

# **The meaning of space in Catalan Sign Language (LSC)**

Reference, specificity and structure  
in signed discourse

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Als meu pares,  
al Cesc  
i a les comunitats sordes d'arreu.

*Cloc els ulls i sé  
que no hi ha res més bonic,  
quan aquest gest és sincer,  
que dar, cada ú, un xic.*

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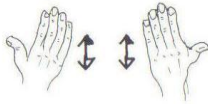
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## **Abstract**

This thesis concerns the use of sign space in Catalan Sign Language (LSC) at the discourse level. I argue that non-descriptive locations are established in the three spatial planes and I describe the grammatical features contained within them. Spatial locations are morphophonologically marked with an abstract point in space which does not have a specific direction and which is categorically interpreted in the linguistic system. In LSC, the frontal plane is grammatically relevant for specificity marking: lower spatial locations correlate with specificity, whereas upper locations correlate with non-specificity. Moreover, the incorporation of discourse structure into the analysis shows that the establishment of lower spatial locations also denotes discourse prominence. Hence, spatial locations are integrated into the grammar of LSC and they are analysed here with respect to the role they play in the denotation of specificity and discourse structure. The analysis is framed under the formalisation of Discourse Representation Theory, on the basis of a small-scale LSC corpus.

## **Resum**

Aquesta tesi se centra en l'ús de l'espai en llengua de signes catalana (LSC) a nivell discursiu. Defenso que les localitzacions no descriptives s'estableixen en els tres plans espacials i en descriu els trets gramaticals. Les localitzacions espacials es representen morfofonològicament amb un punt abstracte a l'espai que no té una direcció específica en els plans espacials i que s'interpreta categòricament en el sistema lingüístic. En LSC, el pla frontal és gramaticalment important i denota especificitat: les localitzacions baixes correlacionen amb especificitat, mentre que les localitzacions altes correlacionen amb no especificitat. A més, la incorporació de l'estructura del discurs a l'anàlisi demostra que les localitzacions espacials baixes també denoten prominència discursiva. Les localitzacions espacials són, per tant, part de la gramàtica de la LSC i aquí les analitzo en relació al rol que tenen en l'expressió de l'especificitat i l'estructura discursiva. L'anàlisi s'emmarca en la formalització de la *Discourse Representation Theory*, tot basant-se en les dades d'un corpus en LSC a petita escala.



# Table of contents

Abstract	xi
List of acronyms and other abbreviations	xvii
Annotation conventions	xviii
List of figures	xix
List of tables	xxi

<b>1 Introduction</b>	<b>1</b>
1.0 Objectives and goals	2
1.1 Sign language research	3
1.2 Catalan Sign Language	5
1.3 Methodology	7
1.3.1 Sign language corpora	7
1.3.2 Small-scale LSC corpus	11
1.3.3 Annotation conventions	14
1.4 Organisation of this thesis	18

<b>2 Space in Sign Languages: background</b>	<b>23</b>
2.0 Introduction	24
2.1 Sign space	25
2.2 Modality effects	31
2.2.1 Modality and space	32
2.2.2 Modality and gesture	35
2.3 Spatial functions	36
2.3.1 Descriptive localisation	38
2.3.2 Non-descriptive localisation	41
2.3.3 One function or two?	43
2.4 Previous accounts	46
2.4.1 Spatial mapping view	47
2.4.1.1 Locus and real space	48
2.4.1.2 Problems	51
2.4.2 R-locus view	59
2.4.2.1 Referential locations and linguistic space	59
2.4.2.2 Advantages	61
2.5 The pointing hodgepodge	63
2.5.1 The morphosyntax of pointing signs	63
2.5.2 The semantics of pointing signs	65

2.5.3 Sign language pronouns	68
2.6 Acquisition and emergence of new sign languages	72
2.7 Proposal	76
2.8 Summary	78

### **3 A morpheme on spatial planes 81**

3.0 Introduction	82
3.1 The spatial morpheme	83
3.2 Localisation mechanisms	87
3.2.1 Index signs	91
3.2.2 Spatial modification	94
3.2.3 Verb agreement	95
3.2.4 Non-manual mechanisms	97
3.3 Non-descriptive use of spatial planes	99
3.3.1 Horizontal	101
3.3.1.1 Kinds of spatial entities	104
3.3.1.2 Contrastive topics	111
3.3.2 Frontal	113
3.3.2.1 Hierarchical relations	115
3.3.2.2 Locatives	118
3.3.2.3 Specificity	121
3.3.2.4 Absence in the physical context	126
3.3.3 Midsagittal	127
3.4 Features on spatial planes	129
3.5 Body-anchored locations	135
3.6 Summary	138

### **4 Spatial locations and discourse referents 141**

4.0 Introduction	142
4.1 Dynamic semantics	143
4.1.1 Discourse and discourse model	143
4.1.2 Discourse representation theories	145
4.1.2.1 Donkey anaphora in DRT	152
4.1.2.2 Accessibility	154
4.1.3 Discourse referents	155
4.1.3.1 s-topic	159
4.1.3.2 Referential status	162
4.1.4 Desiderata for a DRT application to sign language	164
4.2 Locations and discourse referents	166

4.2.1	Locations as variables	167
4.2.2	Identity features	169
4.3	Scope of discourse referents' quantifiers	173
4.3.1	(Non)argumental NPs	177
4.3.2	Donkey sentences	182
4.3.3	Distributivity and quantification	186
4.3.4	Genericity	191
4.3.5	Kinds	194
4.4	Summary	197
<b>5</b>	<b>Deixis and familiarity</b>	<b>199</b>
5.0	Introduction	200
5.1	Definiteness: background	201
5.1.1	Uniqueness	202
5.1.2	Familiarity	203
5.1.2.1	Weak/strong familiarity	207
5.1.2.2	Discourse/addressee familiarity	209
5.1.3	Deixis	212
5.1.4	Definiteness in sign language	218
5.2	Deixis in LSC	222
5.3	Familiarity	230
5.3.1	Assertion of existence	230
5.3.2	Presupposition of existence	233
5.4	Indefiniteness marking	237
5.4.1	Indefinite determiners	237
5.4.2	Nonmanual indefiniteness marking	237
5.5	Summary	238
<b>6</b>	<b>Specificity</b>	<b>241</b>
6.0	Introduction	242
6.1	Specificity: background	243
6.1.1	Scope	245
6.1.2	Partitivity	248
6.1.3	Identifiability	250
6.1.4	Specificity in sign language	253
6.2	Specificity in LSC	255
6.2.1	Scope	258
6.2.2	Partitivity	262
6.2.3	Identifiability	265

6.2.4 Narrow scope marking	271
6.3 Localisation pattern	276
6.3.1 Compositional analysis of the data	277
6.3.1.1 Direction towards the frontal plane	278
6.3.1.2 Amount of mechanisms	280
6.3.1.3 Eye gaze duration	281
6.3.1.4 Simultaneity and coincidence in direction	283
6.3.2 Spatially modified categories	286
6.3.3 Dual nature of localisation	292
6.3.3.1 Non-specific partitives	292
6.3.3.2 Modal subordination	296
6.4 Existence in the model	301
6.5 Summary	306
<b>7 Discourse structure and prominence</b>	<b>309</b>
7.0 Introduction	310
7.1 Background	311
7.1.1 Discourse anaphora and underspecification	311
7.1.2 Prominence	315
7.1.3 Noteworthiness	320
7.2 Sign language pronominal issues	323
7.2.1 Infinity and unambiguity	324
7.2.2 Pronouns versus DRs	326
7.3 Prominence	334
7.3.1 Global discourse structure	334
7.3.2 Topicality	336
7.3.3 Topical variables	337
7.4 Underspecification	344
7.4.1 Informativity	347
7.4.2 Rigidity	353
7.5 Summary	357
<b>8 Final remarks</b>	<b>359</b>
8.0 Conclusions and major contributions	360
8.1 Future directions	366
<b>9 Appendix</b>	<b>369</b>
<b>10 References</b>	<b>371</b>



# List of acronyms and other abbreviations

## Abbreviations of sign languages:

ABSL	Al-Sayyid Bedouin Sign Language
AdaSL	Adamorobe Sign Language (Ghana)
ASL	American Sign Language
Auslan	Australian Sign Language
BSL	British Sign Language
DSL	Danish Sign Language
DGS	<i>Deutsche Gebärdensprache</i> , German Sign Language
HKSL	Hong Kong Sign Language
HZJ	<i>Hrvatski znakovni jezik</i> , Croatian Sign Language
IPSL	Indo-Pakistani Sign Language
ISL	Irish Sign Language
ISL	Israeli Sign Language
ISN	Nicaraguan Sign Language
Kata Kolok	Kata Kolok (Bali)
LIS	<i>Lingua dei Segni Italiana</i> , Italian Sign Language
LSC	<i>Llengua de signes catalana</i> , Catalan Sign Language
LSE	<i>Lengua de signes espanyola</i> , Spanish Sign Language
LSF	<i>Langue des Signes Française</i> , French Sign Language
LSFB	<i>Langue des signes de la Belgique Francophone</i> , Southern Belgium Sign Language
LSQ	<i>Langue des Signes Québécoise</i> , Quebec Sign Language
NGT	<i>Nederlandse Gebarentaal</i> , Sign Language of the Netherlands
RSL	Russian Sign Language
SSL	Swedish Sign Language
TSL	Taiwanese Sign Language

## General abbreviations:

DR	Discourse referent
DRT	Discourse Representation Theory
DRS	Discourse Representation Structure
NP	Noun Phrase
SL	Sign language
SpL	Spoken language

# Annotation conventions

## General annotation

TABLE	Lexical sign
PERSON+++	Reduplication of sign
A-N-N-A	Fingerspelled word
YES/TRUE	Two words needed to denote the precise meaning
IX1	First person pronoun
IX2	Second person pronoun
IX3	Third (person) pronoun
IX3 <sub>i</sub>	Coreferential index
2-IX2	Second person pronoun with number incorporation (“the two of us”)
1-GIVE-2	Agreement verb inflected for first and second person (“I explain to you”)
CL <sub>e</sub>	Entity classifier
CL <sub>h</sub>	Handling classifier
CL <sub>e</sub> .1-duck-walks	Entity classifier with 1 handshape and denoting a duck walking
CL <sub>h</sub> .take-book	Handling classifier denoting a book that is taken
DISAPPEAR(h)	Final hold of the sign

## Annotation of location and direction

IX3 <sub>ip</sub>	Sign localised towards the ipsilateral part
IX3 <sub>cl</sub>	Sign localised towards the contralateral part
IX3 <sub>l</sub>	Sign localised towards the lower part
IX3 <sub>u</sub>	Sign localised towards the upper part

Possible combinations:

ip-l	Localisation towards the ipsilateral and lower part
ip-u	Localisation towards the ipsilateral and upper part
cl-l	Localisation towards the contralateral-lower part
cl-u	Localisation towards the contralateral-upper part
____eg:cl	
FRIEND	Eye gaze with scope over the sign, directed to the contralateral part
____bl:ip	
FRIEND	Body lean directed to the ipsilateral part
____br	
FRIEND	Brow raised with scope over the sign
____rs	
IX1 WALK	Role shift scope

## List of figures

Figure 1.1. ELAN screenshot	14
Figure 1.2. ELAN linguistic tiers annotated	14
Figure 2.1. Sign space	25
Figure 2.2. LSC minimal pairs distinguished by the location parameter	26
Figure 2.3. Regular agreement verb in LSC	28
Figure 2.4. First and further mentions of a referent localised in space	28
Figure 2.5. Descriptive localisation	37
Figure 2.6. Non-descriptive localisation	38
Figure 2.7. Book on the table	39
Figure 2.8. Spatial planes	42
Figure 2.9. Mixed position of the members of two deaf clubs	57
Figure 3.1. First and further mention of a localised discourse referent	88
Figure 3.2 Localisation mechanisms	91
Figure 3.3 Index sign	92
Figure 3.4 PERSON sign	93
Figure 3.5 Spatial modification of signs	94
Figure 3.6 Agreement verbs	96
Figure 3.7 Non-manual mechanisms of localisation	99
Figure 3.8. Spatial planes	100
Figure 3.9 Horizontal plane	101
Figure 3.10 Reference to present objects	104
Figure 3.11 Index signs directed to non-present entities	106
Figure 3.12 Coreferential index referring to a non-entity in LSC	110
Figure 3.13 Discourse referents with a semantic affinity	113
Figure 3.14 Frontal plane	114
Figure 3.15 Denotation of hierarchical relations	116
Figure 3.16 Locative signs directed towards the upper frontal plane	118
Figure 3.17. Non-iconic convention	121
Figure 3.18. Specificity marking on the frontal plane	122
Figure 3.19. Midsagittal plane	128
Figure 3.20. Body-anchored location	136
Figure 3.21. Citation form vs. localisation	137

Figure 4.1. Localisation of discourse referents	170
Figure 4.2 Scope representation in DRT	176
Figure 4.3. Donkey sentence in LSC	184
Figure 4.4. Sign to denote genericity	193
Figure 5.1 Definiteness marking on the frontal plane in ASL and HKSL	220
Figure 5.2 Mixed position of the members of two deaf clubs	224
Figure 5.3 Definiteness marking in LSC sign space	236
Figure 5.4 Indefiniteness non-manual marking	238
Figure 6.1 Upper and lower features of frontal plane	256
Figure 6.2 Definiteness and specificity marking on LSC frontal plane	257
Figure 6.3 Localisation of a wide scope DR	260
Figure 6.4 Localisation of a narrow scope DR	261
Figure 6.5 Quantified NP for a specific DR	263
Figure 6.6 Quantified NP for a non-specific DR	264
Figure 6.7 Identifiable DR	267
Figure 6.8 Non-identifiable DR	269
Figure 6.9 Strong localisation and use of lower frontal plane	278
Figure 6.10 Weak localisation and use of upper frontal plane	279
Figure 6.11 Partitive construction with specific determiner	295
Figure 6.12 Partitive construction with non-specific determiner	295
Figure 6.13 Resumptive pronoun within an intensional context	298
Figure 6.14 Darting eye gaze	301
Figure 7.1 Contrastive locations	349
Figure 7.2 Same location for two DRs	350
Figure 7.3 Two lateral directions for the same DR I	355
Figure 7.4 Two lateral directions for the same DR II	356

## List of tables

Table 4.1 Terminology and treatments of s-topic	162
Table 5.1 Equivalence of information-status w.r.t. definiteness	211
Table 6.1 Indefinites localised on the lower/upper frontal plane	280
Table 6.2 Number of mechanisms used simultaneously in indefinites	281
Table 6.3 Eye gaze duration	283
Table 6.4 Simultaneous co-occurrence with manual component	283
Table 7.1 Features of pronominal person distinction	328
Table 7.2 English and co-speech gesture sentence	331
Table 7.3 English sentence	331
Table 7.4 LSC sentence	332



# Chapter 1

## Introduction

¿Y el lenguaje oral? Todavía lo estoy aprendiendo y a un ritmo más lento. No lo integro con la misma naturalidad que la LSC. Los mensajes orales me llegan opacos, turbios, sombríos. Menos mal que estoy adquiriendo rápidamente una lengua límpia, diáfana y transparente para poder expresar mis sentimientos, para poder acceder a conocimientos, para descubrir el mundo que me rodea, a través de las conversaciones con los compañeros sordos, para vivir y, en definitiva, tener un lugar en la sociedad.

*Háblame a los ojos*, Pepita Cedillo (2004:43)

## **1.0 Objectives and goals**

When we look at a signed conversation for the first time the most striking difference that we may find is that sign languages use space for the representation of meaning. While spoken languages use the audio-vocal modality, sign languages use the visual-spatial modality. As a consequence of this modality, sign space, which is the three dimensional space in front of the signer's body, is thoroughly used. Linguistic expressions in sign languages (SLs) rely on sign space and the different components of the grammar show dependence on it. In fact, sign space plays a role at the phonological, morphosyntactic and discursive level of all SLs studied to date. However, the interpretation of the use of sign space is not free of controversy and there are opposing views considering the status of locations with respect to signs that use space, namely pronouns, agreement verbs and classifiers. For instance, it is not clear how spatial locations are associated with meaning, or whether they belong to the grammar of the language or rather to the gesture domain. This dissertation aims at clearly developing a description and analysis of how spatial locations are integrated in the discourse grammar of Catalan Sign Language (henceforth, LSC) concerning the dynamic nature of discourse and taking into account dynamic semantic theories.

The main goals of this dissertation are three-fold:

**G1. To show that spatial locations are integrated into the grammar of LSC and, even more, that they denote specificity.**

The incorporation of spatial locations into the grammar of sign



languages is a controversial issue. This dissertation shows how they are associated with meaning and the role they play in specificity marking.

**G2. To analyse how spatial locations are set, given the dynamic nature of discourse.** The establishment of spatial locations has been mainly studied within the scope of clauses, but their discursive behaviour has not been considered. Using a small-scale LSC corpus, it is shown that spatial locations consist in abstract points established in space independently of the direction towards spatial planes manual signs may take, which are categorically interpreted within the linguistic system.

**G3. To apply a dynamic semantic theory, such as classical Discourse Representation Theory (Kamp & Reyle, 1993), to a visual-spatial language like LSC.** Due to its face-to-face interaction, LSC uses sign space as well as deictic pronominal elements in the development of discourse. Here deictic uses and sign space are incorporated to the semantic representation.

### **1.1 Sign language research**

That natural SLs are not mere pantomime and that they are provided with grammatical structure was proven about 60 years ago (Teervort, 1953; Stokoe, 1965). Since then, research in SL has advanced and reached different levels of linguistic analysis (see Sandler & Lillo-Martin, 2006 and Brentari, 2010 for an overview),

although the depth of knowledge is not comparable to that of spoken languages (SpLs). The areas which have received more attention are phonology, including phonetics and prosody (Sandler, 1989; Liddell & Johnson, 1989; Brentari, 1998; Crasborn, 2001; van der Kooij, 2002, among others); but also morphosyntax has been studied from a theoretical point of view (Aarons, 1994; Aronoff et al. 2004; Bahan, 1996; Benedicto & Brentari, 2004; Branchini & Donati, 2009; Cecchetto, Geraci, Zucchi, 2007; Fischer, 1975; Friedman, 1976; Kegl, 1986; Liddell, 1990; Lillo-Martin, 1986; Meir, 2002; Neidle et al. 2000; Padden, 1988; Pfau, 2002; Pizzuto et al. 1990; Rathmann & Mathur, 2008; Quer, 2004; Schembri, 2003; Suppalla, 1986; Steinbach & Pfau, 2007; Wilbur, 1997; Zeshan, 2004; Zwitserlood, 2003, only to indicate a very short representative list of references).

As for discourse analysis, it is an area where research has started to reach a basic level of understanding (Baker, 1977; Coates & Sutton-Spence, 2001; Metzger, 1995; Metzger & Bahan, 2001; Meurant 2004, 2006, 2007, 2008; Morgan 1996, 1999; Nilsson, 2007; Wilson, 1996; Winston 1995, among others), and more research is still needed.

However, formal semantics and pragmatics is the interface which is still at a very incipient state (however, see Cecchetto & Zucchi, 2006; Quer 2005a, 2005b, 2011a, 2011b; Schlenker, 2011a, 2011b; Wilbur, 2011; Zucchi, 2004, 2011). Hence, this dissertation aims at

contributing to the analysis of SL, and more specifically of LSC discourse, from a semantic/pragmatic perspective.

### **1.2 Catalan Sign Language**

Catalan Sign Language (LSC, *llengua de signes catalana*)<sup>1</sup> is the natural language used by the signing deaf and deaf-blind community in Catalonia, the northeastern autonomy in Spain. Together with Spanish Sign Language (LSE), they are the two sign languages recognised in Spain. Interestingly, although in the hearing community the bilingualism between spoken Spanish and Catalan is present, no bilingualism between LSC and LSE exists in Catalonia. Signers living in Catalonia use only LSC, apart from spoken Catalan and Spanish. Hence the two sign languages do not co-exist in Catalonia.

Although there is no official count of deaf people, the Catalan Federation for the Deaf estimates that there are around 12,000 deaf people and 25,000 signers around the Catalan territory, including both deaf and hearing people. Both LSE and LSC were legally recognised by a law that was passed in 2007 in the Spanish Parliament (Ley27/2007, October 23<sup>rd</sup> 2007). The Catalan Autonomy Law of 2006 already includes the right to use LSC and on May 26<sup>th</sup> 2010 a bill was approved by the Catalan Parliament to regulate the LSC use in the areas of public life (Llei 17/2010, June 3<sup>rd</sup> 2010) (see Quer et al., 2010).

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<sup>1</sup> This name is used since the 80's. Previous to that, a series of different names, such as *mimics*, *hands*, *signs*, were used (Frigola, 2010).

Teaching and learning materials about LSC are still limited, but a small amount of materials is available to study and practice the language (Domad 2002ab; Illescat 2002ab; Codorniu et al., 2005; Garcia & Codorniu, 2007; Segimon & Fernández-Viader, 2000). Some dictionaries have also been designed (Perelló & Frigola, 1998; Martín & Alvarado, 2004; Illescat, 2004; Ferrerons, 2011), as well as a basic descriptive grammar with its corresponding exercises (Quer et al., 2005; Frigola et al., 2011).

LSC does not have a standardised variety yet, although an indirect planning is taking place since media exist on internet (Webvisual<sup>2</sup>), and LSC is being taught at different institutions.<sup>3</sup> The dialect from the capital (Barcelona) is the most standardised one, since it is where the Federation for the Deaf is located and also where all the largest population of deaf people lives, with the corresponding deaf schools and deaf clubs.

Although LSC is still an understudied language, some published works and master thesis are already available in different linguistic areas, namely phonology (Massone, Bosch i Baliarda, Fernández-Viader, 2003; Bosch i Baliarda, 2005), morphosyntax, including word order (Jarque et al., 2007), agreement (Morales et al., 2005; Quadros & Quer, 2008; Quer, 2009, 2010), negation (Quer &

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<sup>2</sup> Webvisual is the LSC TV channel on internet in which two daily signed news and weekly documentaries, news, shows, interviews, etc. are presented ([www.webvisual.tv](http://www.webvisual.tv)).

<sup>3</sup> Nowadays, deaf clubs, two universities (Universitat Pompeu Fabra and Universitat de Barcelona) and three vocational trainings give lessons of LSC.

Boldú, 2006; Pfau & Quer, 2007), possessives (Quer & GRIN, 2008), classifier constructions (Benedicto, Cvejanov, Quer, 2007; Benedicto, Cvejanov, Quer, 2008), Wh-questions (Alba, 2010); relative clauses (Mosella, 2012); metaphor (Jarque, 2005), role shift (Frigola & Quer, 2006; Quer, 2005b, 2011a); discourse cohesion (Barberà, 2007); machine translation (Massó & Badia, 2010); lexical access in production (Baus, Gutiérrez-Sigut, Quer & Carreiras 2008); lexicography (Ribera, 2007; Barberà & Ribera, 2010), and sociolinguistics (Gras, 2006; Morales-López et al., 2002), among others.

### **1.3 Methodology**

#### **1.3.1 Sign language corpora**

The main aim of this dissertation is to analyse what it takes to have a spatial location established in LSC discourse. The referential meaning of nouns in natural languages, and in LSC in particular, is an intricate topic that is extremely hard to investigate on the basis of elicitation only. In the end, it is connected discourse in the language under investigation which provides the most important clues for analysis of these grammatical domains (Dimmendaal, 2001). In this section the peculiarities of sign language corpora and the methodology for the annotation of the small-scale LSC corpus are presented.

A corpus is a representative collection of language samples in a machine-readable form that can be used to study the type and

frequency of linguistic units (McEnery & Wilson, 2001). For SLs, corpora are collections of video which are annotated, i.e. they contain written material that is added to and time-aligned with the primary sign language digital video data (Schembri & Crasborn, 2010). It represents a description and it is very useful for analysis of the data. The beginnings of standardised annotation conventions for SL corpora can be found in the ECHO project (Crasborn et al., 2007). This project consisted in the recording of some Aesop's fables in three sign languages, namely Sign Language of the Netherlands (NGT), British Sign Language (BSL) and Swedish Sign Language (SSL)<sup>4</sup>. The three university groups responsible for the project had different research interests, but a basic annotation layer was established which has been used for the annotation of LSC data.

SL corpora have the main advantage of improving peer review of descriptions of SLs and make possible a corpus-based approach to SL analysis. Corpora are important for hypotheses testing at all grammatical components (from phonology, morphology, lexis, syntax and discourse). But concerning SL linguistics there are different reasons why corpora are important. First, SLs are young languages of minority communities and lack written forms and developed standards of correctness that often accompany literacy (Johnston, 2010). Second, they have discontinuous transmission and also have few native speakers (see Costello, Fernández & Landa,

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<sup>4</sup> The ECHO webpage, with recordings and many useful annotation guidelines, can be found at <http://www.let.ru.nl/sign-lang/echo/>

### 1.3 Methodology

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2008). And third, the traditional annotation of SL examples using glosses remains often inaccessible for some researchers. Within the last ten years, more corpus projects have been set up for different SLs, among the most known ones are the NGT corpus,<sup>5</sup> the BSL corpus<sup>6</sup>, the AUSLAN (Australian SL) corpus<sup>7</sup>, the DGS (German SL) Corpus<sup>8</sup>, and the ISL (Irish SL) Corpus. LSC does not have a corpus available yet. However, the Aesop fables have been recorded and will be soon publicly available.

Different softwares which allow precise time-alignment of annotations with the corresponding video sources on multiple user-specifiable tiers have been designed. Among the most used ones are ELAN<sup>9</sup>, SignStream<sup>10</sup> (Neidle, 2007), Anvil<sup>11</sup>, and Colin<sup>12</sup>. ELAN is a digital video annotation software developed at the Max Planck Institute and it is the software mostly used for SL annotation. One of the main advantages is that it has customisable, study-specific tiers that can always be added at any time of the annotation process.

Data gathering is an extremely valuable part of a fieldworker's repertoire since it is by collecting spontaneous or semi-spontaneous data that linguists are exposed to phenomena which are outside the boundaries of their imagination. A body of textual material enables

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<sup>5</sup> <http://www.ru.nl/corpusngtuk/>

<sup>6</sup> <http://www.bslcorpusproject.org/>

<sup>7</sup> <http://www.auslan.org.au/about/corpus/>

<sup>8</sup> <http://www.sign-lang.uni-hamburg.de/dgs-korpus/index.php/welcome.html>

<sup>9</sup> <http://www.lat-mpi.eu/tools/elan/>

<sup>10</sup> <http://www.bu.edu/asllrp/signstream/index.html>

<sup>11</sup> <http://www.anvil-software.de/>

<sup>12</sup> <http://www.irit.fr/LS-COLIN>

precisely to study how discourse is connected, for example. However, corpora work entails two drawbacks. First, corpus data cannot be used exclusively when the aim is to describe and analyse a natural language, since not everything that is in the language is precisely contained within the corpus. The observation of the restricted set of data can be a limitation once we want to obtain, for instance, negative evidence (Matthewson, 2004). This is why linguistic studies cannot only be based on corpora data, as the language under study needs to be tested and this cannot be done alone with the data gathered in the corpus. Hence, elicitations and grammaticality/felicity judgments are also very important.

A second drawback is that although annotations should be as atheoretical as possible, it is quite unlikely to have a theory-neutral annotation system (Dryer, 2006). To avoid problems related to this issue, Zwitserlood, Özyürek & Perniss (2008) propose a two-level annotation. Since some structures researchers are interested in still lack a thorough study, it is better not to provide interpretation during the annotation process. They propose to make a distinction between annotations on a mere *descriptive* level and annotations on an *analytic* level. Annotations on the descriptive level describe signs in terms of their phonological/phonetic form only, while annotations on the analytic level tiers provide an interpretation and/or analysis. Analytic annotations can be based on descriptive annotations, but they can also be independently re-analysed if necessary. Importantly, any annotation-related project would also possibly require studies into intra-annotator and inter-annotator reliability, as well as the creation of computational tools that can



increase the reliability of annotators' work (Schembri & Crasborn, 2010). For this goal, the online Kappa calculator calculates inter-annotator agreement amongst several annotators and it can be a reliable tool to be used in future practices.<sup>13</sup>

As for the annotation of signs localised in sign space, different groups have developed complex spatial grids in their own annotation guidelines: Zwitserlood, Özyürek & Perniss (2008) using ELAN; specific signing space font used in iLex<sup>14</sup>; Lenseigne & Dalle (2006) propose a computational representation of the French Sign Language (LSF) spatial organisation both for automatic interpretation and generation; Nonhebel, Crasborn & Kooij (2004) establish the general guidelines for spatial annotations used in the rest of the corpus cited previously.

### **1.3.2 Small-scale LSC corpus**

As mentioned before, LSC does not have a corpus yet. Since the main aim of this dissertation is to study how definiteness and specificity is encoded in spatial locations, a small-scale LSC corpus was built for the purposes of this work. The small-scale LSC corpus consists of three types of data, namely semi-spontaneous, videos recorded for other purposes, and elicited data. The naturalistic data consists of recorded LSC conversations. Videos recorded for other purposes, such as news presentation and materials to learn LSC, were also included in the corpus. This data was used at a

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<sup>13</sup> <http://cosmion.net/jeroen/software/kappa/>

<sup>14</sup> <http://www.sign-lang.uni-hamburg.de/ilex/>

preliminary stage in order to have a general sense of how LSC spatial locations are used in different language situations and what they encode for. This provided a picture within which I would frame specific data questions and intuitions. Afterwards, felicity judgments were also asked from our native informants.

As mentioned before, corpus data cannot be the only reliable piece of data on which hypotheses are based, since not all which is grammatical is found in the corpus. Therefore, elicited data is crucial in order to know whether a specific construction can be used or rather rejected in some contexts. In the elicitation tasks I did, I avoided the use of translations from SpL (i.e. Catalan or Spanish) and also the use of glosses in order to avoid the influence of SpL as much as possible and to have a sign supported speech variant as a result. In SL research, when presenting contexts it is much better not to use a metalanguage (i.e. a language different from the language object of study) (Neidle et al., 2000). Instead, drawings avoid any interference from the SpL in the surrounding community. My elicitation materials consisted of drawings which provided the informants with stimuli to obtain the context desired. I also asked for felicity judgments about the data, which are comments that native signers are qualified to give by virtue of knowing the language. I recorded fragments of discourse and the native informants had to judge the felicity of those constructions. These felicity judgements were based on the intuitions of two native deaf signers. Also some comments signers gave were taken into account, although not included as conclusions for the work but only as aside comments. Research cannot be restricted to informants' intuitions

### 1.3 Methodology

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and it is important to note that when doing fieldwork research comments should be viewed as clues, and not as results by the researchers (Matthewson, 2004). Researchers then have to decide and determine whether the clues are relevant for the analysis. Data collection sessions were conducted in LSC with the informants and myself. I am not a native signer, but after working and being very actively involved in the Deaf Community for many years my signing is very fluent.

The small-scale LSC corpus used in this dissertation includes data from seven native deaf signers (three women and four men), aged between 41 and 62 years old and living in the area of Barcelona. The corpus comprises so far about 5,108 signs. It is a composite of genres, such as news, interviews, documentaries, tales, as well as different discourse modes, namely narrative, explicative, and dialogue (Smith, 2003). The distribution across types of data and the signers that participated in each one is illustrated in the table below.<sup>15</sup>

<b>Types of data</b>	<b>Signers</b>
Semi-spontaneous	2, 4, 6
Recorded for other purposes	1, 2, 3, 6, 7
Elicited	1, 3, 5, 6, 7

Table 1.1. Distribution: types of data and signers

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<sup>15</sup> For the interest of privacy, each signer is identified with a number. The reader is referred to Appendix B where a complete list with the videos, type of data and signer that participated is offered.

### 1.3.3 Annotation conventions

The software used for the annotation is ELAN. When elicited data has been recorded, two cameras were used and the recording was synchronised in the ELAN annotation file.

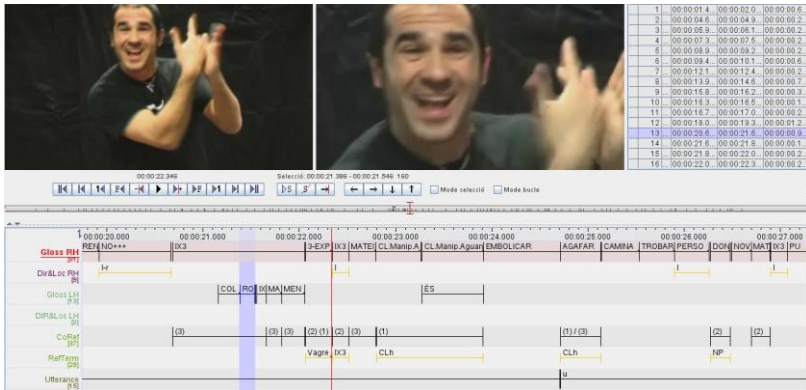


Figure 1.1. ELAN screenshot

The annotation conventions are based on the guidelines established in Nonhebel, Crasborn & Kooij (2004). The ten linguistic tiers the annotation of the corpus comprises are shown in Figure 1.2 and defined below. They are listed in the Annotation conventions (page ix) and described below.

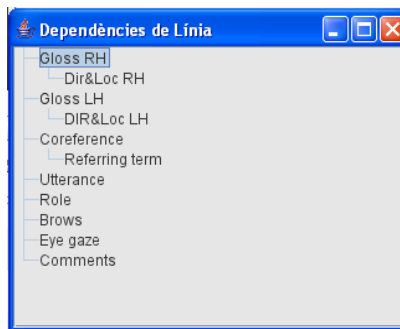


Figure 1.2. ELAN linguistic tiers annotated

Linguistic tiers:

(i) The **gloss** is an approximate and consistent translation of the sign. The gloss for the active and non-active hands have been annotated. This was not meant to be a big corpus, only a representative part of real LSC use. If this would have been a large-scale LSC corpus, we would have used ID-glosses for every sign. Lexical signs need to be identified with a gloss which uniquely identifies the sign. This is referred in the Australian SL (Auslan) Corpus as ID-gloss, which is the spoken word that is used to label a sign all the time within the corpus, regardless of what a particular sign may mean in a specific context (Johnston, 2008). With this consistent annotation it is possible to use the corpus productively and convert it into machine readable.

(ii) **Direction and location** of signs towards sign space have also been considered distinguishing among ipsilateral, contralateral and centre, as well as upper and lower.

(iii) Our annotation of **co-reference** chains consists in giving the same entity number to all coreferring mentions. To this end, in the co-ref tier in each ELAN file, an index number is assigned to each discourse referent introduced. To keep track of the establishment of every discourse referent introduced, we also assign a 0 next to the index which indicates the first mention of the referent. This annotation convention is based on the designing annotation guidelines of coreferential chains in SpL corpus, work that started during the last part of the decade of the 90's. The guidelines of SpL

corpus (MATE/GNOME, Poesio 2004; MUC, Hirschman, 1997; ANCORA, CLiC-UB 2008) have inspired our LSC annotated corpus.

(iv) The **referring term** used is also annotated, and distinguished either as a noun, a pronoun, or an NP. Verb agreement and classifier constructions have also been annotated.

(v) The segmentation of **utterances** has been done according to units of information which contain a predicate, have a semantic interpretation and are delimited by major prosodic boundaries.

Utterance boundaries are a major concern both for SpL (Himmelman, 2006) and for signed languages (Nicodemus, 2009). Specifically considering SLs there are two specific problems in delimiting sentences and clauses: the difficulty of determining what is considered a predicate and the availability of simultaneous constructions (Crasborn, 2007). Discourse units in LSC have been first singled out, with the help of identifying the topic markers which are markers of discourse units (Asher & Lascarides, 2003). As markings of the intonational phrase in LSC, the traditional markings have been taken into consideration, namely change in head or body position, and a change in all aspects of facial expression (Nespor & Sandler, 1999).

(vi) The scope of **role shift** for the different characters in the discourse has been also annotated.

(vii) **Non-manual** elements have also been marked. As for brows, raised and furrowed brows have been distinguished. As for eye gaze, the direction in sign space (similar to the direction and location tier of manual signs) has been annotated.

(viii) **Comments** on the annotation are important and useful for later analysis.

Concerning the distinction between the two levels of annotation as mentioned in the previous section, the linguistic tiers (i), (ii), (v), (vi), and (vii) form the descriptive level and (iii), (iv), and (viii) form the analytic level of annotation.

Many examples in this dissertation are graphically represented with stills. The stills correspond to different instances of pointing signs in a fragment of discourse. Below each still the gloss of the utterance and a free translation are given. Because the important signs localised in space are found in long stretches of discourse I have opted for only illustrating instances of localised and/or relevant signs. In between each mention the signer keeps signing, but these stills have been omitted from the figures in the interest of space. The signing in between is indicated by a larger separation between two stills.

## **1.4 Organisation of this thesis**

This dissertation is concerned with the semantics and pragmatics of sign space in Catalan Sign Language. Different phenomena are presented related to definiteness, specificity and discourse structure. Hence the theoretical background concerns different linguistic phenomena. This is the reason why every chapter has a first section X.1 where the theoretical ingredients needed for the presentation of the hypothesis are presented. The chapter then develops the main analysis and findings in LSC of the concerned topic.

The rest of the thesis is organised as follows.

**Chapter 2** provides background assumptions, analysis and views on sign space found in the literature. The two main views concerning the analysis of space, namely the spatial mapping and the r-locus view, are presented. This dissertation clearly favours the r-locus view and presents new and fresh arguments from LSC discourse data. The modality effects and the different analysis of index signs directed to space are also presented.

**Chapter 3** is devoted to the use of space of non-descriptive locations, which are categorically defined as taking place in the different areas within the three spatial planes projected with respect to the body of the signer. A description of the uses of the three spatial planes and the features is presented. Signs directed to the different parts of spatial planes contribute to the establishment of a grammatical morpheme that consists in an abstract point in space (p), which is categorically interpreted within the linguistic system. In LSC, (p) can be abstractly established in different parts of the three spatial planes. Yet, only the two directions of the frontal



plane, namely upper and lower, are grammatically relevant and distinctively interpreted. As for the horizontal plane, the features [ipsilateral], [contralateral], and [centre] do not encode a specific and grammatical meaning by themselves, and also entities of different nature are localised in each part. Finally, the two features in the midsagittal plane, namely [proximal] and [distal], are not relevant for LSC discourse. This chapter supports goal 1 and goal 2 (see §1.0).

**Chapter 4** shows that (p) undertakes a semantic function: that of being the overt manifestation of discourse referents. Under the specific Discourse representation Theory (Kamp & Reyle, 1993) formalisation, the discourse referent established in space corresponds to a variable established in the main universe of discourse. Hence, the establishment of (p) correlates with discourse referents which are attached to a quantifier that has wide scope. In contrast, variables attached to narrow scope quantifiers, such as donkey sentences, quantified noun phrases, genericity and reference to kinds, lack a spatial location establishment. This chapter offers new evidence in favour of the r-locus view, as well as supports goal 1 and goal 3 (see §1.0).

**Chapter 5** provides evidence that definiteness is not formally encoded in LSC spatial locations. The distinction to show definite and indefiniteness marking established in sign space is implemented here with respect to the status of the DR in the model. That is, whether the DR is presupposed or asserted. It is shown that in LSC both possibilities establish (p). The chapter also focuses on how information is incorporated into the model, and it is claimed

that both deictic uses, which do not have an explicit linguistic antecedent, and discourse referent with explicit antecedents appearing in the previous discourse can introduce variables to the model. In the first case, a default variable is present in the semantic representation which makes all references anaphoric to the model. This chapter supports goal 1 and goal 3 (see §1.0).

**Chapter 6** turns to specificity marking and proposes that spatial locations encode specificity. The frontal plane is grammatically relevant for specificity marking: lower spatial locations correlate with specific discourse referents, whereas upper spatial locations correlate with non-specific ones. In LSC two kinds of localisation on the frontal plane are found, namely a strong and a weak localisation. Strong localisation is instantiated by the feature (p), while weak localisation is instantiated by the marked feature (p)[up]. The formalisation offered to explain this distinction is framed within the distinction between main and subordinate variables in a DRS. This chapter provides support for goal 1 and goal 3 (see §1.0).

**Chapter 7** addresses the fact that lower spatial locations correspond to discourse prominence, defined as backward looking properties as well as forward looking properties. It is shown that independently of the scope of the quantifier attached to the variable, narrow scope variables which are linked to the prominent DR at a specific point in a discourse behave like wide scope ones and establish a lower spatial location. It is also shown that (p) is an abstract point in space which does not correspond to an exact point nor it is related to a specific direction on spatial planes. In

connected discourse, locations associated with the most prominent DR can be shifted in space, showing that the exact direction on planes is irrelevant for the nature of (p). What it is relevant is that the spatial location (p) is associated with a DR from the model and it is categorically interpreted independently of the direction towards the horizontal plane. This chapter provides support to goal 2 and goal 3 (see §1.0).

Finally, **chapter 8** provides a summary of the main findings and contributions of this dissertation, as well as interesting issues raised along these lines that should be accounted for in future research.



# Chapter 2

## Space in Sign Languages: background

- Encara estic en fase de documentació.
- Documentació? I això com funciona?
- Bàsicament, et llegeixes milers de pàgines per aprendre't el més necessari i arribar a l'essència d'un tema, a la seva veritat emocional, i després ho desaprens tot i tornes a començar de zero.

*El joc de l'àngel, Carles Ruiz Zafón (2008:300)*

## **2.0 Introduction**

Linguistic expressions in sign languages (SLs) depend on the use of space. The different components of the grammar show dependence on it, from phonology, to morphosyntax and discourse. This has been considered to be unique to the visual-spatial modality and in some works it has even been connected to co-speech gesture properties. This contrasts with a main opposing view which considers that modality is not reflected in the structure of grammar and, besides the use of space, SLs and spoken languages do share the same basic properties. According to this opposing view, SLs mainly differ from spoken languages (SpLs) in that the referential indices are expressed overtly.

This dissertation claims that the use of space does not make the grammar of SLs especially different. In order to show that, this chapter is devoted to presenting a broad revision of sign space, which is the main theme of this dissertation. Here, a state of the art of the accounts, analyses and views on the use of sign space are offered. After defining “sign space” in §2.1, §2.2 explains the effects that the difference in modality has on the language. §2.3 presents two spatial functions which have been associated with the use of space. §2.4 compares the two main views concerning the analysis of space and §2.5 presents the different syntactic and semantic analysis of pointing signs. §2.6 provides evidence for the linguistic status coming from acquisition and studies about emergence of new SLs. §2.7 presents the proposal underlying this dissertation. Finally §2.8 summarises the main claims presented in the chapter.

### 2.1 Sign space

The actual space where the articulations of signs take place is called “signing space” or “sign space”, and generally it is considered to be constrained to the horizontal and the frontal plane in front of the signer’s torso (Figure 2.1). Pointing signs directed to the back of the signer are also possible but the realisation of the sign does not reach further than the back of the signer’s body.<sup>1</sup> The body of the signer itself is also used as a possible location for the articulation of the signs. As argued by Klima and Bellugi (1979), it is important to note that this space is not only used for articulatory reasons where the hands and the arms can move (like the tongue is accommodated in the mouth for SpLs) but, more importantly, it carries linguistic meaning.

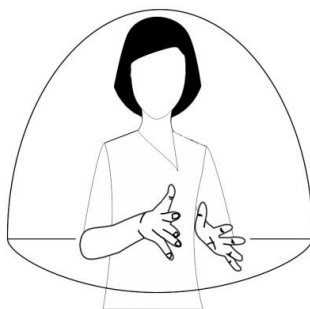


Figure 2.1. Sign space

As previously mentioned, the different components of the grammar rely on sign space: starting from phonology, passing through

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<sup>1</sup> The description of space given in the overall dissertation focuses only on LSC, which shares many features with other Western urban sign languages. However, non-urban sign languages are being more and more studied in different corners of the world. As described so far, these non-urban SLs show differences in the grammar and use of space. For instance, Kata Kolok, a village sign language in North Bali, uses a much larger sign space that goes beyond the limits I describe here (Marsaja, 2008:159).

morphosyntax and reaching the discourse level. At the phonological level, space is used contrastively in the place of articulation parameter of signs. After Stokoe's (1960) study, signs are considered to be a bundle of manual and non-manual components. Non-manual markers are movements linguistically significant which are done with the body, the head and parts of the face. Manual components comprise the characterisation of the shape and position of fingers (i.e. the handshape), the movement of the hand and/or fingers, the orientation of the palm of the hand, and the place of articulation or location, where the realisation of the sign takes place. Hence location is one of the minimal parameters into which a lexical sign can be decomposed and it is considered to be a major phonological category in SLs (Sandler, 1989).

In LSC the minimal pair of signs formed by REMEMBER and DIFFICULT is distinguished by the place of articulation. While the sign for REMEMBER is an index finger with contact on the forehead and moving forward, the same manual articulation located on the chin results in the sign for DIFFICULT, as it can be observed in the following figure.<sup>2</sup>

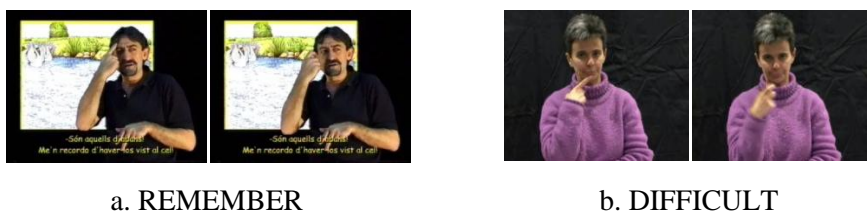


Figure 2.2. LSC minimal pairs distinguished by the location parameter

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<sup>2</sup> In this LSC minimal pair example the nonmanual component is left aside.



## 2.1 Sign space

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At the morphosyntactic level, signs are modulated in space for grammatical purposes to express number, person, and also the arguments of the verb. Padden (1988) classifies ASL verbs in terms of agreement features. Three types are distinguished, namely plain, agreement and spatial verbs. Plain verbs do not inflect. Agreement and spatial verbs use space to express agreement. The main difference between the two, following Padden, is that agreement verbs inflect for person and number, and that the locations in space indicate subject and object. In contrast, spatial verbs make reference to locations. That is, to the initial and final location of the entity being moved or to the location where an entity is.

Both agreement and spatial verbs consist of a location-movement-location sequence (Sandler, 1989) achieved by means of a path movement. Sometimes it is also marked with the orientation of the palm of the hand. For regular agreement verbs implying movement, the trajectory goes from the location associated with the subject towards the location associated with the object (Janis 1992, 1995; Mathur, 2000; Zwitserlood & van Gijn, 2006, among others). I will come back to verb agreement in §3.2.3. As shown in Figure 2.3, the LSC regular agreement verb OFFER is inflected for subject and object. In the first still the movement is articulated from first to third person, and in the second still is articulated from third to first person.



a. 1-OFFER-3 ‘I give (it) to him.’      b. 3-OFFER-1 ‘He gives (it) to me.’

