk.’

- (33) Context: I work as a teacher. During class, I am explaining the next activity to my students, which consists of several parts. They are grouped in threes.

IX₂-IX₂ RESPONSIBLE FIRST PART. WORK FINISH, THE_TWO₂₊₂
a-GIVE_b SECOND GROUP. 

‘You (one/three) and you (one/three) are in charge in charge of the first part. Once you finish it, you (two/six) will give it to the

second group.’

Finally, using a dual pronoun to refer to three different person values (e.g., $(1+2) + (2+3)$) is always out. However, this is not because the handshape excludes reference to a cardinality greater than two, but because the path movement of the sign already rules out this possibility (cf. Section 6.2.1.2).

Based on these results, dual pronouns in LSC cannot be argued to denote ‘two distinct real word entities’ (Corbett 2000: 20) or ‘sums of exactly two (atomic) entities’ (Zabbal 2002: 48), but rather to presuppose a cardinality of two, that can be interpreted as referring to sums of:

- a) two atomic individuals, in which case, any person value is acceptable,
- b) two atomic groups (impure atoms): if person value of both groups is [3] or additive [2] (if [2] is included, then the context must refer to groups),
- c) a combination of an atomic individual and an atomic group: only if the group value is [3].

Interpretation c) is not uniformly accepted, as only one consultant considered the use of the dual systematically felicitous in that scenario. It remains to be studied if this split is attested in a wider population of LSC signers or if there is a tendency for the dual to be either rejected or accepted in the ‘atomic individual + atomic group’ context. Hence, the picture just described leaves us with the following interpretation for the so-called dual pronoun:

Any person value	Atomic individuals	= 2 atomic
If person value is [3]	Atomic	individuals or
If person value is additive [2] (+ context)	groups	atomic groups ¹⁴

Table 7.2: Reference of the dual in LSC

7.4.4 Discussion

I started this section by asking whether dual pronouns in LSC were used to encode an ‘exactly two’ meaning. From what I have explained, it seems clear that in LSC the reference of these forms goes beyond ‘exactly two people or objects.’ Yet, note that the referentiality of the form is also not indeterminate in the sense reported in the literature for other pronouns which had expanded their meaning so as to cover larger groups (e.g., in a paucal-like fashion). To see this more clearly, for a universe of discourse with the elements a , b and c , as in the diagram in Figure 7.11, the dual is assumed to denote the set of sums $\{a\oplus b, a\oplus c, b\oplus c\}$ (Ojeda 1992). That is, it denotes sums of ‘exactly two (atomic) entities’ (Zabbal 2002: 48) (i.e., the intermediate row in the diagram in Figure 7.11). In LSC, this denotation does not account for all the possible readings of the forms, as we just have seen. In fact, only inclusive pronouns (1+2) are necessarily interpreted this way. However, this interpretation is not specific to the so-called dual pronoun. As pointed out in Section 6.2.1.2, first person inclusive pronouns performed with a straight-line movement also come with a dual semantics (i.e., they necessarily refer to the speaker and exactly one addressee). Hence, this ‘pure’ dual meaning seems to be derived from alignment and the movement parameter, which is what both signs share, rather than from the handshape adopted by the pronoun. Therefore, in LSC it might be superfluous to attribute to the configuration of the hand a number distinction which can be accounted for simply by considering the path movement of the sign and the alignment/misalignment of coordinates pattern described in Part I.

On the other hand, forms other than the inclusive may or may not match the denotation above. As with person distinctions, the precise numerosity of each of the denoted referents might be inferred in actual discourse, but the form alone does not constrain the cardinality of the group referred to. In fact, the ‘exact number’ ingredient that arguably

¹⁴I did not consider downward entailing environments, so it remains to be determined whether dual forms in LSC have a systematic ‘exactly 2’ interpretation or if ‘at least 2’ readings are also available.

sets apart duals from other non-exact numbers (i.e., plurals or paucals) fades away in many of the examples provided in this section. That is, the pronoun might refer to a set containing two participants only, but it might also refer to sets containing six, as in (33), and even an indeterminate number, as in ‘the children and the undergraduates’ in (29).

In order to account for this behavior of the dual in LSC, we would have to redefine the reference domain of the dual as to include atomic groups in it. However, it is far from clear whether there are other spoken or sign languages that use the dual number this way that could justify this move. To my knowledge, the closest example to the use of the dual showed above is found in Arabic, which allows some group nouns to take dual feminine agreement. This is shown in (34), where the conjunction of two lexical plural nouns takes dual agreement.

- (34) *Arabic*
 l-furs-u wa t-turk-u ta-ta-faawad-aani.
 the-Persian-NOM and the-Turk-NOM UNIT-REC-negotiate-DU
 ‘The Persians and the Turks (as groups) negotiate with each other.’
(Fassi Fehri 2020: 92)

Besides, further evidence from LSC (Zorzi 2018) suggests that using dual forms is not restricted to atomic entities or atomic groups only, since the very same form can also be used to refer back to two conjuncts in coordinated structures, see (35). According to Zorzi (2018: 124), the sign THE_TWO is used to mark the accomplishment of the two events in the conjuncts it refers to.

- (35) MARINA PIZZA EAT, ICE_CREAM BUY THE_TWO.
 ‘Marina both ate pizza and bought ice-cream.’
(Zorzi 2018: 124)

Yet another alternative would be to consider the forms described in this section as dual in nature but which, under certain circumstances, show no form-meaning correspondence. However, taking into account that, whenever there is a mismatch, all that seems to remain is the person marker(s) and the numeral, we could simply take the forms as pronouns

which come with an incorporated numeral. Rather than specifying the exact number of participants, the contribution of the numeral in this context is to specify that reference is made to a set that has two members, irrespective of their semantic structure (i.e., their inner cardinality). Hence, the forms might be used without further commitment as to whether they refer to atomic individuals (e.g., $a \oplus b$), groups (e.g., $\uparrow(a \oplus c) \oplus \uparrow(b \oplus d)$) or a combination of both (e.g., $a \oplus \uparrow(b \oplus c)$). Under this view, the dual behaves similarly to the numeral *two* or the quantifier *both*. In fact, just like *both* in English, the so-called dual is not limited to refer to two atomic entities, given that it can also be used to refer to two conjuncts, one of which might be a plural or a coordinate NP (Lasersohn 1995). Note that the denotation of “two NP” (and also that of two coordinated NPs, with or without *both*) would correspond to the same denotation provided earlier for the dual (i.e., $a \oplus b$, $a \oplus c$, $b \oplus c$). However, unlike what suggested in studies dealing with the semantics of the dual (e.g., Ojeda 1992; Zabbal 2002; Dvořák & Sauerland 2006), the denotation of noun phrases with *two* or *both* may range over non-atomic entities as well.

7.5 Conclusion

In this chapter I reviewed the arguments provided by McBurney (2002) in order to support a different analysis of dual vs. other exact number forms in ASL (trial, quadral, quintal). My claim is that the arguments given for ASL are motivated by independent reasons in LSC. Specifically, *v-/κ*-handshape alternations seem to be motivated by ease of articulation and ease of perception. Movement alternations, in turn, follow a general pattern equally observed in plural forms. Finally, the obligatoriness argument, while convincing, have some potential drawbacks in the case of LSC. In particular, if we take optionality to demonstrate that a certain distinction is not part of the linguistic system, then plurality should also be disregarded as a number value in LSC, given that plural morphology may also be optionally expressed. Additionally, optionality of the forms may well be motivated by independent reasons, such as frequency effects or limitations of the cognitive system. Therefore, I do not consider that

in LSC these arguments support a different analysis of dual pronouns as opposed to other exact number forms.

Finally, I examined the referential behavior of the so-called dual in LSC. While the data presented in this chapter does not offer a conclusive answer to the question of what the status of the form is, it does provide evidence that challenges the validity for LSC of the traditional analysis of the forms as simply referring to ‘exactly two people or two objects’. Besides, it shows that, in interpreting number distinctions, person needs to be taken into account, given that dual readings are only systematically attested in straight-line movements aligned with the direction of the signer’s head (i.e., forms that refer to the speaker-addressee dyad). The next chapter, provides an account of form-meaning correspondences in the number category and further explores the interaction between person and number distinctions in LSC.

CHAPTER 8

Number (and person) distinctions in LSC

The goal of this chapter is to give an account of the association of features realizing number in LSC and the semantic values they express. In doing so, I will restrict the discussion to personal pronouns only. In a nutshell, I claim that LSC formally marks the number values singular, dual, paucal and plural and that these distinctions are formally expressed through changes in the movement of the sign. Yet, to better account for the interpretation of number morphemes, person needs to be taken into account.

The roadmap of this chapter is as follows. In Section 8.1, I discuss the map of forms and functions in the number category in LSC personal pronouns and show that number morphology can be accounted for by using Brentari's (1998) path features [tracing], [direction] and [repeat]. In Section 8.2, I propose a unified treatment of person and number to cope with the distinctions drawn in the first person. For this, I take into account the spatial features advocated for in Part I of the thesis and the number features presented in the current chapter. The possible evolutionary path leading to the grammaticalization of number inflection in LSC is discussed in Section 8.3. Section 8.4 concludes the chapter and Part II of this dissertation.

8.1 Phonological features and their functions

8.1.1 Number values in LSC personal pronouns

Based on the descriptions presented in the previous chapters, I argue that personal pronouns in LSC express four number oppositions: singular, dual, paucal and plural. That is, personal pronouns might express whether reference is made to one entity (i.e., singular), two (i.e., dual), a few (i.e., paucal) or many (i.e., plural).

As stated in Chapter 6, personal pronouns use two strategies to express numerosity: reduplication with movement and modification of the path movement only. Hence, modifying the movement of the sign comes with a multiplicity inference in LSC (i.e., it expresses dual, paucal and plural values).¹ Besides, depending on the person value, uninflected forms might be compatible with reference to one entity only or to one entity or more (cf. Section 7.4.2.4).

The dual is articulated with a straight-line movement aligned with the direction of the head and proximal to the body. Hence, the dual is restricted to the inclusive (1+2). This question will be addressed in more detail in Section 8.2.3 below.

The paucal, in turn, is associated with reduplication with movement and the plural with movement only. The opposition between the paucal and the plural distinguishes forms which come with an upper bound from those that do not (see Table 8.1). That is, the paucal value refers to an indeterminate small quantity and the plural to a large, unlimited amount of entities.

On top of that, plural pronouns further contrast whether the lower bound interpretation they come with is 2 or 3, whereas paucal pronouns come with less rigid lower bound cutoffs (cf. Section 6.1.2). The contrast between the lower bound readings of the pronouns is due to the shape

¹On top of these operations, nouns further use in situ reduplication to express numerosity.

of the movement. Specifically, circular movements are read as ‘three or more’ in both the plural and the paucal and straight-line shapes have a systematic ‘two or more’ interpretation in the plural. Depending on the number of iterations of the pronoun and on the consultant, paucal pronouns taking a straight-line movement might be read as ‘two’ or ‘two/three or more’.

Number value	Lower bound reading	Upper bounded?
SG	=1/ ≥ 1	y/n
DU	=2	yes
PAUC	=2/ ≥ 2 / ≥ 3	yes
PL	≥ 2 / ≥ 3	no

Table 8.1: Number values in LSC personal pronouns

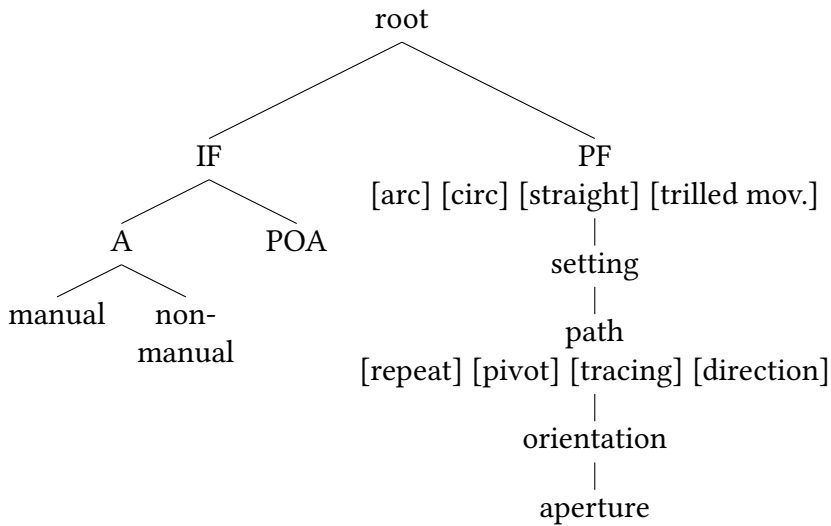
8.1.2 Brentari’s Prosodic Model

The operations used to express number in LSC (repetition and modification of the path shape of the sign) can be accounted for by using three path features, [tracing], [direction] and [repeat], which I directly borrow from Brentari’s (1998) Prosodic Model.

In this model, features are divided into two branches: inherent (IF) and prosodic features (PF). IF represent static properties of signs. They further branch into two parameters, the articulator (A), which accounts for manual and non-manual features, and place of articulation (POA), which refers to features of the passive articulator (i.e., location). The PF branch, in turn, represents movement (i.e., the “dynamic properties of the signal”, cf. Brentari 1998: 22). The set of prosodic features in the movement class node (setting, path, orientation and aperture) are articulated by a set of default joints: aperture is executed by the finger joints; orientation by the wrist or the forearm; path by the elbow or the shoulder; and setting is a movement made with two POAs. That

said, signs can have more than one type of movement (e.g., a change in aperture along with a path movement). Finally, note the ‘abstract shapes’ (i.e., arc, circ...) are represented at the prosodic features node.