Figure 2.3. Regular agreement verb in LSC

Concerning the discourse level, it has been repeatedly noted in the literature that spatial locations are associated with individuals, and referents are identified with certain locations in space which can be further referred back to (Klima & Bellugi, 1979). In fact it is when we enter the syntax-discourse interface that sign space is greatly used. These spatial locations associated with an individual are called “referential loci” or “r-loci” (Lillo-Martin & Klima, 1990). In isolated sentences, entities tend not to be localised in sign space.<sup>3</sup> And it is especially in the realm of connected discourse when the complexity and intricacies of sign space are more evident. The following figure is an example of different instances of reference to a localised entity in space across sentence boundaries.



Figure 2.4. First and further mentions of a referent localised in space

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<sup>3</sup> This does not imply, of course, that syntax does not use space for the construction of sentences. As argued at the beginning, morphosyntax needs space for the modulation of signs to express number, person and arguments. Still the area where space has its main contribution is that of connected discourse.

## 2.1 Sign space

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The set of linguistic mechanisms used to both establish an individual in space and to refer back to it have been described for specific SLs, namely ASL (Winston, 1995), BSL (Morgan, 1996), and LSC (Barberà, 2007). The most commonly used mechanisms are index signs,<sup>4</sup> agreeing verbs, weak hand in dominance reversals sequences, body lean, and classifiers constructions.<sup>5</sup> These mechanisms, as described for LSC in Barberà (2007), not only establish an individual in sign space but they also contribute to keeping the referent active in the discourse and constitute the strategies for reference-tracking.

Several studies have explored how SL signers understand and maintain the association between spatial locations and discourse referents. It has been proved by psycholinguistic experiments that ASL pronouns activate their antecedent and suppress non-antecedents in memory, just as has been found for SpLs (Emmorey, 1997). In addition, ASL agreeing verbs license phonologically null pronouns (Lillo-Martin, 1986). Like in some romance languages, subjects and objects in clauses with agreeing verbs can appear as null elements due to the rich verbal morphological marking. And indeed null pronouns also activate their antecedent to the same extent as overt pronouns, similarly to what has been found for SpLs (Emmorey & Lillo-Martin, 1995). These SL comprehension studies prove that although the association between spatial locations and

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<sup>4</sup> In the overall dissertation, I use indistinctively “index sign” and “pointing sign” to mean the handshape formed by an index finger directed to a spatial location.

<sup>5</sup> Classifiers constructions are complex predicates that express movement, location and description of a referent, as well as the manipulation of it (Suppalla, 1986). Handshape classifiers stand for the referent they denote and have been analysed as agreement markers (see Glück & Pfau, 1998; Zwitserlood, 2003).

space is a typical characteristic of signed languages, the interpretation and resolution of coreferential relations do not differ across language modalities (Emmorey, 2007).

The definition of natural languages as discrete systems has been applied with difficulty to SLs when it comes to the analysis of space. The boundless three-dimensional extent in front of the body of the signer is, at first sight, difficult to be considered a discrete system. It has been claimed, for instance, that the distinctive locations in sign space are evident at the syntax-discourse interface rather than at the phonological-lexical level. Kooij (2002) analyses the NGT frequencies of different locations in the SignPhon database (Crasborn et al., 2002) and provides an overview of the distribution of the different lexical distinctive locations, namely neutral space, head, neck, trunk, arm, and weak hand. Kooij concludes that at the lexical level there are no phonological specifications in neutral space, except for the horizontal plane, which is used as a major location. This implies, according to her, that locations in neutral space with respect to which the hand can move are determined by some referent found in the discourse.

In fact, the analysis of space in SLs is not free of controversy and it has been, and still is, a matter of debate among SL researchers. Some researchers have found similarities in the use of space in co-speech gesture. Since the gestural component of SpL conversations can externally be seen as very similar to co-speech gesture, some researchers have argued that SL signs that necessarily use locations in space (such as pronouns and agreement verbs) are

composed of a linguistic and a gestural part (Liddell, 1990; Meier 1990, among many others, but see §2.4.1 for a revision of the relevant literature). For them, this implies that signs directed to space are analysed as a gradient continuum, and very rarely as categorical elements.

### **2.2 Modality effects**

An important contribution to SL research specifically but also to (neuro)linguistics in general was Poizner et al. (1987)'s book. This pioneering work provided evidence that language is not limited to hearing and speech. By studying deaf subjects with brain lesions, they showed that ASL has the same properties and relies on the same brain areas as SpL. Poizner and his colleagues state that signing space has linguistic meaning:

“Overall the ASL system of spatialized syntax is similar in *function* to grammatical devices found in SpLs of the world. However, in its *form* –marking connections among spatial points– spatially organised syntax in ASL bears the clear imprint of the mode in which the language evolved.” (Poizner et al., 1987:18)

There is in fact a general assumption in the SL literature that the strong candidate for a modality effect in the language is the use of space for indicating reference in pronouns and verbs. But it is still an open question whether the use of space is a total reflection of the

use of a different modality. By *modality* it is meant how the language is perceived and produced. SpLs are considered to use primarily the audio-vocal modality, although to a lesser extent the visual-gestural modality is also used during co-speech gesture. SLs are visual-gestural natural languages and this modality interacts with space, as well as with gesture, and these are the main concerns of the next two subsections.

### **2.2.1 Modality and space**

Bringing this debate into the generativist framework, Lillo-Martin (2002) convincingly states that the modality of the language mainly affects the phonology module, as this is the component of the grammar that interacts with articulation and perception of the language. Phonology and syntax are independent modules, and modality in SL only affects the former. She also argues that abstract syntactic principles of universal grammar apply to both SLs and SpLs. And likewise Universal Grammar allows parametric variation between languages, SLs may vary from SpL (ibid. 2002:243).

As far as agreement is concerned, verbs have been described as lexically specified for certain components, such as handshape and skeletal structure. The template that has been described and applied to many SL verbs is location-movement-location (Sandler, 1989), as previously said. This information relates to the morphological process of agreement. But the problem that arises is how these locations are specified in the finite lexicon of the language since they are left unspecified. Locations must be thus filled in. The

general assumption is that verbs agree with subject/object in person and number. This view is clearly stated by Neidle et al. (2000) and Neidle & Nash (to appear), who analyse spatial locations as constituting an overt instantiation of phi features (specifically person features). This is coherent with the argument that the matching of features among syntactic elements is of essentially the same nature as in other agreement systems.

However, from an opposed perspective, Liddell (1990, 2000, 2003) and Meier (1990), among others, point to some modality differences between SpLs and SLs, the most important one being the spatial locations established in space in SLs due to the visual-gestural modality. According to this view, these locations do not constitute a finite set of discrete elements since verbs and pronouns can be directed to an infinite number of possible locations in sign space.

It has been noted that the variation observed in SLs seems much more limited than the variation found in SpLs (Newport & Suppalla, 2000). In a detailed study of the effects of modality upon linguistic structure, Meier (2002) argues that the differences in the properties of articulators, in the perceptual system and in the youth of SLs are possible sources of modality effects on linguistic structure that underlie the limited variation. According to the author, the possible outcomes of modality effects range among differences between SpLs and SLs in statistical tendencies. That is to say, one modality has more instances of a certain linguistic feature than the other modality. Also one modality has some

preferred typological properties in comparison to the other (e.g. SLs generally opt for nonconcatenative morphology). A relative structural uniformity of SLs vs. a relative diversity of SpLs could be a product of the visual-gestural modality, but it has been noted that this apparent uniformity may be a consequence of the youth of such languages and the scarcity cross-linguistic studies (Newport & Suppalla, 2000; Meier, 2002).

Interestingly, more and more studies are focusing on the comparison of structures among different SLs showing that, once grammatical aspects are closely examined, SLs may be more different than previously thought (see Perniss, Pfau & Steinbach, 2007). Moreover, the study on village SLs, i.e. SLs in small communities with a high incidence of hereditary deafness (Nyst, to appear), enhances the idea that there is more linguistic diversity across SLs than previously assumed. In fact, data from Kata Kolok and AdaSL (Adamorobe SL, in Ghana) adds appreciably to this diversity. For instance, these languages considerably differ between them, and also differ from the features which were previously thought to be modality-specific, such as the use of spatial grammar. AdaSL uses directional verbs, but does not use entity classifiers (Nyst, 2007). This contrasts with Kata Kolok, which does not use directional verbs, but does use entity classifiers (Marsaja, 2008; de Vos, 2010). In fact, Kata Kolok pointing signs may not be directed to abstract areas in space and spatially verb inflection is virtually absent from the language (de Vos, 2010). It also seems that the small-scale setting in deaf villages enables these languages to have structures that are less frequently attested or even not found at all in



other Western SLs, such as absolute pointing instead of using locative names (Zeshan, 2010). Research on village SLs is thus of great importance to contrast what was thought to be modality-specific with other structures found in languages which actually use the same modality.

### **2.2.2 Modality and gesture**

The visual-gestural modality is not only used by SLs, but also by co-speech gesture which co-occurs with SpLs. This is the reason why some authors have put into question the grammatical use that SLs make of it, and they have compared it to gesture. However there is a non-symmetric use of both modalities since the gesture accompanying speech is highly underspecified and dependent on it (Lascarides & Stone, 2009). As argued in Barberà & Zwets (in preparation), the audio-vocal modality in SpL is to be considered the dominant one, and the visual-gestural modality relies heavily on it for its interpretation. That is, a listener gets the cues for interpreting the pointing gesture from the dominant modality that co-occurs with it, in combination with the physical environment surrounding the speech participants. And since the verbal element and the pointing gesture are performed in different modalities they can still occur simultaneously. In contrast, in SL the addressee interprets the pointing sign expressed *only* in the visual-gestural modality by considering both the linguistic and the physical context. In fact, experimental studies show that when using gesture alone, hearing adults placed gestures for particular entities in non-neutral locations and then used these locations to refer back to them. But

when using gesture and speech together, hearing adults also produced gestures in non-neutral locations but used the locations coreferentially far less often (Chee So et al., 2005). These results lead to the hypothesis that when the visual-gestural modality is totally responsible for communicating the message, space is exploited for co-reference.

Hence modality not only determines the extra use of space that SL makes compared to SpL, but also the gestural part. SLs have additional possibilities of developing grammatical markers directly from gestures. This unusual source is evidently due to the particular way signing is produced and perceived, i.e. a modality which exploits the visual-manual medium, also exploited by the gestures that accompany speech. However, the grammaticalisation patterns are considered to be parallel to the SpL ones. The interested reader is referred to Pfau & Steinbach (2006) for convincing arguments based on different SLs which show that the typical paths taken by lexical items as they are transformed into grammatical elements are the same in both SLs and SpLs.

### **2.3 Spatial functions**

Since the beginnings of SL linguistics research, it has been argued that space undertakes two functions, namely a syntactic and a topographic one (Poizner et al., 1987). The syntactic function is an abstract use of space in which entities are localised arbitrarily to identify the arguments of the verb. Entities are assigned a specific location, which is movable as it can be shifted without affecting the

## 2.3 Spatial functions

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truth conditions of the sentence. The topographic function, in contrast, is used to express spatial relations among objects and it is represented by meaningful locations that exploit the iconic properties of the visual-spatial modality. Topographic locations are meaningful by themselves, so a small change in the location affects its truth conditions. In this latter case, space is used to represent spatial arrangements via signed descriptions, and thus the actual spatial relations of signs are significant. Following Quer et al. (2005), I call the localisations occurring in the syntactic use of space “non-descriptive”, and the ones that occur in the topographic use of space, “descriptive” localisations. In descriptive localisations the relations among spatial locations become significant because they represent actual spatial relations topographically. The descriptive location in Figure 2.5a represents a bike leaning against a tree; and in Figure 2.5b, a person seated on a tree. In both cases the location of the manual articulators is meaningful.



a. Bike leaning against a tree



b. Person seated on a tree

Figure 2.5. Descriptive localisation

This contrasts with non-descriptive localisations which are arbitrarily and abstractly established for the syntax and discourse of

the language. As the following figure shows, the signer has arbitrarily localised an entity on his contralateral side.



Figure 2.6. Non-descriptive localisation

Comparing both figures shows that LSC descriptions of spatial layout (i.e. descriptive localisation) use the same horizontal plane of signing space as do SL nominals, pronominal reference and verb agreement devices (i.e. elements within a non-descriptive localisation). Both functions make use of locations in space, the difference being in its significance: locations in signed descriptions are meaningful because they represent actual spatial topographical relations, whereas abstract locations are not meaningful by themselves because they are established for syntactic and discursive purposes.

### **2.3.1 Descriptive localisation**

Descriptive use of space is circumscribed to the expression of spatial information, such as the position of an object or a relative positioning of an object with respect to another one. Most SpLs encode spatial relations with affixes and prepositions, as in (1).

## 2.3 Spatial functions

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- (1) a. El llibre és sobre la taula. [Catalan]  
b. The book is on the table.

Descriptive localisation has largely received a great attention in the literature, especially the relationship between the properties of space and the perspective the signer takes while providing spatial information (Emmorey & Falgier, 1999; Emmorey, 2001; Emmorey, 2002a, 2002b; Emmorey & Tversky, 2002 for ASL; and Perniss, 2007ab; Perniss & Özyürek, 2008 for DGS, among others). Spatial information in SLs is mainly conveyed by classifier constructions and by the placement of the hands in certain locations in sign space and also with respect to the body of the signer (Suppalla, 1986; Engberg-Pedersen, 1993). When an LSC signer wants to convey that the book is on the table, an entity classifier<sup>6</sup> will be used to refer to the book and it will be localised above a flat surface representing the table, as shown below.



Figure 2.7. Book on the table

If more than one referent is represented in space, first the backgrounded entity is introduced (the so-called “ground” in the

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<sup>6</sup> Elements in which the hand configuration indicates a particular semantic class, and the movement or the location of the hand indicates the motion or location of the entity denoted (see Zwitserlood, 2003).

literature on language and space, e.g. Talmy, 1985), and then the smaller entity, which is in the focus of attention (the so-called “figure”). The particular position of one handshape with respect to the other expresses the spatial relation between referents (Supalla, 1986; Perniss, 2007a; Miller, 1994; Morgan & Woll, 2007; Chang et al., 2005; Arik, 2009). This can be done by virtue of the simultaneous use that SLs can make of the two manual articulators.

It has been argued that there is an isomorphic mapping between the location of the hands in space and the location of the objects described (Emmorey & Herzig, 2003). The spatial mapping can be set from the signer’s point of view (i.e. the character perspective) or from the addressee’s point of view (i.e. the observer perspective).<sup>7</sup> Spatial scenes are commonly represented according to the signer’s point of view and in fact ASL signers comprehend much better spatial descriptions when they are represented from the signer’s perspective rather than the addressee’s one, despite the mental rotation these descriptions entail (Emmorey et al., 1998). Finally, when both signer and addressee jointly view an environment, ASL signers use “shared space” (Emmorey & Tversky, 2002). That is, the physically observed setting maps the linguistic represented setting in sign space and to both the signer’s and addressee’s view.

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<sup>7</sup> Researchers interested in spatial descriptions in sign languages have attributed different terminology to the same phenomenon. The two types of descriptive spatial representation have been labelled as follows: fixed/shifted referential framework (Bellugi & Klima, 1990; Morgan, 1999); diagrammatic/viewer format (Emmorey & Falgier, 1999; Emmorey, 2002b; Emmorey & Tversky, 2002); depictive/surrogate space (Liddell, 2003); character/observer viewpoint (Perniss, 2007a). The overlap between the criteria used to distinguish each representation is strong enough to consider them different labels of the same phenomenon.

In shared space there is no true signer's or addressee's point of view, nor mental rotation required. Both interlocutors refer to the same locations, regardless of their actual location.

Before finishing this section, it should be noted that some village SLs have been described as making extensive use of descriptive localisations. Kata Kolok SL predominantly employs topographical space (Marsaja, 2008). As previously mentioned, signers use real-world locations instead of establishing abstract locations, despite the ambiguities (e.g. the sign for a place may be localised differently depending on where the signer is in relation to the referent). Kata Kolok uses then an absolute frame of reference (Levinson, 1996), which is very rarely used in western SLs.

### **2.3.2 Non-descriptive localisation**

While the descriptive use of space exploits a richer freer set of locations in three-dimensional space, the non-descriptive one uses space composed of spatial planes and fixed trajectories in the features within each plane. Importantly, spatial locations in non-descriptive localisations are not restricted to the horizontal plane in front of the signer as originally argued by Klima & Bellugi (1979). For ASL, some authors note that nouns can also be assigned locations vertically above or below the horizontal plane in certain circumstances (Fischer & Gough, 1974; Shepard-Kegl, 1985). Liddell & Johnson (1989), Sandler (1989) and Brentari (1998) provide a detailed phonological analysis of locations and especially a thorough description of body locations for the production of signs.

However, when it comes to analyse space as used in actual discourse, the description is not as detailed as it is at the lexical level. The authors agree that the syntax-discourse interface determines the position of the sign in space and they postulate some major spatial areas interfacing with the discourse domain. In §3.3 the major distinctions made by the works cited above are applied and extended to the LSC discourse data.

Place of articulation, and thus also localisation, can be divided as occurring on three different planes projected with respect to the body of the signer (Brentari, 1998:120). First, the horizontal or transverse plane stands perpendicularly to the body of the signer and it is the default plane where the majority of the signs are localised (Figure 2.8a). Second, the frontal or ventral plane is defined by all those points that can be encountered on the plane in parallel to the body (Figure 2.8b). Finally, the midsagittal plane is vertically perpendicular to the body of the signer (Figure 2.8c).

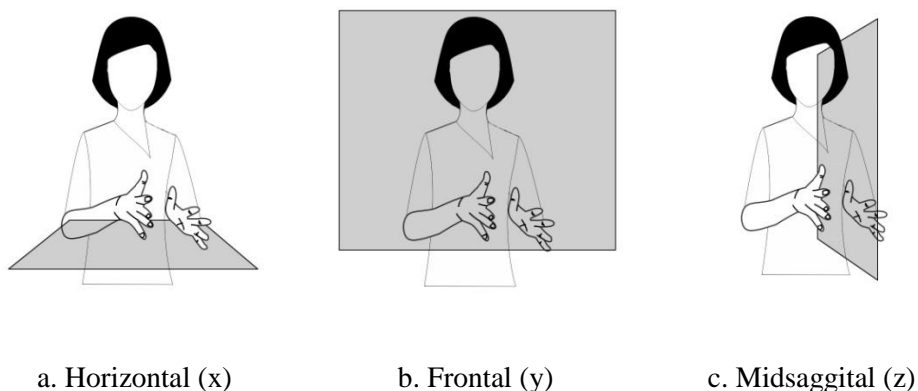


Figure 2.8. Spatial planes



Non-descriptive locations are constrained within these three planes. Section 3.3 is devoted to their use in LSC discourse.

### **2.3.3 One function or two?**

Whether there is a clear-cut distinction between a descriptive and non-descriptive function is still a matter of debate among researchers. Some researchers, in particular Liddell (1990, 1995, 1998, 2003), van Hoek (1992, 1996), Engberg-Pedersen (1993, 2003) and Perniss (to appear) propose a strongly integrated view of the double function of spatial loci, and have argued against maintaining a distinction between them. According to them, both the descriptive and non-descriptive locations are projections of mental representations and the frontier between the two functions is blurred. For example, a signer could use a classifier predicate to establish a referent at a certain descriptive location in sign space, e.g. a man on a tree, as represented in Figure 2.5b above. Subsequently, the signer could direct a verb sign, e.g. TELL, to the same location, specifying the man as the grammatical object of the predicate (see Liddell, 1990:318 and Perniss (to appear), for a similar example). The man is still conceived of as seated above the tree at the time he is told something. In this example, the location associated with the man is both functioning referentially and topographically.

Psycholinguistic studies have been undertaken to motivate this difference from an experimental and testable perspective. Emmorey et al. (1995) present some empirical evidence that these two

functions can be dissociated with brain injury, during on-line processing and memory encoding. Their results suggest that the topographic use of space may be tightly linked to spatial cognitive abilities attributed to the right hemisphere. Although they emphasize the distinctness of these two spatial functions, they also note that they are not mutually exclusive, noting that it is an issue of how a location functions within sign space, and not of two distinct types of sign space, as suggested by Poizner et al. (1987). Depending on how it is used, the same location can function both non-descriptively and descriptively.

Emmorey et al. (1995) show that the two spatial functions are processed differently. When incongruent spatial information is given, processing of descriptive locations is more affected than processing non-descriptive ones. Since topographic space uses space as a map, the information provided must be more explicit in encoding the interrelation between loci and objects. In contrast, the setting for syntactic space does not convey spatial information about their referents, and subjects can easily understand sentences where the spatial setting is completely arbitrary and incongruent. More recent studies provide new evidence for these spatial distinctions. In a PET study, Emmorey et al. (2002) propose that naming spatial relations with classifier constructions in ASL (hence when signing space is used descriptively) involve right hemisphere processing. However, in a related study MacSweeney et al. (2002) used fMRI to investigate the neural areas when deaf and hearing users of British SL comprehend sentences that used space descriptively compared to sentences that used it non-descriptively.

## 2.3 Spatial functions

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Interestingly, their results did not show more right hemisphere activation for processing descriptive locations compared to non-descriptive ones. These differences in the results may be most probably motivated by the difference in the demands of the task. While in the ASL study subjects were asked to translate the spatial relation between the hands in signing space into another representation, in the BSL study the signers were asked to press a button when they detected a semantic anomaly. More research on similar tasks is needed in order to confirm these findings. Also further work is needed on contexts where the descriptive and non-descriptive uses of space are simultaneously inserted in the same context. In the psycholinguistic studies described above the majority of tests presented sentences dealing with one or the other function, but there were no strings of sentences where the two functions were fused. This overlap in the same fragment of discourse would allow us to make a straightforward distinction between the two of them and also see whether one function is more predominant than the other when they co-occur.

Finally, it is worth mentioning that it has been described that some SLs represent temporal reference in space. Engberg-Pedersen (1993) first identified several distinct time lines, which are spatial constructs that represent distinct types of temporal information. These time lines extend on the horizontal plane and can be divided into: basic, anaphoric, sequential, and mixed. This dissertation focuses only on referentiality associated with spatial locations and on the referring back function. On temporal reference, the interested

reader is referred to Engberg-Pedersen (1993) for a description of DSL, Emmorey (2001, 2002) for ASL, and Cabeza & Fernández-Soneira (2004) and Herrero (2009) for LSE. Let's turn now to the two main and opposing views concerning sign space.

## **2.4 Previous accounts**

At the beginning of the 90's many researchers focused their attention primarily on the analysis of space. One of the main concerns was, and still is, how to integrate the infinite directions in space that localised signs may have into a finite system like grammar. In SLs second and third person pronouns are always dependent on the location that the denoted referent occupies and according to some researchers their phonological form does not have linguistic distinctions. The multiple or even infinite number of locations where index signs can be directed to turns the integration of these infinite locations to a discrete linguistic system into an impossible task. This infinity issue splits the view researchers have in space into two main analyses. On the one hand, what I call the "spatial mapping view" considers that spatial locations are not phonologically specifiable. They are a projection of a mental representation and thus they can occupy different non-discrete places on sign space. On the other hand, the "r-locus view" associates spatial locations with referential indices. Locations are overt referential indices that correspond to the referent the nominal denotes. As such, no listability issue is found in the phonological form since locations are derived from the discourse. The main difference the r-locus view argues for is that while referential

indices are covert in SpL, they are overt in SLs. Below the main claims of each view are detailed, as well as the problems and the advantages of each one. As it will become clear, this dissertation follows the r-locus view.

### **2.4.1 Spatial mapping view**

Space has interested SL researchers coming from different perspectives and theoretical frameworks. From the cognitive linguistics area, a large amount of linguists have devoted time to describe how locations in space function. The basis of their analysis is that SLs show a spatial mapping, i.e. “the process used by the signer to reflect mental representations in physical space for reference and subsequent co-reference in discourse” (Winston 1995:87). The spatial mapping view is followed by Mandel (1977), Liddell (1990, 1994, 1995, 2000, 2003), van Hoek (1992, 1992), Engberg-Pedersen (1993), Winston (1995), Rinfret (2009), among others. Because of the great influence of Liddell’s work on the spatial mapping view, the following subsections review the main ideas developed in Liddell (1990, 1994, 1995, 2000, 2003). I first start with the notion of “locus” as defined by this view and the relationship it has with real space according to the spatial mapping account. Then I continue with the problems for this view.

### *2.4.1.1 Locus and real space*

The spatial mapping view defines “locus” as a projection of the referent into space in the absence of the entities in the situational context (Engberg-Pedersen 1993:53). The majority of authors within this account follow Liddell, who bases his approach on mental space theory (Fauconnier, 1985). According to this theory, entities are grounded in space. This means that entities are conceived of as present in the immediate environment. Liddell and followers of the spatial mapping view claim that signers conceptualise the referents they talk about in space. Hence they “visualise” the position they occupy, as well as their height. According to him, agreement verbs are directed towards the areas in space the referents of the arguments are associated with, but there is also a “further agreement” with the conceptualisation of the height of the referent. In order to show this, he bases his argumentation on some lexical verbs. An instance is the verb TO-ASK inflected from first to second person and it is articulated at mid height to a referent that is higher than the signer. This example, following Liddell, is ungrammatical as there has to be a correlation with the height of the referent (either present or not, as what matters most is the conceptualisation) and the height of the chin. He says that “since the signer must conceptualise the location of body parts of the referent imagined to be present, there is a sense in which an invisible body is present. The signer must conceptualise such a body in order to properly direct agreement verbs” (Liddell, 1990:184). Thus, the verb should be directed to the supposed chin of the imagined referent.

Hence, loci consist of place-holders which stand for the conceptualisation of a referent. This conceptualisation is expressed by signs directed to space (such as pronouns and verb agreement). The height features are found in the lexical properties of the verb. In fact, loci express topographic localisation, since they always situate a referent in space as if it were present. He disagrees with the traditional view (Friedman, 1975) according to which the relationship between a locus and a referent is that of referential equality (i.e. referent-a = locus-a), and he proposes a location fixing relation. According to him, every use of space is topographic<sup>8</sup> and the locus itself expresses nothing but that referent *x is at locus y*. According to him, “establishing an index serves as a way of saying where the referent is, not what point is referentially equivalent to the referent. Evidence for this conclusion comes from the fact that agreement verbs were not directed toward the locus at which the index was established, but directed to points in space whose height was a function of the lexical properties of the verb rather than a function of the height of the locus” (Liddell, 1990:186). Actually, Liddell (1990:185) establishes the lexical properties that some ASL verbs have in this respect. By means of some examples, he argues that the verb SAY-NO-TO is directed to the nose, ASK is directed to the chin, REMIND is directed to the shoulder and GIVE is articulated at the height of the chest. Mental space conceptualisations allow Liddell to explain the infinity and

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<sup>8</sup> According to Liddell, the only non-topographic use and hence the only referential equality function is the finger-tips loci. But, as it will become clear in §7.3.1, finger-tips loci are better analysed as enumeration and they do not stand for the referents, since they rather indicate order.

multiplicity of locations in space where signs can be directed to, which was already claimed since De Matteo (1977) and Mandel (1977). However, as it will become obvious next this is not a satisfactory solution.

Liddell (1995) also discusses the behaviour of pronouns and verb agreement<sup>9</sup> in relation with possible spaces he himself defines, namely real space, surrogate space and token space. Following Liddell, real space consists in the person's mental representation of what is real in the current environment. Surrogates are invisible entities (person or objects) that signers conceptualise as if they were present. They may take first, second and third person roles. This kind of reference coincides with what is generally known as role shift.<sup>10</sup> Token space is the situation where the signer places an invisible entity in space. Tokens are not normal sized as surrogates and they are limited to third person referents. Liddell (1995) argues that grammatical reference, when surrogate and token space are used, is the same as with real space because the signer can imagine surrogates and tokens as being in an unlimited number of locations and therefore can treat them as physically present. Thus reference in surrogate and token space are like they are in real space. Hence, in his opinion, they are deictic and not anaphoric.

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<sup>9</sup> Agreeing verbs are called "indicating verbs" in Liddell's terminology. Because this terminological use is very theoretically loaded and in order to keep the coherence in the overall dissertation, I have chosen to use my terminology even if sometimes it does not coincide with that of the authors the section is about.

<sup>10</sup> Role shift is the process whereby a shifting reference is used to reproduce someone else's utterances or thoughts which have occurred at a moment different from the real utterance context (Lillo-Martin, 1995).



### *2.4.1.2 Problems*

Although Liddell's account provides an explanation to the infinity issue, it also faces many problems that a theory of language should not be forced to address. In what follows I present some arguments against the spatial mapping view concerning a distinction Liddell's account makes between pronouns and agreement verbs, as well as the lack of consistency of use of agreement with respect to the lexical properties. I will support my arguments by considering the auxiliary agreement sign and I also incorporate abstract referents into the picture.

Liddell's conceptualisation of referents in space presented in the previous section is apparently only present in the use of some agreement verbs and it is not present in the behaviour of pronouns. However, since spatial locations stand for the arguments of the predicate it is widely accepted that SLs verbs and pronouns behave similarly. Hence, if such conceptualisation is at work, why should there be a distinction between the features that verbs incorporate and pronouns? We could think that the lexical properties of verbs should be also represented in the direction of pronouns if they are directed towards surrogates, and that both an agreement verb and a pronominal form referred to a taller referent should have the same direction in sign space. But this is not the case and in his account pronouns do not show this behaviour of representing different heights of conceptualisations of referents. Notwithstanding, let's suppose that we accept Liddell's conceptualisation of referents, as well as the lexical information incorporated in some verbs. In such a

situation, it is pertinent to ask whether the lexical specifications of the verbs are cognitively coherent, especially if they are treated under such a cognitive framework as mental space theory. According to Liddell (1990), SAY-NO-TO and ASK are directed to the nose and to the chin, respectively. However, since the actions of saying and asking in speech are realised in the mouth, wouldn't it be more cognitively coherent to direct the verbs that represent each action towards the mouth? And even more importantly, since in SLs the action of saying is connected to the hands, why is the verb not directed to the hands of the addressee? Last but not least, GIVE is realised at the height of the chest. But why is it not articulated at the height of the hands? The lexical properties attributed to verbs are not motivated and they do not seem to be coherent with the actual action they represent, especially under an account which precisely deals with conceptualisations of referents. Also, Liddell does not explain why these lexical properties are only present in some verbs but not in others.

If, following Liddell, verbs incorporated lexical properties of these kinds in languages with auxiliary agreement, this distinction should be also evident. So far, studies done on agreement auxiliary signs (i.e. signs which generally co-occur with plain verbs to mark agreement) have claimed that they behave very similar to agreement verbs, i.e. with a movement from subject to object (Steinbach & Pfau, 2007). Nevertheless, to the best of my knowledge, no work has noted so far that the auxiliary sign also represents the conceptualisation of the referent and that it can be directed to

different heights according to the height attributed to the referent. For instance in LSC the auxiliary sign directed towards first person is at the chest, and for second and third person is directed towards the head (Josep Quer, p.c., August 2010). Thus no specific conceptualisation seems to be at play here.

Finally, if referents are conceptualised in space, it is difficult to explain what happens with abstract referents, which do not have a specific height to direct signs to. So if, according to Liddell (1990), in ASL the verb ASK is realised at the chin level, when we use it with an abstract referent it may be difficult to determine how to localise it. Imagine, for instance, that someone is saying that he is very curious about deaf traditions, culture, habits, etc. If he utters the sentence “I may ask all these questions to the Deaf Community”, to which height is he supposed to direct the verb? What are the lexical properties of a sign going to be for an abstract referent, such as “Deaf Community”? This would predict that we need two lexical entries, each related to the denoted referent (i.e. ASK\_concrete and ASK\_abstract), and not a single entry with specific lexical properties. Again, this is not a satisfactory solution. However, in Liddell (1995) this problem is solved with the distinction made between surrogates and tokens. Although he does not make this point precise, I assume that abstract nouns may be only represented by tokens and thus no conceptualisation in space needs to be made. Yet, this issue is not presented in his influential 1990 paper.

Another important aspect in the spatial mapping view is the iconicity attributed to index signs directed to space. It is a widespread belief that pointings are iconic since their meaning depends on the visual connection between the pointing gesture and its target (Mandel, 1977; Liddell, 2003; Cormier, 2007). However, pointing signs are very often directed to an object in space not to mean that object but rather to refer to an idea or an entity related to that object. This indirect reference instances are very frequent in SLs, and in these cases there is not a relation of contiguity between the index sign and the object pointed at, as widely claimed. In indirect reference, for instance, the orientation of the pointing is always directed towards an object that has a strong contextual link with the actual referent that is to be interpreted by the addressee, but the interpretation is not only derived from contiguity. We can easily imagine a situation in which a signer directs a pointing sign towards a book present in the physical environment which is about a deaf school that existed in the 60's in southern Catalonia, while uttering the following sentence.

(2) IX3 INTERESTING.

Depending on the context, the pointing directed to the book can have different meanings, represented in (3), listed from more iconic to more indirect.

- (3) a. The copy of the book I am presently pointing to is interesting.
- b. The deaf school in Catalonia (the book is about) is an interesting topic.
- c. The problems deaf kids had during the 60's (which are reported about in the book) are an interesting topic.

For the interpretation of indirect reference, context becomes of great importance, and physical contiguity is not only insufficient, but it can also be misleading, as shown in (3). To get the interpretation in (3a), physical contiguity is decisive. But for the interpretation of (3b) and (3c) physical contiguity can be rather misleading.

If points in space were precisely what matters, the concrete area where the pointing sign is directed to would be difficult to determine. Since a pointing sign is an index handshape with the fingertip oriented somewhere, to exactly delimit where the exact and relevant point is becomes an impossible task. The relevant point could be 5 cm away from the fingertip, but it could also be 20 cm away, or even 3 metres. Thus, to precisely determine its physical end point becomes an arduous task, even an impossible one. Hence, it is rather a matter of direction of the pointing sign together with linguistic contextual clues (Barberà & Fernández, 2009). But according to Mandel, Liddell and Cormier the exact direction is crucial for the understanding of an index sign and the significant difference between English and ASL pronouns does not lie in their

ability to point conceptually toward their referents, since both do that. Instead, according to Liddell (2003:69ff):

“The significant difference is that during the production of the ASL pronoun the hand also physically points toward the present referent. Its significance can only be determined by following the directionality to see what it leads to.”

However, pointing signs do not point to present referents physically, but conceptually. If they pointed to present entities in the surrounding space it would be very difficult for the addressee to disambiguate whether the signer is pointing to, for instance, the man the pronoun is referring to, to his shirt, to the stain on his shirt or even to the dog that crosses the room and it is precisely in front of the man while the signer is pointing (Barberà & Fernández, 2009). In order to test Liddell’s (2003) hypothesis, I will report on an example that I used with our deaf informants. The setting is the following: let’s imagine a meeting between the president of the Catalan Federation of the Deaf and seven members of two deaf clubs in Barcelona. Three members are from club x, and the other four are from club y. Each member is seated separately from their comrades, and hence the positions they occupy at the table is mixed.

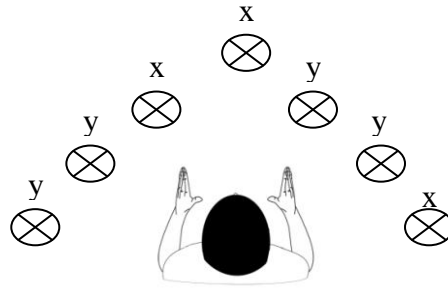


Figure 2.9. Mixed position of the members of two deaf clubs

After one hour of discussion, it is time to establish the duties each club will have to undertake. The president can direct an incorporated pronoun<sup>11</sup> and say “you-three will do this, and you-four will do that”. Even if the members are mixed and the three members of club x do not sit next to each other, the pronoun may be directed to the area where most members of club x are sitting -even if in between there is a member of club y. The linguistic context may guide the interpretation of the pronominal form and hence the most salient referent (members of club x for “you-three”, and members of club y for “you-four”) will be picked irrespectively of the exact direction of the pointing sign. Hence the exact position of the referent denoted by the pronoun is irrelevant to get the felicitous interpretation, but the linguistic context is the needed clue. If pronouns were to be understood as the exact direction of the index sign, the reference of the incorporated pronouns would be as “you three that I am actually pointing at” independently of the club you belong to. However, this is not the case in LSC and what is important is that the reference of the pronoun is derived from the

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<sup>11</sup> See chapter 7 for a description of pronouns in LSC.

combination of the direction of the manual sign and the linguistic context, but not considering the exact direction alone. I agree with Liddell (2003) that the amplitude of the movement of the pronominal form will be in accordance with the setting of the objects in reality denoted: a smaller movement means that objects are closer to each other, and a bigger movement denotes objects that are separated. Nevertheless, the combination of amplitude of movement, the direction, as well as the linguistic context are required for the disambiguation of underspecified forms directed to space.

Liddell's work and specifically the mental space theory do not make any distinction between the actual world and the discourse. Referents exist in the same domain, which is the fusion of the two domains (i.e. real world and discourse). However, a clear distinction must be made between what exists in the real world and what exists in the discourse. If such a distinction is not made, what happens with reference to entities which do not exist or also with quantified expressions? According to the spatial mapping view, the representation of space consists in an abstract mental representation in contexts where the referent is not physically present and with a direct mapping with the referent in contexts where it is present. The main and crucial difference between the spatial mapping view and the r-locus view is that the former considers locations to be projections of mental representations which are not part of the grammar. In contrast, the latter analyses locations in space as integrated into the grammar of the language, as will be shown



below. Before concluding this section it is important to note that this dissertation uses the term “location” to avoid the theoretically loaded term “locus” (see §4.1.3.2).

### **2.4.2 R-locus view**

When establishing a referent, a signer is referring to the discourse model itself. With this establishment, a signer in effect says no more than “when I refer to this spatial location, I will mean such an individual”. The signer is in fact defining a formal relationship between referent and location, for further use later in the discourse. This is the main claim that has inspired the r-locus view, which has been pursued by many authors (Lacy, 1974; Friedman, 1975; Kegl, 1976/2003; Lillo-Martin & Klima, 1990; Janis, 1992; Bahan, 1996; Cormier, Wechsler and Meier, 1998; Aronoff et al., 2000, Lillo-Martin & Meier, 2011, using data from ASL; Schlenker, 2011a b, using data from ASL and French SL (LSF); and Meir, 1998 using data from Israeli SL (ISL), among others). The r-locus view claims that although it is generally assumed in the syntactic literature that NPs are considered to contain referential features that are abstract, SLs show the overt morphological expression of referential distinctions through association of distinct referents with specific spatial locations. Hence locations in space are analysed as the overt manifestation of referential indices.

#### *2.4.2.1 Referential locations and linguistic space*

This approach argues that locations are identified with referential indices (r-indices). R-indices are variables in the linguistic system,

whose content comes from discourse, and which are overtly represented in the linguistic system of SLs. Variables can be one among an infinite number of possible referents, since a discourse model can contain an infinite number of possible referents.

The basic properties that characterise the r-locus view support the analysis that spatial locations are more similar to indices than to pronouns (Lacy, 1974). They are briefly presented below (see Janis, 1992 and Meir, 1998 for detailed comments on each claim):

(i) *Infiniteness*: There is an infinite number of possible locations where index signs can be directed to. Hence they resemble more indices, since pronouns are a closed class with a restricted number of members.

(ii) *Discourse determinacy*: The spatial location that is associated with a referent is discourse-determined, rather than lexically specified. That is, it is considered that there is nothing in the lexical specifications that will determine to which location an index sign will be directed.

(iii) *Non-ambiguity*: In a fragment of discourse, referents are associated with a specific spatial location. Hence an index sign directed to space does not show the ambiguity that SpL pronouns show, since they are associated with a unique referent in a given stretch of discourse.

The infinity issue is thus transferred from pronouns to referents and this is a legitimate move since referents are constrained by the discourse model which can only be limited by perceptual and memory limitations, but not by purely linguistic reasons. Hence we

must accept that the number of referents in a discourse model can be infinite. Even if these characteristics can be applied to indices, in §7.2 it will be shown that these criteria do not exactly fit LSC data and that, in fact, the same properties which apply to SpL pronouns also apply to LSC pronouns.

The fact that index signs may be directed to the 3-dimensional extension sign space is and that the value for location in space is difficult to categorise has led some authors to argue for a phonemic/phonetic distinction in the direction index signs may take (Janis, 1992; Kooij, 2002:165). While the phonology of index signs is considered to be an abstract point in space, their phonetics is the actual direction (and thus the broader dimension) that signs pointing to space can get. The different directions that an index sign towards space may have are in fact considered a gradient property, which can be compared to the opening of vocals in SpL (Rathmann & Mathur, 2002; Russell & Janzen, 2008).

### *2.4.2.2 Advantages*

One of the main differences between the r-locus view and the spatial mapping view is the conception they have of space. The r-locus view considers that space in front of the signer and around the signed conversation is always a linguistic construct which is only built on the basis of discourse. Linguistic space is constructed as long as a sign conversation or monologue takes place. Without 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. This linguistic construct has to be

differentiated from real space, where objects in reality stand and which can be perceived by our senses. As presented in Berenz & Ferreira-Brito (1990) and Herrero (2009), real space is the three-dimensional extent which is unlimited and continuous. In contrast, linguistic space, which is part of real space, is limited and discrete.

In fact, the distinction between the two spaces can be proven by the fact that when talking about objects in the real world they always have to be introduced into the linguistic context. Even if we refer to objects that are present in the immediate surrounding context we have to refer to them by pointing at the direction of the area where they are (but of course, not at the precise point or place) in order to introduce them into discourse. What matters most for the construction of linguistic space is that sign interlocutors share the same coordinates in which discourse is built. Index signs directed to objects present in the physical environment cannot denote anything outside the linguistic context. Hence, the only reference made is towards discourse and not towards real space around the signer. Sign space is a construction space where the conversation takes place, and thus has to be built by the conversation participants. As previously seen in (2), where the issue of indirect reference was raised, an index directed to an object can only get its meaning from the linguistic context.

This dissertation follows the r-locus view which strongly separates real space from linguistic space, and it considers that spatial locations established along the discourse are the overt expression of discourse referents. A formalisation will be offered, which contributes and adds new evidence to the r-locus view.

### **2.5 The pointing hodgepodge**

Pointing signs have been an important focus of research since late 70's and different accounts have been proposed. So far, studies have shown that although pointing signs are formally very similar, they do not form a unique category in SLs and they may have different morphosyntactic functions according to the different proposals. Yet, this hodgepodge is known under the same label in the literature, namely “pointing”.

Pointings are difficult to analyse because of their varied distribution and functionality (Pfau, 2011). They can indicate a location (“the book over there”), they can be used predicatively (“the book is over there”). When co-occurring with a noun they can act as a definite determiner (“the book”) or as a demonstrative (“this/that book”). Their distribution is quite free since they can appear both pre-nominally and post-nominally. And they can also be used anaphorically as pronouns. Moreover, pointing signs have been related with definiteness, determinacy and adverbials. Below a summary of the most relevant accounts is given.

#### **2.5.1 The morphosyntax of pointing signs**

Concerning the syntax of pointing signs, Bahan et al. (1995) and MacLaughlin (1997) observe systematic differences between the syntactic positions index signs occupy. Prenominal pointings correlate with definiteness and can express plurality, while postnominal pointings can be used both for definite and indefinite entities, but they are not marked for plural. Postnominals which are marked for plural are analysed by MacLaughlin as adverbials.

Following this account, Neidle et al. (2000) argue for an analysis of index signs as definite and indefinite determiners when occurring in prenominal position, and for a locative adverbial analysis when occurring in a postnominal position. The authors believe that what we see in (4) is a construction parallel to the construction found in Norwegian and French shown in (5).

- (4) JOHN SEE [MAN IX] (ASL)  
'John saw a man (there).'
- (5) a. den mannen der (Norwegian)  
b. cet homme-là (French)  
'that man (there)' (Bahan et al., 1995)

Another analysis establishes that pointing signs in SLs, and more specifically in SL of The Netherlands (NGT), can occupy a clause final position. When this happens, this is considered to be a right dislocation with a pronoun copy at the end of the sentence (Bos, 1995). However, Crasborn et al. (2009) analyse this NGT index sign at the end as an agreement marker with the topic of the sentence.

As for the morphology, a point of view that makes the grammatical status of pointing signs very weak and relates them more closely to pointing signs is the one of Liddell (1990, 2003). According to him a pointing sign is not symbolic. It is indexic and its significance depends on what the pointing is directed toward, as explained in §2.4.1. According to this account, pointing signs are composed of two morphemes: the root, which includes handshape and movement, and a spatial morpheme. The spatial morpheme is fully

dependent on the actual position that a present referent occupies. Since there can be an infinite number of possible positions for referents, and thus an infinite number of spatial morphemes, this led Liddell (but also Meier and some others, as we have seen in §2.1) to argue that pointing signs are a combination of linguistic and gestural morphemes. The gestural part comes from the infinite possibilities that spatial morphemes can have since they cannot be integrated in a finite system. This debate is linked up to personal pronouns, which are further treated in §2.5.3.

### **2.5.2 The semantics of pointing signs**

Besides the works where pointing signs have been considered to be locatives (Emmorey, 2002; Padden, 1988; Shepard-Kegl, 1985), they have mainly been treated as determiners. Wilbur (1979) is, to the best of my knowledge, the first work to hypothesize that the definite/indefinite distinction in ASL may be due to the contrast between the existence or the lack of a surface determiner. Other works have followed this definiteness hypothesis considering that pointings directed to space are used to express definite NPs (Ahlgren & Bergman, 1994 for Swedish SL; Bahan, 1996, MacLaughlin, 1997 and Wilbur, 2008 for ASL; Tang & Sze, 2002 for Hong Kong SL). In fact, according to Tang & Sze (2002), in HKSL definite reference is marked with eye gaze directed to a location, while indefinite reference is marked with eye gaze directed to the addressee. This contrasts with Neidle et al. (2002), who claim that head tilt and eye gaze are abstract agreement features in ASL. Going beyond the definiteness debate, Bahan (1996) and

MacLaughlin (1997) state that non-specific referents are not associated with any fixed location in the signing space. In these cases, a special location in front of the signer's body "and with a little higher than normal end point associated with object spatial location, is used to express agreement with a non-specific object" (Bahon 1996:105). Hence, according to these authors definiteness is marked in ASL with an index sign directed to space, and indefiniteness is marked with an upward sign. However, as we will see in chapter 5 definiteness distinctions concerning signs directed to space are not found in LSC.

Other works conclude that pointing signs in ASL and *Lingua dei Segni Italiana* (LIS) function as a type of determiner which are used to specify the noun (Zimmer & Patschke, 1990 for ASL and Bertone 2007, 2009 for LIS). Zimmer & Patschke found many instances in which a noun being mentioned for the first time does occur with a determiner; hence they avoid relating it with definiteness. They also did not find instances of pointing co-occurring with generic nouns nor with abstract nouns (according to them, in ASL they happen to be ungrammatical with signs such as CONCEPT or THEORY). And they did not identify a specific marking for the distinction between definite and indefinite. The authors explicitly say that their conclusion is determined by informants' comments about pointing serving to describe only specific entities and they do not provide any further description or analysis of specificity marking. Chapter 6 is devoted to the description and analysis of specificity marking in LSC and it will be



shown that specificity distinctions are clearly marked in LSC sign space.