(1) The Prosodic Model (Brentari 1998)



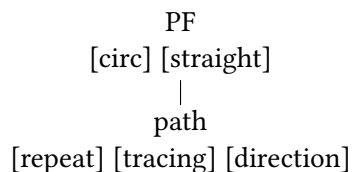
Path features, in Brentari’s (1998: 136) terms, “are lines articulated with respect to a plane of articulation [...] All path features specify a movement either within the plane of articulation or a 90° angle to the plane of articulation”. The path features are the following: [repeat], [tracing], [direction] and [pivot]. In the Prosodic Model, [tracing] is a movement within a plane which may combine with arc, straight or circular shapes; [repeat] and [direction], by contrast, are straight path movements. Besides, [tracing] and [direction] further differ in that [direction] is a movement perpendicular to a plane which entails contact (either at the beginning or at the end of the path movement), whereas [tracing] may involve contact throughout the entire path movement or in the middle of it.

8.1.3 Association between phonological features and number oppositions in LSC personal pronouns

As in most languages, singular and non-singular values in LSC differ in that only the latter carry additional number morphology. That is, on top of the inherent movement of the sign,² singular forms do not incorporate additional specifications for movement (i.e., they are neither repeated nor modified so as to incorporate circular and straight path shapes). If a pronoun contains further path movement specifications, then it expresses a non-singular number value. Hence, the prosodic feature path is responsible for a first split between singular and group values.

Non-singular values are further distinguished by considering which path features are activated, [direction], [repeat], [tracing] or both [repeat] and [tracing]/[direction]. As it has been stressed throughout Chapters 6 and 7 and as just pointed out in Section 8.1.1, the relevant shapes in the expression of number in LSC personal pronouns are [circ] and [straight].³ Hence, in order to account for the attested number contrasts in LSC, we would need to consider the features in (2).

- (2) Phonological features associated with the expression of number in LSC:



The dual value, which is formally marked by a straight-line movement proximal to the body of the signer, is phonologically specified by path + contact. In Brentari's model, this corresponds with the activation of the feature [direction], that is, a straight path perpendicular to a plane which realizes contact at the beginning or at the end of the

²To be considered well-formed, signs are required to have movement (Sandler 1996; Brentari 1998).

³By default, nouns realize path as [straight].

movement. On top of that, [direction] typically combines with [repeat] in the dual, generating a back-and-forth movement (see Figure 8.1). Note that the fact that [direction] requires contact implies that the pronoun has the speaker as its focal referent, as the pronoun targets the body of the signer at some point. However, as it will be shown below, this distinction alone is neither enough to account for inclusive/exclusive interpretations, nor for the number reading of the form, which only gets a systematic dual interpretation when the movement is aligned with the direction of the signer's head. Hence, exclusive pronouns performed with a straight movement, as in Figure 8.2, are interpreted as 'two or more', just like any other pronoun that takes a straight-line shape. That is, the form in Figure 8.2 is compatible with reference to the speaker and one non-participant, but also with reference to the speaker and multiple non-participants. The pronoun in 8.1, by contrast, is always interpreted as referring to the speaker and one addressee only.

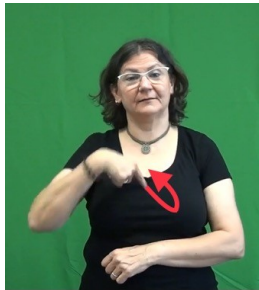


Figure 8.1: [direction]:
dual value



Figure 8.2: [direction]:
plural value

The paucal value, in turn, is formally marked by combining two morphological strategies: reduplication and displacement (as in Figure 5.5, reproduced below as Figure 8.3). Hence, it requires the activation of the path features [repeat] and [tracing]. The plural, in turn, is formally marked by modifying the path movement of the sign. Hence, it activates the feature [tracing] only (see Figure 8.4).⁴

⁴In nouns, in situ reduplication activates [repeat] only; reduplication with

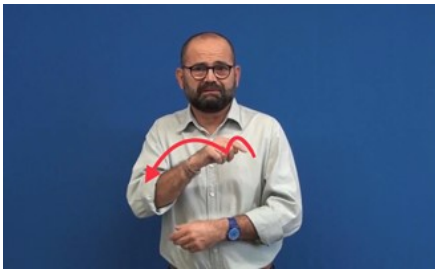


Figure 8.3: [repeat] + [tracing: straight]: paucal value



Figure 8.4: [tracing: straight]: plural value

The association of path features and number oppositions in LSC is presented in Table 8.2.

Number value	Path features	Shape	Lower bound	Upper bounded?
SG	\emptyset		$=1/ \leq 1$	y/n
DU	[direction]		$=2$	yes
PAUC	[repeat+tracing]	[straight]	$=2/ \leq 2/ \leq 3$	yes
		[circ]	≤ 3	yes
PL	[tracing]	[straight]	≤ 2	no
		[circ]	≤ 3	no

Table 8.2: Association of phonological features and number values in LSC personal pronouns

Note that whenever [direction] is activated, the shape of the movement does not need to be specified, as this is necessarily straight. When [tracing] is active instead, the pronoun might be realized either with a straight or with a circular movement. These different shapes are responsible for the lower bound interpretation the pronoun comes with.

displacement activates both [repeat] and [tracing].

The next section expands on the source of these distinctions and provides evidence for the connection between person and number marking in LSC.

8.2 Relation between person and number

8.2.1 Path shapes and the lower bound interpretation of number morphemes

Recall that on Cormier's analysis, number marking cannot be equated with a particular movement pattern. In her analysis, this is due to "an inherent connection between number and spatial location marking" (Cormier 2002: 38). While I do agree with Cormier, considering the analysis offered in Part I and the fact that 'spatial location marking' might give rise to different interpretations, instead of claiming that path movement shapes are simply motivated by a connection between number and spatial locations, I will further add that they are due to a connection between number and person marking. The contrast between straight-line and circular shapes is a good illustration of this claim.

As stated in Chapter 4, person distinctions in LSC can be accounted for by using three spatial features that stand for the way pronouns are projected into the signing space. That is, the expression of person values is tied to the spatial regions in which they are produced.

With this in mind, the contrast between straight-line and circular shapes found in LSC number marking is exactly what one would expect by considering how points are connected in basic geometry. That is, two endpoints (i.e., two locations in space) are connected by line segments forming a straight angle (Figure 8.5), hence, by straight-lines. Therefore, triangles and arc/circular shapes are simply ruled out in such contexts. Since line segments may further contain collinear points (Figure 8.6), they may connect more than just two locations.

If we were to translate this distinction into referential terms, what this means is that straight movements can be used to pick up either two or more than two entities. However, for straight-lines to pick up more than two entities, they have to be in the same line segment. That is,

they are required to either bear the same person value (2+2+2; 3+3+3) or to share at least one value in the spatial features advocated for in Part I ([proximal], [central], [mid]). Hence, a straight-line movement might pick up the speaker and a multiplicity of non-participants (1+3+3), since they share the non-central feature value. Given the analysis presented in Part I, we know that in LSC first, second and third person cannot be collinear, since there is no feature all three person values share. Therefore, straight-lines are ruled out whenever reference is made to the speaker, the addressee(s) and the non-participant(s).



Figure 8.5: Line segment
with two endpoints



Figure 8.6: Line segment
with collinear points

By contrast, straight-lines cannot connect non-collinear points, that is, points that are not on the same line segment (Figure 8.7). In such contexts, circular movements (or triangular shapes) should be used instead. Similarly, reference to the three discourse roles is expected to block straight-line movements, given that the articulation of the three person values necessarily falls into different regions of the signing space. Since they cannot lie on a straight-line (i.e., they do not share spatial features), they cannot be collinear. Therefore, reference to the three person values is necessarily made by arc/circular or triangular shape movements.

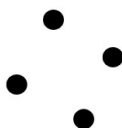


Figure 8.7: Non-collinear points

What these distinctions indicate is that person marking has an influence on the form and interpretation of number markers.

The grammaticalization of path shapes has already been investigated by Wilbur (2008), who claims that the space is meaningfully divided, and that the geometry of space (points, lines and planes) is grammaticalized in sign languages. This is illustrated in the following quote:

Thus, it appears that sign languages evolve by a process that takes perceptually and productively distinct visual and motion characteristics and grammaticalizes them into distinct units that convey lexical or functional meanings [...]. Examples of grammaticalized geometry include use of a point in space to refer to an individual, a line to refer to plural/collective (all), sequential points to refer to ‘distributed’ individuals (each one), an arc to refer to long times, vertical plane movement to refer to ‘within’ actions [...] and horizontal plane movement to refer to ‘across’ actions [...] (Wilbur 2013: 244).

The connection between spatial locations and movements is at the core of Lourenço (2018) and Lourenço & Wilbur’s (2018) proposal on agreement in Libras. Given the interest of their insights on the connection between loci and path movements, the key points of their analysis are reviewed in the next section.

8.2.2 Prosodic and location features in sign languages

As I have exposed throughout Part II, the claim that path movements and reduplication express plurality is not new in the sign language literature. Yet, on top of that, movement features have also been associated with the expression of agreement and event structure.

Changes in orientation (facing of the hand) and path movement of the verb have been traditionally analyzed as agreement in sign languages (see Meir 1998; Sandler & Lillo-Martin 2006; Mathur & Rathmann 2010; Hou & Meier 2018; a.o.). However, Wilbur (2003, 2008), Lourenço (2018) and Lourenço & Wilbur (2018) claim that path movement specifications are not responsible for encoding agreement in sign languages, but rather the event structure of the verb (durativity, telicity...).

According to Wilbur’s (2008: 229) Event Visibility Hypothesis (EVH), “[i]n the predicate system, the semantics of the event structure is visible

in the phonological form of the predicate sign”. That is, the event structure is mapped onto the phonological form. Specifically, the EVH claims that in ASL the morpheme classes associated with the event properties of predicates have regular phonological forms. For example, the path feature [direction] can combine with the morpheme class {EndState}, which is a marker of the end of telic events, whereas [tracing] can combine with {Extent} or {Path}, which mark atelic events.

In Lourenço’s (2018) and Lourenço & Wilbur’s (2018) analysis, verb agreement in Libras, and possibly in other sign languages, is not marked by movement. They propose instead that agreement is encoded through a *co-localization* process, which involves matching of location features between the verb and its argument(s). In Lourenço’s (2018: 100) terms: “[a] verb shows agreement with its argument(s) when the location of the verb is changed in order to match the location of the argument(s)”.

If the above proposal for verb agreement is of interest for the present discussion is because the underlying conception of the interaction of movement and location features is essentially the same. On their analysis, matching of location features (POA in Brentari’s model) is the true morphological exponent of agreement. As in the EVH, movement features such as [direction] and [tracing] are argued to express event properties of the predicates and aspectual modifications. However, they contribute to agreement because they determine how many slots for co-localization a specific verb might have. In the case of [tracing] there is one slot for agreement (one POAs specification); in the case of [direction], there are two.

Similarly, I have argued that location features in LSC express person distinctions, whereas movements encode number.⁵ However, number

⁵Strictly speaking, the similarities between the two proposals are restricted to the connection between locations and movements, not on the information they convey. Specifically, I have argued that location features express person values in LSC, which is crucially not Lourenço’s (2018) and Lourenço & Wilbur’s (2018) claim. As previously argued by Costello (2016), locations are not taken to be exponents of person, but rather of agreement (arguments). This is so because “person plays a role only in verbal agreement and not in other domains, such as adjective noun agreement [...] If the locations in space were a reflex of person agreement, it would be necessary to explain

interpretations may be further affected by the specific locations (person values) a path feature connects. The next section provides further arguments for the connection between the semantics of path shapes and spatial locations (i.e., number and person).

8.2.3 Person and number in LSC personal pronouns

Personal pronouns have traditionally been analyzed as a cross-section of person and number features (Cysouw 2001, 2011; Kibort 2008). Yet, the different interpretations of third vs. first and second non-singular pronouns (i.e., additive vs. associative readings, cf. Section 2.1.2) and the fact that in most languages plural pronouns do not bear the same number morphology as that of nouns, led Benveniste (1971) to propose that number, particularly plurality, is a different phenomenon in nouns and pronouns. Building on this idea, Cysouw (2001) proposes to use the notion ‘group’ marking to replace the traditional ‘plural’ in the pronominal domain (cf. Section 5.1.1). On his typology, group marking is further subdivided according to the members of the group (groups are built on the basis of the three-way division of singular participants, cf. Section 2.2). ‘Singulars’ and ‘(unrestricted) groups’ (i.e., the traditional plural) are defined qualitatively by the kind of participants that form the group (e.g., non-participants only, the speaker plus others, etc.), not by their cardinality. Forms that do mark the cardinality of the referents are described by relying on the concept of ‘restriction’. According to Cysouw, “the idea behind the label ‘restricted group’ is that the number of participants in the group is restricted to what is minimally needed” (2001: 225).

Unlike many spoken languages, number inflection in LSC personal pronouns is not essentially different from number inflection on nouns (see next section). Yet, from what we have seen so far, number in LSC nouns and pronouns behaves differently in a number of respects. First, at least one number marker, reduplication with displacement, has been shown to encode different meanings in the two domains (plurality in the

why person agreement is not limited to the verbal domain” (Costello 2016: 250).

case of nouns, paucity in personal pronouns). Besides, throughout the second part of this dissertation, I have frequently pointed out that the interpretation of number might be influenced by the person values of the set the pronoun refers to. For instance, uninflected pronouns can refer to a non-singleton set if grammatically marked for third person, but not if marked for first person. In turn, the possible readings of uninflected forms have a crucial impact on the interpretation of pronouns inflected for number. This is the case, for example, of pronouns articulated with a straight-line movement. As explained earlier, straight-line movements which are neither proximal nor aligned with the direction of the signer's head are read as ≥ 2 , irrespective of whether the sign takes the index or the v -/ κ -handshape. Importantly, this is so not only because they can connect collinear points, but also because a non-central location (third person) can invariably be used to refer to a multiplicity of non-participants. In fact, recall from Section 6.1.4.1 that paucal pronouns may also be used to pick up a small amount of groups of non-participants.