A different view is that space is used to express topicality (Engberg-Pedersen, 1993; Winston, 1995). To refer to topicality Engberg-Pedersen (1993:99) uses the term “thematicity”, which she defines as the number of repetitions of the nominal indicated with a pointing sign. Thus, when the signer refers repeatedly to an individual this is marked with a location in space, and hence with a pointing sign directed to it. The problem is that Engberg-Pedersen does not make a distinction between first and further mentions. She only deals with localisation in space and collapses both establishing the location and referring back to it. She attributes the feature of topicality to space. That is to say, she ascribes to space the capacity of referring back to entities (co-reference ability), which I consider only to be part of the co-reference mechanism. First mention is usually related with semantic attributes such as (non)specificity and (in)definiteness, and further mentions with co-reference. As she does not distinguish between first and further mentions she cannot attribute semantic attributes to space, only functional attributes, namely that of co-reference (or thematicity, following her terminology). Also definiteness is in many cases the product of subsequent mentions (see chapter 5). There is thus a strong connection between definiteness and co-reference which Engberg-Pedersen seems to neglect. As will become clear in chapter 6, this issue is better defined in terms of specificity.

### **2.5.3 Sign language pronouns**

Sign Language pronouns have received a great amount of attention in the literature. They are a contentious issue and a matter of debate concerning its spatial nature and the person information they encode. Pronouns have a spatial nature because they are always directed to an area of the signing space. First person pronouns are directed to the chest of the signer; second person pronouns are directed to the addressee and third person pronouns are directed to the area in the space associated with that referent in case of non-present referents. As for second person and third person present references, they are always dependent on the location that the person occupies and according to some researchers they do not seem to show linguistic distinctions. The multiple and even infinite number of locations pronouns can be directed to turn the integration of these infinite locations on a discrete linguistic system into an impossible task. This is the reason why, according to some analyses, spatial locations are considered to be not phonologically specifiable and to belong to the realm of gesture for second and third (person) elements (see Liddell, 1990 and a series of subsequent publications; Meier, 1990; Lillo-Martin, 2002; and Meier & Lillo-Martin, 2010, among others). In contrast, the location for first person pronouns is fixed, since the pointing is always directed to the chest of the signer (Meier, 1990). The so-called “infinity problem” has led some researchers to propose an analysis against the traditional account based on a distinction between first/non-first pronominal distinction (Meier, 1990; Engberg-Pedersen, 1993; Lillo-Martin, 1995, *inter alia*). The different

perspectives on the person features that SL personal pronouns encode can be divided among five groups, which are defined and described below.

### *(i) Three-person distinction*

The first analyses of SL pronouns consider that the same features described for SpL pronouns could be applied to visual-gestural languages (Friedman, 1975; Padden, 1988; Sandler, 1989; Berenz & Ferreira Brito, 1990). However, this traditional view was discussed in the late eighties/beginning of the nineties, when sign space became the main focus of attention and it was questioned in analyses that argued for a two way distinction (Meier, 1990; Engberg-Pedersen, 1993; Lillo-Martin, 1995, inter alia). A second wave of research appeared in reaction of the two-way distinction analysis (Berenz, 1998; Alibasic & Wilbur, 2006; Neidle & Lee 2006; Meurant, 2008). The three-person distinction encoded in SL pronouns is shown by including the non-manual component in the analysis. Berenz (1998, 2002) argues for the existence of first, second and third person pronouns distinction. She presents the Body Coordinated Model (BCM) which is used to analyse second and third person pronouns. In the BCM four coordinates, namely eye gaze, head, handshape and chest are aligned. In the case of pronominal reference to second person the angle of the four coordinates will line up along the midline of the signer's body and they will all be directed to the addressee. In case of third person pronouns, disjunction of some of the coordinates will occur, and at least one of the coordinates will not be aligned. Also reference to

third person is made with a briefer eye gaze than when directed to second person. Alibasic & Wilbur (2006) base their analysis on Berenz's BCM and also argue for a three person distinction in Croatian SL. They conclude, though, that the chest is not a reliable feature.

Neidle et al. (2000) consider ASL locations to be the overt manifestation of phi features related to pronouns and verbal agreement. Neidle & Lee (2006) argue for a formal distinction between second and third person by analysing the head tilt. Although in both cases, the head moves in the direction of the phi-location, the salient part of the head involved in the movement is different. For third person it is the temple, and for second person it is the centre of the forehead. Finally, eye gaze has also been analysed as a non-manual marking to distinguish among the three grammatical persons (Meurant, 2008 for Southern Belgium SL).

### *(ii) Two person distinction*

Meier (1990) is the first author to argue for a first/non-first person distinction in ASL. The main argument comes from the impossibility to distinguish the features of second and third person pronouns because they are both directed to space and they depend on the actual location of the referent referred to. Other authors have followed Meier's claim for different SLs, such as Smith (1990) for Taiwanese SL, Engberg-Pedersen (1993) for Danish SL, Meir (1998) for Israeli SL, Rathmann (2000) for German SL, and Lillo-Martin (1995) for ASL too.

### *(iii) No person distinctions*

Ahlgren (1990) for Swedish SL and McBurney (2004) for ASL consider that there is in fact no grammatical category of person encoded in the index signs directed to space because they primarily function as demonstratives rather than personal pronouns. Demonstrative index signs are used to deictically identify referents in a discourse by their location and they do not encode semantic notions of first and second person reference, but only localise entities on sign space.

### *(iv) One single pronoun*

On a very different analysis, Lillo-Martin & Klima (1990) argue for a unique pronominal form in ASL. This work argues that ASL pronouns are realised by a unique pronominal form that goes with a referential index which is overtly manifested. The authors' hypothesis regarding ASL pronouns is as follows: "Pronouns marked with an r-locus represent the physical sign PRONOUN directed toward the r-locus "a". This sign is interpreted with respect to the discourse referent assigned to it (for example  $x_j$ ). In this theory referential signs (such as pronoun signs and other indexed nominals) are interpreted as pairings of the sign with a discourse referent." (ibid. 1990:199).

*(v) Spatial pronouns*

A completely different analysis considers that points in space are indeed SL pronouns (Lacy, 1974; Kegl, 1976/2003). Lacy considers the manual handshape to be an indicator of the spatial location, while Kegl considers the handshape to be an agreement marker.

## **2.6 Acquisition and emergence of new sign languages**

This last section is a very short note on two claims related to the acquisition of sign space and to the emergence of new SLs. The main goal is to briefly provide some evidence for the linguistic status of sign space and to show that sign space is part of the grammatical structure of the language.

Focusing on acquisition, deaf children acquire the ability to direct agreement verbs and index signs towards objects that are present in the physical context by age 3;0 to 3;6 (Emmorey, 2002). But the ability to direct verbs towards locations in sign space takes a longer acquisition route. The process of referring to a non-present entity faces some difficulties and in order to be successful the deaf children must learn to a) associate a referent with a location; b) use different locations for different referents; c) use verb agreement or pronouns with non-present referents; d) remember the association of referents with locations over a fragment of discourse (Lillo-Martin, 1999). The most common errors are, for instance, using one location for several different referents or using inconsistent locations for a single referent (Bellugi, Lillo-Martin, O'Grady & van Hoek, 1990). They also go through different stages of

acquisition as argued in Lillo-Martin (1999). They respect the syntactic restriction that null arguments must be identified. They initially direct agreement verbs towards objects which are present without lexically specifying the arguments. Then they go through a stage in which they use overt arguments with unmarked verbs and so they do not use unidentified null arguments with unmarked verbs. Finally, they correctly direct agreement verbs towards locations and use null arguments (however, cf. also Quadros & Lillo-Martin, 2007 where it is argued that children may also use directionality in gestures together with agreement).

By the age of 6 the cross-sentential use of pronouns and agreeing verbs appears to be firmly acquired. This late acquisition is due, as explained by Lillo-Martin (1999), to non-linguistic cognitive factors, such as spatial memory. The relevant morphosyntactic principles are mastered by about the age of 3 but the children have difficulties establishing and remembering unique associations between discourse referents and locations. This shows that deaf children also undergo specific stages while acquiring spatial syntax.

Some more evidence of the linguistic use of sign space comes from the emergence of two new SLs. One piece of evidence comes from Nicaraguan SL (ISN), a language birth that could be monitored. The other comes from Al-Sayyid Bedouin SL (ABSL), a language that developed in a stable community without influences from other languages, either signed or spoken. Let's start with the monitored one. The recent emergence of a new SL in Nicaragua which could be documented by linguists allows observing the very early stages

of a language and the steps that pidgins follow until they are transformed into a full-fledged language. The Nicaraguan Deaf community and its language came into existence only since 1979, when a Deaf school was created in Managua and deaf people from all over the country would gather together there (Kegl et al., 1999). This had as a result that the first form of communication (i.e. a pidgin) and its evolution could be monitored and studied.

People entered the school at different moments, and this population was divided into three cohorts which correspond to the moment of accessing it. Senghas & Coppola (2001) studied whether spatial modulations (that is, altering the direction of the signs movement to a non-neutral location) are indeed in the process of emerging as a grammatical device in ISN. The results of this study indicate that child learners create ISN, rather than being a reflex of the first language that was created at the beginning. Their analysis shows that spatial modulations are more frequent in the signing of early-exposed signers of the second cohort than among early-exposed signers of the first cohort. This indicates that the second cohort did not reproduce the language as it was produced by their first-cohort elders; rather, they changed the language they learned. Another study by Senghas & Coppola (2001) which focused on the indication of shared reference and on the fluency of spatial modulations also concluded that the youngest members of the second cohort surpassed their input and established a partially developed language and systematized it in a specific way. The second cohort reanalysed the location of spatially modulated signs as indicating something akin to co-reference. In fact, the increase in



the use of deictic signs as they progress from homesigners through the first three cohorts of ISN signers is relevant. This increase is due entirely to an increase in non-spatial, referential uses of deixis, i.e. non-locative (Coppola & Senghas, 2010). Indeed, according to these authors there is a decrease in the spatial meaning attributed to deictic forms in parallel to their increasingly grammatical uses by ISN signers. The crucial aspect in the transformation of index signs from pointing gestures to forms that function grammatically is their loss of their locative function. They also observe an increase in the production of index signs that refer to entities rather than to locations, such as places, which also indicate co-reference relations. Hence, Coppola & Senghas (2010) argue that among the three cohorts studied and over the span of 30 years a clear distinction is made between a simple concrete deictic gesture intended to draw attention to a real world object, and an abstract index sign directed to the empty space which serves a particular linguistic role in the sentence.

Let's now move to the Negev region of present-day Israel where the Al-Sayyid Bedouin group was founded about 200 years ago. The group, considered by outsiders as Bedouins, is now in its seventh generation and contains about 3,500 members. Within the past three generations, approximately 150 individuals with congenital deafness have been born into the community, since consanguineous marriage has been the norm so far (Aronoff et al., 2008). This unusual situation has led to a situation where the signing community of Al-Sayyid is actually much larger than the actual

number of deaf members. This community presents a unique situation of a language that developed in a stable community, without influences from spoken or signed languages from outside.

According to Aronoff et al. (2004) and Meir et al. (2007), the clause structure of ABSL is not based on the use of space, but rather on the order of signs. When looking at predicate forms, no evidence of morphology marking person was found. Predicates where some movement is included are extended from the signer's own body outward and inward (on the horizontal plane, see §2.3.2) to a small degree. Interestingly, a difference among groups of signers was found: younger signers show a greater use of space. While older signers prefer to use to a lesser extent this proximal/distal distinction in front of the signer's body, younger signers make more use of it (almost three times more) than older signers, thus reflecting a greater use of space in younger generations (Padden et al., 2010). This shows that even if this emerging language might utilize little space in older generations, the incorporation of space into the grammar takes time, as the use by young generations shows.

### **2.7 Proposal**

This dissertation claims that sign space should be analysed as a categorical element and very rarely as a gradual continuum. Sign space is part of the discourse grammar of the language and once thoroughly analysed, space is more similar to a linguistic system than to the realm of gesture. It is undoubtedly when we enter the discourse level that spatial locations become distinctively important.

As will be shown along the coming chapters, referring terms and other linguistic expressions which are directed to sign space display a complex and dynamic use of linguistic space. However, as we will see in this dissertation what is unusual in SLs is the greater potential for expressing referential distinctions, and the fact that in SLs discourse referents are overtly manifested, which is an unavoidable imprint of the visual-spatial modality.

A distinction between the linguistic space and real space needs to be argued for. The former is a limited and discrete construct built among the conversation participants, whose different parts in spatial planes are categorically interpreted. The latter is the space where objects in reality are localised which is perceived by our senses.

This dissertation argues for a three-person pronominal distinction in LSC. However, it also proposes that points in space are clitics attached to the manual form (similar to the spatial pronouns analysis). I do not consider it to be a full pronoun but rather a clitic. Although the consideration of seeing spatial locations as pronouns is a very interesting one as pointed by Kegl (1976/2003), it has an important drawback: if we consider that points in space are pronouns, and the actual pointing sign is only an agreement marker or a dummy element, we would need to accept that this dummy element is a very complex one that allows numeral and plural incorporation. Seen the complexity of manual pointing signs which can incorporate number and the direction of the movement varies according to the number incorporated, they can be only analysed as

pronominal forms which are cliticised to a clitic spatial morpheme (see §3.1).

Finally, I follow the r-locus view which considers that r-indices are overtly expressed. However, this claim has not been thoroughly formalised under a theoretical framework<sup>12</sup>, and this is precisely the main goal of this dissertation. As will be proven here, the establishment of spatial locations correlate with a semantic phenomenon, namely that of scope. The analysis offered here proves that features like specificity and topicality can be attributed to spatial locations.

## **2.8 Summary**

This chapter has presented a state of the art about the theme of this dissertation, namely the use of space in SLs. It has described what this use of space consists in, and it has presented the relationship between the use of space and the modality of languages. The two main opposing views concerning the analysis of space have been contrasted, clearly favouring the r-locus view. However, the lack of formalisation of this view has been noted and it is indeed one of the aspects this dissertation aims to cover. The different syntactic and semantic analyses attributed to pointing signs have also been presented. It has also been included some provision of evidence of

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<sup>12</sup> The only attempt to formalise spatial locations has been Lillo-Martin & Klima (1990), which is in fact the line of research this dissertation follows. The dissertation in its globality, and especially chapters 4 and 6, are crucial for this formalisation.

## 2.8 Summary

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the linguistic status of space coming from acquisition and from cases of emergence of new SLs. The chapter has concluded with the proposal defended in this dissertation.



## **Chapter 3**

### **A morpheme on spatial planes**

The structured use of space in ASL is nowhere more evident than in the means by which verbs reflect their arguments [...]. What is reflected is not objectively who or what is referred to by the subject of the verb but rather whether in the discourse situation the subject is the speaker, the person or persons addressed, or some subject of the discourse, not restricted to the participants in it.

Klima & Bellugi (1979:276)

### **3.0 Introduction**

This chapter is devoted to the use of space of non-descriptive locations. Unlike descriptive locations which make a freer use of space, non-descriptive locations are categorically realised in the different areas within the three spatial planes that are standardly projected with respect to the body of the signer. Signs directed to the different parts of spatial planes contribute to the establishment of a grammatical morpheme that consists in an abstract point in space. The direction where the physical point in space is established is completely irrelevant. What is important is that the spatial point is categorically defined and interpreted within the linguistic system (Wilbur, 2008). I argue that this abstract point in space functions as a clitic pronoun (Fischer, 1975). In LSC, this clitic pronoun can be abstractly established in different parts of the three spatial planes. Yet, only the two directions of the frontal plane, namely upper and lower, are grammatically relevant and distinctively interpreted. [lower] is the default feature which the majority of signs are attached to. In contrast, the upper direction of signs is instantiated by the feature [up], which is the marked location established on the upper frontal plane denoting particular meanings, such as locatives, hierarchical relations, non-specificity and non-presence in the immediate physical context.

This chapter is structured as follows. §3.1 presents the analysis this dissertation follows in considering the spatial morpheme localised on the planes to be a clitic. §3.2 presents the set of mechanisms employed in LSC to establish this spatial morpheme and hence to localise entities in space. §3.3 is a detailed description



of the three spatial planes used in non-descriptive locations in LSC. After this overall description, §3.4 outlines the matrix of features spatial locations have. §3.5 briefly expands on body-anchored localisations, and §3.6 summarises the main findings of the chapter.

### **3.1 The spatial morpheme**

A question which has concerned linguists from the beginning of sign linguistics is what exactly is there in space which allows to direct index and localised signs to it (see §2.4 and §2.5). I defend that index signs and other localisation mechanisms establish a spatial location, which is in fact a spatial morpheme attached to manual and non-manual signs. This idea has been already outlined by previous works, which have influenced and inspired the shaping of ideas of the present dissertation. As for SL agreement, Fischer (1975) is, to the best of my knowledge, the first work to argue that points in space are cliticised pronominal forms attached to verbal roots. This view differs from the traditional and general idea that spatial locations are agreement markers of verbal inflection (see §3.2.3). Nevins (2009, 2011), following Fischer (1975), claims that agreement verbs are formed by morphemes that are cliticised to the verbal root. In syntactic terms, this view imposes a clitic-doubling analysis when the arguments of the clause are overt, as defended in Quer (2009) and Koulidobrova (2010). More specifically, Quer implements the big-DP hypothesis (Uriagereka, 1995), whereby the DP and the clitic are generated as a single argument.

As for pronominal forms, Kegl (1976) argues that points in space are precisely the pronoun in ASL. She considers the manual index handshape pointing towards the spatial location to be an agreement marker indicator. Some years later, in her dissertation and a paper based on it (Shephard-Kegl, 1985; Kegl, 1986) she argues that spatial locations are more specifically clitic pronouns, which can be distinguished into two classes. Proclitic pronouns are established by role prominence and are always connected to the subject. Enclitic pronouns are established by coindexation and they are in complementary distribution with full pronouns. Unfortunately she did not carry on this view in further research. In fact, the idea of analysing spatial locations as clitic pronouns is not so far the mainstream view.

In a mixed type of analysis, Padden (1990) considers the spatial modification realised on plain verbs to indicate either subject or object of the predicate to be a pronoun clitic. According to her, this differs from verb agreement realised through verb inflection that agreement affixes represent. An important argument in her analysis is that the pronoun clitic occurring with plain verbs is not very restrictive, while person and number are highly restricted as they appear only with agreement verbs. This dissertation follows Fischer (1975), Kegl (1976, 1986), Shephard-Kegl (1985), Padden (1990), Quer (2009), and Nevins (2011), and considers that spatial locations function as clitic pronouns. The spatial morpheme can appear across different categories, such as index signs, spatially modified signs, as

### 3.1 The spatial morpheme

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well as verb inflection. According to Zwicky & Pullum (1983), this is a strong argument for a morpheme to be considered a clitic.

The establishment of a spatial morpheme form in sign space has been questioned and often bypassed by many works. The problem with spatial locations is that researchers have focused primarily on the physical point in space where index signs are directed to (see the spatial mapping view, as described in §2.4.1), thus neglecting the fact that what matters is not the exact direction in space but rather its categorical interpretation in the linguistic system. Following Wilbur (2008), I consider that the spatial direction where index signs can be directed to consists in an abstract and unique point in space. What matters is not the exact direction where index signs are directed to, but rather the abstract end point that is expressed with the localisation of signs and that is interpreted in the grammar of the language as a categorical element, rather than a gradient one. Wilbur (2008) clearly defines it as follows:

“The morpheme is not ‘this particular point in space where the sign movement or indicator pointing just stopped’; rather it is the geometric point in space ( $p$ ), which indicates an individual ( $x$ ), no matter where it is made in space.” (Wilbur, 2008:239)

Wilbur considers this morpheme to be a geometrical point that has morphological expression via agreement morphemes and end state. The relevance of her account is that she makes precise that the

direction where the physical point in space is established is completely irrelevant. What it is important is that the spatial point is categorically defined and interpreted within the linguistic system. Hence the infinity issue (see §2.4) is no longer a problem, since there is one and only spatial morpheme. A unique spatial morpheme exists in the grammar of the language, which consists in an abstract point where indexical signs and other localisation mechanisms are oriented to.

I consider this final end point represented as (p) to be a grammatical clitic morpheme which stands for the overt manifestation of a DR (see chapter 4). It is an abstract spatial morpheme which is cliticised to the manual handshape as well as to non-manual realisations. And it is in fact an invariable spatial morpheme, regardless of the direction of the index sign (see chapter 7). The so long considered underspecification slot for the location feature (Sandler, 1989; Brentari, 1998; Kooij, 2003, among others) is taken here to be filled in by the clitic (p). The matrix of features that index signs include is illustrated below, where every Greek letter corresponds to a certain feature. Importantly, the location slot has a concrete feature, namely (p) for point in space, which is also related to the orientation the sign will take.

- (1) Index sign
- handshape:  $\alpha$
  - movement:  $\gamma$
  - orientation:  $\beta(p)$
  - location: point in space (p)

As shown in the subsequent sections, this abstract point in space is established by different localisation mechanisms on the three spatial planes in front of the signer's body. However, only some parts within these spatial planes are grammatically relevant in LSC. But before delving into spatial planes, let's analyse the localisation mechanisms used in LSC.

### **3.2 Localisation mechanisms**

In chapter 2 we saw that sign language (SL) discourse referents are associated with an area in sign space. An index sign, followed or preceded by a nominal, indicates that from that moment on the area the pointing is directed to will be associated with the referent the nominal denotes, as long as the referential framework is not shifted. An index directed to a location establishes thus a discourse referent (DR) on a determined spatial area. Agreement verbs, index signs or eye gaze directed to that location in subsequent discourse are understood as coreferential with the corresponding DR.

Example (2) illustrates this. It is an LSC discourse fragment where the signer is talking about his son. The first time he talks about him,

he utters the nominal sign for son and directs an index sign to the contralateral part (i.e. the left area in a right-handed signer, see 3.2.1).<sup>1</sup> This is the first mention of the DR “son” and the index associates the nominal with the contralateral part of sign space. In the second utterance in (1), two index signs are directed to the same area and are thus understood as coreferential.

(2)

IX3<sub>c</sub> LAPTOP 1-OFFER-3 SON IX3<sub>cl</sub>

FOR NEW 3-SELECT-3 WORK IX3<sub>cl</sub> NEED LAPTOP IX3<sub>cl</sub>.

‘I will offer this laptop to my son.

Because he has been selected for a new job and he needs a laptop.’

(S\_Obj 01:11)

Figure 3.1 contains a sequence of the two index signs appearing in (2). The stills in Figure 3.1a correspond to the nominal sign for SON and the index sign to localise it. As we can observe in Figure 3.1b, corresponding to an index sign in the second sentence in (2), further mentions of the DR are realised with a pronominal index sign directed to the same area first established.



a. SON IX3

b. IX3

Figure 3.1. First and further mention of a localised discourse referent

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<sup>1</sup> Nominals can be preceded, followed or both by index signs. §2.5 showed that different analyses have been provided. The syntactic difference among these possible configurations in LSC is outside the scope of this dissertation.

In the initial literature on sign language research, the process of establishing a point in space or pointing to a previously established place to refer to a person, object or location was known as “indexing”, or “nominal establishment” (Friedman, 1975; Mandel, 1977; Klima & Bellugi, 1979; Poizner et al., 1987). The broad term “indexing” included the first association of the nominal with an area in space (i.e. first mention), as well as all those instances used to refer back to the same DR denoted by the nominal (i.e. further mentions). “Indexing” is then used as an umbrella term within which two functions are included: the predicational and the anaphoric one.

As seen in §2.4, “locus” is a very widely used term, but its meaning has an important theoretical load. Although linguists following both the r-locus and the spatial mapping view use this term, the most common definition is more oriented towards the spatial mapping view. Locations are defined as points in space standing for a projection of the referent (Engberg-Pedersen, 1993:97). However, I do not consider this point in space to be such a projection (see §2.4.1.2 for arguments against the spatial mapping view). Rather, the area where the finger tip of index sign points to is a grammatical morpheme which is semantically linked to a DR (see §3.4 below). Since the term “locus” is too theoretically loaded, I opt for the term “location” to denote this spatial morpheme. This term is in fact the same one used for the phonological parameter place of articulation, namely where the index sign is directed to (see §2.1). Since I consider it a grammatical feature I find unnecessary to have a

different term to denote the same grammatical element. The terms and the definitions used in this dissertation follow below.

(3)

- *Localisation* is a broad term which means to direct an index sign or spatially modify a sign towards a spatial area. By means of this indexing, a DR is established in space and gets thus associated with it. It functions both as introduction of the DR and as anaphoric reference.

- *Location* is defined as the spatial morpheme semantically associated with a DR. It is called (p).

The association between a DR and a location may be done by different means. The set of linguistic mechanisms used in LSC to establish (p) are the following:<sup>2</sup>

(4) Localisation mechanisms in LSC

Manual:

- Index signs
- Spatial modification of signs
- Verb agreement

Nonmanual:

- Eye gaze
- Body lean
- Head tilt

Most frequently these mechanisms do not occur alone, but rather combined. In Figure 3.2 the signer establishes a DR in sign space by means of a combination of mechanisms: spatial modification of the

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<sup>2</sup> Mechanisms adapted and extended from Quer at el. (2005) and Barberà (2007).



plain verb SEARCH and head tilt are oriented towards the lateral part where the corresponding DR has been previously established.



Figure 3.2 Localisation mechanisms

In what follows, a subsection is devoted to each mechanism. A state of the art literature is first offered and the LSC specific characteristics are then described on the basis of a qualitative analysis of the small-scale LSC corpus.

### **3.2.1 Index signs**

Index signs consist in an index finger handshape (fist closed, index extended) directed to an area in space (Figure 3.3). They have been described for many SLs and constitute the mechanism most often referred to from the set in (3) (Bergman, 1982 for Swedish Sign Language (SSL); Bos, 1990 for Sign Language of the Netherlands (NGT); Engberg-Pedersen, 1993 for Danish Sign Language (DSL); Berenz (1998, 2002) for Brazilian SL (LIBRAS); Pfau, 2011 for German SL (DGS); Friedman, 1975, Zimmer & Patschke, 1991; Padden, 1988; Neidle et al., 2002, and McBurney, 2002 for

American Sign Language (ASL); Zeshan, 2000 for IndoPakistani Sign Language (IPSL), and Quer, 2004 for LSC, among others).



Figure 3.3 Index sign

In LSC index signs may function as determiners (5a), demonstratives (5b), pronominals (5c), and possessives (5d) (Quer, 2004; Quer & GRIN, 2008). The same manual handshape can function differently. Importantly, it is always spatially modified and thus localises the nominals that it co-occurs with, in the case of determiners, demonstratives and possessives, or the DR that picks up, in the case of pronouns.

- (5) a. IX3a BOOK INTERESTING.  
'The book is interesting.'
- b. *While referring to a present book*  
BOOK IX3a NAME PYJAMA CL.stripes.  
'The name of this book is "The boy in the striped pyjamas".'  
\_\_\_\_\_br
- c. IX3a, IX1 LIKE.  
'I liked it.'
- d. \_\_\_\_\_br  
DELFINA IX3a BOOK INTERESTING.  
'Delfina's book is interesting.'

### 3.2 Localisation mechanisms

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Besides pronominal index signs, localisation in LSC can also be expressed with the sign that consists in a derived form of the lexical noun PERSON. This sign is articulated with a baby-C handshape and a vertical downwards movement (Figure 3.4a). It functions as a pronominal index which can be coreferentially used for the three person distinctions. This sign has been characterised by Meir (2003) for Israeli Sign Language (ISL) as a pronominal form of case marking. Pronominal index signs and the PERSON-3 sign can be indistinctly used without affecting the propositional meaning.<sup>3</sup> An important difference, though, is that while PERSON-3 can only denote [+human] entities, index signs can denote any kind of entity and it is not restricted to [+human]. This sign has an emphatic variant which is a bimanual B handshape articulation with the palm of the hands facing each other and a downwards movement (Figure 3.4b).



a. C-handshape variant



b. B-handshape variant

Figure 3.4 PERSON sign

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<sup>3</sup> The sign PERSON-3 used pronominally does not have to be confused with the LSC auxiliary predicate used as an agreement marker analysed by Frigola & Quer (2006). The auxiliary sign has the same manual handshape and moves from subject to object.

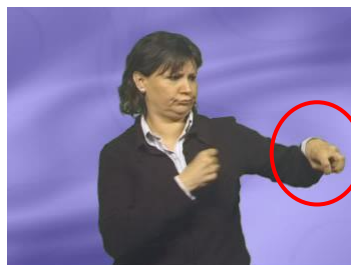
Importantly for the present account, both index and PERSON signs establish (p).

### 3.2.2 Spatial modification

Signs are not always signed neutrally, but are very often spatially modified as well, when they are not body-anchored (Baker & Cokely, 1980; Shepard-Kegl, 1985). Spatial modification of a sign consists in signing the corresponding sign in a non-neutral location in space. That is, not in neutral space in front of the chest of the signer, but rather towards the ipsilateral (Figure 3.5a) or contralateral part (Figure 3.5b). This spatial modification establishes (p) in a lateral part of sign space.



a. Plain verb DISAPPEAR



b. Classifier

Figure 3.5 Spatial modification of signs

In LSC common and proper nouns, determiners, plain verbs and classifiers can be spatially modified. In Quebec Sign Language (LSQ), Rinfret (2009:220) finds that the strategy of spatially modifying the signs is used differently according to the type of data. The author argues that in elicited data spatial modification of signs is the mechanism more frequently used to localise entities in space,

followed by index signs, body lean and finally eye gaze. In contrast, in spontaneous data spatial modification of signs is the least used mechanism, and signers prefer to localise with eye gaze, followed by index signs and body lean before using the spatial modification. No such difference has been found in the LSC data and spatially modification of signs is a strategy equally used in elicited and spontaneous data. However, further research with different kinds of data is needed.

### **3.2.3 Verb agreement**

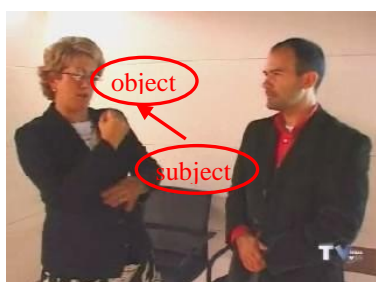
Verb agreement in SLs is also dependent on the use of space. A verb agreeing with subject and object is directed towards the location established with these referential functions (Padden, 1988; Janis, 1995; Mathur, 2000; Zwitserlood & van Gijn, 2006, among others). Agreement is marked with the direction of the movement, palm or fingers orientation and, according to some studies, with non-manual markers. The direction of these mechanisms indicates coreferential binding with the arguments of the predicate. The three verbal classes identified by Padden (1988) are plain, agreement and spatial verbs, which are distinguished among them by affixes, as defined below:

(i) Plain verbs are not inflected for person or number. Agreement is expressed by mean of personal pronouns or the auxiliary agreement sign.

(ii) Agreement verbs are inflected for person and number and the realisation of the verb moves from and towards two areas in space to indicate the arguments of the predicate. They are divided into two

main groups: regular, in which the path is from subject to object (Figure 3.6a), and backwards, where the path is from object to subject (Figure 3.6b).

(iii) Spatial verbs agree with spatial locations, although in this case inflection indicates a locative argument or adjunct, that is where the referent identified with the predicate is located or moves from/to in space. Verbs of location and movement represented by classifiers are included within this broad group.



a. Regular agreement verb:  
SUPPORT



b. Backwards agreement verb:  
ATTRACT

Figure 3.6 Agreement verbs

While this classification has a syntactic motivation according to Padden (1988), a semantic account has been defended claiming that for both agreeing verbs and backward verbs movement proceeds from the Source argument towards the Goal of the action (Meir, 2002). However, other authors convincingly argue that this semantic analysis cannot be valid for SLs. A strong argument comes from the syntactic behavior of auxiliary signs, which always consists in a movement from subject to object, irrespective of the theta-role they bear (Quer & Quadros, 2008; Pfau, Salzmann & Steinbach, 2010). Also this tripartite classification has been put into

question arguing for a plain vs. non-plain verb distinction (Janis, 1995; Quadros, 1999; Quer & Quadros, 2008). Whether spatial and agreeing verbs form separate categories is difficult to maintain since they agree with locative arguments and personal arguments and this is often indistinguishable on the surface. The reader is referred to Quer & Quadros (2008) for fresh evidence coming from LSC and Brazilian Sign Language (LSB).

Manual movement in sign space is not the only indicator of verb agreement. It has been argued for ASL that besides manual agreement, the non-manual component also expresses inflection, and this is explained in the next subsection.

### **3.2.4 Non-manual mechanisms**

The non-manual component provides very important mechanisms to localise entities in space. It is responsible for localising nouns and plain verbs, as well as marking inflection of agreement verbs in ASL under certain analyses. Concerning verb inflection, it has been claimed that agreement in ASL can also be realised non-manually. According to Aarons (1994), Bahan (1996), MacLaughlin (1997) and Neidle et al. (2000), transitive constructions are marked with head tilt and eye gaze: the signer's head may tilt in the direction of the location for the subject, whereas his eyes may gaze in the direction of the location for the object. According to these authors, head tilt is a non-manual manifestation of subject agreement, and eye gaze is a non-manual manifestation of object agreement. This non-manual agreement is not obligatory. In a later study, Neidle & Lee (2006) opt for a reconsideration of the function of head tilt.

Since one unresolved puzzle was the seeming optionality of this marking, Neidle & Lee argue that head tilt is in fact a focus marker that incorporates expression of subject agreement. Hence, its occurrence depends on the information structure of the sentence, and when it occurs, it serves to mark both focus and subject agreement.

Independently of the complications in the description of non-manual agreement (see Sandler & Lillo-Martin, 2006:43), head tilt, eye gaze and body lean<sup>4</sup> serve as mechanisms to indicate that a nominal is established and associated with a certain location in sign space. Baker & Cokely (1980) refer to “eye-indexing” when eye gaze can suffice as a strategy for localising a DR in space. Eye gaze directed to space consists in a break in the eye gaze directed to the addressee, to redirect it to a specific location in sign space. But non-manual strategies are not only confined to eye gaze, but also to body lean and head tilt (Rinfret, 2009 for LSQ).

Most frequently, non-manual mechanisms occur in combination with manual ones. Figure 3.7a shows localisation with a combination of two non-manual mechanisms, namely head tilt and eye gaze, co-occurring with the sign PERSON-3. Figure 3.7b shows localisation with the spatial modification of the sign PERSON-3 and head tilt co-occurring with it.

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<sup>4</sup> For a prosodic analysis of body leans, see Wilbur & Patschke (1998) and Kooij et al. (2006) who claim that body leans mark contrast in ASL and NGT, respectively.



### 3.3 Non-descriptive use of spatial planes

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a. Head tilt and eye gaze



b. Head tilt

Figure 3.7 Non-manual mechanisms of localisation

The next section is a description of the spatial planes and their use in LSC discourse.

### **3.3 Non-descriptive use of spatial planes**

As seen in §2.3.1, descriptive locations are used to express spatial relations among objects and they are not restricted to specific areas within the three-dimensional space. They are motivated by a mapping with the situation described and they are represented by meaningful locations. This is the reason why their use of space is freer. In contrast, non-descriptive locations are localised arbitrarily to identify the arguments of the verb and they are categorically defined as occurring in the three spatial planes projected with respect to the body of the signer. In this section the spatial planes used in non-descriptive locations, briefly presented in §2.3.2, and the features contained within them are treated in detail. The three spatial planes already shown in §2.3 are graphically reminded below.

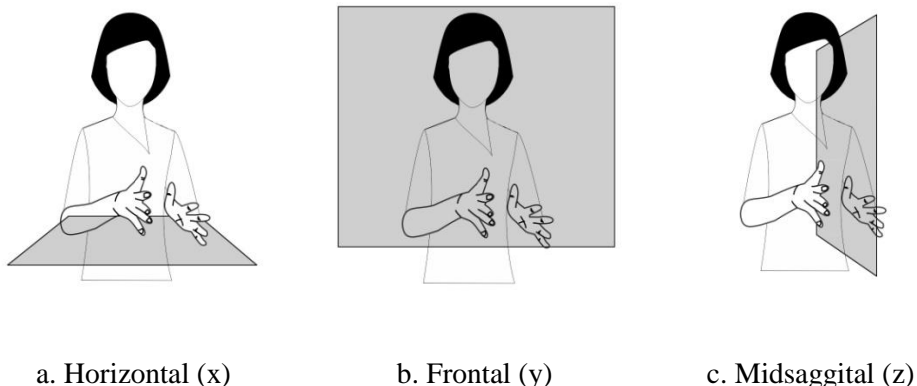


Figure 3.8. Spatial planes

The current proposal of the planes is based in Brentari (1998), and the major features distinctions are presented according to Liddell & Johnson (1989) and Sandler (1989), and they are applied and extended to the LSC discourse data. Below, a whole section is devoted to the specialised use in LSC discourse of each plane, namely horizontal, frontal and midsagittal.<sup>5</sup>

It is important to note that in mathematics, planes are defined according to two perspectives: (i) in terms of the planes on which a point intersects (i.e. a point intersects at a position on the three planes, namely x, y, z); and (ii) according to all the points contained on the specific plane. Although perspective (i) is very

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<sup>5</sup> The organisation of the frame of reference has been described by Engberg-Pedersen (1993:71) for Danish Sign Language (DSL). According to this author, when more than one referent is present in a fragment of discourse, the frame of reference is organised according to some conventions guided by semantic factors. They are divided among four conventions, which are the semantic affinity, the canonical convention, the convention of comparison and the iconic convention. Engberg-Pedersen does not analyze them as strict norms, but rather as a description of the signer's performance. Instead, I have chosen to describe the specialised use that each part has within a given plane, by sorting out the grammatical features contained on each one of those planes.

relevant when dealing with spatial points, to refer to spatial locations established in signed discourse I use perspective (ii) for the sake of clarity and because it allows to focus on the different features contained within each plane (Sandler, 1989). As we will see, (p) may be established in different parts of spatial planes, but not all of them are grammatically relevant in LSC.

#### 3.3.1 Horizontal

The horizontal plane stands perpendicularly to the body of the signer and since the beginning of SL linguistics research it is commonly considered as the default plane where the majority of signs are localised (Klima & Bellugi, 1979). According to Sandler (1989), the horizontal plane can be divided into [ipsilateral] and [contralateral]. In Liddell & Johnson (1989)'s model the horizontal plane is further divided into another [centre] feature. This tripartite distinction is the one found in LSC, and (p) may be established in three areas as shown below.

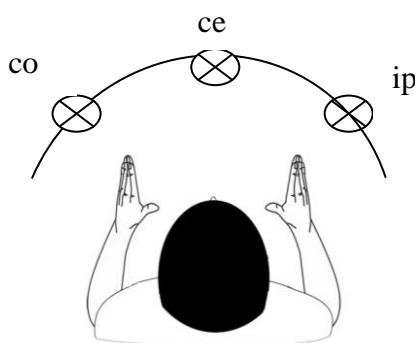


Figure 3.9 Horizontal plane

Following Liddell & Johnson, the features are distinguished in accordance with the signer's body: [centre] is in line with the

breast; [ipsilateral] is in line with the outside edge of the dominant shoulder, and [contralateral] with the non-dominant shoulder. Figure 3.9 is an example of the divisions within the horizontal plane for a right-handed signer, in which the ipsilateral part coincides with the right hand part. With respect to the other planes, the horizontal one has more divisions, as three distinct directions are established.

The features within this plane and the axis they form are grammatically relevant in the expression of plurality and temporality. As for plurality, signs directed towards the axis which unifies the contralateral and the ipsilateral part and repeated up to three times denote reduplication. This reduplication is only expressed in the line from the contralateral to the ipsilateral part.

This same axis also expresses sequences of temporal units. The units are logically ordered from the contralateral to the ipsilateral part, as shown in (6) below, where the days of the week are directly localised to the contralateral and ipsilateral parts.

- (6) IX1 TUESDAY<sub>cl</sub> FRIDAY<sub>ip</sub> WORK OFFICE  
'I work at the office from Tuesday to Friday.'

A temporal axis is also established from the contralateral to the centre part. This is the anaphoric axis in the time lines described by Engberg-Pedersen (1993:81). The anaphoric axis is used to establish events with respect to a point of reference. It does not have a default time and thus it is always established in the context. In (7) the temporal sign BEFORE is articulated in the anaphoric axis from

the centre to the contralateral part. But before the realisation of the sign the point of reference needs to be established.

- (7) TAKE<sub>cl+++</sub> ABANDON<sub>ip</sub> NOT BEFORE THERE-IS SELECTION<sub>cl</sub>  
'Before taking [them to the place where they were exterminated] there was a selection.'  
(A\_AF 08:59)

As far as the discourse level is concerned, the ipsilateral and contralateral areas on the horizontal plane are used as unmarked locations where DRs are established. There does not exist any grammatical norm, but the general tendency is that signers use their corresponding ipsilateral part to establish the first location (i.e. right-handed signers use the right side of sign space, whereas left-handed signers use the left side). This is most surely motivated by economy reasons since the ipsilateral spatial location is always closer to the dominant hand. Importantly, discourse and sidedness (i.e. the side in space where entities are localised) can override handedness, since the active hand can be shifted at a certain point for discourse reasons. Due to the setting of spatial locations, the hand closer to the lateral part where the DR has previously been localised may become the preferred hand along a discourse segment and the signer may use the non-active hand since it is closer to the contralateral part. That is to say, a right-handed signer may use his left hand (instead of the right one) as the active one within a discourse section when the entity is localised in the contralateral part, and thus reverse the hands dominance (Frishberg, 1983). In this dissertation I focus on the localisation of entities in space

without regard to the articulator used and neglecting the realisation of dominance reversals. I leave this interesting issue for future research.

Interestingly, the three main areas distinguished on the horizontal plane are not equally used. On the one hand, the kind and attributes of the entities that can be localised in space are different. On the other, there is a discourse effect when using the sides of signing space. These two aspects are the main concern of the following two subsections.

### *3.3.1.1 Kinds of spatial entities*

Localisation can be used for DRs denoting present and non-present entities in the immediate physical context, as well as abstract objects. When denoting present entities, DRs are introduced into the universe of discourse via a deictic demonstrative pronoun, i.e. an index sign pointing to the direction that the present object occupies, as shown below. In such cases a fixed eye gaze co-occurs with the introduction of the NP denoting the entity.



Figure 3.10 Reference to present objects

Since first and second person roles are required for the conversation to take place, the physical location of signer and addressee are used as default discourse locations. The index sign which localises the DR for first person is directed to and contacts the chest of the signer. The index sign that localises second person is directed towards the position the addressee occupies. The location for second person is commonly established on the horizontal plane [centre], frontal plane [lower], midsagittal plane [distal]. However, as noted by Bhatt (2004), pronominal reference to first and second person functions differently from third person reference. First and second person pronouns function as shifters rather than referring terms. They indicate the two principal conversation roles, namely that of being the sender and that of being the addressee, respectively. First and second person pronouns are local pronouns which directly “point” to their meaning. They act as shifters that indicate the involvement of conversation roles (Bhatt, 2004). This contrasts with reference to third (person) entities which identify the thing the conversation is about by locating it with reference to the spatio-temporal location of the event. Obviously, the thing the conversation is about can be centred on a first or second person, but in this case it functions as the thing the discourse is about, rather than as the conversation participant.

The distinction between conversation roles and the entity the conversation is about is also found in LSC in relation to establishment of DRs in sign space. First and second person pronouns are directed towards the central part of the horizontal plane, while third person pronouns are directed towards the lateral

parts with respect to the coordinates of the body of the signer.<sup>6</sup> The pronoun used to mean second person is directed to the central part, and in contexts of role shift, the second person is by default established. However, first and second person pronouns are not used to denote what the discourse is about and they do not denote discourse entities. Hence they are left aside in the present account, since here I only focus on discourse entities.

Concerning non-present entities, a random location is used and only a very brief eye gaze is directed to the location in space (Figure 3.11). For third (person) entities, the presence and absence of the entity in the physical surrounding affects the direction of the index sign and the spatial setting of locations, but this is only an epiphenomenon. As shown in Barberà & Zwets (in preparation), in present references the location which establishes the anchor for further coreferential chains and the actual position of the object coincide.

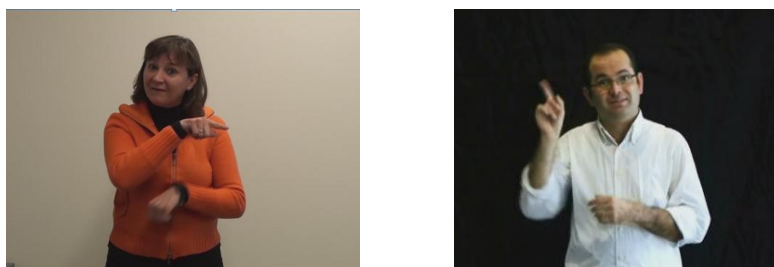


Figure 3.11 Index signs directed to non-present entities

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<sup>6</sup> See §7.2 for further treatment of personal pronouns in LSC, where it is also argued that second person reference is identified not only considering the spatial location but also with non-manual alignment.



Not all the entities established in discourse are equally localised in space, and in LSC there is a clear restriction of the kinds of entities that occupy a spatial location. The motivation for the difference in the kind of entities localised in each spatial part is found in ontological classes. Natural language semantics categorises entities into different ontological classes. The distinction between events or eventualities, states, propositions and facts make the semantics of sentences to become somewhat more complex (Parsons, 1990). Events are considered to be spatiotemporal entities which denote an action. Propositions are objects of belief, and they can receive a true or false value. A third category, very much discussed in the philosophical logic, is facts, which can be considered to be realisations of propositions. That is, propositions are kinds, and facts, which are truth-evaluated propositions, consist in their instantiation. These ontological categories are considered to be abstract objects used in natural language to refer and they can be ordered from less to more abstract, with events and states at one end of the continuum, facts in the middle, and propositions at the most abstract extreme of the continuum (Asher, 1993).

In this section I am not going to go deeply into the features that each class has in LSC and I will leave this interesting aspect for future research. However, it is worth noting that LSC shows a distinction between the expression of entities (i.e. DRs) on the one hand, and the expression of other classes which include facts, propositions, and events, on the other. For the sake of simplicity, I call this second cluster of classes “non-entities”. Hence in this informal description, I define non-entities as being negatively

identified with respect to DRs. Since DRs are described as the entity the conversation is about (see §4.1.3 for a detailed definition of DRs as entities), there is no need here for a fine-grained definition of facts/propositions/events. All what is not a DR, falls into the category of non-entities. As described before, DRs occupy a location in sign space, which is always established in the lateral parts. This contrasts with non-entities, which are established instead in the central position on the horizontal plane. The areas on the horizontal plane are thus specialised: DRs always occupy a spatial location on the lateral parts and non-entities occupy a location in the central part.

A further distinction between DRs and non-entities is found in its anaphoric behaviour. Unlike entities, which are localised during first mention and can be picked up by distant and non-distant resumptive pronouns, non-entities are never localised during first mention, but they are rather introduced into the discourse without being spatially established. However they can have non-distant anaphoric pronouns referring back to them. Although being characterised as non-entities, they can also serve as antecedents towards which resumptive pronouns refer back to (for instance, in the case of propositions). An example of a localised entity is (2), repeated here for convenience as (8), which contains a non-distant and a distant pronoun, marked in boldface below.

(8)

IX3<sub>c</sub> LAPTOP 1-OFFER-3 SON IX3<sub>cl</sub>  
FOR NEW 3-SELECT-3 WORK IX3<sub>cl</sub> NEED LAPTOP IX3<sub>cl</sub>.

[...]

IX1 SURE IX3<sub>cl</sub> HAPPY.

‘I will offer this laptop to my son.

Because he has been selected for a new job and he needs a laptop.

[...]

I’m sure he will be very happy.’

(S\_Obj 01:11)

(8) contrasts with (9) where a non-entity is introduced although not localised. However, in the subsequent sentence a resumptive pronoun which consists in a lax pointing directed to the centre is used (Fig 3.12). In (9) the event of Hitler becoming the German chancellor is not established in space. But a non-distant resumptive pronoun refers back to the just introduced non-entity (i.e. the proposition). This is realised with a lax pointing sign directed to the centre, as graphically shown in Figure 3.12.

(9)

YEAR 1933 HITLER PERSON-3<sub>ipsi</sub> START 1-APPOINT-3<sub>ipsi</sub>  
EQUAL/SAME RESPONSIBLE MAXIMUM GERMANY ZONE. IX3<sub>c</sub>  
NOVELTY LAW

‘In 1933 Hitler was appointed chancellor of Germany.

This (issue) entailed the creation of a new law.’

(A\_AF 03:21)



Figure 3.12 Coreferential index referring to a non-entity in LSC

There is thus a difference between the localisation of DRs and non-entities on the horizontal plane, and also in the referring back process: while DRs are localised on the lateral parts and later on referred back to by both distant and non-distant resumptive pronouns, non-entities are not localised but directly referred back by non-distant anaphoric index signs directed to the centre. When introduced into the discourse, non-entities do not occupy any spatial location. This is logical according to our account in which only entity-like DRs have its corresponding spatial location on a side of the horizontal plane (see §4.2). However, when referring back to non-entities in short distance contexts a lax pointing to the centre can be used. Hence there is a clear distinction between the entity-like properties of the lateral parts of LSC sign space, and the non-entity-like properties of the central part. Since this dissertation focuses on the entity-like properties sign space has I only deal with the lateral parts and will leave the non-entity-like properties of the central part for future research.

#### 3.3.1.2 Contrastive topics

In LSC the features on the horizontal plane used to localise entities, namely [ipsilateral] and [contralateral], are not grammatically relevant themselves. They contrast with the features on the frontal plane, which denote a concrete meaning to be shown in §3.3.2. Whether (p) is precisely established on the ipsilateral or on the contralateral part does not mark any difference on the grammar of LSC. (10a) and (10b) are equivalent and the interpretation of the sentence is the same regardless of which nominal is localised in which lateral part. The denotation of the nominal is not affected by the localisation side as the translation in (10) shows.

- (10) a. YESTERDAY JOAN<sub>ip</sub> 3<sub>ip</sub>-TELL-1 PILAR IX3<sub>cl</sub> SICK  
b. YESTERDAY JOAN<sub>cl</sub> 3<sub>cl</sub>-TELL-1 PILAR IX3<sub>ip</sub> SICK  
'Yesterday Joan told me that Pilar was sick.'

This phenomenon contrasts with the facts discussed in the following section, where we will see that the two features on the frontal plane, namely upper and lower, have different grammatical denotations and correspond to different specificity interpretations. In the small-scale LSC corpus, the only motivations that force the localisation of (p) on the ipsilateral or on the contralateral side is due to assimilation processes and economy reasons, which escape the grammatical restrictions of the language. However, it is important to note that when two lateral locations are established within a concrete fragment of discourse a contrastive relation arises, and this is so regardless of the exact lateral location assigned to each DR.

Thus, even if no grammatical relation is established between the entity localised and the exact opposite part of the horizontal plane, a contrastive relation arises when the two of them are established. This is also shown in (10) where two entities that are contrasted are established in the two lateral parts.

In LSC, when both the ipsilateral and the contralateral parts are used in the same fragment of discourse to localise two entities, a contrastive relation is overtly expressed. This is an overt marking of the expression of contrastive topics (see Barberà, 2007 for LSC contrastive topics; but also Büring, 2003; Vallduví & Vilkuna, 1998; for contrast in the spoken language (SpL) literature, and Wilbur, in press, for a general overview of ASL contrastive topics). Engberg-Pedersen (1993:74) descriptively defines this use as a convention of comparison, used when two entities need to be compared or contrasted. In LSC, this contrastive use of the lateral parts coincides with double contrast as defined in Mayol (2009, 2010). That is, two clause discourses in which two DRs are introduced in each clause and their respective verbs predicate two different, contrasting actions (see §7.4.1 for examples of contrastive topics in LSC).

Furthermore, two or more DRs holding an affinity relation may be localised on the same area (Figure 19). This kind of organisation of the frame of reference in sign space has already been described for Danish Sign Language by Engberg-Pedersen (1993). She calls it the “semantic affinity convention” and it is the convention that covers

different relations which contribute to the organisation of the spatial frame of reference. In LSC contexts of parent-child, person-place, and also different possession relations, the DRs are localised on the same area, as long as they do not need to be distinguished for discourse reasons (i.e. contrastively marked).

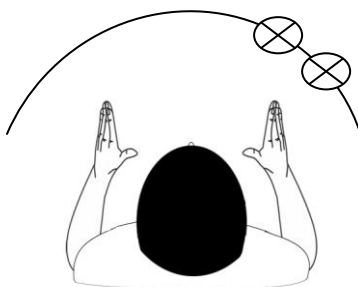


Figure 3.13 Discourse referents with a semantic affinity

#### 3.3.2 Frontal

The frontal plane, according to Brentari (1998)'s terminology, extends vertically to the body of the signer.<sup>7</sup> The features [lower] and [upper] described by Sandler (1989) are clearly distinguished in the LSC data. The phonological distinction between [lower] and [upper] cannot be made in accordance with the angle of the arm since the forearm cannot be taken as indicative of the direction shown by the index sign. When the forearm is parallel to the ground both the lower and the upper area can be indicated, because the wrist can be oriented to the two parts. Likewise, when the forearm is not parallel to the ground and the angle formed between the

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<sup>7</sup> Although Liddell & Johnson also record this plane, called “vertical” plane in their terminology (ibid 1989:221), no further features are distinguished in their model.

forearm and the ground is bigger than 90°, also both the upper and the lower area can be signalled by the different directions of the wrist. Thus the angle formed by the ground and the forearm cannot be taken as a reliable clue to distinguish the two parts of the frontal plane, since the wrist also plays an important role. Even if the arm makes a specific angle, the wrist can point differently. The two parts on the LSC frontal plane are clearly distinguished when we consider the shoulder and the head. The space from the height of the shoulder and upwards is considered to be the upper part. The lower part extends below the height of the shoulder (Figure 3.14).

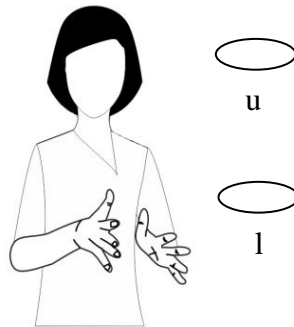


Figure 3.14 Frontal plane

In LSC the lower part of the frontal plane is the default area where (p) is established. In contrast, when (p) is established on the upper part, which is a marked area, it is associated with some particular and very concrete meanings, namely hierarchical relations, locatives, expression of grammatical specificity, and also absence from the immediate physical context. These marked meanings differentiated from the default marking are presented below.



#### 3.3.2.1 Hierarchical relations

The upper part of the frontal plane is used to denote social hierarchical relations, and more specifically superiority. The contrast between upper and lower frontal plane is associated with asymmetrical relations such as parents-children, boss-worker, professor-student, etc. In such contexts, (p) established on the upper part of the frontal plane denotes the individual who is higher in the social hierarchy. This use has also been described for Indo-Pakistani Sign Language (IPSL, Zeshan, 2000) and for ASL (Liddell, 1990).

Within this use only definite NPs referred by pronouns and namesigns (i.e. signs used as proper names within the deaf community) are localised on the frontal plane. In fact, this is a crucial difference with another use that I will discuss later on that denotes non-specificity and which is only operative when localising indefinite NPs (see §3.2.2.3). Definite NPs formed by common nouns such as MINISTRY, GOVERNMENT, BOSS, DEAN, FATHER+MOTHER and UNIVERSITY are always associated with the upper part of the frontal plane. Also namesigns which denote someone higher in the social hierarchy are also localised towards an upper location. Depending on whether they have contact with the signer's body, they are localised with an index sign co-occurring with them (Figure 3.15a). Non-body anchored nouns may be spatially modified and thus realised at a higher location (Figure 3.15b).



a. IX3 GOVERNMENT

b. UNIVERSITY

Figure 3.15 Denotation of hierarchical relations

I analyse nouns which denote entities higher in the social hierarchy to have the feature [up] specified in their lexical entries. The matrix of features of these signs, inspired by the Hand Tier model (Sandler, 1989), is shown in (11). Index signs are underspecified for their location feature (Sandler 1989:132). The location feature is always inherited from the referring term they co-occur with. Since nouns denoting hierarchical relations have the specification [up] in the matrix features, the index sign co-occurring with it agrees with this specification. Underspecified index signs thus agree with the nominal in the location feature.

- (11) Nouns denoting hierarchical relations
- +handshape
  - +orientation
  - +location: [up]

According to the spatial mapping view (see §2.4.1), the localisation of entities towards an upper location is an instance of a projection of the iconic properties, as well as the mental representation of the referent in sign space. However, I argue that the use of the upper

part of the frontal plane to denote hierarchical relations does not reflect real heights that occur in real world situations and it is thus not always iconic. In fact, there is not a transfer from real world space to linguistic space since LSC does not convey the exact heights of entities. I will report an example in order to show this clearly. It is quite normal that when a teenager grows he becomes taller than his parents. In an LSC conversation between a father who measures 1,60 metres and his son who measures 1,90 metres, the father will be always localised in an upper part of the frontal plane and the son on the lower part. Regardless of real height, parents are localised on the upper part while children are localised on the lower one. Hence real height difference is not transferred to space. Sign space represents thus a linguistic convention that follows the premise that referents that occupy a prominent position in the hierarchical social scale are localised up on the frontal plane, rather than a real-world situation convention. A great number of examples that show this preference towards the linguistic convention could be reported. To further illustrate this point, I add another example related to topographical location of the referent in real world. At UPF, our university, the dean's office is located on the third floor of the building. The office of the SL crew happens to be on the seventh floor. In every reference to the dean the localisation to denote her is established with an upper location in the frontal plane. The signer does not present the information differently according to what the addressee knows about the layout of the building, but rather there is a strict compliance with the linguistic convention. Hence no projection of the real world situation into sign space takes place.

3.3.2.2 *Locatives*

Locative NPs denote spatial locations, such as places, cities, regions and physical locations. In LSC they are usually accompanied with an index sign (Quer et al, 2005). This index sign used as a locative tends to be localised on the upper frontal plane when denoting countries and bigger regions. Locatives are generally directed to an upper part of the frontal plane (Figure 3.16a). Also, locatives mark plurals with points in space (Figure 3.16b), rather than arc-shaped movements, which are characteristic of pronominal forms. In some contexts denoting areas within a small region or a city, the imaginary map can be extended on the horizontal plane.



a. Singular locative



b. Plural locative

Figure 3.16 Locative signs directed towards the upper frontal plane

When underspecified index signs occur with locatives they inherit the features of the nominal, as seen previously with the contexts of hierarchical relations. I propose that locative nouns contain the specification [up] in the location feature.

(12) Locative nouns:

+handshape

+orientation

+location: [up]

The feature [up] is in the lexical entry of the locative nominal, rather than in the index sign itself. As argued for hierarchical relations, the index sign accompanying the locative is an underspecified form with the location feature left open, which is inherited from the nominal that co-occurs with it. When index locative signs do not co-occur with locative nouns, they do not necessarily occupy a spatial location on the upper frontal plane. The proof for this is that when locatives do not co-occur with a nominal but function as adverbials not agreeing with a nominal, they are not directed towards the frontal plane. In an LSC sentence such as (13) the index sign does not have an upward direction.

(13) BOOK IX3

‘The book is there’

When more than one locative is used in a fragment of discourse, they are localised on the frontal plane, which is used as if it were a map, and the distance between the places and the location is considered to be at a certain scale on the plane. This use is reminiscent of the absolute localisation where real-world locations are transferred to sign space. This is the context where descriptive and non-descriptive locations are fused. An example of this occurs when we have sentences such as “The neighbour from upstairs sent

me a fax”, where the realisation of the subject location of the verb SEND is localised at an upper part denoting the upper floor and the path moves to first person location. Hence descriptive and non-descriptive locations can be sometimes conflated.

The use of space for locatives has been considered to be an iconic convention according to Engberg-Pedersen (1993:74), since signers organise the frame of reference setting according to this imaginary map when denoting geographical places. It is true that signers localise countries and cities according to the location they occupy in the map represented in sign space with a certain scale. However, LSC tends to lose this iconicity when more than one use of space is at play. In a context where two locatives denoting two cities in a country which have different positions on the hierarchy scale (i.e. one has more administrative/political power than the other) are presented, the representation of the imaginary map is blurred. As shown in Barberà (2007), some instances in the small-scale LSC corpus show that the linguistic convention overrides the iconic one. When, for instance, a signer is talking about Spain and Catalonia, although Catalonia is the north-eastern autonomy of the country and Barcelona is geographically to the North of Madrid, the capital of the country is always localised at an upper location rather than at a lower one, as it would be expected according to the iconic convention. Since Madrid is the place where the central government is, it is a powerful entity. Hence it occupies an upper location regardless of its southern position with respect to Catalonia (Figure 3.17). Again the linguistic convention is preferred over the locative

### 3.3 Non-descriptive use of spatial planes

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one, which is considered to be more iconic. Loss of iconicity is shown in these contexts.



a. Sign INCLUDE referred to Catalonia



b. Sign INCLUDE referred to Spain (Madrid)

Figure 3.17. Non-iconic convention

#### 3.3.2.3 Specificity

The two parts of the frontal plane are also used when the signer wants to convey the specificity of the entity being talked about. The denotation of the same nominal localised on the upper and the lower frontal plane results in different interpretations. While the nominal localised on the lower part of the frontal plane is interpreted as specific (14), the nominal on the upper part is understood as non-specific (15).

(14) IX1 INTERVIEW IX3<sub>l</sub> WOMAN.  
'I have an interview with a woman<sub>spec.</sub>'

(15) IX1 INTERVIEW IX3<sub>u</sub> WOMAN.  
'I have an interview with a woman<sub>nonspec.</sub>'

Hence, when (p) is established on the lower part of the frontal plane overtly expresses specific entities (Figure 3.18a), while (p)

established on the upper part is circumscribed to non-specific entities (Figure 3.18b).



a. Lower location denoting a specific entity



a. Upper location denoting a non-specific entity

Figure 3.18. Specificity marking on the frontal plane

Importantly, this non-specific use is distinguished from the hierarchical one, as only indefinite NPs are marked for non-specificity. Only indefinite NPs can be used to denote specificity or non-specificity by location. In contrast, when denoting hierarchical relations, definite NPs such as namesigns, pronouns and definite descriptions are used to localise the corresponding entity. In this chapter, I am only offering a brief description of the specificity use on the frontal plane, and chapter 6 presents a detailed analysis with respect to the expression of specificity in LSC.

Interestingly, the localisation mechanisms listed in (4) which are directed to the frontal plane are used differently and some restrictions apply differently to the upper and the lower part. Within the lower part of the frontal plane any kind of manual and non-manual mechanism can be directed to it (Figure 3.18a). Concerning



linguistic categories, both lexical and functional elements may be directed to the lower part and establish location (p). As shown in (16a) and (16b), common nouns and plain verbs can be localised on the lower part. (16c) and (16d) show that also verb inflection and determiners can be associated with a lower location.

- (16) a. HOUSE<sub>l</sub>  
b. THERE-IS<sub>l</sub>  
c. 3<sub>l</sub>-ADVICE-1  
d. HOUSE ALL<sub>l</sub>, HOUSE SOME<sub>l</sub>

However, the upper frontal plane presents some restrictions. Only eye gaze can be directed to it, but head tilt and body lean cannot be oriented towards the upper part, arguably because of phonological restrictions. Such a restriction not only operates on the kind of localisation mechanisms, but also on the kind of linguistic elements which are localisable on the upper frontal plane. Only a specific set of signs can be oriented towards the upper part, such as weak determiners (17a) and verb inflection (17b). Bare common nouns (17c), plain verbs (17d) and strong determiners (17e) are not grammatically localised on the upper frontal plane in LSC. Hence (p) is only established on the upper part with a restricted set of linguistic elements.

- (17) a. HOUSE SOME<sub>u</sub>  
b. 3<sub>u</sub>-ADVICE-1  
c. \*HOUSE<sub>u</sub>  
d. \*THERE-IS<sub>u</sub>  
e. \*HOUSE ALL<sub>u</sub>

A further restriction is found on the sign PERSON-3 discussed in §3.1.1. When used pronominally it cannot be localised on the upper part (18a), and the nominal can only be localised on the upper part with an index sign (18b). The interpretation that we get is a non-specific one as shown in the translation.

- (18) a. \*PERSON-3<sub>u</sub> MAN  
b. IX3<sub>u</sub> MAN  
'One man<sub>non.spec</sub>'

However, when the sign PERSON-3 is used as a noun it is considered to be grammatical to localise it on the upper part.

- (19) ONE PERSON<sub>u</sub>  
'One person<sub>non.spec</sub>'

The distinction of the two parts of the frontal plane denoting specificity is the main concern of chapter 6 and as will be shown, only functional categories can be localised on the upper frontal part. In some contexts, two different uses of the frontal plane denoting different meaning may co-occur. This is the case when, for instance, a lower location expressed in one element is conflated in the same NP with an upper location expressed in another element. In such

cases the two opposed locations are realised, although minimised for phonological reasons. That is, the lower location tends to be marked loosely and with a tendency towards an upper location. In (20) the determiner denotes a specific entity and hence has a direction towards the lower part. The nominal denotes an entity higher in the social hierarchy, which is commonly localised on the upper part. The two opposed directions are marked, although the upper direction of the nominal starts before the onset of the realisation of the nominal. The determiner *SOME* is realised towards the lower part of the frontal plane, but before it is finished, it is directed towards the upper part of the frontal plane where the nominal *UNIVERSITY* is also directed to.

- (20) *SOME*<sub>spec</sub> *UNIVERSITY*  
'Some universities'

In principle, no iconic rule operates on the specificity use of the frontal plane. If iconicity were a major criterion, LSC could in principle also convey the expression of specificity using for instance the proximal and distal features on the horizontal plane. Since the proximal area is closer to the body of the signer it could be used to represent specific entities (since they are closer, they are better known by the signer). And according to this, the distal area within the midsagittal plane could be used to denote non-specific entities, that is entities not known or not identifiable by the signer. However, this is not how LSC expresses specificity. Also, another iconic possibility could be found by representing specificity on the horizontal plane (see §3.2.1). Everything that is known and

identifiable by the signer is localised on the ipsilateral part, which is the lateral part close to the active hand of the signer. And all those entities neither known nor identifiable by the signer could be localised on the contralateral part, which is the side in sign space used by the non-active hand. Again, this is not how specificity is marked in LSC and the iconicity hypothesis is thus blurred.

The frontal plane to denote specificity is a major spatial distinction that corresponds to a grammatical function, and this is precisely the main concern of chapter 6. Now, let us move to the last meaning assigned to the upper part of the frontal plane.

#### *3.3.2.4 Absence in the physical context*

A final use of the frontal plane to be noted is the one that denotes absence of the entity, which is always [+human], within the immediate physical context. This is especially notorious in LSC when the entity talked about is a person who is not present in the conversation environment. Hence namesigns used to refer to someone who is not around co-occur with an index sign pointing towards the upper part of the frontal plane.

As shown so far, the uses of the upper part of the frontal plane in LSC split into four main functions. First, it is the area where hierarchical relations are distinguished. Second, it is the place where locative signs are mainly directed. Third, specificity marking is overtly expressed when DRs are established in this area. And fourth, non-presence in the immediate physical context, especially when denoting human individuals, is also marked with an index

sign towards the upper part. Importantly, it has been shown that when a conflict of locations arises, the linguistic convention is preferred over the iconic one. This leads to a preference for relative localisation constrained by linguistic conventions over iconic and absolute ones.

#### **3.3.3 Midsaggital**

The midsaggital plane extends vertically and perpendicularly to the body of the signer. Two features are found, namely [proximal] and [distal]. [proximal] “is defined as a distance a few inches from the specified place, and [distal] is a comfortable arm’s length away from the place” (Sandler 1989:136).<sup>8</sup> Hence the distinction proximal vs. distal is established in accordance with the angle the elbow forms: the [proximal] feature occurs when the angle of the elbow is smaller than 90°, and the [distal] feature occurs when the angle is bigger than 90°, as shown in Figure 3.19.

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<sup>8</sup> Liddell & Johnson also distinguish two more features which Sandler does not mention, such as [medial], a position roughly an elbow’s length from the body location, and [extended], a full arm length from the body location (Liddell & Johnson, 1989:230). Since they are not attested in LSC, they are left aside from the present description.

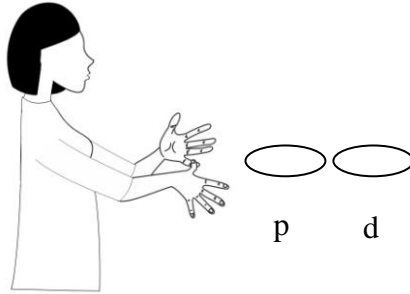


Figure 3.19. Midsagittal plane

The features proximal and distal unify the axis used to express temporal information, where present tense is signed in the proximal area, and future tense is signed in the distal area. They are also relevant at the lexical level. The sign for TOMORROW is signed in the proximal area, and the sign for THE-DAY-AFTER-TOMORROW is signed in the distal area.

This axis also forms the mixed temporal axis (Engberg-Pedersen 1993:81) which conflates the anaphoric and the deictic axis. That is to say, the temporal information in this axis is marked in the discourse and anchored in the context, and lexical signs like FROM-NOW-ONWARDS and UNTIL-NOW are realised starting in the proximal area and moving towards the distal area.

However, as for the discourse level, the dual distinction on the midsagittal plane is not found when establishing entities in space. Entities are not abstractly established in LSC in the proximal as opposed to the distal part. Rather, the midsagittal plane is used as a single extension and no distinguishable areas can be established when localising entities. Thus a singleton feature [front] is

distinguished and (p) is established in it without conveying further distinctions.

However, when a demonstrative sign is used deictically, and it is thus pointing to an object present in the physical environment there is a conflation of a descriptive use of space (i.e. because of the deictic component) and a non-descriptive use. The direction of the demonstrative pointing towards a present object is always precisely oriented towards the direction where the present object is found in the physical environment. This descriptive use is conflated with a non-descriptive one, since once the entity is established in the discourse, it is possible to refer back to it. As already mentioned, descriptive uses of space are freer and categorical distinctions are established with difficulty. Hence due to the descriptive component of these conflated structures, no distinction between [proximal] and [distal] can be straightforwardly made. This is why the midsagittal plane is treated as a single extension where no further distinctions are found. In the next section, I focus on the clusters of features spatial planes have.

### **3.4 Features on spatial planes**

As said at the beginning of §3.2, a location is an intersection among the three spatial planes. Hence, when (p) is established, a cluster of features, which characterise the intersection, coincide. So far we have seen that six features are established in LSC discourse. The possibility of combinations among these features adds up to six,

since we have three possibilities: three features on the horizontal plane ([ipsi], [contra], [centre]); two features on the frontal plane ([low] and [up]), and one feature on the midsagittal plane ([front]) (i.e. 3x2x1). Although these six combinations could potentially be the spatial areas used in the grammar of the language, in LSC only five directions formed by clusters of features are indeed found. The [front] area on the midsagittal plane is not further divided into [low] and [up] parts, but it is rather considered to be one and only direction without further division. As for the frontal plane, the two features [low] and [up] can be combined with the lateral horizontal features, namely [ipsi] and [contra] features. That is, the [ipsi] feature can be combined with [low] and [up], and the [contra] feature can be combined with [low] and [up]. According to this, only the following combinations in (21) are possible.

- (21) a. (p): {[front], [ipsi], [low]}  
b. (p): {[front], [ipsi], [up]}  
c. (p): {[front], [centre]}  
d. (p): {[front], [contra], [low]}  
e. (p): {[front], [contra], [up]}

These five clusters of features represent the directions where (p) may be established. However, no grammatical difference has been found in LSC in using [ipsi] and [contra] features apart from motivations due to assimilation processes and economy reasons (see §3.3.1). Concerning these lateral parts, what matters is the establishment of the two opposing sides, rather than the concrete



side of localisation. Hence, although five directions are possible, only three clusters of features are relevant in LSC grammar. The reason is that the cluster formed by [[front], [ipsi], [low]] is the mirror image of [[front], [contra], [low]], and [[front], [ipsi], [up]] is the mirror image of [[front], [contra], [up]].

- (22) [[front], [ipsi], [low]]  $\equiv$  [[front], [contra], [low]]  
 [[front], [ipsi], [up]]  $\equiv$  [[front], [contra], [up]]

While the features [ipsi] and [contra] do not imply any contrastive difference in the grammar of LSC, the [up] and [low] contrast in the frontal plane does imply a grammatical distinction in LSC. As detailed in 3.3.2, NPs localised on the upper part are associated with some particular and marked meanings, while the lower part is the default marking. Hence the two features on the frontal plane are relevant and play a very specific role in LSC grammar, whereas this is not the case for the lateral features. The three clusters of features which are relevant for LSC and which characterise (p) are the following:

- (23) a. (p): [[front], [ipsi]/[contra], [low]]  
 b. (p): [[front], [ipsi]/[contra], [up]]  
 c. (p): [[front], [centre]]

These three clusters of features indicated in (23) are each specialised in the contribution of grammatical and referential aspects, as indicated below:

- (24) a. (p): [[front], [ipsi]/[contra], [low]]: {discourse referents}  
b. (p): [[front], [ipsi]/[contra], [up]]: {discourse referents  
(hierarchical position, locative information,  
non-specificity, absence in the physical context)}  
c. (p): [[front], [centre]]: {non-entities (events, propositions,  
facts)}

As shown in (24) the referential properties and the anaphoric behaviour of the [centre] area diverges from the [ipsi] and [contra] sides. Not only the kind of entities, but also the referring back process is very different. Entity-like properties of space are only found with (24a) and (24b), and the semantics of non-entities in (24c) is left aside. Only two features concerned with entity-like properties of sign space are relevantly distinct in LSC grammar, namely lower and upper. Thus, the clusters of features in (25a) and (25b) can be abbreviated as [low] and [up] to keep the denotation simple.

- (25) a. [[front], [ipsi]/[contra], [low]] → (p)[low]  
b. [[front], [ipsi]/[contra], [up]] → (p)[up]

Hence [low] and [up] are the two grammatically relevant features that can be attached to the morpheme (p) in LSC. But since (p)[low] is the default morpheme, I keep the denotation even simpler and distinguish between (p), which is the unmarked spatial morpheme, as opposed to (p)[up], which is the marked spatial location denoting a concrete meaning.

The spatial morpheme (p) consists in an abstract and unique point in space, which is interpreted in the grammar of the language as a categorical element. This morpheme is semantically associated with an individual from the model (as will be shown in chapter 4), and has the feature [low] as the default marking. The marked feature [up] denotes a particular meaning. Morphophonologically, I consider the feature [up] added to the spatial morpheme to be an LSC homomorph which denotes four concrete meanings. Homomorphs are morphemes with the same form but different meaning. An English example is the morpheme *-er* which can denote comparative meaning, as in *bigger*; human agentivity, as in *teacher*, and inanimate instrument, as in *screwdriver*. In the case of LSC, the homomorph [up] is specialised with four meanings, indicated below:

- (26) [up]: {hierarchical position, locative information, non-specificity, absence in the physical context}

The grammatical difference between (p) and (p)[up] is also notable when looking at the set of mechanisms that can localise in the different spatial directions. As seen in §3.3, while no difference is manifested on the midsagittal or on the horizontal plane, the frontal plane imposes some restrictions on the kind of localisation mechanisms. Concerning non-manuals, only eye gaze can be attached to the [up] affix. This restriction could be motivated by a phonological restriction, since it is physically hard or impossible to

direct a body lean or a head tilt towards the upper part as opposed to the lower part.

Moreover, only a specific set of elements can be attached to the affix [up]. The localised signs in (27), previously shown as (17), prove that only functional categories, such as weak determiners (27a) and verb inflection (27b), can be felicitously localised on the upper frontal plane. However, nouns, plain verbs and strong determiners are considered to be ungrammatical when localised on the upper part.

- (27) a. HOUSE SOME<sub>u</sub>  
'Some house<sub>non-spec</sub>'
- b. 3<sub>u</sub>-ADVICE-1  
'Someone<sub>non-spec</sub> advised me'
- c. \*HOUSE<sub>u</sub>
- d. \*THERE-IS<sub>u</sub>
- e. \*HOUSE ALL<sub>l</sub>

The restriction of directing functional elements only towards the upper part is a very interesting one, which shows that the feature [up] is grammatically relevant. As shown in the translation of the glosses in (27a) and (27b), the interpretation that arises is a non-specific one. How the spatial morpheme (p) is associated with meaning is the main focus of chapter 4, and the non-specificity marking of the feature [up] is further treated in chapter 6.

### **3.5 Body-anchored locations**

In the preceding sections, I have mainly focused on locations established on the three spatial planes which extend in front of the signer's body. However, locations can also occur as body-anchored forms, since the body of the signer and the spatial area immediately in front of it is also considered to be part of sign space. Hence, DRs may also be introduced into the discourse without being localised in the three-dimensional extent. In such contexts the signer's body is used as the location parameter. Body-anchored locations are realised with verbs agreeing with the body of the signer (generally assigned to first person).<sup>9</sup> Also, this can be combined with role shift. When this happens the DR is picked up again through a role shift construction (see footnote 9 in chapter 2). This referential shift is indicated by modifications on the signer's facial expression and body position. When the shift takes place, the body of the signer is used as a default location for the displaced first person.

In (28) the signer introduces a new entity into the discourse which is a man who is walking. Although he is talking about a third person he does not localise it on a lateral part, but rather uses an entity classifier and role shift, and the location is established in the body. When the body-anchored location is established, the verb WALK and the entity classifier are realised from the body and moving forward. To denote the shift, there is a change on the signer's facial

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<sup>9</sup> Body-anchored locations need to be distinguished from signs which have an internal phonological specification where the location parameter is phonologically specified at a determined location closer or in contact with the body of the signer.



### 3.5 Body-anchored locations

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be seen, no manual or non-manual mechanisms localise the nominal. This contrasts with Figure 3.21b where the signer directs eye gaze and a slight spatial modification to the ipsilateral part.



a. Citation form



b. Localisation in sign space

Figure 3.21. Citation form vs. localisation

Also weak referential elements are not localised in LSC. That is, a bare noun which is not spatially localised can yield a generic reading (see §4.3 and Quer 2005a, 2011b). The minimal pair in (29) shows this distinction. While the non-localised bare noun in (29a) has a generic interpretation, the localised noun in (29b) has a referential interpretation.

- (29) a. WOMAN READ LIKE.  
'Women like to read.'
- b. WOMAN IX3I READ LIKE.  
'This/the/a<sub>spec</sub> woman likes to read.'

In fact a generic interpretation is not obtained when a body-anchored location agrees with the signer's location. As (30) shows, when the verb is localised at the signer's body, only the referential reading is felicitous.





### 3.6 Summary

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morpheme used by default has the feature [low], and the notation used here is (p). The marked feature [up] is used to denote concrete meanings, namely locatives, nouns denoting entities in a higher position in the hierarchy, absence in the physical context, as well as non-specificity. As for the notation, (p)[low] is used for this marked use.



# **Chapter 4**

## **Spatial locations and discourse referents**

Entities may be thought of as hooks on which to  
hang attributes.

(Webber, 1979)

## **4.0 Introduction**

It is clear from chapters 2 and 3 that sign languages (SLs) in general, and LSC in particular, offer the possibility of establishing in sign space entities the discourse is about. However, how spatial locations are associated with meaning and which their precise function is has not been thoroughly formalised under any theoretical framework. In this dissertation it is considered that spatial locations undertake a semantic function: that of being the overt manifestation of discourse referents (DRs). Under the specific formalisation I use, the DR established in space corresponds to a variable established in the main universe of discourse. Hence, spatial locations correlate with DRs which are attached to quantifiers with wide scope.

This chapter offers new evidence in favour of the r-locus view, according to which spatial locations stand for the representation of DRs. §4.1 is an overview of the theoretical framework used in this dissertation, namely dynamic semantics. §4.2 offers new and detailed arguments for the claim that locations are the overt manifestation of DRs. §4.3 shows that the new arguments which are related to scope induce a revision of this claim according to which spatial locations stand only for DRs attached to quantifiers that have wide scope. §4.4 summarises the main findings of this chapter.

### **4.1 Dynamic semantics**

In this section the theoretical framework used in this dissertation is presented. I do not intend to present a complete review of the proposals related to dynamic semantics, but rather I give an overview of the most influential aspects which are relevant for the data to be covered and my analysis.

#### **4.1.1 Discourse and discourse model**

A discourse is more than a sequence of isolated sentences. Sentences within a discourse are interpreted with respect to their truth conditions, but they also need to be interpreted in connection with the context. Every new sentence introduced into a discourse is connected to the preceding ones, but at the same time every new sentence adds information and increments the context. The context is thus changing constantly and formal theories of discourse treat sentences as denoting functions from contexts to contexts.

According to Heim (1982), context is a file of information held in common by the participants of the discourse. Heim bases her theory on Stalnaker (1978)'s notion of *common ground*, which includes the domain of the discourse. The common ground is technically a set of indices considered to be DRs that the interlocutors in the conversation know, which includes linguistically given information, common educational and cultural experience, as well as sensory input (Stalnaker, 1978; Heim, 1982). Stalnaker construes the common ground as a set of possible worlds, i.e. the set of all and only those possible worlds which are compatible with everything that the sender presupposes. Common grounds change

from one context to the next because the words that the sender utters and any obviously observable change in the conversation's physical surroundings potentially change the presumed common background of the participants in the conversation. Hence, during a conversation the participants keep adding the content of what is asserted to what is presupposed. This is summarised as follows:

“To make an assertion is to reduce the context set in a particular way, provided that there are no objections from the other participant in the conversation. The particular way in which the context set is reduced is that all of the possible situations incompatible with what is said are eliminated.” (Stalnaker, 1978)

Hence when a proposition  $\gamma$  is added to context  $c$ , the context obtained is the derived context  $c'$ , as shown in (1). By adding new propositions, the context set is reduced and the amount of possibilities is narrowed down.

$$(1) \quad \gamma \wedge c = c'$$

A discourse includes discourse internal relations which allow to coherently connect sentences by means of rhetorical relations (Mann & Thompson, 1988). However, a discourse also includes all those events and actions which take place in the surrounding physical context. Suppose that in the middle of a conversation a goat walks into the room. From that moment on, it is presupposed

that a goat is in the room and it is part of the common ground. This presupposition can then be exploited by uttering “How did it get in here? It is stinky!”. Since the goat enters the common ground it may be referred to by a definite NP. Hence Stalnaker (1998) proposes to identify context with the body of information that is presumed, at a particular point in a discourse, to be common to the participants in the discourse.

A discourse is thus defined as a sequence of sentences connected coherently among them, linked to a context which is constantly changing. Every discourse includes a discourse model, which is a mental representation of the entities involved in it and the attributes and relations among them (Webber, 1979). In the previous example, for instance, the discourse model includes an entity that corresponds to the goat that the conversation is about, and we refer to this entity by means of a pronominal expression. How the attributes among entities of a discourse model are related is the topic of the following section.

### **4.1.2 Discourse representation theories**

The formal representation of natural languages via the use of predicate logic after Montague Grammar faces several problems when the representation of larger chunks of discourse is needed. While Montague Grammar’s aims at analysing the conditions under which a sentence is true, relying on reference and truth, dynamic semantics theories regard the meaning and interpretation of an expression as its potential to change the context of interpretation in the discourse domain. Non-complex sentences can be easily

represented through predicate logic as shown in (2a) and (2b). However, complex sentences face some difficulties, as shown in (2c).

- (2) a. Marta likes cats.  
 $\exists x(\text{marta}(x) \wedge \text{cat}(y) \wedge \text{like}(x,y))$
- b. Marta doesn't like dogs.  
 $\exists x(\text{marta}(x)) \wedge \neg \exists y (\text{dog}(y) \wedge \text{like}(x,y))$
- c. If Marta has cats around, she is happy.  
 $\exists x(\text{marta}(x) \wedge \text{cat}(y) \wedge \text{have}(x,y)) \rightarrow \text{happy}(x)$

While in (2a) and (2b) the existential quantifier has scope over the variables, in (2c) the variable ( $x$ ) applied to the condition *happy*( $x$ ) is outside the scope of the existential quantifier. The problem posed by this kind of sentences is called the problem of “donkey anaphora”. This phenomenon was named after the famous sentences by Geach (1962), where he used donkeys and farmers in his examples. The so-called “donkey sentences” show the impossibility of predicate logic to represent sentences where an indefinite NP and an anaphoric pronoun are outside the regular scope domain of the NP, as shown in (3)<sup>1</sup>.

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<sup>1</sup> Three possible solutions have been offered to this problematic aspect. This dissertation only deals with dynamic semantics (Kamp, 1981; Heim, 1982; Kamp & Reyle, 1993; Roberts, 2005). The reader is referred to Evans (1980), Elbourne (2005) and Heim (1990) for an e-type approach of the problem, where the anaphoric pronoun is analyzed as a concealed description. For a dynamic predicate logic approach, see Groenendijk & Stokhof (1991).



- (3) a. If a farmer owns a donkey, he beats it.  
 $\exists x(\text{farmer}(x) \wedge \exists y(\text{donkey}(y) \wedge \text{own}(x,y)) \rightarrow \text{beat}(x,y)$
- b. Every farmer who owns a donkey beats it.  
 $\forall x(\text{farmer}(x) \wedge \exists y(\text{donkey}(y) \wedge \text{own}(x,y)) \rightarrow \text{beat}(x,y)$

The earliest formal dynamic semantic theories were independently developed by Kamp (1981) and Heim (1982), who present two similar theories of discourse models. Kamp presents Discourse Representation Theory (DRT) and Heim introduces File Change Semantics (FCS). Heim (1982) uses the notion of file-card as a metaphor for how the information about entities is being tracked and she views discourse as a management of files. DRT (Kamp, 1981; Kamp & Reyle, 1993) uses the notion of “discourse referent”. Each DR in a model (or file-card in a file) corresponds to a discourse entity, that is the thing the discourse is about. Every time that a participant in a conversation talks about a new entity, a discourse referent is added to the model. Entities that are picked up from prior discourse correspond to DRs that are updated. As discourse progresses new DRs are added and already existing ones are updated. Each DR’s content is a contribution to the creation of discourse context that interlocutors share. Thus the context is constantly being built by the additional information that interlocutors keep adding to the conversation. According to both FCS and DRT, a model is formed by a set of entities which form the common ground (Heim, 1982:286). Both FCS and DRT present similar analyses and the term “discourse representation theories” is commonly used to refer to the two approaches. This dissertation uses both as theoretical framework. However, DRT (Kamp &

Reyle, 1993; Kamp, Reyle & Genabith, 2007) is the approach which has received more attention and has been updated more. Therefore it is the technical tool used to represent the semantics of LSC discourse.

According to DRT, interpretation involves a two-stage process: first, the construction of semantic representations called Discourse Representation Structures (DRSs), which represent larger linguistic units and discourses rather than single sentences; second, a model-theoretic interpretation of those DRSs. The construction of a DRS for such larger units proceeds sentence by sentence, and the semantic cohesiveness among the sentences dynamically contributes to the incremental nature of interpretation. To process a sequence of sentences  $S_1, S_2 \dots S_n$ , the construction algorithm starts with a syntactic analysis of the first sentence  $S_1$  and transforms it into a DRS  $K_1$  which serves as the context to process the second sentence  $S_2$  from which DRS  $K_2$  arises. Simple monoargumental sentences have a combination of a noun phrase (NP) and a verb phrase (VP) which semantically signifies that the individual indicated by the NP (the so-called “discourse referent”, see 3.1.3), satisfies the predicate expressed by the VP. Individuals satisfy the predicate and in a DRT formal representation DRs are substituted for the NP and represented by a variable.

A DRS is a pair of sets  $\langle U, C \rangle$ , where  $U$  is a set of DRs, called the universe of discourse, and displayed at the top of the diagram; and  $C$  is a set of DRS conditions (i.e. predicates followed by variables). The semantic representation of the first clause in (4)

is represented in the DRS *K1* in (5), where the DRs are represented by variables at the top of the diagram, and the conditions, such as *lali (u)*, *book (v)*, and *read (u, v)*, are represented below.

(4) Lali is reading a book. She likes it.

(5)

u v
lali (u) book (v) read (u, v)

(6)

u v x y
lali (u) book (v) read (u, v) she (x) it (y) like (x, y) x = u y = v

In *K1* (5) the DR which stands for the variable *u* represents the individual indicated by the NP “Lali”. And in *K2* (6) the variable *x* represents the individual indicated by “she”. They both point to the same object in reality, namely a SL linguist from Barcelona called Lali who happens to be my friend. The two variables are equated by the identity relation  $x=u$ . However, this identity equation is not obviously resolved. In fact, the central problem that theories of discourse anaphora have faced is that of defining and explaining the

relation which holds between the anaphoric pronoun and its antecedent, i.e. the referentially independent expression from which the anaphoric expressions gets its reference. The perspective adopted by classical semantics is that NPs and pronouns correspond less directly to quantifiers and variables than the dynamic view posits. The perspective adopted by dynamic semantics (Kamp & Reyle, 1993; Heim, 1982; and Roberts, 2005, among others) is that natural language allows for dependencies that are far more flexible in standard logical styles. Dynamic semantics assumes that anaphora is not a relation between pronouns and other NPs, but rather one between pronominal referring expressions and DRs that are present in the semantic representation under construction in the discourse progression.

Nevertheless, natural languages provide some features which constrain identity relations, i.e. the mapping of two referring terms standing for DRs which point to the same object in reality. In *K2*,  $u$  and  $x$  are considered to denote the same object, but  $x$  is expressed by an underspecified element. This identity relation is obtained following semantic and syntactic information. The first identity equation in *K2* is  $x=u$ , where  $x$  is a new DR and  $u$  is a suitable DR chosen from the universe of discourse. The suitable qualification depends on all sorts of considerations, both semantic-syntactic, with features such as gender, number, case, and grammatical role, as well as pragmatic.<sup>2</sup> The matrixes in (7) show

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<sup>2</sup> Pragmatic considerations are especially important when an underspecified referring term can be identified with more than one suitable discourse referent, as in “John hit Paul. He was mad at him.” In cases of ambiguity, the integration

the features included in each NP considered for the identity equation.

(7)

Lali	$\left[ \begin{array}{l} +\text{subj} \\ +\text{fem} \\ +\text{sg} \\ +\text{nom} \end{array} \right]$	She	$\left[ \begin{array}{l} +\text{subj} \\ +\text{fem} \\ +\text{sg} \\ +\text{nom} \end{array} \right]$
------	--	-----	--

The features of *Lali* and *she* coincide. Hence when the features coincide, the first NP established becomes a suitable antecedent for the pronominal form. *Lali* is a suitable antecedent for *she*, as well as *book* is a suitable antecedent for *it* as the equation  $y=v$  indicates. The corresponding pronominal construction rule used in DRT which contributes to the DRS composition is as follows:<sup>3</sup>

CR.PRON: Upon encountering a pronominal form,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]], and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. check which variable in the main DRS shares the features  $\alpha$  has, and
4. if no suitable variable is found, go to CR.PRON2; if the suitable variable is found introduce an identity equation  $\alpha = \gamma$
5. go to CR.PROM

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between syntactic and pragmatic motivations contribute together in order to get the correct disambiguation of pronouns, as shown in Mayol (2009).

<sup>3</sup> See Appendix A for a complete list of construction rules used in this dissertation.

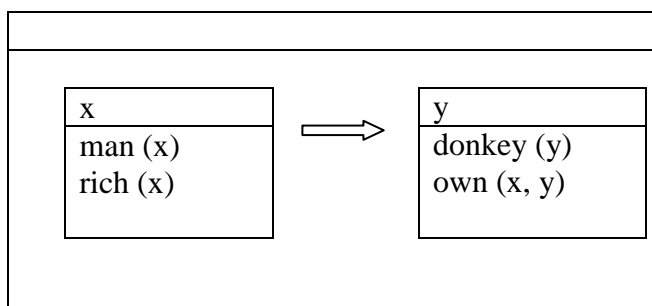
The matrix of features allow the establishment of the identity equation.

*4.1.2.1 Donkey anaphora in DRT*

Discourse representation theories (DRT & FCS included, henceforth DRTs) resolve the problem of donkey anaphora. Both definite and indefinite NPs are not treated as existential operators, but rather as variables, which correspond to a DR as defined by Karttunen (1976) (see §3.1.3 below). DRTs consider that there is existential quantification which takes scope over the entire discourse, and unselectively binds all the free variables in it. For this treatment, DRTs adopt unselective restricted quantification, as proposed in Lewis (1975). Given a quantifier, the construction rule instructs to create a complex condition which contains a pair of DRSs as the following representations of a donkey sentence below shows.

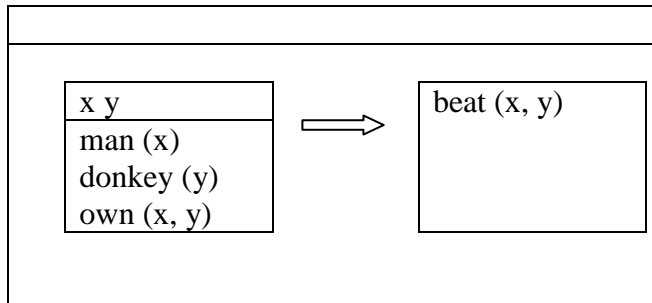
(8) If a man is rich, he owns a donkey.

(9)



(10) Every man who owns a donkey beats it.

(11)



These complex conditions represent a tripartite quantificational structure. The antecedent DRS (i.e. the left-hand box, called  $K_1$ ) represents the restriction; the arrow represents an unselective universal quantifier, and the consequent DRS (i.e. the right-hand box, called  $K_2$ ) represents de nuclear scope. Since there are no variables in the main universe of the DRSs (9) and (11), the sentences are true iff it is verified by the empty embedding function. Every function which verifies the antecedent can be extended to a function which verifies the consequent. The result is that (9) comes out as true iff for every rich man in the model it is possible to find in the model a donkey which he owns. Similarly (11) comes out as true iff for every man who owns a donkey in the model, there is a donkey which he beats.