When straight-lines are articulated proximal to the body of the signer, another crucial distinction is found. First person pronouns, when misaligned, similarly get a 'two or more' interpretation; when aligned, they systematically have a dual semantics ('exactly two, the speaker and the addressee, no one else'). Therefore, the number marker (i.e., straight-line movement) does not constrain, by itself, the number interpretation the pronoun gets. Since the only pronouns with 'true' dual reference in LSC are those formally marked by straight-line movements aligned with the direction of the signer's head (both when performed with the index and with the v -/ κ -handshape), to further differentiate the number reading of [direction], the spatial features argued for in Part I need to be specified as well. The dual reading of straight-lines proximal to the signer corresponds to [direction] + [+cent], whereas the 'two or more' reading of straight-lines proximal to the signer correspond to [direction] only (if the pronoun is misaligned, the non-central value does not need to be specified). Then, under a traditional cardinality-based analysis, the dual would be instantiated in the inclusive only.

Considering the above, the inclusive/exclusive contrast argued for in Part I does in fact distinguish three different meanings: a dual inclusive, a

plural inclusive and an exclusive. In Cysouw’s (2001) typology of person marking, languages that draw three distinctions in the ‘first person complex’ (i.e., “the set of categories that include at least the speaker”, op. cit. 19) are named ‘minimal augmented’. The distinctions in question are the minimal inclusive (or ‘dual inclusive’), referring to the speaker-addressee dyad (1+2); the augmented inclusive (or ‘plural inclusive’), referring to the speaker, the addressee and possibly others (1+2+3); and the exclusive, referring to the speaker and one or more non-participants (1+3(+3)). In order to make these readings explicit, [tracing] needs to incorporate spatial feature specifications as well (see Table 8.3). As in the case of [direction], the non-central value does not need to be specified in the exclusive.

1+2	minimal inclusive	[direction] + [+cent]
1+2+3	augmented inclusive	[tracing: circ] + [+cent]
1+3(+3)	exclusive	[direction] [tracing: circ]

Table 8.3: Distinctions of the ‘first person complex’ in LSC

Note that the reason for considering a three-way opposition in the first person rather than a four-way one (what Cysouw describes as ‘dual-inclusive/exclusive paradigms’) is not becauseclusivity is not formally marked in forms modified by a straight-line movement,⁶ but rather because exclusive forms do not systematically oppose dual vs. plural values.

Recall that in languages in which the dual is found only in the inclusive are analyzed under a minimal-augmented analysis (cf. Section 2.1.4). In minimal-augmented and unit-augmented systems, number is not based on the total cardinality of the group, but rather on the cardinality of the focal referents (Sonnaert 2018).

⁶In fact, as it has been shown in Chapters 3, 6 and 7, pronouns modified by a straight-line movement, irrespective of whether they take the index or the V-/K-handshake, do encode the inclusive/exclusive contrast.

Minimal number denotes a set of minimum cardinality (two for the dual inclusive); unit-augmented number denotes a set minimally greater than that, and the augmented number denotes a set greater than unit-augmented (Kiparsky & Tonhauser 2019: 48-49).

Although LSC seems to favor an analysis of number in terms of the participants involved rather than on their total cardinality, an analysis along these lines would create a number of problems. For example, a problem of a unit-augmented analysis of LSC is that there is no specific form for the inclusive trial. To cope with paradigms in which the inclusive trial is not attested, Cysouw proposes the term ‘partial unit-augmented systems’ (a “special variant of the 11-morpheme paradigm”, cf. Cysouw 2001: 264). Yet, even more important is the fact that there seems to be no evidence that unit-augmented systems allow to distinguish further number oppositions.⁷ Hence, there is no apparent way in which the paucal value, for which the maximum number of participants is relevant, could be accommodated in a unit-augmented system. Therefore, I suggest sticking to the traditional singular-dual-paucal-plural analysis, as it reflects that in LSC both minimal (lower bound) and maximal (upper bound) readings are relevant.

8.3 Grammaticalization of number

As explained in the previous section, number in nouns and pronouns differs both with respect to their association of forms and functions and with respect to the impact that person has on restricting the possible

⁷As Sonnaert (2018: 22) points out “I am not aware of any typological surveys discussing the same variety of numbers as can be found in a singular-plural system [...] in minimal-augmented paradigms. The typological literature mentions a maximum of only three values (minimal, unit-augmented and augmented) and I have come across a few instances of general number syncretic with minimal.” To my knowledge, only one language has been described as opposing the values minimal-paucal-plural, but even for this, alternative analyses have been proposed (cf. Harbour 2014a). In fact, minimal-augmented analyses are not uniformly accepted in the literature. For discussion see Bobaljik (2008) and de Schepper (2012).

readings of number morphemes. Hence, LSC provides evidence for a different analysis of number on nouns and pronouns. Yet, as stated earlier, pronouns and nouns in LSC are no different with respect to morphological strategies used to encode numerosity (they both use reduplication with movement and modifications of the path shape of the sign to encode reference to more than one entity). This section is devoted to discussing the possible grammaticalization pathway of the path movement morpheme in LSC.

As suggested by the end of Section 6.2.2.2, the distinction between reduplicated forms, continuous repetition, and modification of the path movement of the sign seems to be grounded in a grammaticalization process. According to Kuryłowicz (1965: 69), grammaticalization “consists in the increase of the range of a morpheme advancing from a lexical to a grammatical or from a less grammatical to a more grammatical status, e.g., from a derivative formant to an inflectional one”. In Heine & Song’s (2011: 590) view, “[o]ne main motivation for grammaticalization consists in using linguistic forms for meanings that are concrete, easily accessible, and/or clearly delineated to also express less concrete, less easily accessible and less clearly delineated meaning contents. To this end, lexical or less grammaticalized linguistic expressions are pressed into service for the expression of more grammatical functions”.

If we take into consideration the different types of reduplication described for spoken languages, one might wonder whether plural forms expressed by sideways movement only (i.e., specified for [tracing]) should not be better considered as an instance of partial reduplication. As indicated in Section 5.3.2.1, some languages use partial reduplication in addition to full reduplication. Partial reduplication can be produced in a variety of ways, including vowel lengthening or shortening and consonant gemination.

Whether or not sign language reduplicated plurals use partial reduplication has been discussed by Kimmelman (2018) and Pfau & Steinbach (2021). Specifically, they analyze the second and third iteration of a noun, which are more reduced than the first one, as partial reduplication. Besides, reduplicated nouns in which the base is already specified for repetition might consist of three movements, instead of four

or six (i.e., they are not duplicated nor triplicated). Hence, these forms are also considered as instances of partial reduplication. According to Pfau & Steinbach (2006), combining reduplication and movement results in increasing the visual salience of pluralized nouns. Considering that reduplicated nouns in DGS are generally iterated three times, they analyze triplication as a case of overdetermination (i.e., double marking). The combination of triplication and sideways movement, in turn, is considered an instance of hyperdetermination (i.e., triple marking). Given that signers tend to focus on the speaker's face and the manual signing is perceived in peripheral vision, over- and hyperdetermination could be used to enhance phonological contrast. That both sideways movement and triplication increase the visual salience of signs would be further sustained by the claim that movements in sign languages and sonorous sounds in spoken languages are functionally comparable. The analogy between movement in sign languages and vowels in spoken languages is based on the following facts:⁸

- i) movements and vowels function as the syllable nuclei and as the medium of the signal; 'loudness' is a property of vowels and movements (cf. Crasborn 2001),
- ii) if vowels and movements are removed, words and signs can still be parsed,
- iii) the number of paradigmatic contrasts in vowels and movements is fewer than the number of contrasts in consonants and in the IF branch (see Liddell & Johnson 1989). By contrast, consonants and the IF branch carry more potential for lexical contrast than vowels and movements (see Brentari 2002).

Taking on this analogy, one could consider sideways movement to be comparable to vowel lengthening in spoken languages and, hence, that signs that express plurality by modifying their path movement, as

⁸For further details, see Liddell & Johnson (1989) and Brentari (2002).

in the case of plural pronouns, could be taken to fall within the category of partial reduplication.⁹ In what follows, I will examine whether such an evolutionary path could explain the grammaticalization of number morphemes in LSC.

8.3.1 From full to partial reduplication

According to Heine & Kuteva (2002), grammaticalization involves three interrelated mechanisms: desemanticization, decategorialization and erosion. Each mechanism correlates to a particular effect: loss of meaning, loss of categorial properties and loss of phonetic substance. Regarding the grammaticalization of personal pronouns, Heine & Song (2011: 591) further add extension, which is understood as the process through which “linguistic expressions are extended to new contexts that invite the rise of grammatical functions (context induce reinterpretation).” Hence, extension is a pragmatic process, desemanticization is a semantic one, decategorialization is morphosyntactic and erosion is phonetic.

Regarding reduplication, Bybee et al. (1994: 167) “consider it entirely plausible that partial reduplication results from the phonological erosion and assimilation of totally reduplicated forms”. As a result, they predict total reduplication to encode the earlier (fuller) meaning of reduplication. In contrast, partial reduplication is predicted to encode more general meanings and meanings that occur later on the evolutionary path. Additionally, they assume that “total reduplications are maximally iconic at their origins”.

Given that the earlier phases of most sign languages are not well documented, diachronic changes and grammaticalization processes are hard to study.¹⁰ There are, though, some earlier descriptions of a few sign

⁹For example, van Boven et al. (2021) mention that reduplication with movement in NGT might involve partial reduplication, given that in sideways nominal reduplication the location in which the sign is produced is different in each iteration.

¹⁰For studies on the grammaticalization of pronouns from pointing gestures, see Pfau (2011) and Pfau & Steinbach (2011); for research on the grammaticalization of auxiliaries from pronouns, see Steinbach & Pfau (2007).

languages that may shed some light on this issue. Also, recent work on emerging sign languages has provided relevant data to better understand the evolution of reduplicated forms.

Horton et al. (2015), for instance, tested how five different groups of participants represent multiple events by using reduplicated classifiers. The groups in question were hearing participants who were asked to gesture silently (silent gesturers), homesigners, two cohorts of signers of a young sign language, Nicaraguan Sign Language (NSL), and a final group of ASL and LIS signers. The authors focused specifically on two types of reduplicated forms: punctuated and unpunctuated. Interestingly, their results show that the only group that did not use unpunctuated repetition to mark number was the silent gesturers group. Also, homesigners and the first NSL cohort of signers only used unpunctuated repetitions to describe plural events without an agent, whereas the second NSL cohort and ASL and LIS signers used unpunctuated repetitions to describe plural events with and without an agent. According to the authors “[t]his finding suggests that full grammaticization of unpunctuated repetition, as a marker restricted to encoding number, emerges only when a communication system is passed through at least one generation of learners” (Horton et al. 2015: 609). As the authors further show, the number of movements of punctuated repetitions transparently maps to the number of objects. Unpunctuated repetitions, on the other hand are less iconic and, thus, less precise in indicating the exact number of objects. As a result, they constitute a more economic number marker than punctuated repetitions.

Additionally, Coppola et al. (2013) found that homesigners use unpunctuated repetitions for any number of entities greater than one. Hence, unpunctuated repetitions are used as a plural marker, even if the number of entities is as small as two.

8.3.2 LSC evidence

Based on the aforementioned studies and on the descriptions of personal pronouns provided in the previous chapters, we might propose an evolutionary pathway of plural inflection in LSC along the lines of (3).

(3) Grammaticalization of plural inflection in LSC:

Punctuated repetition → unpunctuated/continuous repetition → movement

According to (3), reference to entities of a cardinality greater than one would be first encoded by using punctuated reduplication, that is, by producing series of pointing signs that are clearly separable from each other. As these forms become produced increasingly faster (i.e., via unpunctuated or continuous repetition¹¹), they would partially lose their initial motivation (i.e., iconicity) and they would be able to cover sets containing a larger amount of entities. Finally, the form may be produced simply by preserving the path movement, which will end up being a full productive plural morpheme. This is illustrated in Figure 8.8 for LSC personal pronouns, but the same would apply to LSC nouns.

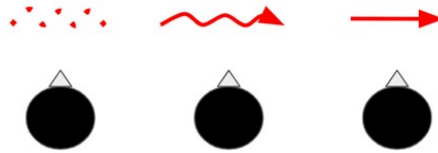


Figure 8.8: Hypothetical evolutionary path of pronominal number

If this hypothetical evolution of number morphemes is on the right track, evidence for a more general meaning should be found as we move rightwards on the grammaticalization path in (3). Also, we should expect the forms to show less variability in their articulation, to be more frequent (and even obligatory) and to be more phonologically reduced. Since I have focused mostly on forms and meanings, I will restrict the discussion to two parameters of grammaticalization only: desemanticization and erosion.

¹¹The distinction between unpunctuated and continuous repetition, although perceptible in some nouns (see Section 6.2.2.2), can hardly be observed in personal pronouns, as pronouns reduplicated with displacement do not involve hand-internal movements.

The description of personal pronouns presented in the previous chapters does in fact show that, on each step of the scale in (3), the forms both generalize their meaning to larger contexts and lose their initial iconicity. In particular, punctuated repetitions have been shown to come with an ‘exactly n ’ reading, which is derived from the actual number of iterations of the pronoun. Unpunctuated repetitions of pronouns have a less rigid interpretation, both with respect to their lower and to their upper bound cutoffs. Besides, the exact interpretation of pronouns modified with reduplication with movement might vary from one consultant to another. With respect to erosion (i.e., phonological/morphological reduction), they have been shown to be produced with no clear intervening breaks between each iteration. Finally, forms which incorporate a modification of the path movement but no reduplication, do not only undergo a further reduction process in which the [repeat] specification is lost, but the upper bound reading observed in pronouns inflected with repetition also fades away. Under this view, the plural in LSC is less marked than the paucal, both in its form (as it is less morphophonologically complex) and its meaning (as it is more general). Given that the plural is used in less specific contexts, it can take over the paucal whenever the opposition paucal-plural is neutralized. In turn, this might explain why pronouns reduplicated with movement were less frequent in the data.