Hence, donkey sentences do not pose a problem for DRTs. The indefinite NP in the restriction has no quantificational force and it is instead treated as a variable. This variable occurs in the scope of the universal quantification (and thus it is bound by it) that is associated by the semantics of the pair of embedded DRSs  $K_1$  and  $K_2$ . Donkey

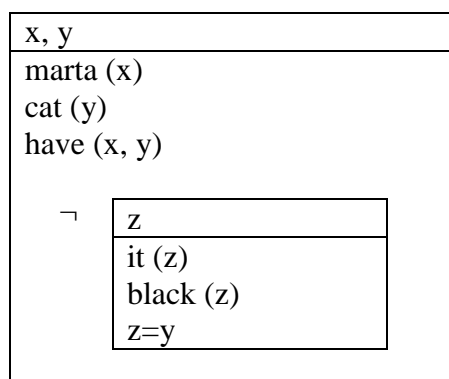
sentences illustrate the utility of DRs (see §3.1.3). Both (9) and (11) include subordinated variables in the discourse model, which allow to keep track of the entities mentioned in the if-clause or relative clause in an embedded context. However, no reference needs to be implied by the two sentences.

#### 4.1.2.2 Accessibility

The structure of a DRS plays a crucial role in pronoun resolution. In DRT, anaphoric pronouns are only allowed to refer to DRs that are *accessible*. Accessibility is defined in terms of how the DRSs are nested into each other. The positioning of a variable within a DRS has consequences for co-reference possibilities: a variable inside a subordinate DRS may not corefer with a subsequent variable. In (13)  $z$  is embedded in the DRS  $K_2$ , which is bound by the negation operator. Since  $K_2$  is embedded in  $K_1$ ,  $z$  is accessible to  $y$ .

(12) Marta has a cat. It isn't black.

(13)

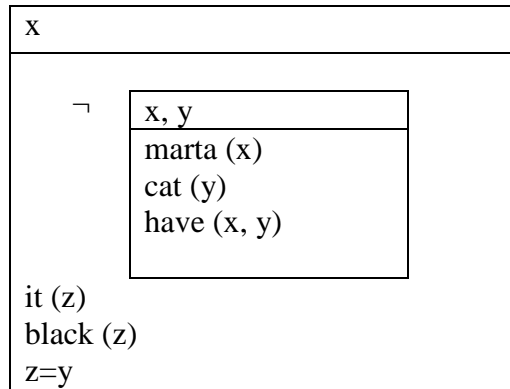




However, in (15),  $z$  is included in DRS  $K_1$ .  $K_2$  is embedded in  $K_1$ , which is bound by an operator. In this case,  $z$  in  $K_1$  is not accessible to  $y$  in  $K_2$ , because  $K_2$  is nested into  $K_1$ .

(14) Marta doesn't have a cat. #It is black.

(15)



While (13) correctly predicts that the coreferential relation is grammatical, the semantic representation in (15) also predicts that the second sentence in (14) is a non-felicitous continuation. Let's turn now to the features of DRS variables.

### 4.1.3 Discourse referents

DRT considers that linguistic reference is not a mapping from linguistic expressions to real world objects, but rather from linguistic expressions to constructs that are built along the discourse progression which represent an object that exists in the real world. Discourse referents (DRs) are entities that denote the object of thought or the thing the conversation is about. Once established in the discourse they can be referred back to by a pronoun or retrieved

by a definite description (Karttunen 1968, 1976). The concept of DR does not have to be identified with the thing in the real world and they can denote concrete, abstract and non-referential entities. For instance, a sentence like “I saw a unicorn in the forest” can be felicitously uttered in a world where unicorns do not exist. Also there are cases where the DR does not have a unique counterpart in reality and it can have a non-specific reading (i.e. not refer to a specific individual), as in cases like “Harvey courts a girl at every convention”. DRs are thus the concepts that we have in mind, that is objects of thought about which we say something.

The notion of DR resolves many discourse based concepts that can be problematic for a syntactic theory of referential indices, such as the distinction between definite vs. indefinite NPs, generic vs. non-generic NPs, specific vs. non-specific NPs, anaphoric vs. deictic NPs (Karttunen, 1968). Below some representative examples of these problematic issues are shown. In (12) the indefinite NP “a book” has an ambiguous reading between denoting a specific or a non-specific DR. In English the anaphoric uptake disambiguates the sentence (Partee, 1970). When it is followed by option (16a) it refers to a specific DR, while in (16b) it refers to a non-specific one.

- (16) I am looking for a book.  
a. Here it is.  
b. Here is one.

Other instances of indefinite NPs also imply the existence of an individual in the discourse when they are picked up again except for two cases, which happen to be also problematic for reference-based discourse theories, namely indefinite NPs in predicate nominal position, and singular indefinite NPs in generic sentences. The sentence in (17) is a statement about an individual and one of his properties, but the indefinite predicate nominal (“an engineer”) does not refer to a DR. In Catalan, in contrast, there is no article in front of the indefinite NP as shown in (18), which minimises the possibilities that the predicate nominal could have some referential properties. Generics also cannot be interpreted as referring expressions, and thus they cannot introduce new individuals since there does not exist a specific engineer to which (19) is referring to. I come back to indefinite NPs in predicate position and generic statements in §3.3.

(17) Francesc is an engineer.

(18) El Francesc és enginyer.  
*the Francesc is engineer*

(19) An engineer is a problem solver.

Some entities introduced into the discourse do not necessarily have a real counterpart in reality. Yet they are still introduced into the discourse implying existence in the model and have the potential of being referred back to. This is the reason why it is then more appropriate to talk about “discourse referent”, rather than “referent”. In (20) and (21) the two indefinite NPs establish a DR, but they do

not imply real reference: first, in (20) the indefinite NP is a variable bound to a quantifier, and second, in (21) the indefinite appears under the scope of negation.

(20) Every engineer found a book and kept it.

(21) Francesc didn't see a book.

An excerpt of discourse can contain more than one DR but only one real corresponding object in reality. In (22) there are three DRs, namely “lali”, “she” and “her”, but only one referent, namely the real person in reality named Lali.

(22) *Lali* is reading a book. *She* likes it very much but *her* boss does not allow *her* to read during breaks.

Hence the notion “discourse referent” as coined by Karttunen (1968, 1976) avoids many claims about reference. As definite or indefinite NPs do not necessarily have reference, the term “discourse referent” was used to denote the entities forming the discourse model. Thus “discourse referent” and “referent” do not coincide. The first one refers to the entity present in the discourse model, the thing that participants are talking about.<sup>4</sup> They are NPs which may have or not a real-world reference, but they still introduce an individual into the discourse. The second refers to the property of denoting an entity that exists in the real world and hence

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<sup>4</sup> See Heim (1982) for some problems with using the term “discourse referent” precisely because it does not coincide with reference.

it has some reference. Existence within the common ground must be differentiated from existence in the real world. As we have seen, a NP may introduce a DR into the model even if it has no referent in the real world. In (16) above, the indefinite “a book” is under the scope of negation and does not correspond to an entity in the real world. However, it still introduces a DR.

Nevertheless different terminology has been used (see Prince, 1981). The terms “discourse referent” and “discourse entity” are used as synonyms to denote the same linguistic construct. Another widespread term is “s-topic”, which also denotes the object of thought the sentence is about. Even if this dissertation uses the term “discourse referent”, the following section is devoted to the s-topic concept.

### *4.1.3.1 s-topic*

Under some analyses the term “topic” has been used as a broad term to denote different but related notions, such as what the sentence is about, the informative part of the sentence, and opposition to focus, among others.<sup>5</sup> Some authors include in this notion the abstract object or what the sentence is about (Reinhart, 1981), while others only include the linguistic marking which signals the abstract topic (Büring 1999, 2003). According to Reinhart, “although in most cases the topics tend indeed to represent old information, this is neither a sufficient nor a necessary condition for topichood” (ibid.

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<sup>5</sup> See Vallduví (1992) for a revision of literature about the informational articulation of the sentence.

1981:73). Topics are better analysed in terms of their effect on the ongoing discourse and considering the effects of previous discourse on the given sentence, rather than as old information. Stalnaker (1978) and Reinhart (1981) base their analysis of s-topics in pragmatic assertions. As explained in §3.2.1, Stalnaker defines the context set of a given discourse at a given point as the set of the propositions which both sender and addressee accept to be true at that point. These propositions are classified in the discourse as detailed below.

“Sentence topics are one of the means available in the language to organise, or classify the information exchanged in linguistic communication – they are signals for how to construct the context set, or under which entries to classify the new proposition.” (Reinhart 1981:80)

For Reinhart, a topic represents thus an entry under which the oncoming information is stored. And as will be shown below, this is reminiscent of Webber (1979)’s *hooks*, Heim (1982)’s *file-cards* and Vallduví (1992)’s *addresses*. Büring (1999, 2003), in contrast, uses the term *topic* to refer to a linguistic category realised by linguistic means, which in English for instance is prosodically manifested by a fall-rise pitch accent. Due to this different conception, some authors have argued that the marking expression must be kept distinct from the abstract object. Hence according to Vallduví (1992) and McNally (1998) there is a clear-cut distinction

between s-topics and the linguistic marking used to signal a specific s-topic. Such a distinction is also assumed here and DRs and linguistic markings expressed through referring terms are teased apart. S-topics (and also DRs) are linguistic constructs that denote the abstract unit where the information is entered. They correspond to the conceptual entity that we refer to and they are the entity within the discourse model that we are talking about (see §3.1.3). S-topics are made explicit in the discourse by means of referring terms. Referring term is the linguistic material which point to an abstract s-topic and it can be instantiated by different linguistic markings, such as intonation, morphological marking, or a marked syntactic configuration. As shown in §7.2.2, the distinction between DRs and referring terms must necessarily be applied to the analysis of index signs and spatial locations in LSC.

As just stated, the notions of s-topic and topic have received different labels in the literature and also different treatments. The following table shows the differences in terms and treatments according to each author. While Gundel, Vallduví and McNally make a distinction between the linguistic material and the abstract element, Karttunen, Webber, Reinhart and Heim do not make a distinction but their definition of DR and entity, s-topic and file-card respectively is closely related to the abstract element. Büring does not make a distinction either, but his definition of topic corresponds to the linguistic material only.

	Linguistic marking	Semantic entity
Karttunen (1968, 1976)		discourse referent
Webber (1979)		discourse entity
Reinhart (1981)		s-topic
Heim (1982)		file-card
Gundel (1988)	topic (relational sense)	topic (referential sense)
Vallduví (1992)	link	address
McNally (1998)	link	s-topic / topic
Büring (1999, 2003)	contrastive topic	

Table 4.1 Terminology and treatments of s-topic

#### 4.1.3.2 Referential status

According to Vallduví (1992:59), links are pointers in the sense that they direct the addressee to the given DR where the propositional content of the sentence is entered. However the term *link* is avoided in this dissertation since links are conceived as relational elements opposed to focus, which are very much connected with information packaging. As Prince (1981) and Vallduví (1992) show, information-packaging and referential status naturally reflect the sender's hypothesis about the receiver's assumptions, beliefs and strategies. While information packaging contributes to the update of DRs, referential status is responsible for creating new referents or activating existing ones in the discourse model. Referential status is an absolute property that reflects the status of an entity with respect to the discourse model, which is expressed through referring terms. Even if both modules are closely related, this dissertation focuses on referential status only.

In order to clarify the distinction between information packaging and referential status of a DR, let's have a look at the following example. In (23) the two instances of third person



pronouns “him” reflect a prominent referential status. Since both DRs are prominent entities the referring terms used to denote them are pronominal forms. However, in terms of information packaging the two pronouns are distinguished. The first one is the focus (i.e. new information) while the second is the topic (i.e. old information). Thus their information structure is different, while their referential status is the same.

(23) I saw *hím* but not him.

Referring terms (i.e. the formal marking of NPs) reflect the referential status of DRs. Although not all referring terms of a given sentence can be considered DRs simultaneously, a fragment of discourse can certainly have more than one DR. Which of the referring expressions of a given DR counts as topic is determined, in most cases, by differences in prominence. The reader is referred to chapter 7 for a detailed treatment of referring terms and prominence issues. The terminology used in this dissertation is as follows:

(24)

- *Discourse referent* is used to mean the construct, the semantic entity or object of thought the discourse is about (known as s-topic under some analyses).
- *Variable* is the construct used in dynamic logic that corresponds to a discourse referent.

- *Referring term* is the morphophonological marking from natural languages which denotes the discourse referent.
- *Object* is used to refer to the real thing existing in the world.

#### 4.1.4 Desiderata for a DRT application to sign language

Sign languages make a great use of deictic pronominal forms because of its characteristic face-to-face interaction. Deixis is used in sign language discourse, as well as it is also used in spoken language oral conversations, as shown below in the English (25a) and LSC (25b) counterpart.

(25) *While entering the office and seeing a man standing on the top of a ladder who is fixing something in the ceiling.*

a. What is he doing here?

\_\_\_\_\_br  
b. IX3a DO-WHAT

The two pronominal forms directly refer to the man who is present in the physical environment without having been previously introduced into the linguistic context (see chapter 5 where cases of pragmatic anaphora, in which deixis and anaphora converge, are treated). However, how underspecified forms without a corresponding linguistic antecedent are incorporated into the semantic structure of the discourse has not been treated in classical DRT. Kamp (1981:197, footnote 5), Kamp & Reyle (1993:66) and Kamp, Reyle & Genabith (2007) explicitly ignore the use of deictic pronouns. Their proposal is only concerned with written language

and hence it only affects anaphoric pronouns rather than deictic uses.

Also, whenever a semantic representation of a discourse is given, only in very few cases has the incorporation of prominence been deeply treated in depth (see Pinkal, 1986; Roberts, 1998). For instance, in the discourse previously presented in (22), and repeated here as (26) for convenience, it is pertinent to ask why one DR (in this case ‘Lali’) is more prominent than the other (‘book’) and how this affects the ongoing discourse.

(26) Lali is reading a book. She likes it very much but her boss does not allow her to read during breaks.

This dissertation offers an innovative approach that classical DRT lacks. It incorporates the properties that a visual-spatial language has which also affect the semantic representation. The desiderata for a DRT application to sign language, and more concretely to LSC, are two-fold:

(i) To properly analyse the role that sign space plays in the semantic representation of discourse.

(ii) To address deictic pronominal uses, and hence to build the corresponding construction rules needed in contexts with deictic elements.

Moreover, this dissertation also aims at implementing a semantic representation of discourse which incorporates a prominence level

of the entities within the model by analysing how prominence is integrated. Thus, a general goal (not specifically applied to sign language) is the following:

(iii) To integrate a theory of discourse structure with special focus on prominence to the representational semantic level.

The following section presents how spatial locations are incorporated in a DRT approach to LSC (goal (i)). As will be shown, spatial locations allow resolving the identity equation between two variables. Deixis incorporation is treated in chapter 5, where a specific construction rule for deictic elements is offered (goal (ii)). Chapter 7 revises this treatment by incorporating prominence also into the picture (goal (iii)).

Once the basis of the most influential aspects of dynamic semantics relevant for this dissertation has been presented, I turn now to the relation between DRs and spatial locations in LSC. In the following I show that locations stand for the overt manifestation of DRs, but they are restricted to some semantic constraints.

## **4.2 Locations and discourse referents**

As reported in chapter 2, within the SL literature there is a controversy about the grammatical status of spatial locations, since they may depend on the actual position of present objects (see §2.4.1). While the spatial mapping view claims that index signs directed to space are formed by a linguistic and a gestural component, the latter motivated by the impossibility to integrate

spatial locations into a finite system, the r-locus view argues for a grammatical analysis of spatial locations. The main goal of this section is to provide new arguments in favour of the r-locus view. The main claim of the r-locus view is defined in (27).

(27) **The discourse referent hypothesis** (first version)

(p) is the overt manifestation of the DR the referring term denotes.

In what follows new and original arguments are provided in favour of this hypothesis. However, as we will see at the end of this chapter this hypothesis needs to be revised in order to fully account for the behaviour of spatial locations in LSC.

### 4.2.1 Locations as variables

The ideas in this chapter have received a great amount of inspiration from the works that formulated the r-locus view, which have been crucial for the sharpening of the main claim (see §2.4.2). Lillo-Martin & Klima (1990) analyse pronominal forms as being interpreted as a pair formed by a pointing sign and a DR. Hence, both the interpretation of pronouns as well as the interpretation of indexed nominals (that is, those nominals which are spatially modified) is obtained by means of assimilation between locations and DRs. Likewise, Wilbur (2008) assimilates the established spatial location (p) with a semantic individual.

As seen at the beginning of this chapter, a discourse model is a set formed by a subset of DRs and conditions applied to these

DRs. In the dynamic logic that DRT uses, DRs are formally represented with variables. The proposal that underlies this dissertation is to establish a correspondence between the spatial morpheme (p) and a DRS variable. (p) has a semantic function, since it is the overt manifestation of a semantic construct, namely a DR. The spatial location realised with (p) is in fact the overt manifestation of a DR: (p) is associated with an individual from the discourse model. While in SpL the link between a referring term and an individual from the model is done implicitly and unambiguously, in SL the connection is overt. SL referring terms are formal markings which are commonly directed to sign space. This direction towards sign space establishes a spatial location (p) which overtly denotes a DR from the discourse model. This is shown in example (1) in the preceding chapter, repeated here as (28) for convenience. The two pronominal index signs in the second sentence are associated with the DR “son”, established in the contralateral part in the first sentence.

(28)

IX<sub>3c</sub> LAPTOP 1-OFFER-3 SON IX<sub>3cl</sub>  
FOR NEW 3-SELECT-3 WORK **IX<sub>3cl</sub>** NEED LAPTOP **IX<sub>3cl</sub>**.  
'I will offer this laptop to my son.  
Because he has been selected for a new job and he needs a laptop.'  
(S\_Obj 01:11)

The covert referential indices of SpLs are manifested overtly in SLs (Lillo-Martin & Klima, 1990). R-indices are the semantic constructs which allow making the coreferential relations, and they are overtly expressed by means of referential locations, which are the specific

directions towards sign space that signs take. In (28), for instance, it is the orientation of index signs towards the contralateral part. At the level of the morphophonological form, the representation of r-indices is overtly realised as distinct locations in signing space. As shown in the next subsection, spatial locations are thus the overt manifestation of DRs.

### 4.2.2 Identity features

As argued in §3.1, dynamic semantic theories associate DRs with NPs which denote a nominal. DRs are represented within DRSs through variables. More than one variable in the discourse model can point to the same object in reality. Let's look at an LSC fragment which includes three DRs that are linked to the same object in reality.

(29)

NOW IX<sub>1pl</sub> WANT 1-EXPLAIN-2 THEME HISTORY PERSON-3<sub>ip</sub> WOMAN NAME A-N-N-A F-R-A-N-K.

IX<sub>3ip</sub> WOMAN PERSON-3<sub>ip</sub> CHARACTER IS/EXACT JEW.

'Now we want to explain the story of Anna Frank. This girl was a Jew.'

[...]

IX<sub>3ip</sub> HIDE DURING TAKE-OPPORTUNITY EVERYDAY WRITE++.

'During the time she was hidden, she took the opportunity to write a diary.'

(A\_AF 00:31)

In this excerpt we find three DRs, referred as "Anna Frank" (expressed through the manual alphabet fingerspelled), "IX<sub>3</sub> WOMAN" ('this girl'), and IX<sub>3</sub> ('she'). The three DRs are linked to

the same object in the world, namely a young little girl called Anna Frank. Each DR is localised in space using different mechanisms. The first one is localised with the sign PERSON-3 (Figure 4.1a). The second one is localised by a determiner index sign co-occurring with the nominal WOMAN (Figure 4.1b). Finally, the third one in the excerpt is localised with a pronominal index sign (Figure 4.1c). As shown below, the three DRs are localised towards the same spatial location, namely the lower ipsilateral part of sign space.



Figure 4.1. Localisation of discourse referents

The semantic representation of this excerpt yields a DRS with three variables, namely  $x$ ,  $y$  and  $z$ . The three variables (i.e. the logic constructs that are identified with DRs) point to the same discourse referent in this specific discourse. This is why in the simplified DRS in (30) the three of them are equated under the identity equation.



(30)

x y z
anna frank (x)
explain (x)
girl (y)
jew (y)
y = x
she (z)
write-diary (z)
z = x

The identity equation between an underspecified element and its antecedent is obtained by means of suitability motivations based on semantico-syntactic and pragmatic criteria. Identity features in SLs are obtained through location information (Zwitserslood & van Gijn, 2006: 213). The coincidence in the spatial direction of index signs contributes to the identification of underspecified expressions with their antecedent. As seen, in Figure 4.1 for instance, the ipsilateral location of (p) is the criterion used as suitability in order to identify the underspecified referring expression with its corresponding antecedent. As for LSC, the antecedent and the underspecified referring term need to have the same spatial direction on the horizontal plane in order for an identity relation to arise.<sup>6</sup> LSC referring terms have an orientation towards the horizontal plane and establish a location (p) which corresponds to the overt marking of the variable in the corresponding semantic representation. DRS' variables are thus overtly expressed in LSC with the establishment of spatial locations. Importantly, the coincidence in the direction

<sup>6</sup> Person features are not included here, but treated in chapter 7. The reader is referred to §7.2 for a three person distinction analysis of LSC pronouns.

towards sign space where the spatial location is established identifies the two variables through the identity equation in the DRS. In (24) the two equations  $y=x$  and  $z=x$  are encoded by coincidence in the direction towards space. Hence, in short fragments of discourse in LSC, the identity equation in the construction rule for pronouns (see §4.1.2 and Appendix A) is resolved by coincidence in the direction in sign space where (p) is established. In fact, this spatial use is with no doubt a unique possibility that SLs have with respect to SpLs. This is stated in (31).

(31) **The spatial point hypothesis** (first version)

The identity condition in the DRS is encoded through coincidence in direction of spatial establishment of (p).

At this point of the presentation it is enough to accept that the identity features in LSC rely on location in order to identify a DR with its corresponding antecedent. However in chapter 7 I will revise *The spatial point hypothesis*. We will see that when dealing with connected discourse and when considering long stretches of discourse there is not a one-to-one mapping between the direction of (p) in space and the DR associated. In §7.4, it is shown that whenever an index sign refers to the most prominent DR of the model the exact location in space where it is established can vary along the discourse. (p) is thus a very abstract point in space, which is identified with a spatial direction in the horizontal plane and that is categorically interpreted. Hence, the identity equation in LSC is not always resolved via coincidence in the direction, but rather via

semantico-syntactic and pragmatic motivations as with SpLs. But at this point of the presentation, it is sufficient to accept that the identity condition is encoded through in the direction towards space. Let's move now to the differences that the scope of quantifiers attached to DRs have and how this is represented in the establishment of (p) in sign space.

#### **4.3 Scope of discourse referents' quantifiers**

The term “discourse referent” has been defined in §4.1.3 as the object of thought the conversation is about. However, not all DRs are equally stable in the discourse. While some DRs are permanent entities in a (fragment of) discourse, some others may not be permanent at all and only discursively exist within a certain discourse span. This distinction is noted by both Karttunen (1969, 1976) and Heim (1982). Karttunen assumes that the appearance of an indefinite NP establishes a DR just in case it justifies the occurrence of a coreferential pronoun or a definite NP later on in the discourse. However, the scope of the quantifier attached to a DR (i.e. the discourse segment in which an introduced DR can be accessed) can vary. When a DR is introduced under normal circumstances as a permanent DR, it remains available for being picked up later on in the discourse. Compare (32) with (33) below:

- (32) Celia must write a postcard to Marta from Venice.  
a. It must be mailed right away.  
b. # It has a picture of Murano on it.

- (33) Celia wrote a postcard to Marta from Venice. It has a picture of Murano on it.

(inspired in Karttunen, 1969)

(32) establishes a DR which is under a narrow scope quantifier. A coreferential pronoun can only occur under the scope of the same modal operator, in this case the modal verb “must” (32a). Without such an operator, the DR cannot be referred back by a resumptive pronoun (32b). In contrast, (33) establishes a DR which is attached to a wide scope quantifier. Since there is no operator restricting the scope of the indefinite, it is accessible in further discourse. The resumptive pronoun in the second sentence in (33) is felicitous. Hence while (32) introduces a short term DR attached to a narrow scope quantifier, (33) establishes a long term one, attached to a wide scope one.<sup>7</sup>

As previously stated, DRs cannot be exactly identified with referential indices, because there are some NPs which bear a referential index but fail to set up a well-established DR (see §4.1.3). Previously, (14) was provided as an example of indefinite NP bound by a narrow scope quantifier. This example is repeated below as (34) for convenience. Because of its narrow scope determined by the negation operator, no coreferential pronoun can

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<sup>7</sup> In fact, Heim redefines the notion of discourse referent’s lifespan (i.e. scope) introduced by Karttunen. She claims that it is better explained once we think in terms of file-cards: the lifespan lasts during the period that the card is introduced and maintained active in the file. As long as the file-card is eliminated from the file, the corresponding DR’s lifespan is over (Heim, 1982:283).

access the indefinite and thus the resumptive coreferential pronoun is not felicitous.

(34) Marta doesn't have a cat. #It is black.

Scope amounts thus to the existence of an NP bound by an operator which binds the extension of its accessibility. Hence if an NP<sub>j</sub> is bound by an operator x, then the DR j that NP<sub>j</sub> introduces ceases to exist outside the scope of x. If NP<sub>k</sub> is free, then the DR k lives throughout the entire text. The definition of scope used in this dissertation is schematised in (35).

(35) Scope of DRs

Narrow scope: Op <NP<sub>j</sub> .... NP<sub>j</sub>>

Wide scope: NP<sub>k</sub> ... NP<sub>k</sub> ... Op <NP<sub>j</sub> .... NP<sub>j</sub>>

Karttunen and Heim use different notions (DRs and file-cards, respectively), but importantly, they highlight the distinction of the two scopes, which predicts some coreferential restrictions. For instance, in (34) the pronoun cannot be anaphoric to the indefinite NP because the scope of the DR is bound by the negation operator, as defined in (35).

The narrow/wide scope distinction is formally represented in DRT. Those variables attached to a quantifier with wide scope appear in the universe of discourse of the main DRS (Figure 4.2a). However, variables attached to a narrow scope quantifier appear in a

subordinate DRS (Figure 4.2b). The occurrence in a subordinate DRS as in Figure 4.2b is the result of being under the scope of an operator, as shown in (35).

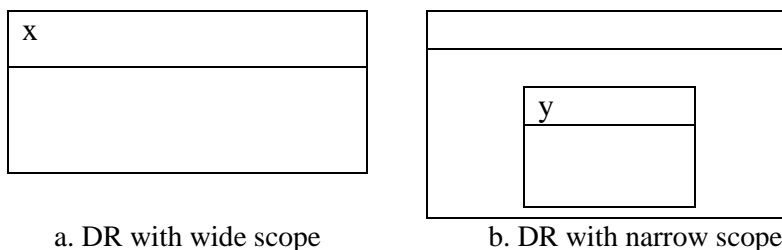


Figure 4.2 Scope representation in DRT

Recall that the positioning of the corresponding variable within the DRS has consequences for coreferential possibilities, as both Karttunen and Heim predict. Their positioning stands also in direct relation with the semantic and referential properties that DRs have. In the following subsections, examples of dependent variables, that is variables introduced into the model the value assigned to which co-vary with those assigned to another variable (Farkas, 1997), are presented. I take examples of non-argumental NPs, LSC donkey sentences, non-specific indefinites and generic statements to analyse the behaviour of these variables by studying their semantic representation. These contexts establish a variable in the DRS. However, the quantifier attached to the variable has narrow scope and it is only established in a subordinate DRS. As a consequence, they are not available for further coreferential relations outside the

scope of the relevant operator.<sup>8</sup> As we will see below, there is a correlation between scope of the quantifier attached to the variable and establishment of a spatial location in LSC signing. While DRs attached to wide scope quantifiers have a corresponding spatial location in LSC, DRs attached to narrow scope ones do not establish such spatial location.

#### 4.3.1 (Non-)argumental NPs

As already stated in §4.1.3, nominals in predicate position do not introduce a DR. They do not refer to an individual, but rather it is a predication about an individual. Equative sentences are a good example to show the difference in the introduction of DRs. Specificational and predicational sentences have received a great amount of attention among generative syntacticians.<sup>9</sup> The felicity conditions of these types of sentences are different and from a semantic point of view they also have different DRS' representations. As shown below, in LSC the syntactic configuration of predicational and specificational sentences is very different. LSC clearly distinguishes between argumental and non-argumental NPs and this is reflected in the localisation process. This difference proves the distinction in the introduction of each

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<sup>8</sup> However, see §6.3.3.2 for a description of modal subordination cases and a further refinement of this claim.

<sup>9</sup> The reader is referred to Rosselló (2008) for an interesting syntactic account which distinguishes two different structures for specificational and predicational sentences from the start of the derivation. According to her account, while predicational sentences have an external argument, the precopular DP of specificational sentences is directly merged by means of an operator.

nominal. In order to compare the two different structures, first I give a Catalan sentence and then the LSC counterpart.

(36) is a Catalan equative sentence. It introduces an individual called “Francesc” and it predicates something about him, namely the property of being an engineer.

(36) El Francesc és enginyer.  
*the Francesc is engineer*

(36) is a predicational sentence where the argumental NP “Francesc” picks out a DR, which has the following semantic representation. The variable introduced by the individual is applied to the property.

(37)

x
francesc (x)
engineer (x)

The equivalent of a predicational sentence as in (36) is signed with the nominal FRANCESC localised in space (38a, 38b, 38c). Any attempt of localising the non-argumental NP ENGINEER results in an odd construction as shown in (38d, 38e).



- (38) a. FRANCESC IX<sub>3a</sub>/PERSON-3<sub>a</sub> ENGINEER.  
b. IX<sub>3a</sub> FRANCESC, ENGINEER.  
c. FRANCESC<sub>a</sub> ENGINEER.  
d. # FRANCESC ENGINYER IX<sub>3a</sub>.  
e. # FRANCESC, IX<sub>3a</sub> ENGINYER.  
'Francesc is an engineer.'

As for specificational sentences, they also introduce an individual and a property. In (39) the property of being an engineer is applied to the individual "Francesc".

- (39) L'enginyer és el Francesc.  
*the engineer is the Francesc*

In this Catalan specificational sentence, the non-argumental NP "enginyer" is not a DR, but rather a predicate ascribed to the argumental NP "Francesc".

In LSC, specificational sentences equivalent to (39) have a different syntactic structure. The precopular nominal is instantiated as a rhetorical question with the corresponding nonmanual marker.<sup>10</sup> The rhetorical question is followed by the argumental NP which is localised in space (40a, 40b, 40c). But the non-argumental NP in the rhetorical question cannot be localised in space (40d, 40e).

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<sup>10</sup> Rhetorical questions are structures formed by a question-answer sequence which have a focusing function similar to that of pseudoclefts or Wh-clefts in other languages. The reader is referred to Wilbur (1994, 1995, 1996, 1997) and Caponigro & Davidson (2011) for a detailed account of such structure.

- (40)
- a. \_\_\_\_\_br  
ENGINEER WHO, FRANCESC IX3<sub>a</sub>.
  - b. \_\_\_\_\_br  
ENGINEER WHO, IX3<sub>a</sub> FRANCESC.
  - c. \_\_\_\_\_br  
ENGINEER WHO, FRANCESC<sub>a</sub>.
  - d. # \_\_\_\_\_br  
ENGINEER IX3<sub>a</sub> WHO, FRANCESC.
  - e. # \_\_\_\_\_br  
IX3 ENGINEER WHO, FRANCESC IX3<sub>a</sub>.  
'The engineer is Francesc.'

The corresponding DRS of a specificational sentence is represented by a function denoting asserted identity in classical DRT (Kamp & Reyle, 1993:257). This is shown in (41), where the condition *x is y* asserts that the individuals represented by *x* and *y* coincide.

(41)

<i>x y</i>
francesc ( <i>x</i> )
engineer ( <i>y</i> )
<i>x is y</i>

As shown in (38a), (38b), (38c), (40a), (40b), and (40c) argumental NPs in LSC are grammatically localised in sign space and establish thus (p). In contrast, non-argumental NPs do not refer to an individual, but rather they attribute some property to it. In (38a), (38b), (38c), no variable is established in the DRS but rather the property denoted by the non-argumental NP is ascribed to the variable introduced by the argumental NP. Predicational and

specificational sentences in LSC show that non-argumental NPs cannot be localised in sign space, as in (38d), (38e), (40d), and (40e).

However, there is one context where non-argumental NPs can have a localisation in space and this is when there is a contextually determined group of people. In such contexts the nominal ENGINEER can be localised in space, as shown below.

- (42) \_\_\_\_\_br  
ENGINEER IX3pl<sub>a</sub> WHO FRANCESC.  
'Among those, the engineer is Francesc.'

Indeed, localisation also denotes individuals which are contextually determined and constitute a subset of a non-empty set. This is further treated in §6.2.2. For now let's assume for the sake of the present argumentation that non-argumental NPs which do not belong to a contextually determined set are not localised.

A counterargument to what has been said so far could be that in (38) and (40) there appears a proper name ("Francesc"). In DRT proper names directly establish a variable in the main DRS because by uttering the proper name the existence of such an individual is asserted. However if you slightly modify the sentence and substitute the proper name for a definite description the same semantic representation and the same results are obtained.

(43)

- \_\_\_\_\_br  
a. IX1 FRIEND IX3<sub>a</sub>, ENGINEER.  
‘My friend is engineer.’
- \_\_\_\_\_br  
b. ENGINEER WHO IX1 FRIEND IX3<sub>a</sub>.  
‘The engineer is my friend.’

(43) shows again that the non-argumental NP attributes some properties to the argumental NP and hence only the argumental NP is established in space.

The discussion in this section is indicative that only argumental NPs have a corresponding spatial location. Argumental NPs project a variable into the main DRS and this corresponds with the establishment of (p) in LSC signing. The upcoming arguments also show that lack of a variable in the main DRS corresponds to a lack of spatial location establishment in actual signing.

### 4.3.2 Donkey sentences

Donkey sentences were previously introduced in §4.1.2.1 and they illustrate the usefulness of DRs. The corresponding semantic representation of a donkey sentence shows that the position variables occupy in the universe of the DRSs is very important. In general, nominals introduced by donkey sentences are represented by variables which are unselectively bound by a universal quantifier. They do not appear in the main DRS but rather in a subordinate one.

In LSC donkey sentences, nominals do not occur with a determiner index sign directed to space to establish a location, but

rather are uttered as bare nouns and hardly ever localised. Verb agreement is realised in a neutral articulation (Quer, 2010). That is, agreeing verbs are not directed to any concrete location but rather to the centre of sign space. They are thus an example of realisations of neuter forms. In the glosses in (44) below the lack of localisation is shown by the absence of subindices which signal the spatial localisation.

- (44) EXAMPLE/IF TOWN FARMER HORSE THERE-IS,  
SURE 1-TAKE-CARE-3<sub>c</sub>.  
'If a farmer owns a horse, he certainly takes care of it.'  
(B\_Don 00:01)

Neither the farmer nor the horse in (44) occur with an index sign or eye gaze that localises the nominal in space, and they are also realised in an unmarked position in space, as Figure4.2a and Figure4.2b show. Since the individuals are not introduced in any spatial location, the verb in Figure4.2c does not agree with any location either since it is realised through an uninflected form.<sup>11</sup>

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<sup>11</sup> Interestingly, donkey sentences have been tested in ASL and LSF in Schlenker (2011ab). In these languages nominals in donkey sentences and in quantified expressions can be localised in sign space, which leads Schlenker to the conclusion that, in line with Nouwen (2003), all quantifiers (not only indefinites) can introduce DRs and can bind variables they do not c-command.

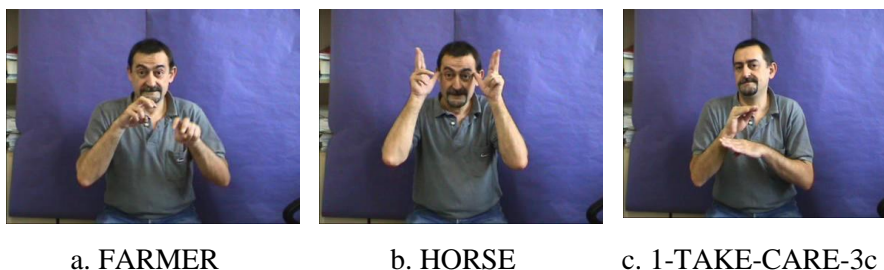
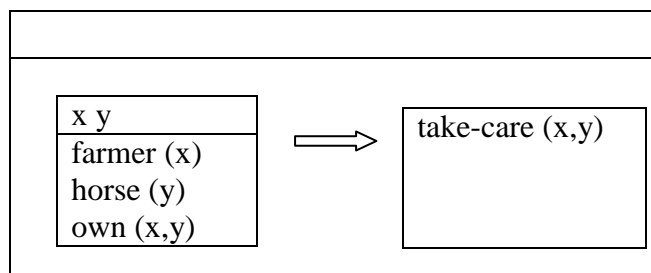


Figure 4.3. Donkey sentence in LSC

The semantic representation of (44) is as follows in (45). The complex condition formed by the antecedent and the consequent constrain the variables to appear in embedded boxes (44). They appear thus in a subordinate DRS and not in the main DRS. Hence the corresponding quantifiers attached to the variables have narrow scope.

(45)



Interestingly, a sentence like (44) could be felicitously followed with a pronominal form referring back to one of the DRs introduced under the scope of an operator such as a modal verb (46a). However, when the resumptive pronoun in following discourse is not bound by an operator, the continuation is not considered to be felicitous by native signers (46b).

- (46) a.  $IX_{3ip}$  MUST GOOD-PERSON.  
'He must be such a good person.'
- b. #  $IX_{3ip}$  GOOD-PERSON.  
'He is such a good person.'

Contexts where variables with narrow scope can be further referred back to as long as they are under the scope of an operator are known as modal subordination (see Roberts, 1989, 1990), and they are further treated in §6.3.3.2.

Also resumptive pronouns in subsequent sentences can be directed to the centre of space. In such contexts they refer to the whole proposition, as shown below.

- (47) BUT  $IX_{3c}$  NORMAL NOT.  
'But this is unlikely to happen.'

This is in fact coherent with the entity-like properties attributed to the lateral parts of the horizontal plane, namely ipsilateral and contralateral, and the non-entity-like properties assigned to the central part, as described in the previous chapter (see §3.3.1).

The correspondence between the lack of location in sign space in LSC and the lack of variable in the main DRS shows a direct relation between the DRS variable setting and the establishment of spatial locations. Nominals corresponding to variables appearing in embedded boxes are not represented by spatial locations in LSC signing. The third argument in this line, referred to quantified NPs and distributivity, offers another proof to support this claim.

### 4.3.3 Distributivity and quantification

Bound variable and quantified readings of NPs share a feature: both uses have non-referential antecedents. That is, they do not identify concrete individuals. Non-referential antecedents can be further referred back to with anaphoric elements, but since they are non-specific they have narrow scope. As for SLs, it has been largely noted in the literature that distributive and quantificational NPs show a different behaviour concerning the use of space. Since they do not denote DRs, they do not establish a fixed spatial location. Rather space is used to denote plurality or quantificational relations. Klima & Bellugi (1979) observe that in ASL grammatical categories such as number and distributivity are very interrelated and there are a set of verbal inflections which overtly express those relations. The form of some verbs reflects both a distinction in the number of actions as well as quantificational distinctions, as the ASL examples in (48) show.

(48)

a. MEETING TIME-TEN, SUPERVISOR INFORM[dual]

‘The supervisor informed each of the two about the ten o’clock meeting.’

b. HOMEWORK, TEACHER GIVE[multiple]

‘The teacher gave out homework to them.’

c. DIPLOMA, PRINCIPAL GIVE[exhaustive]; (ME) NONE

‘The principal gave out a diploma to each one, except for me.’

(ASL, Klima & Bellugi, 1979:281ff)

The verb in (48a) has a double movement which overtly expresses the quantification relation of duality. The verbs in (48b) and (48c)



express plurality. While the former has a circular movement which expresses multiplicity, the movement of the latter expresses exhaustivity by realising the action back and forth several times.

Petronio (1995) looks at the interaction between bare NPs in ASL and the three classes of verbs (Padden, 1988). She argues that bare NPs expressed together with plain verbs are interpreted as either singular or plural. In fact the interpretation is influenced by pragmatic, discursive, and contextual factors. Also, affixes on agreement verbs as well as the morphological information included in classifier constructions determine the quantificational value of the corresponding bare NP argument. What is interesting for the present reasoning is that the arguments of these verbs which co-occur with bare nouns do not occupy a specific location in space, as the glosses indicate. Rather, the inflection of agreement verbs towards space is used to denote singularity or plurality. The following sentences from ASL cited in Petronio (1995) contain typical examples of an inflected agreement verb. INFORM is inflected for singular in (49a), dual in (49b) and multiple in (49c).

(49)

- \_\_\_\_\_br  
a. NURSE, IX1 FINISH INFORM[singular]  
‘I informed the nurse’
- \_\_\_\_\_br  
b. NURSE, IX1 FINISH INFORM[dual]  
‘I informed two nurses’
- \_\_\_\_\_br  
c. NURSE, IX1 FINISH INFORM[multiple]  
‘I informed the nurses’ (ASL, Petronio, 1995:609)

The verbal inflection of INFORM determines the quantificational value of the bare noun NURSE. However, the nominal is not localised in space and no spatial location is set up.

Similar constructions are found also in LSC (Quer 2005a, 2011b). In (49) the verbal morphology influences the quantificational interpretation of the bare noun STUDENT.

(50)

- a. STUDENT THREE IX1 1-ASK-3[mult]  
‘I asked the three students.’
- b. STUDENT THREE IX1 1-ASK-3[exh]  
‘I asked each one of the three students.’
- c. STUDENT TWO IX1 1-ASK-3[dual]  
‘I asked (the) two students.’ (LSC, Quer, 2005a)

The agreement verb ASK is inflected for multiple, exhaustive and dual. This inflection is marked with a direction of the verb towards

sign space to denote plurality. But again it does not refer to a concrete individual and the nominal does not occupy a spatial location. If the nominals occupied a location in space a singular resumptive pronoun could be used in following discourse to refer back to one of the students. But this is not the case as shown by the non-felicitous continuation in (51).

- (51) # IX<sub>3ip</sub> CLEVER  
'He is very clever'

However, plurals have a different behaviour. Plural referents in LSC can be viewed as a group and be treated as a collective location. In such cases although index signs are not articulated without an arc-shaped movement but rather as a singular use, they are interpreted as plurals. In this case, the uptake is felicitous as shown in (52a)<sup>12</sup>. Whenever a plural pronoun is used to refer back to the set of students (i.e. a collective plural, with an arc-shaped movement) the uptake is also felicitous (52b). Hence only when the resumptive pronoun is treated as referring back to a plural entity, but without a specific singular location, the continuation is felicitous.

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<sup>12</sup> However, there seems to be an interpretation difference when the numeral is non-overt, as in (i).

(i) STUDENT IX<sub>1</sub> 1-ASK-3[mult].

In this case, a resumptive pronoun in the following sentence is interpreted as plural only. The different discourse behaviour plural entities have in discourse in terms of discourse transparency has been largely noted in the literature (Farkas & de Swart, 2003). Nevertheless, this issue is outside the scope of this dissertation.

- (52) a. IX3<sub>ip</sub> CLEVER  
 ‘They are very clever’  
 b. IX3<sub>pl,ip</sub> CLEVER  
 ‘They are very clever’

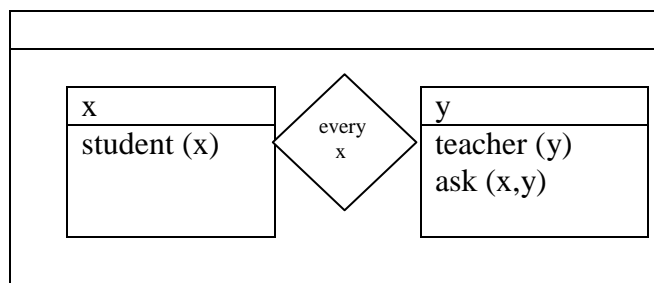
According also to Quer (2005a, 2011b) there is a strong relation between quantifier-bound readings and distributivity. Quantifier-bound readings are also expressed by means of lexical quantification. In this case, the reduplication of quantifiers (EACH-ONE in (53a)), verbs (ASK (53a), HELP (53c)), the agreement marker glossed as AGR (53b) and a specific LSC marker to denote kin relations (KINSHIP in (53c)) express distributivity and also bind the quantifier.

- (53)
- a. \_\_\_\_\_<sub>br</sub>  
 STUDENT EACH-ONE+++ TEACHER ASK+++  
 ‘Each pupil asked his/her teacher.’
- b. \_\_\_\_\_<sub>br</sub>  
 STUDENT EACH-ONE+++ TEACHER AGR+++ RESPECT  
 ‘Each pupil respects his/her teacher.’
- c. \_\_\_\_\_<sub>br</sub>  
 MOTHER SON/SIBLING KINSHIP+++ HELP+++  
 ‘A mother helps her siblings.’

(LSC, Quer, 2005a)

Verbal morphology is used to mark plurality and space is used to denote distributivity. However no specific spatial location is established. The representation of (53a) is shown below, where the quantifier ‘every’ binds the variable x and no variable is introduced in the main universe of discourse.

(54)



On the basis of the above argumentation concerning non-argumental NPs, donkey sentences and quantified sentences, I have shown that there is a direct relation between lack of location establishment in LSC sign space and subordinate DRS variables which have narrow scope. When no spatial location is established, there is a lack of variable appearing in the main universe of discourse in the corresponding semantic representation. The fourth argument is related to genericity.

#### 4.3.4 Genericity

Generic statements express general claims about kinds, rather than claims about particular individuals, as well as propositions which denote general properties (Krifka et al., 1995). In English, generics can be expressed using a variety of forms, and definite and indefinite singulars are two possible forms (55a, 55b), as well as bare plurals (55c).

- (55) a. The dog is a mammal  
 b. A dog is a mammal  
 c. Dogs are mammals

These constructions are impossible to interpret in a spatiotemporal context. And queries such as “How many dogs?”, “When are they mammals?” cannot be answered as they just do not make sense.

De Vriendt & Rasquinet (1989) observe that SLs generally do not make use of determiners in generic NPs. Since the expression of index signs attribute some referential properties to the NP, generic statements do not co-occur with an index sign, and hence the entity is not localised in space.

In LSC, bare nouns can assume a generic interpretation if they are not localised in space (Quer 2005).

- (56) \_\_\_\_\_br  
WOMAN PLAY LIKE NOT.  
‘Women do not like to play.’  
(LSC, Quer 2005a)

Any attempt to localise the DR “woman” in space is understood as referential (i.e. as denoting a specific woman).

- (57) \_\_\_\_\_br  
WOMAN IX3ip PLAY LIKE NOT.  
‘A/the/this/that woman does not like to play.’