That said, reduplication is not the only source of the plural morpheme in LSC. As discussed in Section 6.1.2.1, since reduplication requires repetition, series of pointing signs directed to different discourse participants cannot be considered instances of reduplication. Yet, the plural morpheme (i.e., modification of the path movement) is equally found in first person pronouns. In fact, as argued in Section 8.2.1, reference to three different discourse participants is known to require a circular shape movement and circular shapes are not restricted to first person plural pronouns. What this suggests is that plural inflection might be rooted in a more general phenomenon involving a rapid concatenation of signs, irrespective of whether they are reduplicated or not. That is, irrespective of whether the signs express reference to the same or to different person values. In the former case, modification of the path

movement would be rooted in reduplication with movement, in the latter in a coordinated-like sequence of pointing signs. In fact, note that punctuated repetitions of pronouns were also considered coordinated-like structures, just like a sequence of first, second and third person pronouns. As illustrated in Figure 8.9, once such a string of pronouns is produced rapidly, clear breaks between each form are no longer observed. Finally, only movement is preserved which, as in the case of second and third person, develops into a plural morpheme. Interestingly, while in some sign languages the circular shape does not seem to have grammaticalized into a plural marker for all pronouns (cf. Section 5.3.2.2), in LSC this is the less semantically marked morpheme (i.e., the one with the more general meaning) and can equally be used with first, second and third person pronouns. As shown in Chapter 6, circular path shapes are the only ones that have been found not to express iconic information regarding the spatial arrangement of the entities they refer to. Straight-lines, by contrast, might or might not come with iconic inferences. Therefore, as long as reference is intended to a minimum of three entities, circular shapes can be used, no matter what the discourse roles of the referents are or what their spatial arrangement is.

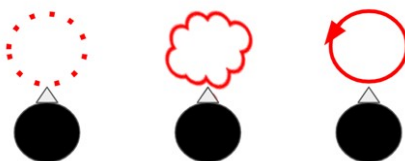




Figure 8.9: Hypothetical evolutionary path of first person plural forms

In her ASL study, Cormier (2002) mentions two examples of phonetic/phonological reduction in ASL, one of which corresponds to the first person plural form. For this, Cormier builds on Klima & Bellugi's (1979) descriptions, which in turn give examples of historical change by using an earlier ASL dictionary (Long 1918) and old signed movies. In particular, Klima & Bellugi (1979: 80) argue that in the 1910s the first person plural consists in a "series of separate thrusts, sometimes as many as five or six, first pointing at one's own chest, then at three

or four other persons (real or imagined) and finally at the chest again (...) Today the sign makes two touches on the chest with a smooth (and small) sweep of the wrist or arm between the touches”.¹² Further data confirming a diachronic evolution of the first-person plural pronoun in ASL is given in Baker-Shenk & Cokely (1980: 209). When presenting the different articulations of the first person plural, they claim that pronouns performed with an arc movement seem “to be an older form of the pronoun WE”. In fact, that is exactly the way Long (1918: 17) describes the form of the first-person plural “[p]oint forefinger at self, then point out, bring round in circle as in “You” and back to self”. Additionally, if one examines the 1910s ASL clips available at the Historical Sign Language Database,¹³ first person plurals are invariably performed with a circular movement whose initial and final point correspond to the speaker’s chest.

As a side note, notice that the grammaticalization of number markers and the association of forms and functions argued for in this dissertation can be further observed in the fact that forms already modified might incorporate yet another marker. This is shown in sentences (4) and (5), in which pronouns that incorporate a circular movement undergo a further inflectional process by being reduplicated with displacement. For ease of illustration the forms are also presented in Figures 8.10 and 8.11.

- (4) IX₁ PROFESSOR COURSE FIRST_{-a} SECOND_{-b} THIRD_{-c} IX_{3-circ}-rep_{3-c-b-a}
 LANGUAGE SIGN_LANGUAGE LOVE. 
 ‘I have three groups of students. They love sign language.’
- (5) COURSE PERIOD UNTIL_NOW IX_{2-circ}-rep_{2-a-b} IX₁ HAPPY WORK-
 rep_{2-b-a} VERY_WELL. 
 ‘I am glad that this school year you.PL worked very well.’

¹²Note that this contradicts the claim that first person plurals are not compositional in ASL, as claimed in Meier (1990). As stated by Todd (2009: 184): “[w]e could also recognize a plural morpheme realized in the two contacts with the chest—the same morpheme as the “sweep” movement seen in non-first-person plural signs like THEY but subject to a different morphophonemic rule”.

¹³Historical Sign Language Database: <http://hsldb.georgetown.edu/>

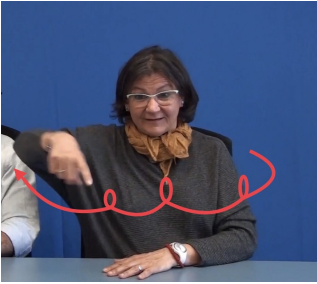


Figure 8.10: Third person (circ. movement + repetition with displacement)



Figure 8.11: Second person (circ. movement + repetition with displacement)

Burkova & Filimonova (2014), cited in Kimmelman (2018), argue that reduplication and sideward movement express isolatable meanings: modification of the path movement is associated with nominal plurality; the combination of reduplication and movement is associated with distributive plurality instead. Although LSC does not favor the same association of number morphemes and meanings, such a form-function mapping seems to be supported by examples (4) and (5), in which reference to a small amount of groups incorporates a plural marker, expressing that each group is formed by a large amount of individuals, and a paucal marker, expressing that the total cardinality of the groups is small.¹⁴

8.4 Conclusion

In Part I of this thesis, I argued for an analysis of person distinctions in terms of spatial features. In Part II, I have shown that path movement specifications of personal pronouns are responsible, at least partially, for the number reading they get. However, to have a fuller picture of

¹⁴In (5), the form is accepted in a scenario in which students are forming different groups in the audience, like in a theatre.

the possible interpretations of number morphemes in LSC, person (i.e., spatial locations) should also be taken into account. This is particularly clear in the case of straight-line shapes that target the body of the signer, for which the alignment/misalignment of coordinates pattern argued for in Part I is essential to determine the numerosity of the entities referred to by the pronoun. Specifically, misaligned straight-line shapes give rise to a 'two or more' interpretation, instead of the 'exactly two' reading observed in central pronouns. This results in three different interpretations of pronouns which have the speaker as its focal referent: a minimal inclusive (1+2), an augmented inclusive (1+2+3) and an exclusive (either 1+3 or 1+3+3).

The observation above constitutes additional evidence for the person analysis presented in Part I of this dissertation, given that the number interpretation of the forms results directly from the formal marking of clusivity oppositions (which, in turn, are derived from the formal marking of person distinctions). This proposal lines up well with Wilbur's (2008) analysis on the connection between locations and movements, which is tied to the fact that sign languages recruit characteristics of the geometry of space.

The set of number distinctions I have argued for shows that LSC does not favor an analysis of number in personal pronouns along the lines proposed for other sign languages, which generally assume the values singular, dual and collective and distributive plural. In Chapter 6, I proposed that the markers associated with distributive plurality in other sign languages better correspond to a paucal meaning in LSC. In Chapter 7, I further argued that the so-called dual pronoun does not seem to differ from other exact number pronouns and I suggested a description of the forms in terms of numeral incorporation. In LSC, a proper dual semantics is to be found only in the first person inclusive. Hence, in terms of number marking, LSC seems to differ substantially from other sign languages. Yet, with respect to the variation attested in the world's languages as reported in typological literature, the array of values that LSC distinguishes is not uncommon.

CHAPTER 9

General conclusions and outlook

In this chapter I summarize the most relevant contributions of the thesis and I also point out some open questions and future extensions of this research.

9.1 Main contributions

In this dissertation, I have argued in favor of a three-person analysis of pronouns in LSC, showing that it is possible to describe the different articulatory distinctions of first, second and third person by using a modified version of Berenz's (1996) Body Coordinates Model. The proposal I suggested assumes a set of three spatial features ([proximal], [central], [mid]) which account for the articulatory contrasts encoding person values in LSC. Essentially, I claim that different spatial regions are associated with reference to the different discourse participants. Therefore, this study supports the idea that the signing space is a linguistic construct and that spatial locations are incorporated into the LSC grammar, as proposed in R-loci accounts.

The analysis presented in Part I of this thesis successfully accounts for the encoding of person values in LSC singular and non-singular personal pronouns, since the same morphophonological person markers were found regardless of number values. Besides, the very same

system of spatial features used to describe the articulation of person values can also account for the morphological expression of clusivity oppositions. In fact, since clusivity distinctions result from combining the morphophonological markers of first and second person (if the form includes the addressee) or first and third person (if the addressee is excluded), they constitute further support for the articulatory description and the spatial featural analysis of person markers presented in Part I.

Regarding number, I proposed that LSC formally marks four number values in personal pronouns (singular, dual, paucal and plural) and that such distinctions can be accounted for by considering the path specifications of the sign. Besides, I showed that person markers have an influence on the interpretation of number morphemes (straight-line forms proximal to the signer and aligned with the direction of the head have a dual meaning, misaligned forms, by contrast, come with a plural interpretation). Hence, on top of the inclusive/exclusive contrast, LSC further distinguish whether the inclusive denotes two entities only or more than two entities. Again, these findings constitute further evidence for the person analysis suggested in Part I of the thesis. Hence, although the means through which LSC encodes person and number distinctions (locations and movements) are different from the resources spoken languages use, the analysis of person and number in LSC offered in this thesis lines up well with the cross-linguistic tendencies observed in the two categories in the world's spoken languages.

From the description presented in Part II it can be concluded that number marking is probably more varied than generally presumed in the sign language literature. For instance, concerning the morphological operations expressing a multiplicity reading in nouns, it has been shown that, on top of *in situ* and sideways reduplication, LSC further uses modification of the path movement as a pluralization strategy. This results on adding another operation to the set of strategies previously described for other sign languages, such as DGS and NGT. By contrast, it has been showed that lack of overt morphology in LSC nouns is not to be treated as a zero marking strategy, but rather as general number (in line with what has been previously argued for ASL by Koulidobrova 2021).

Regarding reduplication with displacement in personal pronouns,

an important distinction with previous sign language descriptions has been brought to light. In LSC, the combination of the two morphemes (reduplication + displacement) is neither a marker of distributivity nor exhaustivity. In fact, it cannot even be treated as a marker of plurality, but of paucity. This distinction further entails that using the same morphological strategy does not need to correspond to an identical interpretation across linguistic domains.

With respect to marking of restricted groups, I showed that the arguments given for ASL for considering the dual as a number value and other exact number forms (trial, quadral...) as numeral incorporated pronouns are not solid enough for the LSC case. Besides, I provided evidence showing the so-called dual in LSC might be compatible with reference to more than two atomic entities, against what would be expected if such forms had a strict dual semantics. Although the dividing line between number values and numeral incorporation is a very thin one, if the contrast number value/numeral incorporation is of particular interest is because no spoken language has been found to formally mark more than five number values. As a result, typological studies generally assumed that the values of the number category typically range from two to five distinctions. Although it cannot be excluded at this point the possibility for other sign languages to encode more than five values (and, hence, that the alleged five upper limit should be circumscribed to spoken languages only), for LSC at least, there is no evidence strong enough to support that the language constitutes a counterexample to the generalization above.

Therefore, regarding the question of whether LSC fits with previous descriptions of other sign languages, it may be concluded that differences have been identified. However, lack of detailed descriptions of certain aspects of other sign languages, particularly concerning number marking in personal pronouns, makes a linguistic comparison unfeasible. Thus, the analysis presented here informs about the expression and interpretation of number in LSC pronouns and no claims on the function of such markers on other sign languages are intended. That is, I do not assume that the number markers already described for other sign languages should correspond to the same meanings posited for LSC.

Considering that the person and number distinctions encoded in LSC personal pronouns are claimed to be derived from general properties of spatial locations and movements, one could expect to find the same distinctions across sign languages. However, nothing prevents a marker from taking over a different function in the grammaticalization process. Therefore, while most of the operations described for LSC have also been reported in other sign languages, whether their mapping of forms and meanings resembles that of LSC is yet unsettled.

That said, and as it was suggested in Chapter 1, it is important to underline that not only the data considered in the analyses, but also the analyses themselves, might have an influence on what distinctions a particular sign language is argued to display. This is particularly important when such analyses are used in cross-linguistic studies, especially if taken as counterexamples of well-established generalizations. Take the case of person distinctions as an illustration. As stressed in Section 2.3.2.2, the analysis undertaken by the so-called first vs. non-first person proposal and that of the Body Coordinates Model focus on rather different phenomena (reference resolution in the former proposal, person marking in the second). In turn, this disparity is due to the different conceptions of the connection between spatial locations and referents each proposal assumes. Hence, the motivation for these different analyses is, strictly speaking, not to be found in the data. In fact, since the first vs. non-first person proposal considers that second and third person pronouns are not formally distinguishable, they do not provide any description of the forms. Therefore, there is simply no available description which can inform a comparative-oriented study.

The case of clusivity is yet another case in point. While the data presented by Cormier (2005) does not seem to differ from that of Libras, as reported by Berenz (1996), nor from the LSC data described in this thesis, our interpretations of what element of the inclusive/exclusive pair is the less marked differ substantially. As pointed out in Section 2.3.3, Cormier takes the exclusive to be the unmarked member of the pair, whereas for LSC I proposed that the inclusive is less marked than the exclusive (cf. Section 4.3). The motivations for this discrepancy do not seem to be found in the data, but rather in which markedness criterion is

prioritized. In the description of clusivity presented in this dissertation, I consider neutralization of oppositions as the fundamental criterion. Cormier, in turn, takes the crosslinguistic distribution of markers as the central factor. Since Cormier considers that in ASL there is no special form for the inclusive, ASL would constitute an exception to the claim that languages have either a special form for the inclusive only or dedicated markers for both the inclusive and the exclusive. These considerations must be borne in mind before concluding that ASL and LSC are essentially different in this matter.

According to Cysouw (1998), “[i]f the known variation of human language is not accounted for, any statement about the possible variation is still far from home.” I trust this research has contributed to a better understanding of the forms and functions of person and number in LSC personal pronouns. Most of this dissertation is descriptive in nature. Hopefully, this will provide future cross-linguistic studies enough details to further investigate both the similarities and the limits of variation across sign languages.

9.2 Future directions

Comparison with other sign languages, other domains and a wider population of LSC signers

As it has just been stressed in the previous section, comparison of the results reported in this dissertation with other sign languages may lead to a deeper understanding of person and number marking in the visual modality. A possible extension of the person analysis provided here would involve checking whether the featural system I proposed in Chapter 4 can be applied to other sign languages as well.

Besides, the same featural system could potentially account for the articulation of other pointing signs in LSC, such as determiners, locatives and adverbs and the semantic values attached to them. That is, research on pointing signs with functions other than personal pronouns might also give us a better insight into the semantics of signing space in LSC. A preliminary analysis of the LSC locative *HERE* and the adverb *NOW*

showed that they can be analyzed using the same approach based on spatial features (see Table 9.1).

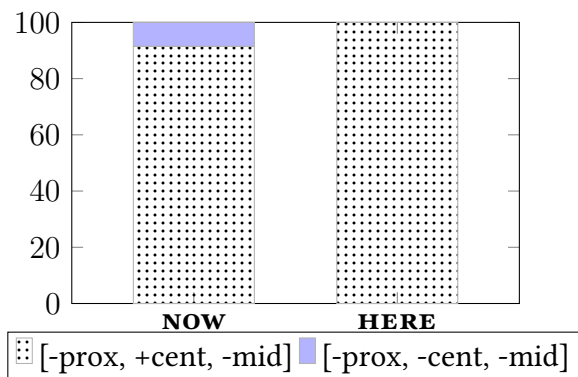


Table 9.1: Spatial features for NOW and HERE

The verbal domain is yet another natural extension of the proposal made in this dissertation about the morphological expression of person and number. That is, since person and number participate in agreement, the study of LSC verbs would provide a fuller picture of the distinctions drawn in the two categories, just like comparison with nouns proved useful for a better understanding of form-meaning (a)symmetries in the domain of nominal number.

While the data analyzed for any linguistic study is always necessarily partial, a clear limitation of this work, as in most sign language studies, is the size of the sample. This is particularly true regarding the expression of number values, which relies on the linguistic intuitions of two consultants only. On the other hand, this apparent limitation also allowed for a level of description that is not common with a larger set of consultants. In any case, future research should confirm the findings presented in this dissertation with more signers to check whether they can be extended more broadly to the LSC deaf signing community or if, on the contrary, any sort of variation is found. That said, it is worth noting that the person and number markers I described in this dissertation were consistently found across the data (corpus, elicited productions and

judgments).¹ Besides, the analysis I provided, qualitative in nature, aimed precisely at exploring in detail the interpretation of the forms in a wide range of contexts so as to support claims about the connection between forms and functions in LSC.

The eye gaze component and other non-manual markers

The number interpretation of nouns reduplicated with movement is affected by several factors, such as world knowledge, the addressee's expectations or the mouth component. However, this research has only tackled the question of whether the sign was produced with an accompanying mouthing. By contrast, mouth gestures and the potential role of other non-manual markers in expressing and interpreting number distinctions in LSC remains unaccounted for.

The direction of the eye gaze deserves further exploration as well. Indeed, while the preliminary analysis of eye gaze directions presented in Section 3.1.2.1 contradicts the claim that gazing at the addressee is a defining property of the signed conversation, the study itself does not solve the question of what the status of such gazes during the production of second person pronouns is. Hence, it remains to be studied if gazing in such contexts should be granted a grammatical status in LSC. A possible avenue of investigation is to check the gaze behavior of the signer when reference to more than one addressee is intended. In the data analyzed in this work, if the pronoun incorporates a straight-line or a circular movement, the eye gaze was not found to systematically change its direction. However, when the manual sign is not inflected for number, the eye gaze and the head were found to be able to take over the movement as to encode plurality. Compare the sequence of screenshots in Figure 9.1, in which the pointing sign takes a straight path movement, with Figure 9.2, where the manual sign remains in the same position, whereas the head and the eye gaze rotate in the direction of the addressees. In the second example, the pronoun cannot be interpreted as

¹The possible interpretations of number exact forms, at least under certain conditions, is an exception to this claim. See below for suggestions of future work.

referring to one addressee only.



Figure 9.1: Reference to multiple addressees (straight path movement)



Figure 9.2: Reference to multiple addressees (eye gaze and head movement only)

Interestingly, eye gaze and head tilts have also been argued to express agreement in sign languages (cf. Neidle et al. 2000). On Brentari’s (2000) analysis, this could be analyzed as spreading of manual features to the non-manual branch of the articulator node (see Section 8.1.2). The spreading of manual features, in turn, is explained as an assimilation process. On her view, just like the migration of movements from distal to proximal joints (e.g., movements performed by the fingers might spread to the elbow) has the effect of making the movement more salient, “the addition of nonmanual expression of handpart features of the hand node make the agreement morphology more salient”. Besides, the non-manual branch might be the only expression of agreement. If gaze and head movements, as in Figure 9.2, are the only means by which person and

number distinctions are encoded, their grammatical nature should then be reconsidered.

Pronouns uninflected for number and exact number forms

Another area which calls for further examination concerns the analysis of exact number pronouns, as well as that of pronouns unmarked for number. Apart from working out the details of the suggestions made for these forms in Chapter 7, future research should ideally look to other contexts in which they might occur. To give an example, in their ASL study, Schlenker & Lamberton (2019) provide examples in which possessives referring to the second (middle) iteration of a noun reduplicated in an unpunctuated or in a continuous fashion might either get a plural interpretation (the possessive is understood as referring to the set of referents denoted by the noun) or a singular one (the possessive is understood as referring to the intermediate referent only). Similar uses exist in LSC as well. Besides, although one might think that uninflected forms are possible as long as their direction matches the location of a certain group of individuals (either previously introduced or present in the context), similar readings were found to arise when two or more entities were previously introduced in different areas of the signing space (e.g., using sign names, instead of reduplicated nouns) and the pronoun was directed to a location associated with one entity only.

In Chapter 7, I suggested that the interpretation of exact number pronouns is similar to that of numerals. Yet, as noted by Marušič & Žaucer for Slovenian (2021), saying that the meaning of the dual is the same as the numeral *two* does not explain much, because the semantics of numerals is not yet settled.² Besides, as the authors further argue, “[i]f we suppose that the dual has exact interpretation [...] we have made it different from the other non-singular number: the plural clearly cannot have an exact interpretation as it means ‘more than one/two’” (op. cit.

²Numerals have been argued to give rise to exact readings (‘exactly n ’), lower bounded readings (‘at least n ’) and upper bounded readings (‘at most n ’). See Spector (2013) for discussion.

441). For LSC, a potential line of inquiry along the lines proposed by Marušič & Žaucer would involve comparing the readings of inclusive first person pronouns performed with a straight-line movement (i.e., pronouns which systematically give rise to a dual-only interpretation) with that of numeral incorporated pronouns and numerals in downward monotonic contexts. It is uncertain at this point whether any relevant contrast will be found. Yet, if numeral incorporated pronouns happen to show similarities in their interpretation with numerals and a contrast with the dual (or the other way round), it could constitute the beginning of an answer to the issue at hand.

On the other hand, recall that first person pronouns articulated with the *v*- or the *κ*-handshape were not equally acceptable for the two consultants when used to refer to the speaker and a multiplicity of non-participants. For one consultant, the pronoun could be used to pick up the referential set 1+3+3. For the other, this interpretation was degraded, as the pronoun was preferably interpreted as referring to the speaker and one non-participant only (1+3). Hence, it might be that the acceptability of the form reflects some difference on its semantic structure. As stated in Section 7.4.3, further investigation into these distinctions should ideally consider a wider population of signers to understand what the grounds for this split are.

Altogether, exploration into these topics will provide us a better understanding of the nature of person and number markers in LSC and the semantic distinctions associated with them. As it has been shown throughout this dissertation, more detailed descriptions of person and number are still needed in sign language research, in particular if one aims at providing well-informed comparisons on the distinctions drawn in the two categories both across languages and modalities.

Bibliography

- Ackema, Peter & Ad Neeleman. 2018. *Features of person: from the inventory of persons to their morphological realization*. Cambridge, MA: MIT Press.
- Acquaviva, Paolo. 2005. The morphosemantics of transnumeral nouns. In Geert Booij, Emiliano Guevara, Angela Ralli, Salvatore SgROI & Sergio Scalise (eds.), *Morphology and Linguistic Typology, On-line Proceedings of the Fourth Mediterranean Morphology Meeting (MMM4)*, 251–266. Bologna: Università degli Studi di Bologna.
- Alibašić Ciciliani, Tamara & Ronnie B. Wilbur. 2006. Pronominal system in Croatian Sign Language. *Sign Language and Linguistics* 9. 95–132.
- Almeida-Silva, Anderson. 2019. *A (in)definitude no sintagma nominal en Libras: Uma investigação na interface sintaxe-semântica*. Universidade Estadual de Campinas dissertation.
- Andrzejewski, B. W. 1960. The categories of number in noun forms in the Borana dialect of Galla. *Africa* 30. 62–75.
- Ariel, Mira. 1990. *Accessing Noun-Phrase Antecedents*. London: Routledge.
- Baker-Shenk, Charlotte & Dennis Cokely. 1980. *American Sign Language. A teacher's resource text on grammar and culture*. Clerk Books: Gallaudet University Press.
- Bale, Alan, Michaël Gagnon & Hrayr Khanjian. 2011a. Cross-linguistic representations of numerals and number marking. *Proceedings of SALT 20*. 582–598.
- Bale, Alan, Michaël Gagnon & Hrayr Khanjian. 2011b. On the relationship between morphological and semantic markedness. *Morphology* 21. 197–221.

- Barberà, Gemma. 2015. *The Meaning of Space in Sign Language. Reference, Specificity and Structure in Catalan Sign Language Discourse*. Berlin/Boston: Mouton de Gruyter & Ishara Press.
- Barberà, Gemma & Brendan Costello. 2017. ¿Cómo se expresa la referencia impersonal? Análisis contrastivo entre lengua de signos catalana (LSC) y lengua de signos española (LSE). In *Actas del Congreso CNLSE de la Lengua de Signos Española: Madrid, 24 y 25 de septiembre de 2015*, 49–63. Madrid: Real Patronato sobre Discapacidad.
- Barberà, Gemma, Josep Quer & Santiago Frigola. 2015. Primers passos cap a la documentació de discurs signat. El projecte pilot de constitució del corpus de la llengua de signes catalana. *Treballs de Sociolingüística Catalana* 25. 287–302.
- Bauer, Anastasia. 2014. *The use of signing space in a shared sign language of Australia*. Berlin: Mouton de Gruyter.
- Benedicto, Elena & Diane Brentari. 2004. Where did all the arguments go? Argument changing properties of classifiers in American Sign Language. *Natural Language and Linguistic Theory* 22. 743–810.
- Benítez Burraco, Antonio. 2005. Valores de la categoría de número en las lenguas eslavas: evolución histórica y caracterización actual. *Eslavística Complutense* 5. 155–173.
- Benveniste, Emile. 1971. *Problems in General Linguistics*. Coral Gables, FL: University of Miami Press.
- Berenz, Norine. 1996. *Person and Deixis in Brazilian Sign Language*. University of California, Berkeley dissertation.
- Berenz, Norine. 2002. Insights into person deixis. *Sign Language and Linguistics* 5. 203–227.
- Bergman, Brita & Östen Dahl. 1994. Ideophones in Sign Language? The place of reduplication in the tense-aspect system of Swedish Sign Language. In Carl Bache, Hans Basbøll & Carl-Erik Lindberg (eds.), *Tense, Aspect and Action. Empirical and Theoretical Contributions to Language Typology*, 397–422. New York: Mouton de Gruyter.
- Biermann, Anna. 1982. Die grammatische Kategorie Numerus. In Hansjakob Seiler & Christian Lehmann (eds.), *Apprehension. Das sprachliche Erfassen von Gegenständen*. 229–243. Tübingen: Gunter Narr.

- Boas, Franz. 1911. *Handbook of American Indian Languages*. Bureau of American Ethnology, Bulletin 40, Part 1. Washington: Government Printing Office (Smithsonian Institution).
- Bobaljik, Jonathan D. 2008. Missing persons: A case study in morphological universals. *The Linguistic Review* 25. 203–230.
- Börstell, Carl. 2017. *Object marking in the signed modality Verbal and nominal strategies in Swedish Sign Language and other sign languages*. Stockholm: Stockholm University dissertation.
- Bourdon, Benjamin. 1908. Sur le temps nécessaire pour nommer les nombres. *Revue philosophique de la France et de l'étranger* 65. 426–431.
- van Boven, Cindy. 2020. Fill the gap: a novel test to elicit nominal plurals in Sign Language of the Netherlands. *Formal and Experimental Advances in Sign Language Theory* 3. 56–67.
- van Boven, Cindy, Silke Hamann & Roland Pfau. 2021. Nominal plurals in Sign Language of the Netherlands: accounting for patterns and variation in stochastic optimality theory. *Formal and Experimental Advances in Sign Language Theory*. Hong Kong.
- Brentari, Diane. 1998. *A Prosodic Model of Sign Language Phonology*. Cambridge, MA: MIT Press.
- Brentari, Diane. 2000. *The uses of orientation in agreement morphology*. Intersign meeting Working Paper. <https://www.sign-lang.uni-hamburg.de/intersign/workshop2/brentari/>.
- Brentari, Diane. 2002. Modality differences in phonology and morphophonemics. In Richard P. Meier, Kearsy Cormier & David Quinto-Pozos (eds.), *Modality and structure in signed and spoken languages*. 35–64. Cambridge: Cambridge University Press.
- Brisson, Christine M. 1998. *Distributivity, Maximality, and Floating Quantifiers*. New Brunswick, NJ: Rutgers University dissertation.
- Burkova, Svetlana I. & Elizaveta V. Filimonova. 2014. Reduplikatsija v russkom zhestovom yazyke (Reduplication in Russian Sign Language). *Russkij yazyk v nauchnom osveshchenii* 28. 202–258.
- Bybee, Joan. 2015. *Language change*. Cambridge: Cambridge University Press.