Interestingly in LSC there is a lexical sign which denotes genericity (Quer, 2005a). It is used when a general claim is stated about a kind, and it occurs either pronominally or postnominally. This sign (Figure 4.4) does not act as a mechanism of localisation and cannot co-occur with an index sign. Hence the co-occurring nominal is never established in space.

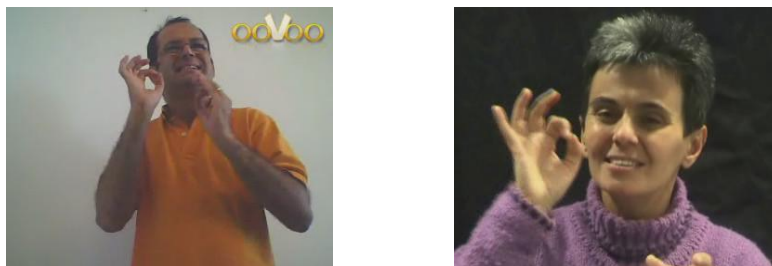
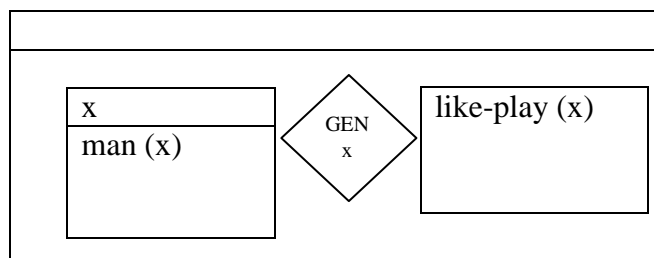


Figure 4.4. Sign to denote genericity

Generic statements are represented according to the idea that the generic operator binds particular variables in its scope. Variables appear in the complex construction represented by a subordinate DRS bound by the generic operator, as shown below.

(58) Men like to play.

(59)



Variables in generic statements are not main variables but rather subordinate ones. In this subordination setting in the DRS there is lack of establishment of (p) in LSC sign space. However when the generic statement refers to an object present in the immediate physical environment by a kind-example, an index sign can be directed to it. Hence generic statements can co-occur with an index sign whenever a token of that kind is present. This is not a counter-

example, but rather an example of a proper deictic reference towards an object from the physical context. Last but not least, the fifth argument is related to reference to kinds.

#### 4.3.5 Kinds

Kind reference expresses reference involving entities related to specimens (Carlson, 1977; Krifka et al., 1995), as in (60) where “potato” refers to the kind *tuber tuberosum*.

(60) The potato was first cultivated in South America.

In such contexts, LSC nominals are never localised in space. The following examples show that when denoting kind reference in LSC, the nominal is not localised in space. That is, “doctor” in (61a) and “professor” in (61b) are not spatially established.

(61)

a. DOCTOR DON’T-DO

‘A doctor would never do this’ (D\_Tip1 00:01)

b. TEACHER FRISK NEVER

‘Teachers can never frisk (his students)’ (D\_Tip1 00:01)

When we try to localise the nominal in space, the reading we get turns out to be a referential one since it refers to a concrete and identifiable DR, as shown in (62).



(62)

a. IX3 DOCTOR DON'T-DO

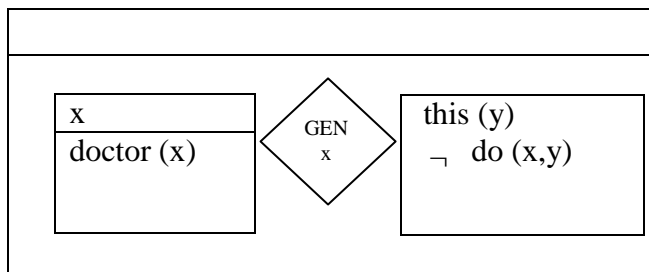
'This doctor would never do this' (D\_Ref1 00:01)

b. TEACHER IX3 FRISK NEVER

'This teacher can never frisk (his students)' (D\_Ref1 00:02)

Concerning the semantic representation, kinds do not have a corresponding variable in the main DRS. One possible way to semantically represent kind reference follows the idea that a generic operator binds particular variables in its scope. Variables appear in the complex construction represented by a subordinate DRS bound by the generic operator.<sup>13</sup> The simplified semantic representation of (61a) is represented in (63), where the variable is bound by a generic operator.

(63)



The examples in this section have shown that nominals referring to kinds are not localised in LSC. In the corresponding semantic

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<sup>13</sup> Another possible analysis which is not followed here is to consider that plural NPs denote properties of individuals instead of kinds, as in McNally (2004). The study of this possibility is left for future research.

representation, the variable appears subordinated in an embedded context.

So far, the five previous arguments show that semantically DRs with narrow scope do not have a corresponding variable in the main universe of the DRS but rather in a subordinated one. They have been grouped into 4 different types, namely donkey sentences, quantified NPs, generic statements and kinds. Also non-argumental NPs have provided some evidence towards the hypothesis defended in this chapter. On the one hand, non-argumental NPs are nominals in predicate position. They do not establish a DR, but rather they function as a predicate which is applied to the DR introduced by the argumental NP. Hence the nominal does not project a variable in the DRS. On the other hand, variables in contexts such as donkey sentences, quantified NPs, generic statements and kind reference do not establish a DR with wide scope and the corresponding variable appears in the subordinate DRS. The variable only exists within the scope of the operator which binds it. Outside this scope, the variable does not have existence anymore and it cannot be accessed by further pronominal forms in discourse. Variables with wide scope do not have any restriction of existence and their accessibility in discourse is not restricted by any operator.

Concerning the form level, DRs with narrow scope do not establish a spatial location in the actual LSC signing. This contrasts with DRs with wide scope, which formally establish a spatial location (p), since signs are directed to a concrete area in space. This location is available for further co-reference. Hence spatial

locations are semantically represented by main variables in the corresponding representation which are not restricted in a discourse segment by any operator.

As shown by these new arguments, *The discourse referent hypothesis* presented in (27) needs to be revised. It is not that spatial locations establish a DR, but rather that only DRs with wide scope have a corresponding spatial location. DRs with narrow scope, which appear in subordinate DRS, do not establish a spatial location.

(64) **The discourse referent hypothesis** (second version)

(p) is the overt manifestation of DRs attached to a quantifier that has wide scope.

### 4.4 Summary

This chapter has introduced the theoretical framework used in this dissertation, namely dynamic semantics. Spatial locations in LSC have been associated with DRs, as understood in dynamic semantics. The implementation in DRT has allowed us to see that the positioning of the variable in the DRS is the representation of the scope of the variable. Narrow scope DRs (i.e. those which are bound by an operator and thus represented by an embedded variable) do not occupy a spatial location in LSC. Only DRs with wide scope (i.e. those DRs not bound by any operator which can be accessed in further discourse that are represented by a variable in

the main DRS) are formally represented by spatial location (p) in LSC actual signing. Hence the phenomenon of establishing entities in LSC space is directly associated with the establishment of DRs into the model. Interestingly, only a specific set of DRs can be localised in space; specifically, only those which appear in the main universe of discourse and have thus wide scope.

However, as will be shown in chapter 6 the positioning of the variable in a DRS is also relevant for specificity marking. The main/subordinate DRS distinction is overtly encoded on the LSC spatial frontal plane and on the amount of morphophonological information directed to it. As we will see, some DRs can be localised on the lower part of the frontal plane, while others are localised on the upper part. This distinction is directly connected to the expression of specificity, which is the main topic of chapter 6. But before delving into the specificity domain, let's focus on the relationship between space and definiteness marking in LSC in the next chapter.

# Chapter 5

## Deixis and familiarity

The deictic use and the anaphoric use have at least this in common: both are among the possible uses of definite NPs, but neither is possible with an indefinite. One possible explanation for this might be that the pragmatics of deixis and anaphora are intrinsically similar, and definiteness correlates with the property they share.

Heim (1982:309)

## 5.0 Introduction

Whether definiteness is encoded in sign space has been a matter of debate in the sign linguistics literature. The main goal of this chapter is to analyse the connection between spatial locations and the expression of definiteness. Its main aim is not to describe how definiteness is encoded in LSC, but rather whether spatial location establishment denotes definiteness. The goals of this chapter are two-fold. On the one hand, it shows that definiteness is not formally encoded in LSC sign space and that both asserted and presupposed discourse referents (DRs) are established in LSC space. Hence, (p) does not distinguish between definite and indefinite noun phrases (NPs). On the other hand, it shows that deictic uses may have a corresponding (p) established. Deictic, as well as anaphoric uses, have in common that both are the possible uses of definite NPs, but neither is possible with indefinite NPs. Both presuppose that the DR is familiar and that it belongs to the common ground.

The theoretical background in §5.1 presents the ingredients needed for the purposes of the chapter from theories about definiteness, deixis, as well as the description of definiteness marking in sign language. §5.2 shows that deictic uses are another means to introduce DRs, which are newly introduced to the common ground. Thus, when (p) is established it does not need to have an overt antecedent but it refers to an entity from the model. The identification between the variable being overtly expressed in discourse with the default variable associated with entities introduced without an explicit linguistic antecedent is a very common use in LSC. These contexts of weak familiarity show that

reference in LSC is always referred with respect to the discourse model and it is thus anaphoric. In §5.3 it is shown that the distinction between definiteness and indefiniteness is not marked in LSC locations and this is analysed with respect to the status of the DR in the model. That is, whether the DR is presupposed or asserted. Also, when (p) corresponds to a presupposed DR, this is better analysed in terms of familiarity. Finally, §5.4 briefly shows that indefiniteness marking may be overt expressed with a restricted set of determiners and a non-manual marking. And §5.5 concludes the chapter.

### **5.1 Definiteness: background**

The current state of research on definiteness usually associates definiteness with uniqueness and familiarity. On the one hand, uniqueness approaches are built on the insight that a definite description is used to refer to entities which have a role or a property which is unique. These theories are more focused on logical semantics (see Russell, 1905; Strawson, 1950; Löbner, 1985; Kadmon, 1990; and Abbott, 1999 and subsequent work). On the other hand, pragmatic theories tend to treat familiarity as the central notion for definiteness. They are based on the idea that definite descriptions serve to pick out DRs that are in some sense familiar to the discourse participants (among the most recent work, see Prince, 1981, 1992; Heim, 1982; Kamp, 1981; Kamp and Reyle, 1993; and Roberts, 2003). An important feature that marks a distinction between these two theoretical options is that whereas

uniqueness-based theories treat (indefinite) NPs as quantificational, familiarity-based theories treat them as variables. In the following, a section is devoted to each approach.

### 5.1.1 Uniqueness

Uniqueness indicates that there is one and only one entity of some property. The representation of this notion in mathematical logic uses the existential quantifier followed by the exclamation mark which turns the formula into an indication of uniqueness, as shown in (1) below. It can be read as “there is exactly one  $x$ , such that  $x$  has the property  $P$ ”.

$$(1) \quad \exists!x \in P$$

An example of such a sentence in English is (2a), which denotes that there is exactly one entity of the kind book in the universe of discourse and that it is on the table. This differs from (2b), which implies that there are some more books elsewhere but that there is exactly one on the table.

- (2)    a. The book is on the table.  
      b. A book is on the table.

The domain of quantification needs to be restricted to the relevant context in order for the utterance to be felicitous. With a sentence such as (2a) the claim must be about a salient and relevant book in the specific context. This salient entity does not need to be the same



in the same discourse and the focus of salience can be shifted to different entities at different points in discourse (Lewis, 1979). However, which domain of reference the uniqueness condition applies to has been a matter of debate. Kadmon (1990) and Roberts (2003) propose to limit the uniqueness of the definite to the specific universe of discourse, and hence to restrict the utterance to the relevant context in order for it to be felicitous. To use Roberts's term, *pragmatic enrichment* of the descriptive content of the NP is an instance of the phenomenon of domain restriction in the interpretation of logical operators (ibid. 2003:292). A domain of reference is required for the uniqueness condition. When a definite NP is uttered, it does not generally apply to the set of DRs denoted by the NP existing in the whole universe, but rather it applies to a restricted domain. If a sentence like (3) is uttered, the interlocutor does not think of all the books existing in the universe, but rather of the set of books which are relevant in the specific situation. This reading is obtained by restricting the domain of interpretation of the set. (4) shows that this can be achieved by the intersection of the set of books and the domain variable (C). This intersection refers thus to the relevant discourse familiar set of books.

- (3) All the books are on the table.  
(4)  $\forall x(\text{book}(x) \wedge C(x)) \rightarrow \text{on table}(x)$

### 5.1.2 Familiarity

The notion of definiteness has been established within a familiarity theory according to which the essential function of definiteness is to

signal that the intended DR of an NP is already familiar to the audience at the current stage of the conversation (Heim, 1982 building on Christophersen, 1939, and Hawkins, 1978). Definiteness is understood as identifiability of the DR which can be found in the universe of discourse. While a definite NP is used to signal existence in the model, an indefinite NP is used to signal that the DR being introduced is yet unfamiliar, i.e. novel. Modern accounts of familiarity develop a new theory based on a more formal semantic and pragmatic account (Heim, 1982; Kamp, 1981). Both Heim and Kamp argue against the view that definite and indefinites are quantificational expressions and treat both of them as free variables that are bound to an existential operator (as seen in §4.1.2). Their representation of an indefinite is shown in (5), and for a definite, in (6) below.

(5) A man came in

x
man (x) come (x)

(6) The man came in

x
man (x) come (x)

Definite and indefinite NPs have the same semantic representation and both have the same open formula. The difference then does not lie in the quantifier attached to them, but rather in the different conditions attached to each one: indefinites are associated with a novelty condition, whereas definites have a familiarity condition (Heim, 1982). The novelty condition indicates that the DR and its descriptive content are not presupposed to be satisfied by any individual in the domain of the common ground of the context.

Definites and indefinites also have different descriptive content: in indefinites, the descriptive content is asserted, while in definites it is presupposed. In the Heimian account, familiarity is determined by whether there is information about a corresponding DR already in the local context of interpretation. For every indefinite, a new DR is created, the descriptive content of which is novel with respect to the model. For every definite, a suitable old DR is updated, the descriptive content of which is already familiar with respect to the model (see §4.1.3.1 for the equivalence of terms among the different accounts, e.g. under Heim's account, a DR is labelled "file-card"). This is formalised as in (7).

(7) Extended Novelty-Familiarity Condition (Heim, 1982)

For a logical form  $\Phi$  to be felicitous w.r.t. a context C it is required for every NP<sub>i</sub> in  $\Phi$  that:

- (i) if NP<sub>i</sub> is [-definite], then  $i \notin \text{Dom}(C)$
- (ii) if NP<sub>i</sub> is [+definite], then
  - a)  $i \in \text{Dom}(C)$ , and
  - b) if NP<sub>i</sub> is a formula, C entails NP<sub>i</sub>

(7i) refers to the novelty condition, (7iia) refers to the familiarity condition and (7iib) to the descriptive content condition. However, Heim does not explain how suitability is specified in condition (7iib). In §4.2.1 suitability features were presented for LSC, and this issue is further treated in chapter 7.

In order to account for definites appearing for the first time and for associative uses of definites, a process of accommodation is used. Heim's operation of accommodation (based on Lewis, 1979)

involves a linking or bridging operation (Clark, 1975). Accommodation is defined as a non-monotonic process which forces to review the previous record of the discourse and to adapt it to the new demands. Hence novel definites are rendered felicitous by accommodation, which is defined as follows:

“If at time  $t$  something is said that requires presupposition  $P$  to be acceptable, and if  $P$  is not presupposed just before  $t$ , then *–ceteris paribus* and within certain limits – presupposition  $P$  comes into existence at  $t$ .” (Lewis, 1979)

By this process, the interlocutor accepts the information as given and revises his interpretation of the context accordingly. Hence, if at some point of a conversation the sender utters (8) without previously having introduced the information that she has a brother, the interlocutor assumes, all other things being equal, that the sender has a brother.

(8) I gave the book to my brother.

The need of this additional operation weakens Heim account by making only possible to explain first mention definites through accommodation. For this reason, Roberts (2003) extends Heim’s familiarity and offers a revised version of the theory by making a distinction in terms of the introduction of the DR into the model.

Roberts (2003) argues for a distinction of definites depending on where the antecedent may be found.

### 5.1.2.1 *Weak/strong familiarity*

Roberts (2003) argues for a re-elaboration of the Heimian notion of familiarity. She proposes a distinction between strong and weak familiarity, the latter being a broader notion very well suited to account for definite NPs presupposing existence in the discourse. Roberts defines the two distinct but related notions of strong and weak familiarity as follows: strong familiarity refers to those DRs that are explicitly introduced in the preceding linguistic context by an antecedent, whereas weak familiarity refers to those DRs whose existence is entailed in the context. Roberts' proposal is summarised in (9).

- (9) Taxonomy of familiarity
- a. *Strong familiarity*: A linguistic antecedent exists in the preceding discourse.
  - b. *Weak familiarity*: Existence is entailed in the context.

Strong familiarity denotes instances of definite NPs which have a coreferential NP in the preceding linguistic context.<sup>1</sup> This contrasts with weakly familiar DRs which do not have a coreferential linguistic antecedent and hence their existence is entailed in the context. Some motivations allow DRs falling into this group to be

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<sup>1</sup> Backwards anaphora (i.e. when the underspecified element precedes the full NP, which appears afterwards) is also applicable here.

first mention definite NPs. They can be accessed by the interlocutors since they are present in the immediate context of utterance and are thus perceptually accessible. They can also belong to the group of DRs which are known from the general culture or at least known from the relevant common knowledge surrounding the conversation, as shown in (25) in the previous chapter repeated here as (10) for convenience. In addition, they can also be accommodated, as described in the previous section.

- (10) *While entering the office and seeing a man standing on the top of a ladder who is fixing something in the ceiling.*

What is he doing here?

It is important to note that it follows from Roberts's analysis that weak familiarity subsumes strong familiarity and it is more inclusive, encompassing explicitly introduced DRs and also DRs introduced non-linguistically on the basis of contextual entailment alone (via perceptually accessed information). Weak familiarity is thus a broader concept which includes strong familiarity. It is also worth mentioning that the distinction between weak/strong familiarity is not equivalent to prominent vs. non-prominent DRs. Both weakly and strongly familiar DRs can be prominent or not. For instance, there can be strongly familiar DRs which are not prominent because they are picked up again far away from its antecedent. Also not all prominent DRs are only strongly familiar, since they can also be weakly familiar. In chapter 7 a deeper

treatment of prominence is offered. Roberts's distinction is equivalent to Prince's fine-grained distinction described below.

### 5.1.2.2 *Discourse/addressee familiarity*

Prince (1981, 1992) considers definiteness to be a formal phenomenon which can be analysed as a discourse phenomenon, related to the information-status of the entities in the discourse. She argues for a distinction between discourse new/old entities and addressee<sup>2</sup> new/old entities, which is based on the sender beliefs about the addressee's beliefs about an entity. The distinction between discourse-familiarity and addressee-familiarity can be combined in a four-celled matrix of possible information statuses. Of these four cells, only three occur in natural discourse.<sup>3</sup> They are the following:

(11)

- a. *Addressee-new/discourse-new*: Information which has not been evoked in the current discourse, and which the sender assumes to be also unknown by the addressee.
- b. *Addressee-old/discourse-new*: Information which has not been evoked in the current discourse, but which the sender assumes it is known by the addressee.
- c. *Addressee-old/discourse-old*: Information which has previously been evoked in the current discourse, and which the sender therefore believes is known to the addressee.

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<sup>2</sup> Originally, Prince's terminology uses the term 'hearer'. However, I have opted to adapt it into a more generic term such as 'addressee' in order to apply it also to a signed conversation.

<sup>3</sup> The reader is referred to Prince (1981) for a specific taxonomy related to these properties of referents which distinguish new (equivalent to discourse new/addressee new), evoked (discourse old/addressee old) and inferrable entities.

- d. *Addressee-new/discourse-old*: Theoretically, information which has been previously evoked in the current discourse, but which the sender assumes to be unknown by the addressee. As Prince notes, this information status does not occur in natural discourse.

The following sentence will help us work out to which kind of NP refers each information-status.

- (12) Last night a friend called to tell me that on March 19 2011, the moon will be the closest it has been to the Earth in 18 years. It will also be at its fullest. He proposed to go out to the mountain to try the new camera he just bought.

In (12) *a friend* is an instance of addressee new/discourse new DR. *The moon, the Earth, and the mountain* are three instances of addressee old/discourse new DRs. And *it, its, and he* are examples of addressee old/discourse old DRs.

Prince argues that definites do not presuppose that the DR they denote is discourse-old but rather addressee-old. This resembles Heim's claim that DRs which satisfy the familiarity presupposition of definites need not be introduced by prior mention. Thus Prince's addressee-oldness is equivalent to Heim's familiarity even if the second author does not make this further distinction. In fact, this distinction is precisely exploited by Roberts (2003), who argues for a fundamental difference between the "localisation" of the linguistic antecedent, i.e. whether the antecedent can be found in the linguistic context or not, which is in fact a consequence of whether the DR is asserted or presupposed.



## 5.1 Definiteness: background

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Robert's taxonomy of familiarity is equivalent to Prince's distinction. Both pairs of concepts show a distinction between an antecedent appearing or not in the linguistic context, i.e. between existence being entailed from the context and existence being asserted by means of a full referential NP. The table below shows this equivalence. Although the terms are equivalent, in this dissertation I use "weak familiarity" following Roberts to denote cases in which the DR is definite by virtue of having the corresponding object in the present environment and no linguistic antecedent is explicitly introduced into the model.

	Information-status	
Prince 1981, 1992	Discourse-oldness	Addressee-oldness
Roberts 2003	Strong familiarity	Weak familiarity

Table 5.1 Equivalence of information-status w.r.t. definiteness

Data from natural languages provides evidence that different languages have different requirements on the type of familiarity required for use in their definite articles. For example, Hidatsa and Ewe use the definite article only anaphorically, i.e. when strong familiarity is satisfied (Lyons, 1999:158). German also distinguishes between two types of definite articles. Non-contracted forms, which consist in bare prepositions followed by regular forms of definite articles, are used in contexts of strong familiarity, whereas contracted forms (contraction between a preposition and definite article) are only used in contexts of weak familiarity (Puig-Waldmüller, 2008; Schwarz, 2009).

Some approaches argue for a theory of definiteness which combines the two notions, i.e. uniqueness and familiarity.<sup>4</sup> Based on corpora work, Fraurud (1990), Birner & Ward (1998) and Poesio & Vieira (1998) claim that in order to account for all definite NPs occurrences found in corpus, both uniqueness and familiarity together must be taken into account. A similar claim is made by Farkas (2002) and Farkas & de Swart (2007), who assume that both uniqueness (“maximality”, in their own terms) and familiarity play a role in definiteness. To include these two semantic properties they use the umbrella term “determined reference”. In the analysis of the possible encoding of definiteness in LSC spatial locations, the theory needs to be based on the notion of familiarity, as will be shown in §5.3. Now, the next section is devoted to the description of deixis, as one of the main means to introduce definite NPs into the model.

### 5.1.3 Deixis

Deictic elements directly refer to objects present in the real world and they have an interpretation related to the spatiotemporal coordinates of the actual context of utterance, such as I-here-now. By deixis is meant the location and identification of persons, objects, events, processes and activities being talked about, or referred to, in relation to the spatiotemporal context involved in an act of utterance and with the participation of one sender and at least one addressee (Lyons, 1977; Anderson & Keenan, 1985). The two

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<sup>4</sup> For a detailed overview with strong and weak points of each line of thought, see Lazaridou-Chatzigoga (2009).

properties of deixis are referentiality, since it is used to refer to, as well as egocentricity, since it is dependent on a centre of coordinates. Deixis is thus understood in relation with the canonical situation of utterance in which the communication occurs in face-to-face interaction.

Traditional grammar distinguishes between deictic and anaphoric uses of pronouns. The terms are defined as follows: a pronoun is deictic when it receives its reference from an extralinguistic element, and it draws the attention to some new object of discourse. And it is anaphoric when it picks up a DR from the preceding text. However, the distinction is not so clear-cut. There are contexts where the difference between a deictic and an anaphoric element is blurred. For instance, if we think of a possible utterance like (13), we realise that the use of “she” is deictic, since it refers to someone who was present in the immediate physical context, but it is also an anaphoric use since it picks up a referent, although not previously introduced. The current view is that anaphora and deixis should not be distinguished (Heim & Kratzer, 1998; Recanati, 2005). This is shown below, where a weakly familiar DR is referred to.

- (13) *After someone left the room:*  
I am glad she finally left.

As (13) shows not all the information in the context is always linguistically given. Information in the common ground can sometimes be there by virtue of the common experience and background of the interlocutors, but also it can be accommodated

on the basis of deixis or inference. Under some accounts, anaphora is considered to function once DRs have already been established in the universe of discourse either by being explicitly mentioned or implicitly mentioned also and then accommodated. Hence anything in the immediate environment of the sender and addressee towards which the attention is directed becomes a DR whether it has been explicitly introduced with a full NP before or not. In fact anything occurring in the surrounding context which is linguistically mentioned is information added to the common ground (Karttunen 1968:16; Heim 1982:309; Prince 1981; Vallduví 1992:68). The knowledge included in the common ground is not null at the beginning of a discourse since weakly familiar DRs that the addressee has in his knowledge-store are part of the common ground, including also all the objects that are in the immediate surrounding context. These contexts have received different terminology, such as “pragmatic anaphora”, by Partee (1978); “indexicality” by Nunberg (1993); “hearer-old”, by Prince (1981, 1992), “weak familiarity-entities perceptually accessible”, by Roberts (2003); or “bridging” by Clark (1975). As already stated, in this dissertation I use “weak familiarity” according to Roberts to mean the knowledge included in the common ground which has not been explicitly introduced into the model.

In this chapter we will see that these two notions, traditionally considered different -although related- phenomena, are in fact the same phenomenon. They are just different means of introducing entities into the discourse model (Roberts, 1998). Both deictic

reference and anaphoric reference presuppose that the DR is already familiar to the audience. In the case of deictic reference, it has attained familiarity by being pointed at, being perceptually prominent, or being otherwise salient. In the case of anaphoric reference, it has been made familiar by previous mention. The deictic use is shown in (14) where the definite description “the goat” is licensed not by an antecedent NP in prior discourse, but by the common experience of A and B at the moment of utterance, which entails the existence of a single, perceptually prominent goat. Both interlocutors are certain that the other has the same goat in mind, so the utterance can be assumed to be felicitous. In a context like (14) the use of a pronominal form such as “it” instead of the definite NP would also be felicitous. In (15) the demonstrative “this” is accompanied by a deictic gesture that brings the indicated object to the attention of other interlocutors and so introduces the corresponding DR, which will satisfy the familiarity presupposition of the definite.

(14) *A goat walks into the room noisily. A says to B:*  
The goat stinks!

(15) This [*accompanying deixis*] is the tool you need to use.  
(Roberts, 1998:367)

In line with Roberts (1998) there is no need to establish different types of definites on the basis of how they find their antecedent (e.g. deictic vs nondeictic pronouns). Instead, we consider that they are all free variables with familiarity presuppositions. Thus DRs which may satisfy those presuppositions may get introduced into the

discourse context in different ways, one possible way being deixis. Thus deixis and hence weak familiarity uses should not be seen as the means to refer to DRs which have a corresponding object in the immediate context, but rather the means to introduce DRs into the universe of discourse. These DRs that can be put in the universe of discourse through deixis are entities from the physical context and shared knowledge. Anaphoric and deictic uses are then special cases of the same phenomenon: the pronoun refers to an individual which, for whatever reason, is highly prominent at the moment when the pronominal referential expressions is uttered. Prominence is obtained by different reasons, namely by recent previous mention and by being present in the physical context. Indeed, weak familiarity cases do not differ that much from indirect anaphora as in (16), where the pronoun is connected to an expression found in the previous context to which it indirectly refers to.

- (16) a. Susan went to the surgery. He gave her pills for her headache.  
b. I've just been to a wedding. The bride wore blue.  
(Consten, 2003)

This is in fact what has been said in discourse studies that consider that the inventories of the referring expressions do not have to be paired with a co-textually occurring antecedent expression in order to receive an interpretation, unlike in the traditional account of anaphora. An antecedent, according to Ariel (1988, 1990) and Gundel, Hedberg & Zacharski (1993), is a mental representation bearing a given prominence, or accessibility level, and is not a segment of co-text (Cornish 1999:7). In Ariel's theory there is no

such antecedent in the linguistic context, as antecedents are mental representations which denote prominent entities, as will be shown in chapter 7.

Deixis and anaphora are related to definiteness. They both presuppose that the DR is already familiar to the audience. Familiarity is obtained in deixis by pointing at something which is perceptually prominent and in anaphora by pointing at some previous linguistic mention. So far the fundamentals about definiteness relevant for the present account have been exposed and they are summarised in (17). They are the basis on which the present analysis applied to LSC relies.

(17)

- a. Definites and indefinites have different conditions attached:  
Indefinites are novel to the discourse, and definites are familiar.
- b. The existence of the DR in the model is asserted with strong familiarity (or discourse-oldness), while it is presupposed with weak familiarity (addressee-oldness).
- c. Deixis is another means to introduce a DR into the model, which is presupposed to be already in the common ground.

To describe how definiteness is distinguished in the use of LSC sign space and how deictic uses also play a role in the introduction of DRs in the model in LSC is the main goal of the chapter. But before delving into it, this section concludes with a state of the art of the description of definiteness marking in SLs.

#### **5.1.4 Definiteness in sign language**

Whether definiteness is grammatically encoded in sign languages (SLs) is still a matter of debate among SL linguists. Studies on sign language definiteness are very scarce. So far, only descriptions of how definiteness is expressed in ASL and Hong Kong Sign Language (HKSL) are available. According to some works, in ASL an index sign directed to space in a prenominal position is considered to be the formal marking of definiteness (Bahan et al., 1995; Bahan, 1996; MacLaughlin, 1997; Wilbur, 2008). ASL marks indefiniteness with an upward direction of manual and non-manual mechanisms which establish a spatial region rather than an area (MacLaughlin, 1997). Indefinite NPs are established on the upper part of the frontal plane with the determiner SOMETHING/ONE, which is an index finger pointing upwards very similar to the numeral ONE. The difference is that SOMETHING/ONE involves a slight circular movement of the forearm and hand. Hence, definiteness is marked with an index pointing towards the lower part of the frontal plane, whereas indefiniteness is marked with an index sign co-occurring with a darting eye gaze directed towards the upper part of the frontal plane. Also another distinction is that while definite determiners in ASL access a point in space, indefinite determiners involve an articulatory movement within a spatial region rather than a point (MacLaughlin, 1997:129). As for HKSL, Tang & Sze (2002) describe a similar indefinite determiner as the one described for ASL. It is articulated with the same handshape used for the definite determiner (e.g. index handshape), but the index finger points upward. Unlike the indefinite determiner in



ASL, in HKSL it does not involve a tremorous motion. When this sign is articulated, eye gaze is never directed to space but instead towards the path of the hand, suggesting that there is no spatial location established for the DR. This is important and we will see that LSC shares this upward darting eye gaze, as well as the weak establishment of a spatial location. However this formal marking does not denote indefiniteness, but rather non-specific reference, as shown in chapter 6.

Definiteness distinctions are not only marked in the manual component, but also in the non-manual one. In fact, according to Tang & Sze, the definiteness/indefiniteness distinction is marked in the eye gaze behaviour. The indefinite determiner in HKSL is distinguished from the definite one following the eye gaze which co-occurs with it: while definite determiners co-occur with an eye gaze directed to the spatial location, for indefinite specific DRs eye gaze is directed towards the addressee (Tang & Sze, 2002:303). Hence in HKSL the definiteness/indefiniteness distinction is formally marked in the non-manuals, and more concretely by eye gaze.

Figure 5.1 is a representation of the definiteness distinctions projected into space that the above cited works on ASL and HKSL describe. The upper part of the frontal plane is the extended area (represented with a big ellipsis) where indefinites are localised. The lower frontal plane is the more reduced area (represented with a point) where definites are established. As it will be shown along this chapter, definiteness marking in LSC differs from the picture in

Figure 5.1, since both definites and indefinites can occupy a spatial location on the lower frontal plane. The upper frontal plane in LSC is in fact reserved for a subtype of indefinites, namely non-specific only (see chapter 6).

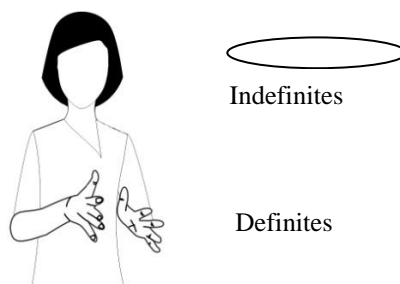


Figure 5.1 Definiteness marking on the frontal plane in ASL and HKSL

However, other authors have questioned the definiteness marking of index signs. In fact, according to some works, definiteness is not encoded in SLs (Engberg-Pedersen, 1993, 2003, for Danish SL (DSL); Winston, 1995 for ASL; and Rinfret, 2009 for Quebec SL (LSQ)). Engberg-Pedersen (1993:101) argues that in DSL DRs with high discourse value are more likely to be represented by a spatial location than DRs with a low discourse value.<sup>5</sup> According to her, discourse value in DSL is measured following the number of repetition of mentions of the DR. Winston (1995:109) also ascribes to spatial locations in ASL the potential of marking discourse value. The spatial location in space itself is a marking of topic continuation as a consequence of its discourse-status marking. If the

---

<sup>5</sup> Engberg-Pedersen (1993:128) explicitly mentions that in this statement she leaves aside role shift construction denoting animate referents. As well as in DSL, role shift in LSC is also a way of assigning discourse prominence to the entity without regard to whether it is spatially established or not (Barberà, 2009). However, role shift constructions are outside the scope of this dissertation.

entity is not established, it means that it is an unimportant entity and the discourse will not be centred on it.

As will be shown in this chapter, in LSC the mere localisation does not stand for the marking of definite NPs, since also indefinite NPs can be established in space. The argumentation used in this dissertation moves away from discourse value, and it is based on definiteness and specificity phenomena, as well as topicality. Although I agree with Engberg-Pedersen and Winston that spatial locations denote topicality of the entity, I also introduce specificity marking into the picture. My explanation is more indirect but also more interesting, since definiteness, specificity and topicality are considered when analysing the semantic attributes DRs may have in order to have a corresponding spatial location established. Also the above cited works do not provide a formalisation of discourse value. The theoretical background DRT used in this dissertation provides a detailed framework which provides the tools for an implementation to concretely define these notions without having to resort to vague notions such as “discourse value”. One of the goals of this dissertation is to offer a clear formalisation of how sign space is used in discourse.

After this state of the art of definiteness marking in space in SLs, we now turn to the language object of this study, namely LSC. As it will be shown in the next section, both definites and indefinites are established in sign space, and hence both presupposition of existence (for weakly familiar DRs) and assertion

of existence (for strongly familiar DRs) are equally marked in space.

## **5.2 Deixis in LSC**

In this section we will see that newly introduced DRs establishing (p) do not need to have an overt antecedent. As shown in §5.1.2, weak familiarity are contexts where the antecedent is not overtly expressed, but rather inferred from the contextual environment. The DR is incorporated into the model by means of accommodation.

To the best of my knowledge, there is only one work in sign language where deictic references are considered to be first mention references (Pizzuto et al., 2008 following Lyons, 1977). Other works consider that in deictic frames of reference, signers point in the direction of objects in the context of utterance. In these contexts, the frame of reference is determined by the actual locations of the objects to which the signer refers (Engberg-Pedersen, 1993; Cormier, 2007). The more extreme description is that presented by Liddell (2003). He argues that the directionality of pointing signs is crucial for the understanding of reference. According to him, ASL pronouns physically point to their DRs and their significance can only be determined by the directionality in sign space (see §2.4.1.2, for the constructive criticism of the spatial mapping view).

The present account claims that the interpretation of index pronominal signs is not done by the directionality or the action of the physical index sign, but by the selection of a suitable DR among

a set of context-available information. The selection of the specific DR that will be chosen in every context depends solely on the linguistic context, where syntactic-semantic-pragmatic motivations are included. As mentioned in §2.4.1.2, many counterexamples are found in which the directionality does not precisely match the intended DR. Also contexts of indirect reference show that the physical directionality cannot be a reliable clue when linking the pronominal form with its corresponding DR. Hence, linguistic and non-linguistic motivations, such as syntactic-semantic-pragmatic, shared knowledge and physical environment need to be considered.

To show that directionality cannot be a reliable clue, let's consider the example shown in Figure 2.9 in chapter 2, repeated here as Figure 5.2 for convenience. The context is the following: the two main deaf clubs in Barcelona are organising a joint party with all the members. The president of the Catalan Federation for the Deaf is telling the organising committee the tasks each club must undertake. It is a mixed committee formed by four members of Cerecutor and three members of Casal. The setting is shown in Figure 5.2, where y corresponds to Cerecutor members and x to Casal members. The signer in front of them is the president, who tells the following:

(18)

ASSOCIATION CERECUSOR RESPONSIBLE FOOD DRINK.  
 ASSOCIATION CASAL RESPONSIBLE ORGANISATION. 4-  
 IX2 BUY THING++. 3-IX2 STAY SIGN THEME ORGANISE  
 HOW.

‘Cerecutor will be responsible for food and drinks. And Casal will take care of the organisation. You-four go and buy everything. And you-three may stay here and talk about organisational issues.’

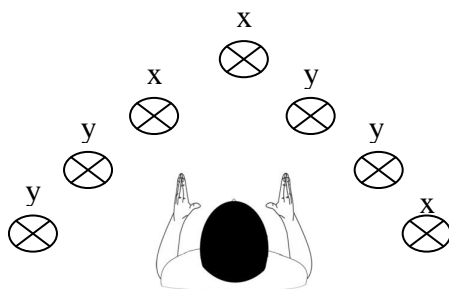


Figure 5.2 Mixed position of the members of two deaf clubs

In such contexts the incorporated pronouns cannot be understood according to the directionality of signs because as shown in the setting in Figure 5.2 the members are mixed and not seated correlatively. When the president utters 4-IX2 (‘you four’), he directs a four-handshape with an arc-movement towards the front. This pronominal form refers to entities marked as y in the figure above. But they are not seated together, and thus the arc-movement is directed towards the whole group. The same goes for the pronoun 3-IX2 (‘you three’), which denotes the entities marked as x. Thus the arc-movement must be a circular one but not directed to any concrete area. The interpretation of these pronominal forms must be

done following linguistic clues. Indeed, this is a case of weak familiarity since no linguistic antecedent for the pronouns is previously introduced. But as said before, this deictic use is similar to indirect anaphora previously exemplified in (16), where an element from previous discourse functions as an anchor. In (18) ASSOCIATION CERECUSOR and ASSOCIATION CASAL serve as anchors to which pronouns are linked to. However, the directionality of the pronominal form is in fact misleading for the right interpretation.

As already claimed in §2.4.1, Liddell (1995) argues that grammatical reference when surrogate and token space are used they function in the same way as with real space because signers imagine surrogates and tokens as being in an unlimited number of locations and therefore treat them as if they were physically present. Thus, any kind of reference for Liddell is articulated like reference to real space: deictic and not anaphoric. His account does not make a distinction between presence and absence of objects in the immediate context, and the actual world and the discourse model are fused. However, a clear distinction must be made between what exists in the real world and what exists in the discourse, in order to account for reference to entities which do not exist (i.e. like unicorns) or also for quantified expressions. While Liddell's account considers all the references to be deictic, this dissertation considers all the references to be anaphoric to the discourse model. According to the present account, reference is always anaphoric to the model. That is, referential expressions refer to entities present in

the discourse model, without regard to the mechanism of introduction into the model. This is shown with the minimal pair (19) and (21) below. In the first example the goat entering the room is referred to with a definite description, while in the second example it is referred to by a demonstrative pronoun. (19) is a context where the pronoun in the second sentence is linked to the linguistic antecedent introduced.

- (19) *Uttered while a goat is entering the room.*  
IX<sub>3a</sub> GOAT SMELL-BAD. BUT IX<sub>3a</sub> BEAUTIFUL.  
'The goat stinks. But it is beautiful.'

Since a noun is introduced, the corresponding construction rule determines the establishment of a DR in the DRS and the corresponding predicative condition. The pronoun in the second sentence derives from the use of the construction rule for pronouns (see Appendix A for the complete list of construction rules used in this dissertation):

CR.N: Upon encountering a common noun co-occurring with a determiner,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]],  
and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. introduce the predicate condition  $\beta(\alpha)$



CR.PRON: Upon encountering a pronominal form,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]],  
and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. check which variable in the main DRS shares the features  $\alpha$  has,  
and
4. if no suitable variable is found, go to CR.PRON2; if the suitable  
variable is found introduce an identity equation  $\alpha = \gamma$
5. go to CR.PROM<sup>6</sup>

A suitable antecedent is found because of the coincidence in the direction of (p), according to the hypothesis mentioned in the preceding chapter and repeated below.

(20) **The spatial point hypothesis** (first version)

The identity condition in the DRS is encoded through coincidence in direction of spatial establishment of (p).

Hence the identity condition is created and resolved. The resulting DRS is that in (21).

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<sup>6</sup> The construction rule about prominence is treated in chapter 7.

(21)

x, y
goat (x)
stink (x)
it (y)
beautiful (y)
y = x

But the same goat within the same context can also be referred to by a pronoun. This is a context of a weak familiar DR, where no linguistic antecedent is introduced. Instead the goat is accommodated into the model by being perceptually accessible to the two conversation participants.

(22) IX3<sub>a</sub> SMELL-BAD. BUT IX3<sub>a</sub> BEAUTIFUL.  
'It stinks. But it is beautiful.'

For the construction of the semantic representation, first the construction rule for pronouns is used. But since no suitable variable is found, the algorithm requests to go to the second construction rule for pronouns CR.PRON2.

As claimed in §5.1.3, many authors accept that anything occurring in the surrounding context is information added to the common ground (Partee, 1978; Karttunen, 1968; Heim, 1982; Prince, 1981; Vallduví, 1992; Nunberg, 1993; Roberts, 2003). However, the formal representation of weak familiarity in DRT has not been implemented yet. As CR.PRON2 in the present account states, there is a default variable  $\delta$  which stands for all the DRs introduced into the common ground without an explicit linguistic antecedent. This default variable is identified with the variables in

deictic contexts and hence when the DR is a weak familiar one. The final semantic representation is shown in (23).

CR.PRON2: Upon encountering a pronominal form,

1. go to the main DRS and take the default variable  $\delta$ ,
2. introduce an identity equation  $\alpha = \delta$
3. go to CR.PROM

(23)

y, w
it (y)
stink (y)
it (w)
beautiful (w)
$y = \delta$
$w = \delta$
$w = y$

So far, deictic uses have been proven to be another means to introduce DRs into the model, which are expressed by definite NPs by virtue of having the corresponding object present in the immediate physical situation. The identification between the variable being overtly expressed in discourse with the default variable associated with entities introduced without an explicit linguistic antecedent is a very common use in LSC. These contexts of weak familiarity show that reference in LSC is always referred to the discourse model and it is thus anaphoric.

### **5.3 Familiarity**

Leaving intensional contexts aside, indefinite NPs generally denote an assertion of existence. That is, they establish a DR into the model by asserting that such an individual exists. On the other hand, definite NPs imply a presupposition of existence. That is, the interlocutor is able to infer that the DR refers to a non-empty set. Recall that a broad definition of familiarity is considered here (see §5.1.2), including not only strongly familiar DRs for which there exists a linguistic antecedent in the discourse, but also weakly familiar ones where no linguistic antecedent is present. In LSC the mere localisation of a DR in space does not formally denote a definite reading. The distinction to show both definiteness and indefiniteness marking established in sign space is implemented here with respect to the status of the DR in the model. That is, whether the DR is presupposed or asserted. As shown below, both possibilities establish (p) in LSC.

In this section we will see that the establishment of (p) in LSC does not denote a difference between definite and indefinite NPs as shown for other sign languages (unlike in ASL and HKSL, as seen in §5.1.5). It is also shown that when (p) is established for a presupposed DR, this is better explained in terms of familiarity.

#### **5.3.1 Assertion of existence**

An example of assertion of existence marked in space is (24). The first sentence is a body-anchored localisation which co-occurs with role shift (see §3.5). The NP “ONE MAN” is not localised on the lateral parts but it is rather a body-anchored location (see §3.5). The

predicate WALK and the entity classifier move forwards from the body of the signer to the centre of sign space. The introduction of the second DR “ANOTHER MAN” in the second sentence is done by means of a spatial location established on the ipsilateral part which also co-occurs with role shift. They are both indefinite NPs which are introduced with two indefinite determiners, namely ONE and ANOTHER (24). However they are both localised: the first is body-anchored and the second is localised on a lateral part. This shows that indefinite NPs in LSC which assert the existence of the DR into the discourse may be spatially established.

(24)

\_\_\_\_\_br \_\_\_\_\_rs

ONE MAN 1-WALK CLe.long-upward-entity-advancing 1-SEE-3 TREE  
 CLe.tree BIKE CLe.tree/CLe.bike.  
 ‘There is one man and he is walking. He sees a bike leaning against a tree.’

[...]

\_\_\_\_\_br \_\_\_\_\_rs

ANOTHER<sub>ip-1</sub> MAN 3-WALK<sub>ip-1</sub> CLe.long-upward-entity-advancing<sub>ip-1</sub> 1-SEE-3  
 BIKE IX1 POSS.  
 ‘There is another man who also walks there and realises that that bike is his.’  
(S\_Bic 00:01)

The corresponding semantic representation in (25) shows the introduction of the two corresponding variables for the two men, namely x and z. Its assertion in the discourse is done in the two instances by means of a topicalised clause as shown in (24). The first one with the NP “ONE MAN” localised as body-anchored is marked with brow raise, and the second sentence is introduced with the NP “ANOTHER MAN” and (p) corresponding to this DR is localised on the ipsilateral side and co-occurring with brow raise and a pause after the NP.

(25)

x, y, z
man (x)
walk (x)
bike (y)
lean-against-tree (y)
see (x, y)
man (z)
see (z, y)

Both DRs denoted by the NPs in (24) are not presupposed to exist in the model previously to its introduction. It is the beginning of a story in which the signer introduces the characters which participate in it through two localised NPs.

Localised indefinite NPs can also appear in-situ without being dislocated. In (26) an indefinite NP is the internal argument of the verb OFFER. It is localised on the ipsilateral side. This is the first time the signer introduces this DR and she does so by means of an indefinite NP containing the indefinite determiner ONE.

(26)

\_\_\_\_\_eg:ip-1  
 IX1 1-OFFER-3 ONE PERSON-3<sub>ip-1</sub> PEN-DRIVE COMPUTER  
 \_\_\_\_\_eg:ip-1  
 PEN-DRIVE 1-OFFER-3<sub>ip-1</sub>  
 ‘I will offer a pen-drive to a person/someone.’

(P\_Obj 0:01)

(27)

x, y, z
person (y)
pen-drive (x)
offer (1, x, y)

Indefinite NPs in LSC can thus be localised in sign space and establish (p). This shows that assertion of existence in LSC can occur with the nominal established in sign space.