- Bybee, Joan L., Revere Perkins & William Pagliuca. 1994. *The evolution of grammar: tense, aspect, and modality in the languages of the world*. Chicago: University of Chicago Press.
- Cecchetto, Carlo, Alessandra Checchetto, Carlo Geraci, Mirko Santoro & Sandro Zucchi. 2015. The syntax of predicate ellipsis in Italian Sign Language (LIS). *Lingua* 166. 214–235.
- Comrie, Bernard. 1989. *Language universals and linguistic typology, 2nd ed.* Oxford: Blackwell.
- Conklin, Harold C. 1962. Lexicographical treatment of folk taxonomies. In Fred W. Householder & Sol Saporta (eds.), *Problems in Lexicography*, 119–142. Bloomington: Indiana University Press.
- Cooke, Joseph R. 1965. *Pronominal Reference in Thai, Burmese, and Vietnamese*. University of California, Berkeley dissertation.
- Coppola, Marie, Elizabet Spaepen & Susan Goldin-Meadow. 2013. Communicating about quantity without a language model: Number devices in homesign grammar. *Cognitive Psychology* 67. 1–25.
- Corbett, Greville G. 2000. *Number*. Cambridge: Cambridge University Press.
- Corbett, Greville G. 2006. *Agreement*. Cambridge: Cambridge University Press.
- Corbett, Greville G. 2007. Canonical typology, suppletion, and possible worlds. *Language* 83. 8–42.
- Cormier, Kearsy. 2002. *Grammaticization of Indexic Signs: How American Sign Language Expresses Numerosity*. University of Texas at Austin dissertation.
- Cormier, Kearsy. 2005. Exclusive pronouns in American Sign Language. In Elena Filimonova (ed.), *Clusivity: Typology and case studies of inclusive-exclusive distinction*, 241–268. Amsterdam: John Benjamins.
- Cormier, Kearsy. 2012. Pronouns. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language – An international handbook*, 227–244. Berlin: Mouton de Gruyter.
- Cormier, Kearsy, Adam Schembri & Bencie Woll. 2013. Pronouns and pointing in sign languages. *Lingua* 137. 230–247.
- Cormier, Kearsy, Stephen Wechsler & Richard P. Meier. 1999. Locus agreement in American Sign Language. In Gert Webelhuth, Jean-

- Pierre Koenig & Andreas Kathol (eds.), *Lexical and constructional aspects of linguistic explanation*, 215–229. Stanford, CA: CSLI Press.
- Costello, Brendan. 2016. *Language and modality: Effects of the use of space in the agreement system of lengua de signos española (Spanish Sign Language)*. Utrecht: LOT dissertation.
- Crain, Stephen & Mark Steedman. 1985. On not being led up the garden path: the use of context by the psychological syntax processor. In David R. Dowty, Lauri Karttunen & Arnold M. Zwicky (eds.), *Natural Language Parsing: Psychological, Computational, and Theoretical Perspectives*, 320–358. Cambridge: Cambridge University Press.
- Crasborn, Onno. 2001. *Phonetic implementation of phonological categories in Sign Language of the Netherlands*. Utrecht: LOT dissertation.
- Crasborn, Onno & Els van der Kooij. 2013. The phonology of focus in Sign Language of the Netherlands. *Journal of Linguistics* 49. 515–565.
- Crasborn, Onno, Johanna Mesch, Dafydd Waters, Annika Nonhebel, Els van der Kooij, Bencie Woll & Brita Bergman. 2007. Sharing sign language data online. Experiences from the ECHO project. *International Journal of Corpus Linguistics* 12. 535–562.
- Croft, William. 2002. *Typology and universals, 2nd ed.* Cambridge: Cambridge University Press.
- Crowley, Terry. 1982. *The Paamese Language of Vanuatu*. Pacific Linguistics, B-87. Canberra: Australian National University.
- Cruse, David Alan. 1986. *Lexical semantics*. Cambridge: Cambridge University Press.
- Cysouw, Michael. 1998. Syntagmatic variation in the world's pronominal systems. In Heleen Strating & Jorn Veenstra (eds.), *Proceedings CLS Opening Academic Year '98/'99*, 27–50. Tilburg: Center for Language Studies.
- Cysouw, Michael. 2001. *The Paradigmatic Structure of Person Marking*. Radboud University Nijmegen dissertation.
- Cysouw, Michael. 2002. 'We' rules: The impact of an inclusive/exclusive opposition on the paradigmatic structure of person marking. In Horst J. Simon & Heike Wiese (eds.), *Pronouns: Grammar and Representation*, 41–62. Amsterdam: John Benjamins.

- Cysouw, Michael. 2005. What it means to be rare: the variability of person marking. In Zygmunt Frajzyngier, Adam Hodges & David S. Rood (eds.), *Linguistic Diversity and Language Theories*, 235–258. Amsterdam/Philadelphia: John Benjamins.
- Cysouw, Michael. 2011. The expression of person and number: a typologist's perspective. *Morphology* 21. 419–443.
- Cysouw, Michael. 2013. Inclusive/exclusive distinction in independent pronouns. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/39>.
- Champollion, Lucas. 2010. *Parts of a whole: Distributivity as a bridge between aspect and measurement*. Philadelphia, PA: University of Pennsylvania dissertation.
- Chierchia, Gennaro. 1998. Plurality of mass nouns and the notion of 'Semantic Parameter'. In Susan Rothstein (ed.), *Events and Grammar*. 53–104. Dordrecht, Netherlands: Kluwer.
- Dalrymple, Mary & Suriel Mofu. 2012. Plural semantics, reduplication and numeral modification in Indonesian. *Journal of Semantics* 29. 229–260.
- Dalrymple, Mary & Suriel Mofu. 2013. Semantics of number in Biak. *Language and Linguistics in Melanesia* 31. 42–55.
- Daniel, Michael. 2000. *Tipologija asociativnoj mnozhestvennosti*. [*The typology of associative plurals*]. Moscow: Russian State University for Humanities dissertation.
- Daniel, Michael. 2005. Understanding inclusives. In Elena Filimonova (ed.), *Clusivity: Typology and case studies of inclusive-exclusive distinction*, 3–48. Amsterdam: John Benjamins.
- Daniel, Michael & Edith Moravcsik. 2013. The associative plural. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/36>.
- Davidson, Kathryn & Deanna Gagne. 2014. Vertical representations of quantifier domains. In Urtzi Etxeberria, Anamaria Fălăuș, Aritz Irurtzun & Bryan Leferman (eds.), *Proceedings of Sinn und Bedeutung* 18, 110–127.

- Dehaene, Stanislas. 1996. *The Number Sense. How the Mind Creates Mathematics*. Oxford: Oxford University Press.
- DeLancey, Scott. 1981. An interpretation of split ergativity and related patterns. *Language* 57. 626–657.
- Dixon, Robert M. W. 1979. Ergativity. *Language* 55. 59–138.
- Dixon, Robert M. W. 1988. *A Grammar of Boumma Fijian*. Chicago: University of Chicago Press.
- Dixon, Robert M. W. 2010. *Basic Linguistic Theory. Vol. I. Methodology*. Oxford/New York: Oxford University Press.
- Dixon, Robert M. W. 2012. *Basic Linguistic Theory. Vol. III. Further grammatical topics*. Oxford/New York: Oxford University Press.
- Dvořák, Boštjan & Uli Sauerland. 2006. The semantics of the Slovenian dual. In Hana Filip, James Lavine, Steven Frans & Mila Tasseva-Kurktchieva (eds.), *Proceedings of FASL 14*, 98–112.
- Eccarius, Petra Nichole. 2008. *A constraint-based account of handshape contrast in sign languages*. West Lafayette, IN: Purdue University dissertation.
- Eccarius, Petra Nichole & Diane Brentari. 2010. A formal analysis of phonological contrast and iconicity in sign language handshapes. *Sign Language and Linguistics* 13. 156–181.
- Eckardt, Regine. 2014. Dear Ede! Semantics and pragmatics of vocatives. In Daniel Gutzmann, Jan Köpping & Cécile Meier (eds.), *Approaches to Meaning: Composition, Values and Interpretation*, 223–249. Leiden: Brill.
- Engberg-Pedersen, Elisabeth. 1993. *Space in Danish Sign Language. The Semantics and Morphosyntax of the Use of Space in a Visual Language*. Hamburg: Signum-Verlag.
- Engberg-Pedersen, Elisabeth. 2003. From pointing to reference and predication: pointing signs, eyegaze, and head and body orientation in Danish Sign Language. In Sotaro Kita (ed.), *Pointing. Where Language, Culture and Cognition Meet*, 269–292. Mahwah, NJ: Lawrence Erlbaum.
- Everett, Daniel L. 1986. Pirahã. In Desmond C. Derbyshire & Geoffrey K. Pullum (eds.), *Handbook of Amazonian Languages. Vol. 1*. 200–325. Berlin: Mouton de Gruyter.

- Farkas, Donka F. & Henriëtte E. de Swart. 2010. The semantics and pragmatics of plurals. *Semantics and Pragmatics* 3. 1–54.
- Fassi Fehri, Abdelkader. 2020. Number and Gender Convergence: The Arabic Plurative. *Catalan Journal of Linguistics* 19. 75–126.
- Ferrando, Ignacio. 2006. The plural of paucity in Arabic and its actual scope. In Sami Boudelaa (ed.), *Perspectives on Arabic Linguistics XVI: Papers from the annual symposium on Arabic Linguistics*, 39–61. Amsterdam: John Benjamins.
- Filimonova, Elena. 2002. Person hierarchy and its implications: the case of Aymara. In Mily Crevels, Simon van de Kerke, Sérgio Meira & Hein van der Voort (eds.), *Current Studies on South American Languages [Indigenous Languages of Latin America (ILLA), Vol. 3]*, 199–213. Leiden: Research School of Asian, African, & Amerindian Studies (CNWS): Leiden University.
- Fischer, Susan D. 1973. Two processes of reduplication in the American Sign Language. *Foundations of Language* 9. 469–480.
- Fischer, Susan D. 1975. Influences on word order change in American Sign Language. In Charles Li (ed.), *Word Order and Word Order Change*, 1–25. Austin: University of Texas Press.
- Fischer, Susan D. & Bonnie Gough. 1978. Verbs in American Sign Language. *Sign Language Studies* 18. 17–48.
- Foley, William A. 1986. *The Papuan Languages of New Guinea*. Cambridge: Cambridge University Press.
- Forchheimer, Paul. 1953. *The category of person in language*. Berlin: Walter de Gruyter.
- Friedman, Lynn. 1975. Space, time and person reference in American Sign Language. *Language* 51. 940–961.
- Frigola, Santiago & Xavier Álvarez. 2018. La comunitat sorda a Catalunya i la llengua de signes catalana (LSC). *Llengua, societat i comunicació* 16. 6–15.
- Gazdar, Gerald. 1979. *Pragmatics: Implicature, Presupposition, and Logical Form*. New York: Academic Press.
- Greenberg, Joseph H. 1966a. *Language universals, with special reference to feature hierarchies*. The Hague: Mouton.

- Greenberg, Joseph H. 1966b. Some universals of grammar with particular reference to the order of meaningful elements. In Joseph H. Greenberg (ed.), *Universals of language*, 73–113. Cambridge, MA: MIT Press.
- Grice, Paul. 1975. Logic and conversation. In Peter Cole & Jerry L. Morgan (eds.), *Syntax and Semantics, Vol.3, Speech Acts*, 41–58. New York: Academic Press.
- Harbour, Daniel. 2014a. Paucity, abundance, and the theory of number. *Language* 90. 185–229.
- Harbour, Daniel. 2014b. Poor pronoun systems and what they teach us. *Nordlyd* 41. 125–143.
- Harbour, Daniel. 2016. *Impossible persons*. Cambridge, MA: MIT Press.
- Hardy, Heather K. & Timothy Montler. 1988. Imperfective gemination in Alabama. *International Journal of American Linguistics* 54. 399–415.
- Haspelmath, Martin. 1993. *A Grammar of Lezgian*. (Mouton Grammar Library, 9). Berlin/New York: Mouton de Gruyter.
- Haspelmath, Martin. 2005. Occurrence of nominal plurality. In Martin Haspelmath, Matthew S. Dryer, David Gil & Bernard Comrie (eds.), *The World Atlas of Language Structures*, 142–145. Oxford: Oxford University Press.
- Haspelmath, Martin. 2006. Against markedness (and what to replace with it). *Journal of Linguistics* 42. 25–70.
- Haspelmath, Martin & Andres Karjus. 2017. Explaining asymmetries in number marking: Singulatives, pluratives, and usage frequency. *Linguistics* 55. 1213–1235.
- Hayward, Richard J. 1979. Bayso revisited: some preliminary linguistic observations, Part II. *Bulletin of the School of Oriental and African Studies* 42. 101–132.
- Heine, Bernd & Tania Kuteva. 2002. On the evolution of grammatical forms. In Alison Wray (ed.), *The transition to language. Studies in the evolution of language*, 376–397. Oxford: Oxford University Press.
- Heine, Bernd & Kyung-An Song. 2011. On the grammaticalization of personal pronouns. *Journal of Linguistics* 47. 587–630.
- von Heusinger, Klaus. 2002. Reference and representation of pronouns. In Horst J. Simon & Heike Wiese (eds.), *Pronouns: Grammar and Representation*, 109–135. Amsterdam: John Benjamins.