### 5.3.2 Presupposition of existence

The establishment of (p) also occurs with DRs which are presupposed to exist in the model. Both definite NPs with a previous explicit antecedent (strongly familiar DRs) and definite NPs without a previous antecedent (weakly familiar DRs), can establish (p). By the mere appearance in the discourse the signer is intending to refer to the non-empty set to which the nominal refers to. Hence their existence is presupposed in the common ground and it is thus familiar to the conversation participants rather than referring to a unique DR.

The example in (28) shows a combination of the two possibilities (i.e. assertion and presupposition). The first sentence asserts that a DR which has not been introduced previously is introduced into the model. The DR is localised on the ipsilateral side. The second sentence contains a resumptive pronoun referring back to the same DR. Hence it presupposes that the DR exists in the model and it is a

familiar entity for the conversation participants. Both weakly and strongly familiar DRs are spatially established.

(28) TODAY INTERVIEW ONE PERSON-3<sub>ip</sub> WOMAN. IX3<sub>ip</sub>  
KNOWS ENGLISH.

‘Today (I) have an interview with a woman. She knows English.’

(S\_IndefSpec 00:01)

As far as weakly familiar DRs are concerned, their existence is entailed in the context, either because the corresponding object in reality is perceptually accessible or because the DR belongs to the general encyclopaedic knowledge. An example of the former is given in (29). The signer is talking about a laptop which is in front of him. Even if the object is around it must be introduced into the discourse model and so he introduces the nominal for the DR occurring with an index sign realised with the palm pronated, emphasis and a slight repetition of movement.

(29) IX3<sub>a</sub> LAPTOP.

‘There is a/this laptop.’

The predicative index sign alone in the indexing clause is sufficient to introduce a DR which is perceptually accessible and hence familiar to the discourse participants.

Concerning DRs that belong to the general encyclopaedic knowledge, a spatial location is also established. In daily



### 5.3 Familiarity

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conversations and in Webvisual<sup>7</sup> many references to DRs that are introduced for the first time in the discourse (i.e. discourse-new) but which are known by the participants (i.e. addressee-old) are established in sign space. In such cases, the nominal denotes a DR that belongs to the general knowledge or that is contextually entailed. Thus DRs for “the Pope”, “Laporta” (the previous president of Football Club Barcelona), “Montilla” (the previous president of the Generalitat de Catalunya), and “Antonio Martínez” (the current president of the Catalan Federation for the Deaf) are localised in space when appearing for the first time in discourse. In (30), for instance, the DR “Hitler” is localised on the ipsilateral side when first introduced into the discourse.

(30) IX3<sub>c</sub> FOUND ORGANISE MATEIX PERSON-3<sub>ip</sub>  
HITLER.

‘This was founded by Hitler himself.’

(A\_AF 02:39)

Other examples containing proper names which by themselves already imply a presupposition of existence can also be established in space. Proper names also co-occur with an index sign in LSC and establish (p). As shown below, the DR denoted by the proper name can be established with a spatial location on the horizontal plane.

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<sup>7</sup> As mentioned in §1.2, Webvisual is the LSC TV channel on the Internet ([www.webvisual.tv](http://www.webvisual.tv)).

- (31) YESTERDAY JOAN IX<sub>3ip</sub> 3<sub>ip</sub>-TELL-1 IX<sub>3ip</sub> THESIS SOON FINISH.

‘Yesterday Joan told me he will finish his thesis soon.’

The previous examples from (23) to (30) show that in LSC there is no distinction between assertion and presupposition of existence of DRs concerning the spatial localisation, since both asserted and presupposed DRs can be established in space. Both asserted and presupposed DRs are introduced as variables that occupy a localisation in space as shown in Figure 5.3, and hence the novel/familiar condition is thus not formally distinguished in LSC spatial marking.

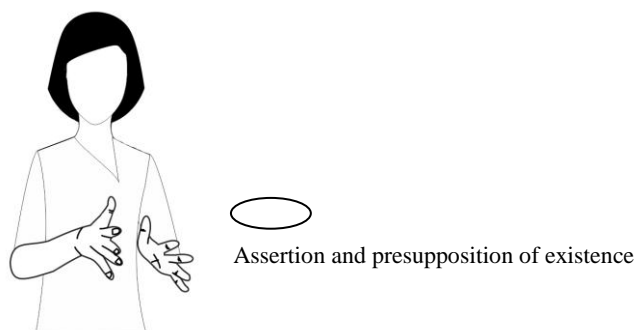


Figure 5.3 Definiteness marking in LSC sign space

The examples denoting a presupposition of existence of the DR in the common ground show that when analysing LSC spatial locations in terms of definiteness, it is better to account for them as considering the phenomenon of familiarity. By the mere appearance in the discourse of the DR, the signer intends to refer to the non-empty set to which the nominal refers to. Hence its existence is presupposed in the common ground and it is thus familiar for the conversation participants rather than referring to a unique entity.

### **5.4 Indefiniteness marking**

Although definiteness marking is not expressed in space, LSC has other strategies to denote indefiniteness, such as the use of a concrete set of determiners, as well as a specific non-manual marking, as briefly exposed below.

#### **5.4.1 Indefinite determiners**

LSC has a specific set of determiners which denote indefiniteness. Their denotation indicates that the DR of an expression is presumed to be not identifiable or familiar. The entity is thus not part of the common ground of the discourse. Some of these determiners are for instance, ANY, SOME, ONE, ONE+++('few'), just to list some of them (this is of course not an exhaustive list).

They can have a strong and a weak reading depending on the part of the frontal plane where they are established, as we will see with more detail in §6.3.2.

#### **5.4.2 Nonmanual indefiniteness marking**

Nonmanual marking is also a crucial part of the grammar of sign languages (see Pfau & Quer, 2010 for an overview of nonmanuals). In LSC nonmanuals also play a role in the encoding of information, since indefiniteness is expressed with a specific non-manual marking. It is articulated on the lower part of the facial expression and it consists in sucking the cheeks in and pulling the mouth ends down. This is sometimes combined with a shrug. The facial expression is shown in Figure 5.4.

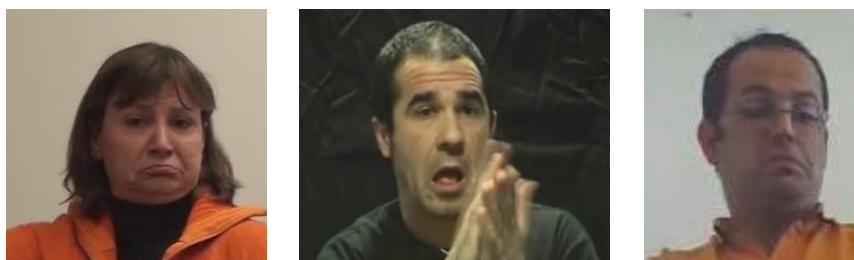


Figure 5.4 Indefiniteness non-manual marking

Interestingly, this non-manual articulated on the lower part of the facial expression provides semantic-pragmatic information (see Wilbur (2000), who claims that the non-manuals from the upper part of the face are used for syntactic information (i.e. affirmation, negation, topics, conditionals), whereas the non-manuals from the lower part of the face are used to provide adverbial modification (i.e. adjectives, adverbials)).

An interesting question that arises and which is outside the scope of this dissertation is how this indefinite nonmanual marking is compositionally combined with other markings, as well as how the pulling down of the cheeks is combined with shrug, or whether there is a different denotation between the two of them.

## 5.5 Summary

In this chapter the main features which characterise the localisation of DRs in sign space in LSC and their relation with the expression of definiteness have been analysed. We have seen that, although (in)definiteness distinctions can be expressed with a restricted set of determiners and a specific nonmanual marking, the establishment of

the DR in sign space does not distinguish between definite and indefinite NPs. The features of localisation of (p) are the following. First, objects referred to by means of weak familiarity do not have an explicit linguistic antecedent, but they have a corresponding DR in the common ground. The pronominal form in weak familiarity contexts does not deictically refer to the present object, but rather to the DR they are linked to. This shows that all references are anaphoric to the discourse model and that even deictic uses are anaphoric to the entities present in the discourse model. Second, the localised DR is not marked as definite or indefinite, and both asserted and presupposed DRs are localised in space. However, for presupposed DRs, the establishment of (p) is better explained in terms of familiarity in the discourse model.

However, concerning indefinite NPs there is a further categorisation, which is that of specificity. Specific indefinites are used to indicate that the DR is known to the sender though not to the addressee. And non-specific indefinites are used when neither the sender nor the addressee know the DR. Hence while definiteness implies givenness for both interlocutors, specificity implies accessibility to the addressee alone. Definiteness and specificity are closely connected to scope. Generally, while definite and specific indefinites correspond to permanent DRs, non-specific indefinites introduce temporary DRs which survive only under the scope of an operator. This is precisely the main topic of the next chapter, where we will see that in fact LSC spatial locations mark distinctions which denote specificity.



# Chapter 6

## Specificity

The notion of specificity in linguistics is notoriously non-specific [...]. The common thread uniting these distinctions is the notion of variation in value assignments for the variable introduced by the noun phrase.

Farkas (2002)

## 6.0 Introduction

This chapter is devoted to the expression of specificity in LSC in relation to sign space. As seen in chapter 5, in LSC there is no distinction between the marking of definite and indefinite NPs upon sign space localisation. However, in this chapter it is shown that LSC has instead a marking for specificity. The phenomenon I analyse here is the possibility of establishing spatial locations on the upper frontal plane as opposed to being localised on the lower frontal plane. I will argue, as already advanced in §3.2.2.3, that this distinction is related to the expression of specificity. In LSC two kinds of localisation on the frontal plane are found, namely a strong and a weak localisation, which correlate with specific and non-specific marking, respectively. Strong localisation is instantiated by the feature [low] which is formally marked by the default spatial location (p), while weak localisation is instantiated by the feature [up], formally marked as (p)[up]. The formalisation offered to explain this distinction is framed within the distinction between main and subordinate variables in a DRS: whereas main DRS variables represent a specific interpretation and they are expressed with spatial locations established on the lower frontal plane, subordinate DRS variables represent a non-specific interpretation and they are expressed with spatial locations on the upper frontal plane. Hence the main/subordinate DRS distinction which is associated with wide and narrow scope respectively is overtly encoded in LSC use of space. The chapter is organised as follows. §6.1 presents the background concerning specificity which is relevant for my account. In §6.2 the different properties



encompassed by specificity with respect to LSC data are presented. The LSC localisation pattern which is associated with specificity marking is offered in §6.3. §6.4 summarises the main findings of the chapter.

### **6.1 Specificity: background**

Noun phrases can be categorised with respect to definiteness and indefiniteness, as seen in chapter 5. Indefiniteness can be further divided with respect to specificity depending in the knowledge that the sender and addressee have about a DR. Specific indefinites encode that the DR is known only by the sender, but not by the addressee. Non-specific indefinites encode that the DR is not known by the sender or the addressee. Specificity is encoded differently in each language. Some languages encode it in the article system, others encode it with affixes and others lack encoding of this notion. Samoan and Maori are two Polynesian languages which have an article system that distinguishes specificity rather than definiteness (Lyons, 1999). Samoan uses the article *le* with specific DRs which indicate that the NP refers to one particular entity regardless of whether is definite or indefinite. A different article (*se*) is used with non-specific DRs, which do not refer to a particular, specified item (Mosel & Hovdhaugen, 1992 cited in Lyons, 1999:57). In Maori, the article *he* (which does not distinguish number) is used when the kind of entity is crucial, and *teetahi/eetahi* when the number is significant (Bauer, 1993 cited in Lyons, 1999:59). The meanings and patterns of use of Maori articles are not yet established, but it

seems that its article system relates partly to the distinction between specific and non-specific, rather than definite and indefinite. Another way of marking specificity is by means of affixes. Turkish, for instance, encodes specificity with an accusative affix. NPs with overt case morphology are specific, and NPs without case morphology are non-specific, as will be shown in 6.1.2 where Turkish specificity is treated in detail. This differs from languages like Catalan or English where specificity is not overtly marked. Indefinite NPs in Catalan and English are thus ambiguous between having a specific or a non-specific interpretation. It is only in coreferential chains that the resumptive pronoun disambiguates the two readings. Let us look at some examples. In English the indefinite determiner *a* is used both for specific and non-specific NPs. (1) has two possible readings: a specific and a non-specific one. Yet specificity in English has observable effects on co-reference, and the resumptive pronoun disambiguates the two possible readings (Partee, 1970). Under the specific reading, the indefinite NP refers to an identifiable book (1a). Under the non-specific reading, Celia is looking for an element of the kind “syntax book”, but there is not any concrete book that the speaker has in mind when uttering (1b).

- (1) Celia wants to read a book about syntax...  
a. but she cannot find it.  
b. but she cannot find one.

Specificity encompasses different but related properties, such as scope, partitivity and identifiability. In the following a subsection is devoted to each property in detail.

### 6.1.1 Scope

An expression  $\alpha$  is in the scope of an expression  $\beta$  iff the interpretation of  $\alpha$  is affected by the semantic contribution of  $\beta$  (Farkas, 2000). Scopal specificity is defined in terms of the interpretation of the indefinite NP outside the scope of an operator. According to this view specificity is equated with wide scope (Farkas 1994, 1997, 2002; Ionin, 2006). Hence those indefinite NPs which are outside the scope of an operator are considered to have wide scope and those indefinite NPs which are under the scope of an operator are considered to have narrow scope. In English, as previously seen, indefinite NPs are ambiguous between a definite and an indefinite reading. In (1a) the indefinite NP has wide scope and thus the reading is specific, as represented in (2a) below. In contrast, in (1b) the indefinite NP has narrow scope and thus it yields a non-specific reading, as shown in (2b)<sup>1</sup>.

- (2)     a.  $\exists x(\text{book}(x) \wedge (\text{celia}(y) \wedge \text{want-read}(y,x)) \wedge \text{cannot-find}(y,x))$   
       b.  $\text{want-read}(y,x)(\exists x(\text{book}(x) \wedge \text{celia}(y) \wedge \text{cannot-find}(y,x)))$

In DRT specificity is treated as a scope phenomenon (Kamp & Reyle, 1993; Kamp & Bende-Farkas, 2006). The narrow/wide scope divide is implemented with the positioning of the variables in the boxes. Wide scope is represented when the variable is inserted in the main DRS and all the variables contained in it are under the

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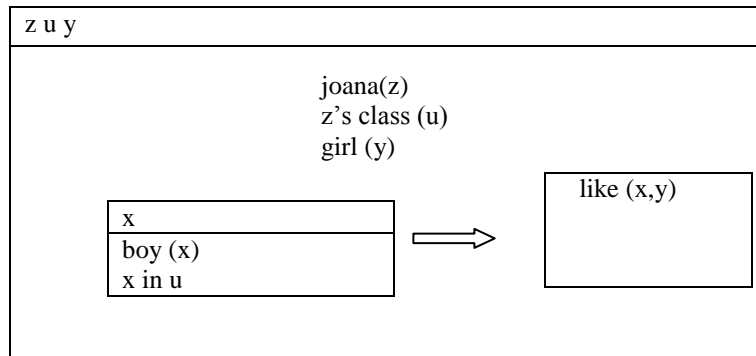
<sup>1</sup> For a covariation analysis of scope, the reader is referred to Farkas (2001, 2002), where it is shown that reduplication of the indefinite article in Hungarian marks dependency. Dependent indefinites are considered by Farkas to arise when the DP co-varies with a variable.

scope of the main universe of discourse. Narrow scope is represented when a variable is inserted in an embedded box. To illustrate this point let us look at an instance of a sentence with two readings.

- (3) Every boy in Joana's class likes a girl.

Within the specific reading, which can be paraphrased as “There is a girl such that every boy in Joana's class likes her”, the DR corresponding to the indefinite NP is represented with a variable in the universe of discourse, and it is in a higher position in the DRS.

- (4)



Under the specific interpretation the variable is represented in the main DRS and it is a global DR. Thus it can be picked up by further pronominal reference. Hence a continuation of (3), under the specific reading of “a girl”, can felicitously be as in (5).

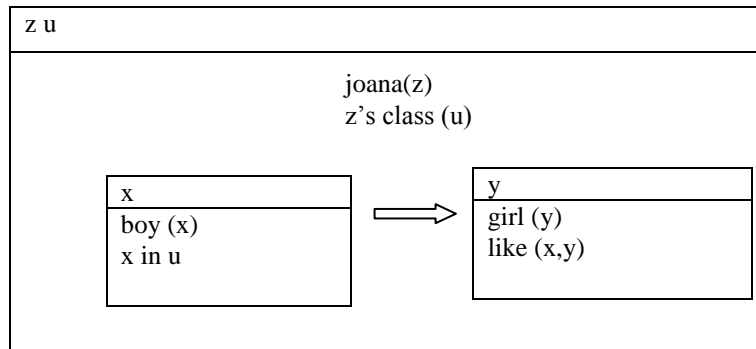
- (5) Every boy in Joana's class likes a girl. Every day she flirts with a different boy.

## 6.1 Specificity: background

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Differently, within the non-specific reading, paraphrased as “For every boy in Joana’s class there’s a girl such that he likes her”, the non-specific DR does not appear in the main DRS, but only embedded in the DRS for the consequent (i.e. the embedded right box).

(6)



The variable for the non-specific reading of the indefinite is a local DR, which is represented in an embedded box. Thus it is only available to be further picked up as long as it is under the scope of an operator.<sup>2</sup> Outside this scope a continuant with a resumptive pronoun is not felicitous.

(7) Every boy in Joana’s class likes a girl. # Every day she flirts with a different boy.

Let us continue with the second property related to specificity, namely partitivity.

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<sup>2</sup> These are cases of modal subordination, which is treated in §6.3.3.2.

### 6.1.2 Partitivity

A partitive indefinite is an indefinite NP which has a restricted set as a possible value. Indefinite NPs receive a partitive interpretation when the denotation of the NP is included within a given set. In English, for instance, sentences like (8) are examples of overt partitives. The partitive and non-partitive pairs in (8) and (9) are quite similar in interpretation. The main difference is that in the case of overt partitives (8), the quantification necessarily ranges over some specific, non-empty, contextually fixed set.

- |     |                       |     |                |
|-----|-----------------------|-----|----------------|
| (8) | a. Three of the books | (9) | a. Three books |
|     | b. One of the books   |     | b. One book    |
|     | c. Some of the books  |     | c. Some books  |

Enç (1991) views specificity as partitivity. She argues that in some languages NPs in certain positions are always unambiguous with respect to specificity. The ambiguity is resolved through case marking: NPs with overt case morphology are specific, and NPs without case morphology are non-specific. An example of this phenomenon is Turkish where specific indefinites are marked with accusative case. Such indefinites denote members of a previously mentioned set. For instance, the presence of accusative case on an indefinite yields a partitive interpretation (10), as opposed to the minimal pair without the accusative case (11).<sup>3</sup> The indefinite NP with accusative case has a covert partitive reading, and it introduces

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<sup>3</sup> Here I am dealing only with semantic partitivity to refer to the interpretation of partitive NPs. This contrasts with the use of the term “partitivity” in the syntactic literature where it refers to non-specificity (Belletti, 1988).

into the domain of discourse individuals from a previously given set.<sup>4</sup>

- |      |  |      |   |
|------|--|------|---|
| (10) | Iki kız-i taniyordum<br>Two girl-Acc I-knew<br>'I knew two of the girls' | (11) | Iki kız taniyordum<br>Two girl I-knew<br>'I knew two girls' |
|------|--|------|---|

(Enç 1991:6)

In short, indefinite partitives such as “three of the books” refer to groups that are a subgroup of the referent of the NP contained in the partitive, in this case “the books”. Partitive specifics induce a presupposition that there is a non-empty and contextually salient set. Under this view, the specificity of the NP places a constraint on the structure of the domain of discourse in addition to the constraint placed by the definiteness of the NP. Partitivity quantifies over contextually given sets. By “contextually given” it is meant ‘already in the domain of discourse’ (i.e. in the common ground, see 4.1.1), since the contextually relevant individuals are those that have been previously established in the discourse, or also incorporated to the model by means of accommodation. Hence the set may be accommodated, explicitly mentioned or part of a contextually determined set. The third and last property is related to identifiability.

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<sup>4</sup> In a similar view, Diesing (1992) argues that specific indefinites crosslinguistically are always presuppositional since they presuppose the existence of the set denoted by the restrictor.

### 6.1.3 Identifiability

Identifiability, also known as epistemic modality, is another phenomenon related with specificity. It is defined as the property of those indefinite NPs which are identifiable by the sender, i.e. those entities that are known and/or inherently identifiable (Fodor & Sag, 1982; von Stechow, 2002, 2008, 2011; Kamp & Bende-Farkas, 2006). The following example shows this distinction. While (12a) corresponds to an epistemically specific DR and it is thus identifiable by the sender, (12b) corresponds to an epistemically non-specific and thus unidentifiable DR.

- (12) a. A student cheated on the syntax exam. It is the blond lady that always seats on the back row.  
b. A student cheated on the syntax exam. I wonder who it was.

It is commonly assumed that in English adjectives such as *certain*, *specific*, and *particular* form specific NPs. The insertion of these adjectives in (12a) makes the sentence felicitous, as in (13a). However this is not the case in non-specific readings like (12b). The insertion of the adjective blocks the non-specific interpretation (13b).

- (13) a. A *certain* student cheated on the syntax exam. It is the blond lady that always seats on the back row.  
b. A *particular* student cheated on the syntax exam. # I wonder who it was.

Partee (1970) proposes to collapse the specific use of indefinites with a referential use in the sense of Donnellan (1966), and the non-



specific use of indefinites with an attributive use. Donnellan argues for a distinction between referential and attributive uses of a NP which is also related with identifiability. Referential NPs are used to refer to particular individuals (i.e. with a specific reading), whereas attributive NPs refer to non-particular individuals (i.e. with a non-specific reading). However, the existence of such an individual is presupposed in both interpretations. The well-known example by Donnellan in (14) is analysed as having two readings. In the first reading, the NP is interpreted as referential and hence as specific. In the second reading, the definite description is interpreted as predicative, and as a consequence there is no such specific individual in the mind of the person uttering the sentence, but rather it is implied that the task this individual has undertaken is that of having murdered Smith.

(14) Smith's murderer is insane. (Donnellan, 1966)

The identifiability property is then based on knowledge of the DR and on referential and attributive uses of NPs. However, as Geurts (1999) claims, the identifiability view of specificity based on knowledge of the DR is quite vague, since it is very difficult to determine what a sender has in mind. Of course to determine what is part of the common ground is also a difficult task, but it is nothing compared to achieving a definition of having something in mind. At least, to be part of the common ground can be diagnosed by means of some tests (such as being available for anaphoric uptake), but to the best of my knowledge no diagnostic test has been

established to determine whether some referent is in the mind of someone (if it is not just by directly asking him). Since epistemic identifiability is closely connected to the scope of the variable, in order to distinguish between identifiable and non-identifiable DRs I use scope as criterion. Scope can be formally proven without having to resort to the opacity of the mind of the sender that identifiability by itself encompasses.

It is important to note that von Heusinger (2008, 2011) considers noteworthiness to be another property encompassed by specificity. Since remarkable information about the specific DRs is usually provided along the discourse, wide scope variables have a noteworthy feature. However cases of modal subordination show that narrow scope can also be related to noteworthiness, and thus both wide and narrow scope variables can be noteworthy. Thus I do not consider noteworthiness to be only a property of specificity, but rather a property related to discourse structure that is orthogonal to specificity (both specifics and non-specifics can be noteworthy). This is further argued for in §7.3.

What has been laid out so far is summarised in (15).

(15)

**-Scope** is related to a dependence on an operator. Wide scope arises when the variable is outside the scope of an operator and appears in the main universe. Narrow scope arises when the interpretation of an indefinite is under the scope of an operator.

**-Partitivity** is linked to indefinite NPs the denotation of which is included within a given set. The set may be accommodated, explicitly mentioned or part of a contextually determined set.

**-Identifiability** is understood as the interpretative property of those indefinite NPs known by the sender. Identifiable DRs have a corresponding wide scope variable, while non-identifiable ones have a narrow scope one.

### 6.1.4 Specificity in sign language

Studies on sign language specificity are very limited. So far, only a description of how specificity is expressed in ASL and Hong Kong Sign Language (HKSL) is available, as already seen for definiteness marking (see §5.1.3). While the studies on ASL indefiniteness and specificity focus on the description of direction of signs on spatial planes and non-manual marking, the study on HKSL concentrates on the non-manual behaviour only. As summarised in §5.1.5, ASL marks indefiniteness with the determiner SOMETHING/ONE, an index sign pointing upwards which involves a slight circular movement of the forearm and hand. This articulation correlates with the degree of identifiability of the DR: when the DR is identifiable,

and hence specific, the tremoring motion of the manual sign is minimised. When the DR is not identifiable, and hence it is non-specific, the movement is bigger and intensified and the hand moves through a larger area in space (MacLaughlin, 1997:131). However, the concepts indefiniteness and specificity are collapsed in her account and she uses “indefinite” and “specific” interchangeably without establishing a clear categorisation (ibid.:137ff).

Non-manual marking also contributes to the expression of specificity. As described in Bahan (1996:272) for ASL, eye gaze to mark agreement also differs according to the (non)-specificity of the DR. While the expression of specific referents involves a direct eye gaze to the spatial location, non-specific referents involves a darting gaze generally towards an upward direction. This is important and we will see that LSC shares this upward darting eye gaze for non-specific reference.

Concerning HKSL, specificity is marked with the sign ONE, realised with an upwards index finger moving from left to right with a tremoring motion involving the wrist. This sign is accompanied with round protruded lips, lowered eyebrows and an audible bilabial sound (Tang & Sze, 2002:304). When this sign is articulated, eye gaze is never directed to a spatial location but instead towards the path of the hand, suggesting that there is no location established for the DR.

On a different view, Zimmer & Patschke (1990) for ASL and Bertone (2007, 2009) for Italian Sign Language (LIS) explicitly claim that an index sign directed to sign space specifies the noun it co-occurs with. However, no further comment of what is meant by specificity nor which properties are encompassed by it are mentioned. To further refine the notion of specificity in relation to sign space is precisely the aim of this chapter. As will be shown along it, specificity marking in LSC is slightly different from the forms described for ASL and HKSL. Specific indefinites are localised on the frontal plane, as well as definites. In fact, the upper frontal plane is reserved for non-specific DRs and, similarly to ASL and HKSL, the location is very weakly established.

### 6.2 Specificity in LSC

As seen in the previous chapters, the introduction of DRs into the model in LSC is done by means of localisation which derives into the creation of a spatial location (p). In §4.2, it has been shown that variables being in the scope of an operator derive into lack of establishment of spatial location in actual signing. Thus only variables attached to wide scope quantifiers have a corresponding spatial location, as stated in *The discourse referent hypothesis* repeated below.

(16) **The discourse referent hypothesis** (second version)

(p) is the overt manifestation of DRs attached to a quantifier that has wide scope

In this chapter, I focus on specificity contexts in LSC and this hypothesis is slightly refined and extended, due to the fact that in specificity contexts the presence of an operator can also give rise to a weakly established spatial location on the upper part of the frontal plane. While definiteness distinctions are not overtly encoded in space marking (see § 5.3), LSC does encode the marking of (non-)specificity, which is overtly expressed with different directions of index signs directed to space. The two relevant directions for (non-)specificity marking are the lower and the upper part of the frontal plane previously described in §3.2.2.3 and now graphically reminded in Figure 6.1.

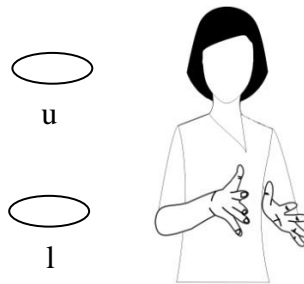


Figure 6.1 Upper and lower features of frontal plane

This chapter argues that specific indefinites are characterised by a location on the lower part of the frontal plane and a strong coincidence of morphophonological features directed to it. Here I offer a more fine-grained version of *The discourse referent hypothesis*, which focuses on specificity marking, as in (17) below.

- (17) **The discourse referent hypothesis** (specificity version)  
(p) is the overt manifestation of wide scope which denotes specificity.

This contrasts with non-specific DRs which are characterised by a location on the upper part of the frontal plane and a weak morphophonological marking of signs directed to space. This is stated in the hypothesis below.

- (18) **The discourse referent hypothesis** (non-specificity version)  
(p)[up] is the overt manifestation of narrow scope which denotes non-specificity.

Figure 6.2 is a representation of the duality of specificity marking expressed in LSC sign space which this chapter focuses on.

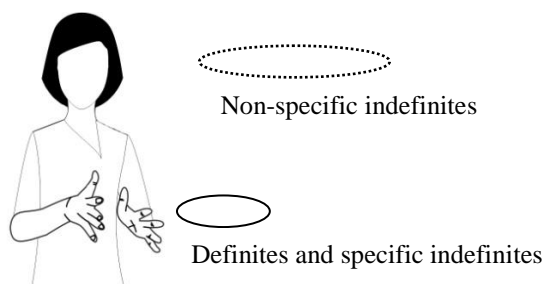


Figure 6.2 Definiteness and specificity marking on LSC frontal plane

A thorough and intensive analysis of our LSC small-scale corpus data allows distinguishing between two different kinds of localisation according to the morphophonological mechanisms directed to spatial locations. These differences result in two distinct

localisation processes that I call *strong* and *weak* localisation, which correlate with the expression of specific and non-specific DRs, respectively. Specific DRs are referred to with a clear establishment of a spatial location on the lower part, whereas non-specific ones are characterised by a diffused marking of a big area (that is, not a clear marking, but rather marked with a fuzzy direction) on the upper part of the frontal plane. The upper spatial location is thus weakly established and this is represented as a bigger and wider dotted circle in the upcoming figures and stills (Figure 6.2). In what follows we will see that the three properties encompassed by specificity can be assigned to the locations established on each part of the frontal plane. These differences yield a localisation pattern. But before the exposition of the localisation pattern (see §6.3), I revise the properties encompassed by specificity that were previously presented in §6.1, and I exemplify each one with an LSC minimal pair.

### 6.2.1 Scope

As presented at the beginning of this chapter (see §6.1.1), specific DRs are formally represented with wide scope variables, while non-specific DRs are represented with narrow scope ones.<sup>5</sup> In intensional contexts, English indefinite NPs can have a double reading, namely a specific and a non-specific one. This differs from

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<sup>5</sup> Cases of intermediate scope, such as (i), where the indefinite NP “a student of mine” has narrow scope w.r.t. to the DR teacher, and wide scope w.r.t. the *that*-clause (Kratzer, 1998), are outside the scope of this dissertation and merit further investigation.

(i) Each teacher overheard the rumor that a student of mine had been called before the dean.



indefinite NPs in LSC, which do not have an ambiguous reading, because specificity is overtly encoded. To see this more clearly, I will exemplify it with a minimal pair.

(19) is about a concrete, specific cat the signer has in mind. The signer first localises the nominal by means of an eye gaze towards the contralateral part which co-occurs with the realisation of the verb WANT (Figure 6.3a) and the verb BUY (Figure 6.3b). Next, the pronominal index sign co-occurs with a body lean towards the contralateral part again (Figure 6.3c). Importantly the direction of localisation signs coincides in the three mechanisms of localisation, namely eye gaze, body lean and index signs, and this is precisely what is required for the proper creation of the contralateral spatial location (p). The clear marking of both manual and non-manual signs directed to space in (19) allows the creation of a spatial location, which constitutes the overt manifestation of a specific DR corresponding to the cat the signer is talking about.

(19)

\_\_\_\_\_eg:cl \_bl:cl  
 IX1 CAT WANT BUY. IX3<sub>cl-l</sub> CHARACTER OBEDIENT  
 ‘I want to buy a cat<sub>spec</sub>. It is very obedient.’<sup>6</sup>

(D\_gat\_esp 00:01)

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<sup>6</sup> I have opted to analyse this segment and followings as two single sentences because of the prosodic marking. But whether this should be treated as a relative clause is still a matter of debate which is outside the scope of this dissertation.

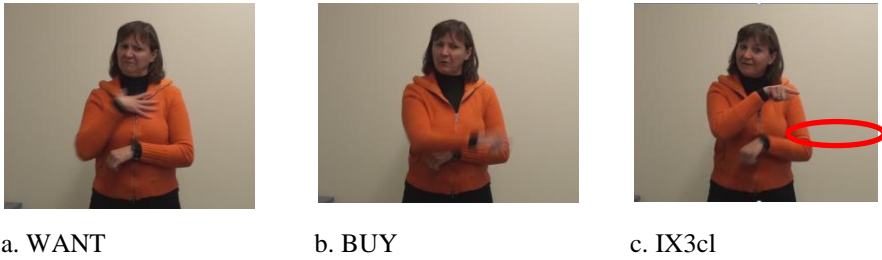
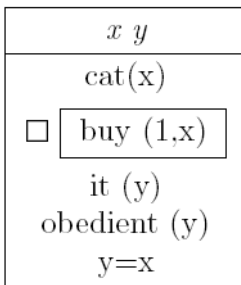


Figure 6.3 Localisation of a wide scope DR

The implementation of specificity marking is formally represented with a variable appearing in the main DRS. The existential quantifier associated with the variable has wide scope over the other possible embedded variables in the subordinated DRS (20). This is a global DR that appears in the main DRS.

(20)



This example contrasts with the minimal pair in (21) in which the signer is referring to a non-specific, unidentifiable cat. Non-specificity is directly marked in the signs directed to space in LSC. When the signer utters the nominal CAT she only directs a single eye gaze to the ipsilateral upper part (Figure 6.4a). She then directs the indefinite determiner IX3.pl to the ipsilateral upper part (Figure 6.4b). In following discourse no eye gaze or body lean is directed to

any direction in space. When the modal verb **MUST** is uttered it does not co-occur with other non-manuals directed to any spatial direction (Figure 6.4c). Due to the few morphophonological marking towards the upper part, the upper spatial location (p)[up] in (21) is very weakly established. This constitutes the overt manifestation of a non-specific DR which has narrow scope.<sup>7</sup>

(21)<sup>8</sup>

*\_eg:ipsi-u*

CAT IX3.pl<sub>u-ipsi</sub> IX1 WANT BUY. MUST CHARACTER OBEDIENT.

‘I want to buy a cat<sub>nonspec.</sub> It must be obedient.’

(D\_gat\_noesp 00:01)



Figure 6.4 Localisation of a narrow scope DR

This is formally implemented with a subordinate variable in (19) which is embedded under the necessity operator corresponding to a

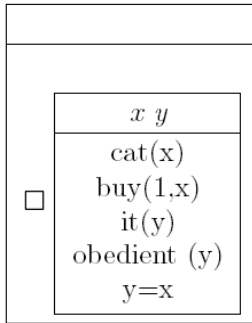
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<sup>7</sup> Interestingly, in this minimal pair a resumptive pronoun is present in the specific version (24), whereas there is a null argument in the non-specific sentence (26). Relating the use of the referring terms with specificity marking is outside the scope of this dissertation.

<sup>8</sup> As noted in the Annotation conventions (page xiv), signs directed towards the upper frontal plane of sign space are represented with *u*.

local DR. The variable can only occur within the embedding of an operator and it is thus infelicitous outside its scope.

(22)



This minimal pair shows that scope differences are marked on the LSC frontal plane. Signs localised within the lower part mark wide scope which results into a specific reading, while signs directed towards the upper part contribute to a weakly established location analysed as narrow scope denoting non-specificity.

### 6.2.2 Partitivity

Indefinite NPs receive a partitive interpretation when the denotation of the NP is included within a given set (see §6.1.2). In LSC there is a difference between NPs which have a specific restriction of a quantified NP and those which do not have such a restriction. This is marked in LSC with a difference in the two opposed directions of the frontal plane. Under the restriction of a quantified NP, LSC localisations use the lower frontal plane. When there is no such restriction, the upper frontal plane is used (Quer, 2010).

## 6.2 Specificity in LSC

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In (23) the determiner *SOME* quantifies over the common noun *FRIENDS*. The determiner is articulated towards the ipsilateral side of the lower frontal plane by means of eye gaze and body lean directed to it. This complex NP denotes a specific DR, namely a set formed by a concrete group of people.

(23)

GROUP<sub>ip-1</sub> FRIEND SOME<sub>ip-1</sub> INSIDE IX3<sub>c</sub> HIDE DURING YEAR-TWO.

‘Some of the friends were hidden there for two years.’

(A\_AF 00:44)



a. FRIEND

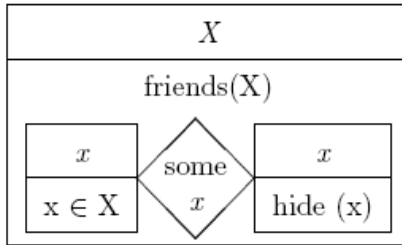


b. SOME<sub>ip-1</sub>

Figure 6.5 Quantified NP for a specific DR

*SOME* is a subset of the set denoted by the NP. This is shown in the corresponding DRS by the relation  $x \in X$  where  $X$  corresponds to a non-atomic variable that is projected to the main universe.  $x$  is an atomic variable and hence a subset of  $X$ . It does not appear in the main DRS but it belongs to the set, as the formula  $x \in X$  indicates. In the actual LSC signing a set that belongs to another set involves the creation of a (p) on the lower frontal plane, as shown in Figure 6.5b.

(24)



In contrast, in (25) the signer is referring to a non-concrete, non-specific DR. He refers to a group of people which does not belong to a determined set. To refer to it, he directs an index plural sign towards the upper ipsilateral part. The localisation is only realised manually with the index sign, and no eye gaze or body lean is directed to the upper location, as illustrated in Figure 6.6.

- (25) IX3<sub>ip-u</sub> plu SOME 1-DENOUNCE-3<sub>ip-u</sub> IX3-c THERE-IS.  
 ‘Someone denounced they were there.’  
 (A\_AF 11:54)



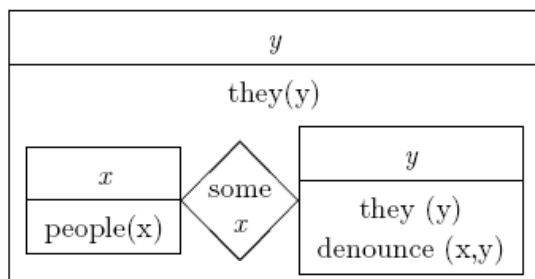
IX3<sub>ip-u</sub> plu

Figure 6.6 Quantified NP for a non-specific DR

The sentence in (25) denotes a non-specific DR which does not belong to a contextually determined set. This absence of contextual

determinacy is manifested in the actual LSC signing by establishing (p)[up] on the upper frontal plane. In the corresponding DRS, this is represented with an embedded variable under the scope of the quantifier which does not belong to any set from the main DRS, as indicated in (26).

(26)



The previous minimal pair is a representative example of the distinction between partitive cases found in our LSC small-scale corpus. The lower frontal plane is not only used to denote wide scope cases, but also partitivity. In contrast, the upper frontal plane is used to denote both non-partitivity and narrow scope. As we will see in the following subsection, the expression of identifiability is also divided between the two parts of the frontal plane.

### 6.2.3 Identifiability

Identifiability has been defined as the interpretive property of those indefinite NPs known by the sender (see §6.1.3). Interestingly, LSC overtly encodes the information that is identified by the signer and distinguishes it from what is not known by the signer. Thus as seen

in chapter 5, no distinction is made between the knowledge of the signer and that of the addressee. Rather the establishment of lower and upper locations mark the distinction between what the signer knows and what the signer does not know, respectively.

In the fragment in (27) the signer is talking about a pen-drive. After explaining what this gadget is used for, she explains to which person she will offer it to. The person the signer is talking about is an identifiable person. That is, a concrete person that the signer has in mind. She knows that the person she is talking about works with computers, and that it will be a very appropriate present. The DR is first referred to with an indefinite NP introduced by ‘ONE PERSON-3<sub>cl</sub>’. The localisation process is done both with manual and non-manual mechanisms. On the one hand, she directs the agreement verb 1-OFFER-3<sub>ip-1</sub> and the sign PERSON-3<sub>ip-1</sub> towards the ipsilateral part. On the other, eye gaze and body lean are also directed to the same side (Figure 6.7). Hence, (p) is established

(27)

\_\_\_\_\_eg:ip-1  
IX1 1-OFFER-3<sub>ip-1</sub> ONE PERSON-3<sub>ip-1</sub> PEN-DRIVE COMPUTER PEN-DRIVE

\_\_\_\_\_eg:ip-1 \_\_\_\_\_eg:ip-1  
1-OFFER-3<sub>ip-1</sub>, BECAUSE PERSON-3<sub>ip-1</sub> ALWAYS++ WORK THEME

IS/SAME COMPUTER.

\_\_\_\_\_eg:ip-1  
PEN-DRIVE ADEQUATE IX1 1-OFFER-3<sub>ip-1</sub> IX3<sub>ip-1</sub> PEN-DRIVE

‘I will offer the pen-drive to someone, since he/she/this person always works with computers. I find it very adequate to offer the pen-drive to him/her.’

(P\_Obj 00:01)



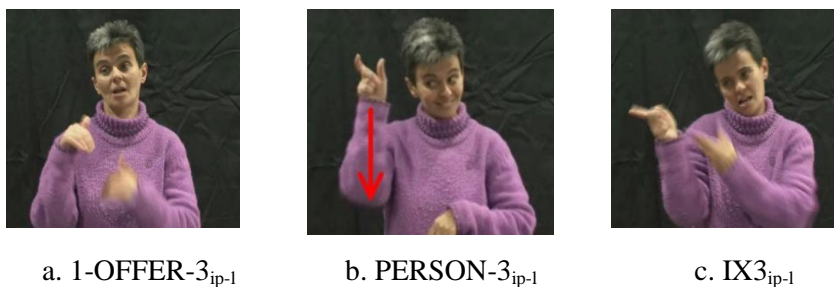


Figure 6.7 Identifiable DR

Figure 6.7 shows that in this LSC fragment the signer establishes a (p) in the ipsilateral part that corresponds to an identifiable DR. This spatial location is available for further co-reference, as exemplified in the second utterance in (27) where a resumptive pronoun is directed back to it (Figure 6.7c).

The corresponding semantic representation places a wide scope variable in the main DRS, which is available for further co-reference as the identity relation  $z=x$  shows. Again, there is a correlation between placing a variable in the main DRS and establishing a lower spatial location in actual signing (Figure 6.7).

(28)

x, y, z
person (y)
pen-drive (x)
offer (1,x,y)
work-computer (y)
offer-adequate (1,x,z)
$z = y$

The establishment of this global DR contrasts with a minimal pair example found in the small-scale corpus. In this case, the signer is talking about a book and explains to which person he would offer it

to. The indefinite NP the signer uses to refer to the person has a clear non-specific interpretation, as marked in the translation and the glosses in (29). This non-specific interpretation is derived from the localisation process. The first instance of PERSON-3 (Figure 6.8a) is localised with a very slight eye gaze co-occurring with it and directed towards the ipsilateral part. In the second instance of the sign PERSON-3 (Figure 6.8b) the nominal is localised with eye gaze towards the centre of sign space, instead of towards the ipsilateral side as in the first instance. The subsequent signs are directed towards the contralateral part (Figure 6.8c) and then towards the centre again (Figure 6.8d). Hence eye gaze is not directed to a concrete spatial direction, but instead it moves in different directions towards the upper frontal plane (Figure 6.8). As a consequence, (p)[up] is very weakly established.

(29)

\_\_\_\_\_eg:book \_\_\_\_\_eg:ip-u  
 IX1 THINK IX3 BOOK 1-OFFER-3 ADEQUATE PERSON-3<sub>ip-u</sub>  
 \_\_\_\_\_eg:cl-u \_\_\_\_\_eg:c  
 MUST PERSON-3<sub>cent</sub> LIKE HOBBY IS/SAME TRADITIONAL PAST  
 \_\_\_\_\_eg:ip-l  
 SAME/ALWAYS. IX3<sub>ip-l</sub> IX1 1-OFFER-3 PERSON-3<sub>ip-l</sub> IX3<sub>ip-l</sub>

‘I think that I would offer this book to someone<sub>non-spec...</sub>  
 It must be someone who likes traditional things.  
 Definitely, I would offer it to him/her.’

(S\_Obj 00:42)

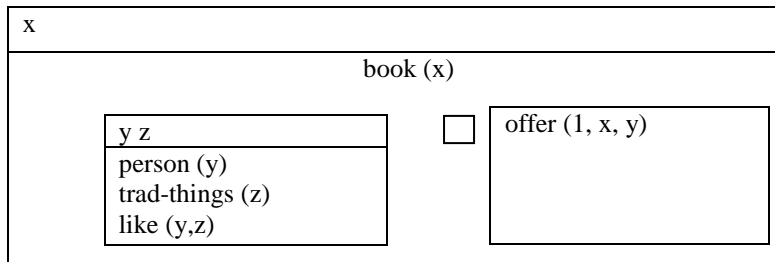
## 6.2 Specificity in LSC



Figure 6.8 Non-identifiable DR

The corresponding DRS places a variable for the unidentifiable DR in an embedded DRS. Hence it does not appear in the main universe of discourse, but rather in a subordinated context corresponding to the embedded box for the antecedent. This local variable is dependent on the operator.

(30)



As the DRSs in (28) and (30) show, the scope of  $y$  is different. While in (30)  $y$  has narrow scope and it is thus interpreted as an unidentifiable DR (i.e. the sender cannot identify it from other DRs present in the model), in (28)  $y$  has wide scope and it is interpreted as an identifiable one (i.e. the sender does have a concrete entity in mind). Since non-identifiable DRs correspond to narrow scope variables, a coreferential pronoun in further discourse has to be under the scope of the modal operator too, as shown in (31a).

Outside the scope, the uptake is not felicitous (31b) (in §6.3.3.2 modal subordination contexts are treated in more detail).

- (31) I would offer this book to a person who likes traditional things.
- a. He must be smart.
  - b. #He is smart.

In short, the direction of eye gaze towards the upper frontal plane and (p)[up] being weakly established stand in direct relation with the introduction of the variable in an embedded context. Hence, upper space and weakly established location are overt markings for narrow scope contexts to denote non-identifiable DRs in LSC. For now, it is sufficient to assume that non-identifiable DRs weakly establish a location on the upper frontal plane, but in §7.3 it will be proven that embedded variables can also strongly establish a location on the lower frontal plane as long as they denote the discourse topic.

On the basis of the minimal pairs presented in this section, it is fair to say that the position of the spatial location in the frontal plane in LSC stands in direct relation with specificity. The lower frontal plane is associated with scopally specific (i.e. wide scope) and identifiable DRs, as well as with a restriction of the quantified NP. In contrast, within the upper frontal plane there is no such restriction and this is thus associated with scopally non-specific (i.e. narrow scope) and non-identifiable DRs. This distinction derives into a localisation pattern based on the direction of the localisation

of signs (whether they are directed towards the lower or the upper part) and also according to the amount of morphophonological features directed to both directions. The presentation of the LSC localisation pattern is the main concern of the following section but before delving into it, a final note is devoted to argue in favour of a denotation of non-specificity marking of the upper frontal plane, rather than narrow scope marking.