- Horn, Laurence. 1972. *On the semantic properties of logical operators in English*. Los Angeles: University of California dissertation.
- Horn, Laurence. 1984. Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature. In Deborah Schiffrin (ed.), *Meaning, Form, and Use in Context: Linguistic Applications*, 11–42. Washington, DC: Georgetown University Press.
- Horn, Laurence. 1989. *A natural history of negation*. Chicago: University of Chicago Press.
- Horton, Laura, Susan Goldin-Meadow, Marie Coppola, Ann Senghas & Diane Brentari. 2015. Forging a morphological system out of two dimensions: Agentivity and number. *Open Linguistics* 1. 596–613.
- Hou, Lynn & Richard P. Meier. 2018. The morphology of first-person object forms of directional verbs in ASL. *Glossa: a journal of general linguistics* 3. 114.
- Hutchisson, Don. 1986. Sursurunga pronouns and the special uses of quadral number. In Ursula Wiesemann (ed.), *Pronominal Systems*, 1–20. Tübingen: Gunter Narr Verlag.
- Jakobson, Roman. 1971. Shifters, verbal categories and the Russian verb. In Roman Jakobson (ed.), *Selected Writings. Vol. 2: Word and Language*, 130–147. The Hague: Mouton.
- Janis, Wynne D. 1995. A crosslinguistic perspective on ASL verb agreement. In Karen Emmorey & Judy S. Reilly (eds.), *Language, Gesture and Space*, 195–223. Hillsdale, NJ: Lawrence Erlbaum.
- Jespersen, Otto. 1922. *Language, it's Nature, Development and Origin*. New York: Henry Holt Company.
- Johnston, Trevor. 2006. Sign Language: Morphology. In Keith Brown (ed.), *Encyclopedia of Language and Linguistics, 2nd ed.* 324–328. Amsterdam: Elsevier.
- Johnston, Trevor. 2013. Formational and functional characteristics of pointing signs in a corpus of Auslan (Australian sign language): are the data sufficient to posit a grammatical class of 'pronouns' in Auslan? *Corpus linguistics and linguistic theory* 9. 109–159.
- Jungbluth, Konstanze. 2003. Deictics in the conversational dyad. In Fiedrich Lenz (ed.), *Deictic Conceptualisation of Space, Time and Person*, 13–40. Amsterdam/ Philadelphia: John Benjamins.

- Kaplan, David. 1989. Demonstratives. In Joseph Almog, John Perry & Howard Wettstein (eds.), *Themes from Kaplan*, 481–563. New York/Oxford: Oxford University Press.
- Kaufman, E. L., M. W. Lord, T. W. Reese & J. Volkman. 1949. The discrimination of visual number. *The American Journal of Psychology* 62. 498–525.
- Kemmer, Suzanne. 1996. Collective and distributive marking, or: Where unity meets multiplicity. In Alan K. Melby (ed.), *23rd LACUS Forum 1996*, 231–249. Chapel Hill, NC: Linguistic Association of Canada and the United States.
- Kibort, Anna. 2008. Grammatical features inventory: Person. University of Surrey. <http://dx.doi.org/10.15126/SMG.18/1.03>.
- Kibort, Anna & Greville G. Corbett. 2008. Grammatical features inventory: Number. University of Surrey. <http://dx.doi.org/10.15126/SMG.18/1.02>.
- Kimmelman, Vadim. 2014. *Information Structure in Russian Sign Language and Sign Language of the Netherlands*. University of Amsterdam dissertation.
- Kimmelman, Vadim. 2018. Reduplication and repetition in Russian Sign Language. In Rita Finkbeiner & Ulrike Freywald (eds.), *Exact Repetition in Grammar and Discourse*, 91–109. Berlin: De Gruyter.
- Kiparsky, Paul & Judith Tonhauser. 2019. Semantics of inflection. In Claudia Maienborn, Klaus von Stechow & Paul Portner (eds.), *Semantics: interfaces*, 41–74. Berlin/Boston: Mouton de Gruyter.
- Klima, Edward & Ursula Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.
- Koulidobrova, Elena. 2021. Counting (on) bare nouns: revelations from American Sign Language. In Tibor Kiss, Francis Jeffrey Pelletier & Halima Husić (eds.), *Things and stuff: the semantics of the count-mass distinction*, 213–233. Cambridge: Cambridge University Press.
- Krifka, Manfred. 1995. Common nouns: a contrastive analysis of English and Chinese. In Greg N. Carlson & Francis Jeffrey Pelletier (eds.), *The generic book*, 398–411. Chicago: Chicago University Press.

- Kubuş, Okan. 2008. *An analysis of Turkish Sign Language (TİD) phonology and morphology*. The Middle East Technical University, Ankara. MA thesis.
- Kuhn, Jeremy. 2016. ASL loci: variables or features? *Journal of Semantics* 3. 449–491.
- Kuhn, Jeremy. 2021. Discourse anaphora – theoretical perspectives. In Josep Quer, Roland Pfau & Annika Herrmann (eds.), *The Routledge Handbook of Theoretical and Experimental Sign Language Research*, 458–479. London: Routledge.
- Kuhn, Jeremy & Valentina Aristodemo. 2017. Pluractionality, iconicity, and scope in French Sign Language. *Semantics and Pragmatics* 10. 1–49.
- Kuryłowicz, Jerzy. 1965. The evolution of grammatical categories. *Diogenes* 13. 55–71.
- Laidig, Wyn D. 1993. Insights from Larike Possessive Constructions. *Oceanic Linguistics* 32. 311–351.
- Landman, Fred. 1989. Groups, I. *Linguistics and Philosophy* 12. 559–605.
- Landman, Fred. 1996. Plurality. In Shalom Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, 425–458. London: Blackwell.
- Laserson, Peter. 1995. *Plurality, conjunction, and events*. Dordrecht: Kluwer Academic Press.
- Lichtenberk, Frantisek. 2005. Inclusive-exclusive in Austronesian: an opposition of unequals. In Elena Filimonova (ed.), *Clusivity: Typology and case studies of inclusive-exclusive distinction*, 261–289. Amsterdam: John Benjamins.
- Liddell, Scott K. 1995. Real, surrogate, and token space: grammatical consequences in ASL. In Karen Emmorey & Judy Reilly (eds.), *Language, Gesture and Space*, 19–41. Hillsdale, NJ: Lawrence Erlbaum.
- Liddell, Scott K. 1997. Numeral incorporating roots and non-incorporating prefixes in American Sign Language. *Sign Language Studies* 92. 201–226.
- Liddell, Scott K. 2000. Indicating verbs and pronouns: Pointing away from agreement. In Karen Emmorey & Harlan Lane (eds.), *The Signs of Language Revisited: An Anthology to Honor Ursula Bellugi and Edward Klima*, 303–320. Mahwah, NJ: Lawrence Erlbaum.

- Liddell, Scott K. & Robert E. Johnson. 1989. American Sign Language: the phonological base. *Sign Language Studies* 64. 195–277.
- Lillo-Martin, Diane & Edward S. Klima. 1990. Pointing out differences: ASL pronouns in syntactic theory. In Susan D. Fisher & Patricia Siple (eds.), *Theoretical Issues in Sign Language Research 1*, 191–210. Chicago: University of Chicago Press.
- Lillo-Martin, Diane & Richard P. Meier. 2011. On the linguistic status of ‘agreement’ in sign languages. *Theoretical Linguistics* 37. 95–141.
- Link, Godehard. 1983. The logical analysis of plural and mass nouns: a lattice-theoretic approach. In Rainer Bäuerle, Christoph Schwarze & Arnim von Stechow (eds.), *Meaning, use and interpretation of language*, 302–323. Berlin/ Boston: de Gruyter.
- Long, Joseph Schuyler. 1918. *The sign language: a manual of signs*. Des Moines, IA: Robert Henderson.
- Lønning, Jon Tore. 1987. Mass terms and quantification. *Linguistics and Philosophy* 10. 1–52.
- Lourenço, Guilherme. 2018. *Verb agreement in Brazilian Sign Language: Morphophonology, Syntax & Semantics*. Belo Horizonte: Universidade Federal de Minas Gerais dissertation.
- Lourenço, Guilherme & Ronnie B. Wilbur. 2018. Are plain verbs really plain?: Co-localization as the agreement marker in sign languages. *Formal and Experimental Advances in Sign language Theory* 2. 68–81.
- Lynch, John D. 1998. *Pacific Languages: An Introduction*. Honolulu: University of Hawaii Press.
- Lyons, John. 1968. *Introduction to Theoretical Linguistics*. Cambridge: Cambridge University Press.
- Lyons, John. 1977. *Semantics*. Cambridge: Cambridge University Press.
- MacLaughlin, Dawn, Carol Neidle, Benjamin Bahan & Robert G. Lee. 2000. Morphological Inflections and Syntactic Representations of Person and Number in ASL. *Recherches linguistiques de Vincennes* 29. 73–100.
- Mantovan, Lara. 2020. Lexicon: 3.7. Pronouns. In Chiara Branchini & Lara Mantovan (eds.), *A Grammar of Italian Sign Language (LIS)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).

- Martí, Luisa. 2020. Inclusive plurals and the theory of number. *Linguistic Inquiry* 51. 37–74.
- Marušič, Franc & Rok Žaucer. 2021. Dual in Slovenian. In Patricia Cabredo Hofherr & Jenny Doetjes (eds.), *The Oxford Handbook of Grammatical Number*, 428–444. Oxford: Oxford University Press.
- Marušič, Franc, Rok Žaucer, Yasutada Sudo & Andrew Nevins. under review. Inflectional competition and interpretation: a case study on the Slovenian dual. Ms., University of Nova Gorica & UCL.
- Mathur, Gaurav & Christian Rathmann. 2010. Verb agreement in sign language morphology. In Diane Brentari (ed.), *Sign Languages: A Cambridge Language Survey*, 173–196. Cambridge: Cambridge University Press.
- McBurney, Susan. 2002. Pronominal reference in signed and spoken language: Are grammatical categories modality-dependent? In Richard P. Meier, Kearsy Cormier & David Quinto-Pozos (eds.), *Modality and Structure in Signed and Spoken Languages*, 329–369. Cambridge: Cambridge University Press.
- McKay, Graham R. 1978. Pronominal person and number categories in Rembarrnga and Djeebbana. *Oceanic Linguistics* 17. 27–37.
- Meier, Richard P. 1990. Person deixis in American Sign Language. In Susan D. Fisher & Patricia Siple (eds.), *Theoretical Issues in Sign Language Research* 1, 175–191. Chicago: University of Chicago Press.
- Meir, Irit. 1998. *Thematic structure and verb agreement in Israeli Sign Language*. The Hebrew University of Jerusalem dissertation.
- Meir, Irit. 2003. Grammaticalization and Modality: the emergence of a case-marked pronoun in Israeli Sign Language. *Journal of Linguistics* 39. 109–140.
- Miljan, Merilin. 2003. Number in Estonian Sign Language. *Trames* 7. 203–223.
- Moravcsik, Edith A. 1978. Reduplicative constructions. In Joseph H. Greenberg (ed.), *Universals of human language*, 297–334. Stanford, CA: Stanford University Press.
- Moravcsik, Edith A. 2003. A semantic analysis of associative plurals. *Studies in Language* 27. 469–503.

- Moravcsik, Edith A. & Jessica R. Wirth. 1986. Markedness – an overview. In Fred R. Eckman, Edith A. Moravcsik & Jessica R. Wirth (eds.), *Markedness*, 1–11. Boston, MA: Springer-Verlag.
- Navarrete-González, Alexandra. 2019. The notion of focus and its relation to contrast in Catalan Sign Language (LSC). *Sensos-e* 6. 18–40.
- Navarrete-González, Alexandra. 2020a. Lexicon: 3.10. Numerals and quantifiers. In Josep Quer & Gemma Barberà (eds.), *A Grammar of Catalan Sign Language (LSC)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).
- Navarrete-González, Alexandra. 2020b. Sociohistorical background: 2. The sign language community. In Josep Quer & Gemma Barberà (eds.), *A Grammar of Catalan Sign Language (LSC)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).
- Navarrete-González, Alexandra. 2020c. Sociohistorical background: 3. Status. In Josep Quer & Gemma Barberà (eds.), *A Grammar of Catalan Sign Language (LSC)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).
- Navarrete-González, Alexandra. 2021. The expression of contrast in Catalan Sign Language (LSC). *Glossa: a journal of general linguistics* 6. 29.
- Neidle, Carol, Judy Kegl, Dawn Maclaughlin, Benjamin Bahan & Robert G Lee. 2000. *The Syntax of American Sign Language: Functional categories and hierarchical structure*. Cambridge, MA: MIT Press.
- Neidle, Carol & Joan Nash. 2012. The noun phrase. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language – An international handbook*, 265–292. Berlin: De Gruyter.
- Newman, Paul. 1980. *The Classification of Chadic within Afroasiatic*. Leiden: Universitaire Pers.
- Ojeda, Almerindo E. 1992. The semantics of number in Arabic. In Chris Barker & David Dowty (eds.), *Proceedings of SALT 2*, 303–325. Columbus: Ohio State University.
- Padden, Carol A. 1983. *Interaction of morphology and syntax in American Sign Language*. University of California at San Diego dissertation.
- Padden, Carol A. 1990. The relation between space and grammar in ASL verb morphology. In Ceil Lucas (ed.), *Sign language research:*

- Theoretical issues*, 118–132. Washington, DC: Gallaudet University Press.
- Partee, Barbara H. 1978. Bound variables and other anaphors. In David L. Waltz (ed.), *Theoretical Issues in Natural Language Processing 2 (TINLAP-2)*, 79–85. Urbana, IL: University of Illinois.
- Petronio, Karen. 1995. Bare noun phrases, verbs, and quantification in ASL. In Emmon Bach, Eloise Jelinek, Angelika Kratzer & Barbara Partee (eds.), *Quantification in natural language*, 603–618. Dordrecht: Kluwer.
- Pfau, Roland. 2011. A point well taken: on the typology and diachrony of pointing. In Donna Jo Napoli & Gaurav Mathur (eds.), *Deaf around the world: the impact of language*, 144–163. Oxford: Oxford University Press.
- Pfau, Roland, Martin Salzmann & Markus Steinbach. 2018. The syntax of sign language agreement: Common ingredients, but unusual recipe. *Glossa: a journal of general linguistics* 3. 107.
- Pfau, Roland & Markus Steinbach. 2005. Plural formation in German Sign Language: Constraints and strategies. In Helen Leuninger & Daniela Happ (eds.), *Gebärdensprachen: Struktur, Erwerb, Verwendung*, 111–144. Hamburg: Buske.
- Pfau, Roland & Markus Steinbach. 2006. Pluralization in sign and in speech: a cross-modal typological study. *Linguistic Typology* 10. 135–182.
- Pfau, Roland & Markus Steinbach. 2011. Grammaticalization in sign languages. In Heiko Narrog & Bernd Heine (eds.), *The Oxford Handbook of Grammaticalization*, 683–695. Oxford: Oxford University Press.
- Pfau, Roland & Markus Steinbach. 2021. Number in sign languages. In Patricia Cabredo Hofherr & Jenny Doetjes (eds.), *The Oxford Handbook of Grammatical Number*, 644–660. Oxford: Oxford University Press.
- Pizzuto, Elena & Serena Corazza. 1996. Noun morphology in Italian Sign Language (LIS). *Lingua* 98. 169–196.
- Plank, Frans. 1996. Domains of the dual, in Maltese and in general. *Rivista di Linguistica* 8. 123–140.

- Plank, Frans & Elena Filimonova. 2020. *The Universals Archive*. <https://typo.uni-konstanz.de/rara/>.
- Poppe, Nicholas. 1960. *Buriat Grammar*. Bloomington: Indiana University.
- Quadros, Ronice M. de & Josep Quer. 2008. Back to back(wards) and moving on: On agreement, auxiliaries and verb classes in sign languages. In Ronice M. de Quadros (ed.), *Sign Languages: Spinning and Unraveling the Past, Present and Future*, 530–551. Petrópolis, RJ: Editora Arara Azul.
- Quer, Josep. 2011a. Reporting and quoting in signed discourse. In Elke Brendel, Jörg Meibauer & Markus Steinbach (eds.), *Understanding quotation*, 277–302. Berlin: Mouton de Gruyter.
- Quer, Josep. 2011b. When agreeing to disagree is not enough: Further arguments for the linguistic status of sign language agreement. *Theoretical Linguistics* 37. 189–196.
- Quer, Josep. 2012a. Legal pathways to the recognition of sign languages: a comparison of the Catalan and Spanish Sign Language acts. *Sign Language Studies* 12. 565–582.
- Quer, Josep. 2012b. Quantificational strategies across language modalities. In Maria Aloni, Vadim Kimmelman, Floris Roelofsen, Galit W. Sassoon, Katrin Schulz & Matthijs Westera (eds.), *Logic, Language and Meaning: 18th Amsterdam Colloquium Amsterdam, The Netherlands, December 19-21, 2011, Revised Selected Papers*, 82–91. Dordrecht: Springer.
- Quer, Josep. 2019. Reduplication revisited: verbal plurality and exhaustivity in the visual-gestural modality. *Sensos-e* 6. 5–17.
- Rathmann, Christian & Gaurav Mathur. 2002. Is verb agreement the same cross-modally? In Richard P. Meier, Kearsy Cormier & David Quinto-Pozos (eds.), *Modality and Structure in Signed and Spoken Languages*, 370–404. Cambridge: Cambridge University Press.
- Rathmann, Christian & Gaurav Mathur. 2005. Unexpressed features of verb agreement in signed languages. In Geert Booij, Emiliano Guevara, Angela Ralli, Salvatore Sgroi & Sergio Scalise (eds.), *Morphology and Linguistic Typology, On-line Proceedings of the Fourth*

- Mediterranean Morphology Meeting (MMM4)*, 235–250. Bologna: Università degli Studi di Bologna.
- van Rooy, Robert. 2004. Signalling games select Horn strategies. *Linguistics and Philosophy* 27. 493–527.
- Rubino, Carl. 2001. Pangasinan. In Jane Garry & Carl Rubino (eds.), *Encyclopedia of the World's Languages: Past and Present*, 539–542. New York/ Dublin: H. W. Wilson Press.
- Rubino, Carl. 2013. Reduplication. In Matthew S. Dryer & Martin Haspelmath (eds.), *The World Atlas of Language Structures Online*. Leipzig: Max Planck Institute for Evolutionary Anthropology. <http://wals.info/chapter/27>.
- Rullmann, Hotze & Aili You. 2006. General number and the semantics and pragmatics of indefinite bare nouns in Mandarin Chinese. In Klaus von Stechow & Ken Turner (eds.), *Where semantics meets pragmatics*, 175–196. Amsterdam: Elsevier.
- Sandler, Wendy. 1993. A sonority cycle in American Sign Language. *Phonology* 10. 243–279.
- Sandler, Wendy. 1996. Phonological features and feature classes: The case of movements in sign language. *Lingua* 98. 197–220.
- Sandler, Wendy & Diane Lillo-Martin. 2006. *Sign Language and Linguistic Universals*. Cambridge: Cambridge University Press.
- Saral, Burcu & Meltem Keleşir. 2020. Lexicon: 3.7. Pronouns. In Meltem Keleşir (ed.), *A Grammar of Turkish Sign Language (TİD)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).
- Sauerland, Uli. 2003. A new semantics for number. In Robert B. Young & Yuping Zhou (eds.), *Proceedings of SALT 13*, 258–275. Ithaca, NY: Cornell Linguistics Club.
- Sauerland, Uli, Jan Anderssen & Kazuko Yatsushiro. 2005. The plural is semantically unmarked. In Stephan Kepser & Marga Reis (eds.), *Linguistic Evidence*, 413–434. Berlin, New York: Mouton de Gruyter.
- Schembri, Adam. 2003. Rethinking ‘classifiers’ in signed languages. In Karen Emmorey (ed.), *Perspectives on Classifier Constructions in Sign Languages*, 3–34. Mahwah, NJ: Lawrence Erlbaum Associates.
- de Schepper, Kees. 2012. Against a minimal–augmented analysis of number. *Linguistics in the Netherlands*. 134–146.

- Schlenker, Philippe. 2016. Featural variables. *Natural Language and Linguistic Theory* 34. 1067–1088.
- Schlenker, Philippe & Johnathan Lamberton. 2019. Iconic plurality. *Linguistics and Philosophy* 42. 45–108.
- Schlenker, Philippe & Johnathan Lamberton. to appear. Meaningful blurs: the sources of repetition-based plurals in ASL. *Linguistics and Philosophy*.
- Schuit, Joke. 2014. *Signs of the artic: typological aspects of Inuit Sign Language*. University of Amsterdam dissertation.
- Schütz, Albert J. 1985. *The Fijian language*. Honolulu: University of Hawaii Press.
- Siewierska, Anna. 2004. *Person*. Cambridge: Cambridge University Press.
- Siewierska, Anna. 2011. Person marking. In Jae Jung Song (ed.), *The Oxford Handbook of Linguistic Typology*, 322–345. Oxford/ New York: Oxford University Press.
- Siewierska, Anna & Dik Bakker. 2005. Inclusive and exclusive in free and bound person pronouns. In Elena Filimonova (ed.), *Clusivity: Typology and case studies of inclusive-exclusive distinction*, 151–178. Amsterdam: John Benjamins.
- Silverstein, Michael. 1976. Hierarchy of features and ergativity. In Robert M. W. Dixon (ed.), *Grammatical Categories in Australian Languages*, 112–171. Canberra: Australian Institute of Aboriginal Studies.
- Simon, Horst J. 2005. *Only you?* Philological investigations into the alleged inclusive-exclusive distinction in the second-person plural. In Elena Filimonova (ed.), *Clusivity: Typology and case studies of inclusive-exclusive distinction*, 113–150. Amsterdam: John Benjamins.
- Slobodchikoff, Tatyana G. 2019. *The evolution of the Slavic dual: a biolinguistic perspective*. Lanham, MD: Lexington Books (an imprint of Rowman & Littlefield).
- Smith, Wayne. 1990. Evidence for auxiliaries in Taiwan Sign Language. In Susan D. Fisher & Patricia Siple (eds.), *Theoretical Issues in Sign Language Research* 1, 211–228. Chicago: University of Chicago Press.
- Smith-Stark, T. Cedric. 1974. The plurality split. In Michael W. La Galy, Robert A. Fox & Anthony Bruck (eds.), *Papers from the Tenth Regional*

- Meeting*, Chicago Linguistic Society, 657–671. Chicago: Chicago Linguistic Society.
- Sonnaert, Jolijn. 2018. *The atoms of person in pronominal paradigms*. Utrecht: LOT dissertation.
- Spector, Benjamin. 2007. Aspects of the pragmatics of plural morphology: On higher-order implicatures. In Uli Sauerland & Penka Stateva (eds.), *Presuppositions and Implicatures in Compositional Semantics*, 243–281. London: Palgrave Macmillan.
- Spector, Benjamin. 2013. Bare numerals and scalar implicatures. *Language and Linguistics Compass* 7. 273–294.
- Steinbach, Markus. 2012. Plurality. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language – An international handbook*, 112–136. Berlin: Mouton de Gruyter.
- Steinbach, Markus & Roland Pfau. 2007. Grammaticalization of auxiliaries in sign languages. In Pamela M. Perniss, Roland Pfau & Markus Steinbach (eds.), *Visible variation: Comparative studies on sign language structure*, 303–339. Berlin: Mouton de Gruyter.
- Sudo, Yasutada. 2017. Another problem for alternative-based theories of plurality inferences: The case of reduplicated plural nouns in Japanese. *Snippets* 31.
- Thomas, David D. 1955. Three analyses of the Ilocano pronoun system. *Word* 11. 204–208.
- Todd, Peyton. 2009. Does ASL really have just two grammatical persons? *Sign Language Studies* 9. 166–210.
- Trubetzkoy, Nicolai. 1939. *Grundzüge der Phonologie*. Göttingen: Vandenhoeck & Ruprecht.
- Uhlik, Mladen & Andreja Žele. 2019. Slovenian comitative constructions with dual personal pronouns. *Rhema* 3. 115–132.
- Veiga Busto, Raquel. 2020a. Lexicon: 3.7. Pronouns. In Josep Quer & Gemma Barberà (eds.), *A Grammar of Catalan Sign Language (LSC)*. 1st ed. SIGN-HUB Sign Language Grammar Series (<http://sign-hub.eu>).
- Veiga Busto, Raquel. 2020b. Person marking in Catalan Sign Language (LSC) personal pronouns. *Formal and Experimental Advances in Sign Language Theory* 3. 68–79.

- Veiga Busto, Raquel. 2021. The category of person in Catalan Sign Language (LSC) personal pronouns. *Revista d'Estudis Catalans/Zeitschrift für Katalanistik* 34. 49–78.
- de Vos, Connie. 2012. *Sign-spatiality in Kata Kolok: How a village sign language in Bali inscribes its signing space*. Nijmegen: Radboud University Nijmegen dissertation.
- Wierzbicka, Anna. 1996. *Semantics: Primes and Universals*. Oxford: Oxford University Press.
- Wilbur, Ronnie B. 1987. *American Sign Language: Linguistic and applied dimensions*. Boston: College Hill.
- Wilbur, Ronnie B. 1999. Stress in ASL: empirical evidence and linguistic issues. *Language and Speech* 42. 229–250.
- Wilbur, Ronnie B. 2003. Representations of telicity in ASL. *Chicago Linguistic Society* 39. 354–368.
- Wilbur, Ronnie B. 2005. A Reanalysis of Reduplication in American Sign Language. In Bernhard Hurch (ed.), *Studies on Reduplication. (Empirical Approaches to Language Typology 28)*, 595–623. Berlin: Mouton de Gruyter.
- Wilbur, Ronnie B. 2008. Complex predicates involving events, time, and aspect: Is this why sign languages look so similar? In Josep Quer (ed.), *Signs of the time: Selected papers from TISLR 8*, 217–250. Hamburg, Germany: Signum.
- Wilbur, Ronnie B. 2009. Productive reduplication in a fundamentally monosyllabic language. *Language Sciences* 31. 325–342.
- Wilbur, Ronnie B. 2013. The point of agreement: Changing how we think about sign language, gesture, and agreement. *Sign Language and Linguistics* 16. 221–258.
- Wilhelm, Andrea. 2008. Bare nouns and number in Dëne Sų́łíné. *Natural Language Semantics* 16. 39–68.
- Winter, Yoad. 2018. Symmetric predicates and the semantics of reciprocal alternations. *Semantics and Pragmatics* 11. 1–46.
- Zabbal, Youri. 2002. *The semantics of number in the arabic noun phrase*. Calgary: University of Calgary MA thesis.
- Zeshan, Ulrike. 2003. Indo-Pakistani Sign Language grammar: A typological outline. *Sign Language Studies* 3. 157–212.

- Zeshan, Ulrike. 2007. The ethics of documenting sign languages in village communities. In Peter Austin, Oliver Bond & David Nathan (eds.), *Proceedings of the Conference on Language Documentation and Linguistic Theory, 7-8 December 2007*, 269–279. London, SOAS.
- Zorzi, Giorgia. 2018. *Coordination and gapping in Catalan Sign Language (LSC)*. Universitat Pompeu Fabra dissertation.
- Zweig, Eytan. 2009. Number-neutral bare plurals and the multiplicity implicature. *Linguistics and Philosophy* 32. 353–407.
- Zwicky, Arnold M. 1977. Hierarchies of person. In Woodford A. Beach, Samuel E. Fox & Shulamith Philosoph (eds.), *Papers from the Thirteenth Annual Meeting of the Chicago Linguistic Society*, 714–733. Chicago: University of Chicago Press.
- Zwicky, Arnold M. & Jerrold M. Sadock. 1975. Ambiguity tests and how to fail them. In John P. Kimball (ed.), *Syntax and Semantics* 4, 1–36. New York: Academic Press.
- Zwitserslood, Inge. 2003. *Classifying hand configurations in Nederlandse Gebarentaal (Sign Language of the Netherlands)*. Utrecht: LOT dissertation.
- Zwitserslood, Inge. 2012. Classifiers. In Roland Pfau, Markus Steinbach & Bencie Woll (eds.), *Sign language – An international handbook*, 158–186. Berlin: Mouton de Gruyter.
- Zwitserslood, Inge & Sibylla Nijhof. 1999. Pluralization in Sign Language of the Netherlands (NGT). In Jan Don & Ted Sanders (eds.), *OTS Yearbook 1998-1999*, 58–78. Utrecht: UiL OTS.