### **6.2.4 Narrow scope marking (or what this chapter is not about)**

As stated in non-specificity version of *The discourse referent hypothesis*, this chapter argues that in LSC narrow scope denoting non-specificity is expressed with index signs directed to the upper part of the frontal plane. The immediate question that arises here is whether these upper locations stand for non-specificity marking, for narrow scope marking in general, or even for a concrete kind of definite NPs, the so-called weak definites. In this section I show that the upper frontal plane does not stand for a marking of narrow scope in general because other phenomena which can be explained through narrow scope are not marked on the upper frontal. For instance, narrow scope is also one of the main features of weak definites, such as “(take) the train” or “(read) the newspaper” in English. Since the use of the upper part of the frontal plane is an indication of narrow scope too, a revision of the main features which characterise weak definites is needed in order to reject (or not) the possibility that we are dealing with narrow scope marking when using the upper frontal plane. In the following we will see that since the features related with weak referentiality, and more

concretely with weak definites, are not found on the upper locations, we are definitely dealing with a specificity distinction.

Although they are very similar in form, weak definites and regular definites have some distinguishing properties. Weak definites in Dutch and English (i) take narrow scope (32a); (ii) occur with a restricted class of nouns which lexically determine the construction (32b); (iii) only allow modification that yields a subclass (32c) (see Carlson & Sussman, 2005), and (iv) have limited capacities to establish DRs (32d) (Scholten & Aguilar-Guevara, 2010).

- (32) a. Every student took the train<sub>wdef</sub>  
b. Mary went to the store<sub>wdef</sub> vs. Mary went to the desk  
c. Lola is in the psychiatric hospital<sub>wdef</sub> vs. Lola is in the big hospital  
d. ??Lola is still at school<sub>i</sub> because today her class had to help to clean it<sub>i</sub>.

(32a) can be paraphrased as “for every student there is a train they took”, showing that weak definites take narrow scope. (32b) shows that there is a distinction between the kind of noun which is used in weak definite readings, such as *the pen*, *the radio*, or *the hospital*, which is contrasted with regular definites, such as *the cage*, *the tape-recorder*, or *the building*. (32c) shows that the kind of modification co-occurring with weak definites can only yield a subclass and thus regular modifiers such as *new*, *big*, and *green* do not derive into a weak definite reading. Finally, (32d) shows that the sequence where a weak definite establishes a DR which is picked up by a resumptive pronoun does not sound very natural.

Although in chapter 5 it has been shown that LSC spatial locations do not encode definiteness, here I am testing whether the upper locations are a phenomenon related to weak referentiality. Hence, I am using the distinguishing properties attached to weak definites to determine whether or not we are dealing with such phenomenon. Thus I will test the kind of nouns which can be localised on the upper frontal plane, the kind of modification allowed as well as the possibility of establishing a DR.

In LSC, spatial locations established on the upper frontal plane are not restricted to a class of nouns, which have been used in the literature to distinguish the nouns that are used as weak definites, such as *the pen*, *the radio* or *the hospital* (Carlson & Sussman, 2005; Schulpen, 2011). Nouns considered to form a restricted class as *pen* and *hospital* (33a) and (34a), as well as the ones considered to be regular definite nouns, such as *cage* and *building* (33b) and (34b) can be both localised on the upper frontal plane.

- (33) a. IX1 LOOK-FOR IX3<sub>u</sub> PEN  
'I am looking for a pen.'
- b. IX1 LOOK-FOR IX3<sub>u</sub> CAGE  
'I am looking for a cage.'
- (34) a. IX1 FIND IX3<sub>u</sub> HOSPITAL NEED  
'I need to find a hospital.'
- b. IX1 FIND IX3<sub>u</sub> BUILDING NEED  
'I need to find a building.'

It has been suggested that weak definites can be modified as long as the modifier establishes a subkind of the noun it modifies (Aguilar-Guevara & Zwarts, 2010; Schulpen, 2011). Unlike weak definites, upper locations allow any kind of modification, and not only the one that yields a subclass. The LSC examples below show that subclass modification (35a) and (36a), as well as regular modification (35b) and (36b) are grammatically localised on the upper frontal plane.

(35)

- \_\_\_\_\_br  
a. CAT PERSIAN IX3<sub>u</sub> IX1 WANT BUY.  
‘I want to buy a Persian cat<sub>wdef</sub>’
- \_\_\_\_\_br  
b. CAT FAT IX3<sub>u</sub> IX1 WANT BUY.  
‘I want to buy a fat cat.’

(36)

- \_\_\_\_\_br  
a. RESTAURANT TURKEY IX3<sub>u</sub> IX1 WANT EAT.  
‘I want to eat at a Turkish restaurant<sub>wdef</sub>’
- \_\_\_\_\_br  
b. RESTAURANT CALM IX3<sub>u</sub> IX1 WANT EAT.  
‘I want to eat at a calm restaurant.’

Hence the upper frontal plane does not respect the criteria established for weak referentiality marking. More importantly, weak definites in LSC are not established in sign space, but rather realised in neutral space without having a corresponding spatial



location.<sup>9</sup> Examples (33) to (36) prove that the upper frontal plane does not stand for narrow scope marking, but it rather stands for narrow scope marking denoting non-specificity. Moreover the upper spatial locations are not limited with respect to the establishment of DRs, and as shown in (26) indefinite NPs established in the upper space in LSC can be further referred back to by a resumptive pronoun as long as the corresponding variable is under the scope of an operator. This I take to be an important distinction with respect to weak referentiality.

On a final note, in §4.3 I have shown some arguments where narrow scope marking does not have an upper location establishment. In fact, we have seen that when the DR inserted in contexts of donkey sentences, generic NPs and quantified NPs there is a lack of spatial locations establishment. This also points towards the hypothesis that upper locations stand for non-specificity, rather than narrow scope marking in general, since narrow scope also entails lack of location establishment. Also following this reasoning, in §6.3.3.2 I will also show that modal subordination contexts, which also share the property of narrow scope, are marked with a lower spatial location, rather than an upper one. Once the arguments for non-specificity marking are clear, it is now time to present the localisation pattern this chapter argues for.

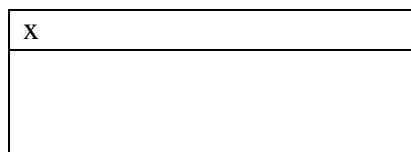
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<sup>9</sup> As presented in §4.3.5, reference to kinds in LSC does not have either a corresponding spatial location established. This is evidence towards the hypothesis which analyses weak definites as reference to kinds (Aguilar-Guevara & Zwarts, 2010).

### 6.3 Localisation pattern

In the previous section it has been shown that the expression of specificity in LSC can be analysed taking into consideration three properties that specificity encompasses, namely scope, partitivity and identifiability. In this section we will see that the expression of specificity in LSC can be accounted through a localisation pattern. What I call *strong localisation* consists in a kind of localisation established with localised signs directed to the lower frontal plane and quite a lot of morphophonological mechanisms also directed to it simultaneously. As a consequence, (p) is strongly established. This contrasts with *weak localisation* in which the spatial location is weakly established with localised signs directed to the upper frontal plane and very few mechanisms are directed to it which do not simultaneously co-occur. As a consequence, p[up] is very weakly established. This localisation pattern is associated with specificity marking. Strong localisation expresses specific DRs and can be accounted through wide scope, partitivity and identifiability. The semantic representation of strong localisation is shown in (37), where the variable appears in the main DRS and has wide scope over the embedded variables.

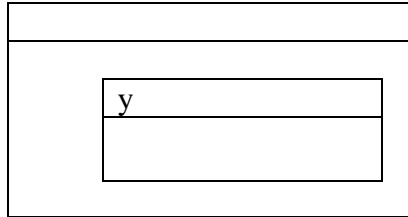
(37)



Weak localisation expresses non-specificity and it is explained through narrow scope, non-partitivity and non-identifiability. This

is implemented in DRT with a variable embedded in a subordinated DRS, as shown in (38).

(38)



The localisation pattern is motivated by the analysis of corpus data and the association with specificity interpretation. In the next subsections the systematic and compositional combination of the morphophonological features which contribute to specificity readings is first presented. Second, the categories which can be spatially modified within the localisation pattern are analysed (see §6.3.2). And third, the dual nature of localisation in LSC is further motivated by arguing through examples coming from modal subordination and the combination between non-specificity and partitivity (see §6.3.3).

### 6.3.1 Compositional analysis of the data

The morphophonological features of weak and strong localisation can be divided into five main components, which can be grouped as follows:

- i) Direction of signs towards the frontal plane
- ii) Amount of mechanisms directed to space
- iii) Eye gaze duration
- iv) Co-occurrence of mechanisms
- v) Coincidence of direction

These features are systematically and componentially combined to denote meaning. That is, specificity interpretation is overtly encoded by the combination of the above cited features. Each feature contributes to the construction of specificity interpretation as a whole. In what follows they are treated in detail one by one.

### *6.3.1.1 Direction towards the frontal plane*

Both manual and non-manual linguistic elements can be directed to sign space. In order to indicate different locations established on the frontal plane many elements can be used, such as index signs, spatially modified signs, agreement verbs, as well as eye gaze, body lean and head tilt. In LSC the frontal plane can be marked by some of these mechanisms as shown in the Figures below. Figure 6.9 shows both manual and non-manual mechanisms directed towards the lower part of the frontal plane, which correspond to a strong localisation. As already stated in §3.3 the distinction between signs directed towards the ipsilateral and contralateral parts of the horizontal plane are not contrastively relevant for the grammar of LSC, but rather the lower and upper areas of the frontal plane.



Figure 6.9 Strong localisation and use of lower frontal plane

### 6.3 Localisation pattern

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The upper frontal plane can also be indicated by both manual and non-manual features. Figure 6.10 also shows mechanisms directed towards the upper part, which correspond to a weak localisation.

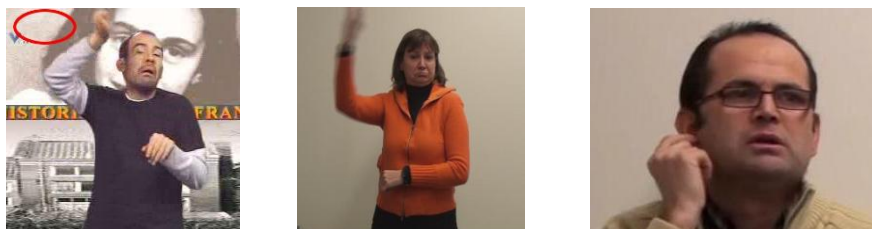


Figure 6.10 Weak localisation and use of upper frontal plane

As seen in the previous section, the distinction between the two directions within the frontal plane is associated with specificity interpretations. While localisation on the lower frontal plane is used for specific readings, localisation on the upper frontal plane is used for non-specific readings. The former are instances of strong localisation, and the latter are localised by means of weak localisation. A detailed observation and analysis of our LSC small-scale corpus shows that both manual and non-manual mechanisms are directed to the two parts of the frontal plane. Table 6.1 below shows the instances of indefinites found in the LSC corpus (32). Among the indefinites which correspond to a strong localisation and thus have a specific interpretation, 22 out of 22 are localised on the lower frontal plane. Concerning the indefinites that correspond to a weak localisation and have a non-specific interpretation, 8 out of 10 instances of indefinites are localised on the upper frontal plane.

<b>Indefinite NPs</b> / 32	Specific interpret. / 22	Non-specific interpret. / 10
Lower frontal plane	22	2
Upper frontal plane	0	8

Table 6.1 Indefinites localised on the lower/upper frontal plane

Interestingly, the fact that two instances of indefinite NPs are articulated on the lower frontal plane is not due to a random behaviour of index signs. Their direction towards space in non-descriptive localisation is very systematic, as already argued in §3.3. These two instances occur in contexts where the signer is talking about a non-specific entity and, although it is not an identifiable and concrete DR, the discourse is centred around it. The DR appears under an intensional verb and it has a non-specific interpretation but this is not incompatible with being the entity the discourse is about, and hence with being localised on the lower frontal plane. They are instances of modal subordination contexts (Roberts 1986, 1989) and section §6.3.3.2 is devoted to this issue.

#### *6.3.1.2 Amount of mechanisms*

The difference between weak and strong localisation is also distinguished by the amount of morphophonological mechanisms directed to space in each case. Concerning strong localisation, the spatial location is more properly established due to a coincidence of more than two mechanisms which simultaneously co-occur directed towards the same spatial area. They are directed towards the lower frontal plane. On the other hand, concerning weak localisation the spatial location is weakly established since only very few mechanisms are used, which very rarely co-occur. Also the

## 6.3 Localisation pattern

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movement of the manual sign and eye gaze do not have the same direction. They are both directed to the upper frontal plane, but there is no coincidence in the axis direction in sign space. While the manual sign points towards one direction, the non-manual consists in a darting eye gaze that moves around in the upper space. The amount of simultaneous mechanisms used during both localisations is presented in the following table. The instances of indefinites which receive a specific interpretation incorporate a higher number of mechanisms during the localisation process. Whereas specific interpretations are characterized by a localisation with at least two mechanisms, which results in a strong localisation, non-specific interpretations generally have no more than two mechanisms and it thus results in a weak localisation.

<b>Number of mechanisms</b>	Specific interpret. / 22	Non-specific interpret. / 10
1	1	3
2	7	6
3	14	1

Table 6.2 Number of mechanisms used simultaneously in indefinites

Thus strong localisation that corresponds to a specific interpretation is characterised by two or more mechanisms, whereas weak localisation corresponding to non-specificity is featured by two or less mechanisms.

### *6.3.1.3 Eye gaze duration*

As said in §3.2, non-manual mechanisms are crucial for the localisation process. When an indefinite NP has a specific

interpretation, eye gaze towards the strongly established location is longer than when it has a non-specific interpretation. In fact, indefinites interpreted as non-specific only have a weakly established location and eye gaze directed to it is very brief. But once this brief eye gaze is directed to the weakly established location, a darting eye gaze is directed afterwards towards the upper frontal plane from one lateral part to the other. This darting eye gaze lasts longer but it is not fixed to any concrete spatial area.

The following table presents the difference in eye gaze duration for indefinite NPs. Eye gaze towards the spatial location in specific readings doubles the time of eye gaze directed to a spatial location within non-specific readings. However, eye gaze in non-specific interpretations, after being briefly directed to the upper location, moves around in sign space from one lateral part to the other, without being fixed in a single direction. This darting eye gaze is quite long and in our small-scale corpus it is never articulated within specific interpretations. The longer eye gaze directed to a spatial location contributes to the strong establishment of a location which stands for the manifestation of a DR interpreted as specific. In contrast, the short eye gaze fixed to a location and the subsequent darting eye gaze, which moves around on the upper frontal plane, contributes to the weak establishment of a location that stands for a non-specific DR.



### 6.3 Localisation pattern

<b>Indefinite NPs</b>	Specific interpret.	Non-specific interpret.
Eye gaze duration to spatial location (ms)	431	268
Darting eye gaze	-	2015

Table 6.3 Eye gaze duration

#### *6.3.1.4 Simultaneity and coincidence in direction*

Localisation is often realised with manual and non-manual marking. In our small-scale LSC corpus, spatial locations which correspond to a specific interpretation are established with simultaneous realisation between manual and non-manual marking. This simultaneity is less frequent when the interpretation is non-specific. Also whenever there is more coincidence in the direction towards space of manual and non-manual marking, it corresponds to a specific interpretation. When the coincidence in direction is almost absent, the DR is interpreted as non-specific.

<b>Indefinite NPs</b>	Specific interpretation	Non-specific interpretation
Simultaneous occurrence of manual and non-manual marking	20	12
Coincidence of direction of manual and non-manual marking	30	2

Table 6.4 Simultaneous co-occurrence with manual component

Due to the great coincidence in direction and simultaneity, a spatial location is established which corresponds to a specific interpretation. This spatial location is strongly established on the lower frontal plane, and this is the direction towards which index signs, eye gaze and other localisation mechanisms are directed to.

On the contrary, the lack of coincidence in direction and of simultaneity between the manual and the non-manual component in non-specific interpretations result in the lack of a discrete, identifiable spatial location. Eye gaze is very short and, since there is not a concrete and well-established spatial location, it is only directed briefly to the weakly established spatial location. Moreover, eye gaze darts around towards the upper frontal plane denoting that a concrete spatial location is only weakly established. These phonological differences result in the distinction this chapter argues for, namely strong vs. weak localisation, which is characterised by the pairing between the features described so far and the semantic interpretation (i.e. expression of specificity).

In the first chapter of this dissertation (see §1.4) I already indicated that the data used is taken from a small-scale LSC corpus. The main aim has been to develop a qualitative study by observing and analyzing the tendencies that naturalistic, semi-spontaneous and elicited data can provide. The quantification shown in the previous tables should be taken as a strong tendency of real data which is associated with a theoretical model to account for specificity marking. A follow-up study based on a yet non-existent large LSC corpus should help confirm the generalisations and the analysis provided here on the basis of naturalistic data. Yet this strong tendency can be summarised as follows:

- (39) Localisation pattern: morphophonological data analysis
- a. **Strong localisation**
    - Direction towards the lower frontal plane
    - Movement of manual signs and non-manual (especially eye gaze) have the same direction
    - Eye gaze is longer fixed and targets a spatial location
    - High number of localisation mechanisms ( $x \geq 2$ ) are simultaneously combined
    - Spatial location well established
  - b. **Weak localisation**
    - Direction towards the upper frontal plane
    - Movement of manual signs and non-manual signs (especially eye gaze) do not have the same direction
    - Eye gaze is very short and does not target a spatial location; it rather darts around
    - Few localisation mechanisms are used ( $x \leq 2$ ), and lack of coincidence among them
    - Spatial location weakly established

As it is clear at this point of the argumentation, each localisation encompasses the specificity properties previously defined (see §6.1). On the one hand, strong localisation is used to denote specific and identifiable DRs. It is used in partitive constructions, to denote contextual determinacy. This contrasts with weak localisation which, on the other hand, is used to denote non-specificity and non-identifiability. Within weak localisation, DRs do not belong to a contextually determined set. Moreover, weak localisation is instantiated by the feature (p)[up] and strong localisation is instantiated by the feature (p) already introduced in §3.4. The establishment of these two features is instantiated by the two kinds of localisation defined so far. In fact, weak and strong localisation are not only distinguished by the direction on the frontal plane and the amount of morphophonological features directed to it, but also

by the kind of grammatical elements that can be localised on each part. Below the restrictions that each localisation impose on signs are presented.

### 6.3.2 Spatially modified categories

The morphemes (p) and (p)[up] established with strong and weak localisation respectively add different constraints on the categories they can be attached to. The morpheme (p) established with strong localisation does not add any restriction on the kind of grammatical elements that can be related to it, since both lexical and functional categories can be directed to it. In contrast, the morpheme (p)[up] established in weak localisation imposes some restrictions and as will be shown below only functional elements can be associated with it.

As for the (p) morpheme established with strong localisation, there is no restriction concerning the linguistic categories which can be spatially modified. Non-anchored common nouns, plain verbs and entity classifiers, as well as determiners and verb agreement can be strongly localised. More specifically, the sign itself can be spatially modified, or it can also be established on space with non-manuals or with the co-occurring determiner. In (40a) the noun is spatially modified, and in (40b) it is the determiner which is spatially modified, as the subindices in the glosses indicate.<sup>10</sup>

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<sup>10</sup> Since in this section only the features [low] and [up] are relevant, the glosses are only marked with the corresponding indices (i.e. l, u) and ipsilateral and contralateral are left aside for the interest of simplicity.

- (40) a. HOUSE<sub>l</sub>  
b. HOUSE IX3<sub>l</sub>

Plain verbs (i.e. the type of verbs which do not agree for subject and object (see §3.2.3) can also be spatially modified and hence localised on the lower frontal plane.

- (41) a. CONSTRUCT<sub>l</sub>  
b. THERE-IS<sub>l</sub>

However, lexical categories cannot be localised on the upper part, and any attempt to spatially modify non-anchored nouns, plain verbs or entity classifiers towards the upper frontal plane feature results in an ungrammatical construction.<sup>11</sup> Non-anchored common nouns or plain verbs cannot be incorporated to the clitic (p)[up] to denote non-specificity, as shown in the ungrammatical examples in (42). Rather, only the determiner co-occurring with the noun can be weakly localised (43).

- (42) a. \*HOUSE<sub>u</sub>  
b. \*CONSTRUCT<sub>u</sub>  
c. \*THERE-IS<sub>u</sub>

- (43) IX3<sub>u</sub> HOUSE

---

<sup>11</sup> Recall that here I am only dealing with non-descriptive localisation denoting non-specificity. In contexts of descriptive localisations, entity classifiers can be localised in an upper part to denote a descriptively higher location, as argued in §2.3.1. Descriptive locations, though, are totally unrelated to non-specificity marking.

A distinction is thus established: while the feature [low] can be attached to lexical categories, [up] cannot. However, the situation is slightly different when we focus on functional categories. In LSC functional elements such as determiners and verb inflection can establish (p), as well as (p)[up]. As for inflection, agreement verbs (i.e. a type of verbs which are inflected for subject and object) can be both localised on the lower and on the upper frontal plane, but a different interpretation is conveyed. The interpretation that we get with (p) corresponds to a specific reading (44a), while the interpretation that we get with (p)[up] corresponds to a non-specific one (44b). Unlike with plain verbs, the feature [up] can be attached to verb inflection denoting a non-specific interpretation. Hence while lexical categories cannot have the [up] feature, functional categories can.

- (44) a. 3<sub>l</sub>-ADVISE-1  
‘Some specific person advised me’
- b. 3<sub>u</sub>-ADVISE-1  
‘Some non-specific person advised me’  
(adapted from Quer, 2010)

Another inflectional category which can be linked to [up] is a restricted set of determiners. Weak determiners (Milsark, 1974) are grammatically localised both on the lower and the upper frontal plane. LSC weak determiners, such as ONE, ANY, SOME, ONE+++ (‘few’) can be attached to both [low] and [up].

- (45) a. HOUSE SOME<sub>l</sub>, HOUSE FEW<sub>l</sub>, HOUSE ANY<sub>l</sub>  
 b. HOUSE SOME<sub>u</sub>, HOUSE FEW<sub>u</sub>, HOUSE ANY<sub>u</sub>

Weak determiners are ambiguous between denoting presupposition and assertion (Diesing, 1992). In LSC this ambiguity is resolved by the spatial modification. When the weak determiner is established on the lower frontal plane (43a), a presupposition reading arises, and hence the DR denotes that there exists an entity under discussion. Examples in (43a) can thus be paraphrased as “some of the houses”, “few of the houses” and “any of the houses” since a restriction on the quantified NP is overtly expressed with a localisation on the lower part. When no such restriction is present, this is also overtly expressed in the determiner system with a weak determiner directed towards the upper part. The non-presupposition of existence is marked with the spatial modification of determiners towards the upper part (43b). Hence the upper part denotes non-contextual determinacy and examples in (43b) are paraphrased as “some houses”, “few houses”, “any house”.<sup>12</sup> This shows that the morphophonological feature [low] cliticised to the determiner as well as on the verbal inflection denotes contextual determinacy and specificity, whereas the feature [up] is associated with non-contextual determinacy and non-specificity (46).

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<sup>12</sup> In LSC, the sign glossed as MATEIX may be analysed as a determiner (Mosella, 2012). It is interesting to note that this sign can never co-occur with a nominal established on the upper frontal plane.

- (46) a. FRIEND SOME<sub>u</sub>  
       ‘Some<sub>non-spec</sub> friends’
- b. STUDENT ONE<sub>u</sub>  
       ‘One<sub>non-spec</sub> student’

As for strong determiners, they are much more restricted in that they can only occur on the lower frontal plane (47a). As shown in (47b), strong determiners spatially modified towards the upper part are considered to be ungrammatical.

- (47) a. FRIEND MOST<sub>l</sub>, HOUSE HALF<sub>l</sub>  
       b. \*FRIEND MOST<sub>u</sub>, \*HOUSE HALF<sub>u</sub>

This restriction shows that the presupposition of existence that strong determiners denote cannot be grammatically encoded on the upper part. Moreover, whenever a strong determiner is spatially modified towards a lower spatial location, only a restricted set of elements is denoted. In (48) not most students in the universe are intended but rather only the set under discussion. This restriction of the set is overtly encoded with the determiner MOST being spatially modified and hence with the spatial morpheme [low].

- (48) \_\_\_\_\_br  
 STUDENT, MOST<sub>l</sub> COME.  
 ‘Most students came.’ (D\_Maj 00:01)

Since the morpheme [low] marks domain restriction, a universal determiner localised on the lower frontal plane denotes that the set



referred to is not empty, and thus it refers to a contextually determined set.

In LSC the spatial morpheme (p) established on the lower frontal plane denotes a DR. It is used to denote definites as well as specific indefinites. It marks that the DR is in the model, and no distinction between knowledge of the sender or the addressee is made. Once the entity is introduced into the model, this is not formally distinguished in LSC. Hence since it is included in the model, it is restricted within a domain, and this domain restriction is in fact marked by the spatial morpheme established on the lower frontal plane. On the contrary, I consider the (p)[up] is established by some functional categories only. [up] is a marked feature denoting absence of domain restriction. Since there is no restriction in the domain, NPs localised with (p)[up] are used to denote non-specific DRs. Hence the feature [low] combines with lexical and functional elements to denote specificity and domain restriction, and forces the associated determiner to refer to a set of relevant elements. The feature [up] combines with weak determiners and verb inflection to denote absence of domain restriction. As shown in Barberà (in press), domain restriction is thus a necessary part of the denotation of the spatial morpheme. The context narrows down the domain where the function will choose any individual or sets of individuals from.

On the basis of the above argumentation, it is fair to say that the two parts of the frontal plane are not equal. (p)[up] established by weak

localisation has more restrictions: only weak determiners and verb agreement with a non-presuppositional interpretation can be directed to the upper frontal plane. The feature [up] functions thus as non-contextual determinacy of the DR denoted by the weak determiner or by agreement inflection. This differs from (p) established by strong localisation, where both lexical and functional categories can be localised. The feature [low] functions as contextual determinacy and domain restriction. Interestingly, in LSC the two localisations can be combined under the same construction, as shown in the next section.

### **6.3.3 Dual nature of localisation**

The localisation pattern shows a different use of the establishment of DRs. While strong localisation is associated with the expression of specificity, weak localisation is associated with non-specificity. Moreover, some particular constructions incorporate these two kinds of localisation, showing the dual nature of such a process. This is the case of some partitives that are combined with determiners denoting non-specificity, as well as contexts of modal subordination.

#### *6.3.3.1 Non-specific partitives*

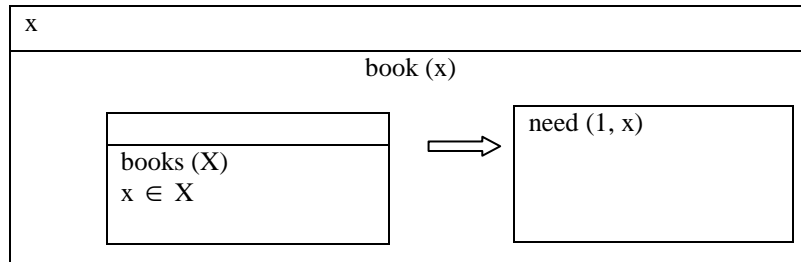
Although partitivity is commonly associated with specificity, in some contexts partitive constructions in some specific languages can co-occur with a determiner having a non-specific interpretation, as shown in the following English (47a) and Catalan (47b) equivalent examples:

(49) a. I need one of those books.

b. Necessito un d'aquells llibres.

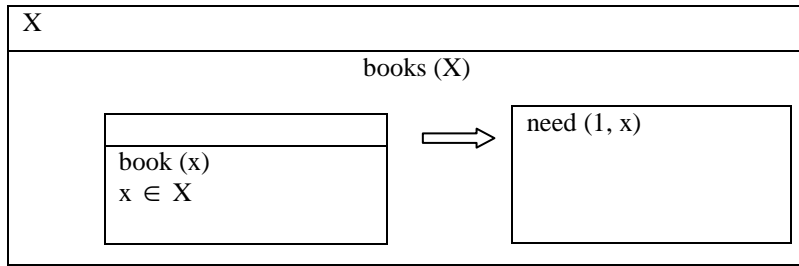
The determiner in (47a) and (47b) is ambiguous between a specific and a non-specific reading. Within the specific interpretation, there is one identifiable and concrete book from the set of a determined group of books that the speaker needs. In the semantic representation, the determiner attached to the corresponding variable has wide scope over the set of books.

(50)



Within the non-specific interpretation, from the set of those books there is an unidentifiable, non-concrete book that the speaker needs. In the corresponding semantic representation the quantifier attached to the set of books has wide scope over the book. Since it is a non-atomic variable it is represented with a capital X. The variable attached to the non-specific DR has narrow scope and thus it appears in an embedded context in the DRS.

(51)



The corresponding translation of the LSC sentence of (47a) and (47b) is not ambiguous. The two different forms obtained for each reading show that partitives can be combined with non-specific determiners and that these combined constructions show the dual nature localisation has in LSC.

LSC partitive constructions generally denote specificity, but they may co-occur with determiners denoting both specific and non-specific DRs. In such constructions, the partitive first establishes the domain of quantification, and then the determiner that ranges over it. In (50), the domain of quantification is first strongly established on the lower frontal plane (Figure 6.11a) and immediately after the specific determiner that ranges over it (Figure 6.11b).

(52) BOOK IX3<sub>1</sub>, IX1 NEED ONE<sub>1</sub>  
 'I need one<sub>spec</sub> of those books.' (D\_Qual 00:01)

### 6.3 Localisation pattern

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a. IX3<sub>1</sub> ('those')



b. ONE<sub>1</sub> ('one<sub>spec</sub>')

Figure 6.11 Partitive construction with specific determiner

The combination of a non-specific determiner with a partitive construction is grammatical in LSC. In (51) the domain is also first established and after the non-specific determiner. Again, strong localisation is characterised by the signs directed to the lower frontal plane (Figure 6.12a) and weak localisation is marked with the non-specific determiner directed to the upper frontal plane (Figure 6.12b).

- (53) BOOK IX3<sub>1</sub>, IX1 NEED ONE<sub>u</sub>  
I need one<sub>non.spec</sub> of those books (D\_LlibUn 00:01)



a. IX3<sub>1</sub> ('those')



c. ONE<sub>u</sub> ('one<sub>non.pec</sub>')

Figure 6.12 Partitive construction with non-specific determiner

(53) shows that although a partitive construction is used and hence a strong localisation is established, a weak localisation can also be

established in the same utterance when a non-specific determiner co-occurs with it. A single utterance can combine the denotation of specificity and non-specificity and this is formally marked on the direction of signs on the frontal plane and the corresponding localisation.

*6.3.3.2 Modal subordination*

Another context where the weak and strong nature of localisation is combined is that of modal subordination. It is generally considered that anaphoric contexts generally take place when variables have wide scope. However, there exists a context in which anaphora can occur within intensional contexts. These are called “modal subordination” contexts and consist in noteworthy entities introduced into the model the existence of which is not presupposed. Modal subordination is instantiated in anaphoric contexts which occur under the scope of a modal operator or a propositional attitude predicate, which display anaphoric relations that at first glance appear to violate generalisations about scope operators and anaphoric potential (Roberts 1986, 1989). As shown in (54a) the resumptive pronoun not bound by an operator is an infelicitous continuation. Once the pronoun is under a narrow scope context it is considered a felicitous continuation (54b).

- (54) If John bought a book, he will be home reading it by now.  
a. # It is a murder mystery.  
b. It will be a murder mystery. (Roberts, 1986:19ff)

Modal subordination consists thus in contexts which combine narrow scope with anaphoricity, a property generally attributed to wide scope. Interestingly, this dual nature of modal subordination is also overtly expressed in LSC instances of modal subordination contexts. They denote narrow scope entities which are embedded under an operator and are thus introduced into discourse by means of a weak localisation. But also, since the entity is noteworthy and further resumptive pronouns refer back to it, a spatial location is also strongly established.

The previous example (29), repeated for convenience as (55), shows the dual establishment of the DR in sign space. In (55) the signer is talking about a non-specific, unidentifiable DR. As shown in the glosses the DR is first weakly established towards the upper frontal plane. But in the last sentence a resumptive pronoun refers back to it.

(55)

\_\_\_\_\_eg:book \_\_\_\_\_eg:ip-u  
 IX1 THINK IX3 BOOK 1-OFFER-3 ADEQUATE PERSON-3<sub>ip-u</sub>  
                                   \_eg:cl-u \_\_eg:c  
 MUST PERSON-3<sub>cent</sub> LIKE HOBBY IS/SAME TRADITIONAL PAST  
                                   \_eg:ip-l  
 SAME/ALWAYS. IX3<sub>ip-l</sub> IX1 1-OFFER-3 PERSON-3<sub>ip-l</sub> IX3<sub>ip-l</sub>

‘I think that I would offer this book to a person<sub>non-spec...</sub>  
 It must be someone who likes traditional things.  
 Definitely, I would offer it to him/her.’

(S\_Obj 00:42)

While introducing the antecedent (“someone who likes traditional things”) the signer establishes a very weak spatial location on the upper frontal plane. Immediately after that, a darting eye gaze is

directed to an upper direction that goes from the ipsilateral, to the centre and to the contralateral part. This eye gaze moves around along the upper frontal plane, without being directed to an area, and this is reminiscent to the eye gaze described to mark indefinites in ASL in Bahan (1996). However, when the antecedent is introduced, although being under an intensional context, a spatial location is established on the lower frontal plane in order to have a location set up where to direct the coreferential signs to. In the subsequent sentence the signer directs a pronoun, an agreement verb and a pronoun again towards an established spatial location on the ipsilateral side. A strongly established location is then used where coreferential signs are directed to (Figure 6.13).



Figure 6.13 Resumptive pronoun within an intensional context

Previously, Table 6.1 showed that two instances of indefinites with a non-specific interpretation were localised on the lower frontal plane, rather than on the upper part. In fact, these are two instances of modal subordination found in the corpus, and (55) is such an example. Although the variable occurs embedded under an operator, the discourse is about that DR, which is the topic of the discourse fragment. Hence a lower spatial location is established and further



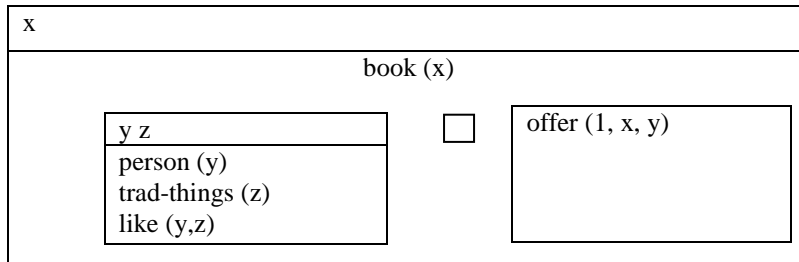
### 6.3 Localisation pattern

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resumptive pronouns can be directed back to it (see §7.3 for a further treatment of the notion of discourse topic).

Within modal subordination contexts, the discourse can continue focusing on the DR as long as the operator binds the variable. Following Roberts (1986, 1989), in the semantic representation of modal subordination the necessity operator is included in the DRS both for the antecedent and the consequent (56).

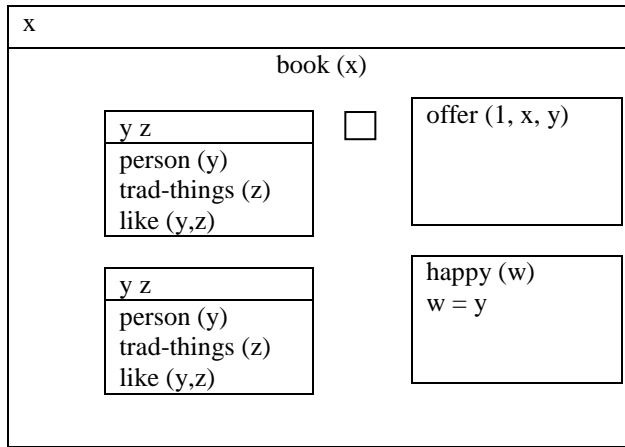
(56)



Resumptive pronouns can be used along the discourse as long as they are embedded within the corresponding modal operator. Hence a possible continuation of (55) can felicitously be (57) which is semantically formalised as (58).

(57) He would be very happy.

(58)



The translation for the DRS in (58) can be paraphrased as follows:

(59) In all the possible worlds where there is someone who likes traditional things, then I offer the book to this person.

The antecedent functions as a hypothetical common ground that narrows down the context set over which the necessity force of the modal operator will range. Intensional contexts, in fact, introduce possible worlds since they move us to the universe of desires of an individual. In English, these contexts are introduced by verbs such as “want”, “desire”, “seek”, “look for”, etc. English indefinite NPs introduced by such verbs are ambiguous between having a specific reading (i.e. a *de re* reading which focuses on the referent), or a non-specific reading (i.e. a *de dicto* reading that reproduces the propositional attitude of the individual). In LSC, in contrast, no such ambiguity is found. Intensional verbs co-occur with a non-manual operator. This operator is realised as a darting eye gaze

directed towards the upper frontal plane, which is not fixed at a concrete location but rather moves around (Figure 6.14). This darting eye gaze is systematically found in LSC intensional contexts and also contexts where a non-specific entity is denoted. It is a marking for narrow scope, which is associated with modal subordination and non-specificity.

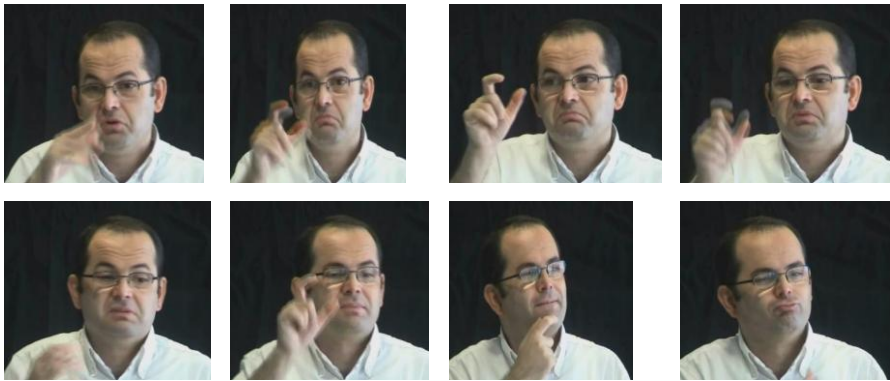


Figure 6.14 Darting eye gaze

This eye gaze functions as an overt non-manual intensional operator. It has scope over the introduction of the antecedent in an intensional context, which narrows down the context set over which the modal operator may range.

### **6.4 Existence in the model**

Definiteness and specificity encode the difference of knowledge the interlocutors of the conversation have about entities in the discourse. Definites are used when both sender and addressee know the DR; and indefinites, when the DR is not known by the

addressee. Indefinites can be subcategorised between specific and non-specific. On the one hand, specific indefinites are used when the entity is known by the sender, but not known by the addressee. On the other, non-specific indefinites encode that the DR is known by neither the sender nor the addressee. Note, however, that specific indefinites do not differ that much from definites once introduced into the model. In fact, Enç (1991) and von Heusinger (2002) claim that definiteness and specificity is related to a DR linked to a previously entity or accommodated. Both definites and specific indefinites are dependent on a domain of discourse, and this dependence is formally marked in LSC by spatial locations on the lower frontal plane. Since they introduce a noteworthy DR the discourse will focus on, the addressee is not aware of its existence before its introduction into the model. But once introduced into the model and as the discourse develops, the DR is incorporated as part of the common ground. Hence both definites and specific indefinites encode that the entity is part of, or will be immediately incorporated into, the common ground. This is in opposition to non-specific indefinites, which encode that the entity has a rather minor role in the common ground, since it will not be present in a long fragment (again, modal subordination contexts are an exception, as stated in §6.3.3.2).

As shown along the chapter, this is represented in DRT with the positioning of the variables in the corresponding DRS. Those DRs that are introduced into the model and that will have a discourse importance are represented with a variable in the main DRS. In LSC

there is no need for encoding the difference in what the signer knows that the addressee is aware and unaware of. What is encoded is rather that the introduced DR will have importance in the model and that the discourse will develop around it. This is marked with a location established on the lower frontal plane, and semantically it corresponds to a global variable. In contrast, DRs that are introduced but for which no further information will be provided are marked differently, namely with index signs weakly localised towards the upper frontal plane. Semantically, this is represented with a subordinate variable.

A formal difference between definites and specific indefinites is absent in the spatial marking in LSC (it is rather only marked with non-manuals). Hence, spatial locations stand for an entity present in the model be it definite or indefinite (but see chapter 7 for an incorporation of discourse structure into the analysis of spatial locations). Locations on the lower plane encode what the sender knows (and thus they encode only the sender's assumption or belief that P, as in Stalnaker, 1974), but also what the addressee will know immediately. Hence, they encode what is present in the model, rather than the status the entity has. In LSC, strong localisation marks that the DR is present in the model, since it is known by the sender, and that it will be soon known by the addressee. In contrast, weak localisation marks that neither the sender nor the addressee knows the DR, and the discourse will not be about that DR. In a nutshell, spatial locations are the overt encoding of what is in the

model of discourse, rather than the distinction between sender and addressee's acquaintance with DRs.

Whether embedded variables denote existence in the discourse is a controversial issue. I consider, along with Karttunen and Heim, that all variables, independently of embedding conditions, denote existence in the model. The different nature of embedding corresponds to difference in scope behaviour. Embedded variables can only exist in the model as long as they are under the scope of an operator. Non-embedded variables do not have such restriction. This vision differs from Matthewson (1998), according to which only variables in the main universe of discourse assert existence. In the Salish language St'át'imcets neither definiteness nor specificity are encoded in the language, but rather existence. Matthewson revises the DRT mechanism which formalises the distinction between specificity/non-specificity. She redefines this formalisation into an assertion/non-assertion of existence, which behaves similarly to specificity. Indefinites under the scope of an operator do not allow a coreferential pronoun outside it, whereas indefinites outside the scope of an operator do allow coreferentiality. The former are considered not to assert existence, while the latter do assert it (Matthewson, 1998:164ff).

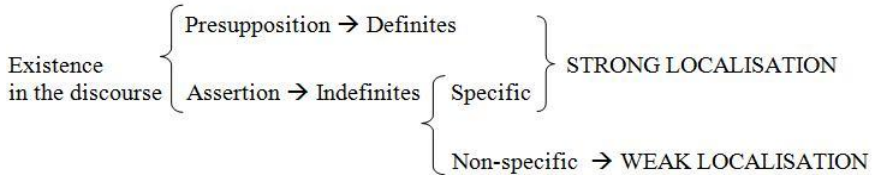
Following Karttunen and Heim I claim that the main difference is not in the assertion of existence but rather in the scope of the variable. Both embedded and non-embedded variables assert existence, and they denote non-specific and specific DRs, respectively. Yet, only the latter allow coreferentiality without any

restriction. But as we have seen in the previous section, modal subordination contexts show that also in narrow scope contexts coreferentiality can arise as long as the variable is under the scope of an operator. Hence the notion of “existence” is applied to one of the universes under consideration in the discourse. Modal subordination cases verify truth conditions by looking for a possible world where the antecedent is true and then apply the consequent to it. Once the antecedent has narrowed down the context set, and chosen a possible world where that is true, the necessary or possibility force will range over it. This means that in the concrete possible world the entity corresponding to the variable must necessarily exist. Even if the variable is embedded under an operator, it has existence in a possible world. Hence, along with Karttunen and Heim, in this dissertation it is considered that variables denote existence in the current model and they can be further distinguished between being embedded or not under an operator.

A spatial location set up in LSC discourse denotes existence in the model. This existence in the discourse can be presupposed or asserted, and it can be attributed to DRs that are free in their domain and to DRs that are bound to an operator, such as necessity and possibility. This scope (in)dependence for wide and narrow scope variables is overtly marked in the two directions of the frontal plane. Narrow scope denoting non-specificity is marked on the upper part, while wide scope is marked on the lower part. And as shown along this chapter narrow scope is marked with a weak

localisation, whereas wide scope is realised with a strong one. This is summarised below.

(60)



## 6.5 Summary

The data analysis and the correlation with the expression of specificity shown so far can be taken as evidence of good motivation for the localisation pattern. The results from the analysis of the small-scale LSC corpus data have led us to the distinction between a strong localisation, which uses more co-occurring mechanisms directed to the lower part of the frontal plane and a well-established spatial location is set up with the feature [p]. Weak localisation uses fewer mechanisms that do not necessarily overlap and are directed to an upper part of the frontal plane. Hence, a spatial location is weakly established, which corresponds to the feature (p)[up]. This distinction motivated by the data has a direct correlation with the semantics of the language, and more concretely with specificity marking. On the one hand, strong localisation is associated with specificity, which can be explained by the three properties specificity encompasses, namely wide scope, partitivity and identifiability. On the other hand, weak localisation is associated with non-specificity, and this is also explained by three



properties, namely narrow scope, non-partitivity and non-identifiability. Recall that the arguments provided in §4.2.2 concerning narrow scope and binding by an operator were instantiated in the language with lack of spatial location establishment. However, only isolated sentences were treated then. Now, once connected discourse is considered, the binding by an operator denoting specificity is instantiated in LSC grammar with a weakly established location.

Some works about specificity (von Heusinger, 2008, 2011) consider noteworthiness to be a property encompassed by specificity. According to these works, since with specific DRs remarkable information about the DR is usually provided along the discourse, the variable has a noteworthy feature. However, this chapter has proved that in cases of modal subordination narrow scope can also be related to noteworthiness. As long as the variable is embedded under a modal operator, further information can be provided. Thus I do not consider noteworthiness to be only a property of specificity, but rather a property related to discourse structure that is orthogonal to specificity (both specifics and non-specifics can be noteworthy). In LSC, for instance, there is a close relationship between strong localisation and noteworthiness (understood as topicality of the DR), and as it will be shown in the following chapter, both wide and narrow scope variables can occupy a spatial location in sign space as long as they are connected to the most prominent DR. In chapter 7, discourse structure is incorporated in the analysis of the properties DRs may have in order to establish a spatial location.



# Chapter 7

## Discourse structure and prominence

A mida que el discurs progressa, els ens discursius objecte d'atenció van canviant i, per tant, l'estructura atencional ha de modelar aquests canvis. La proposta de Grosz i Sidner és que els estadis atencionals dels interlocutors poden ésser modelats mitjançant un conjunt d'espais anomenats focals.

(Vallduví, 1997)

## 7.0 Introduction

This chapter builds on the principles concerning (p) exposed in the previous chapters and presents fine-grained hypotheses which enhance the analysis of LSC spatial locations specifically on the horizontal plane. The goals are two-fold. First, it is shown that lower spatial locations correspond to discourse prominence, defined as variables with backward looking properties as well as forward looking properties, independently of the scope of the determiner attached to the variable. Previously, I have defended that narrow scope variables correspond to a lack of spatial location establishment, as presented in chapter 4, or also to an upper established location when denoting non-specificity, as presented in chapter 6. However, here it is shown that narrow scope variables which are linked to the prominent DR at a specific point in a discourse behave like wide scope ones and establish a lower spatial location. The second goal is related to the nature of spatial locations. (p) is an abstract point in space which does not correspond to an exact point nor it is related to a specific direction on spatial planes. In connected discourse, locations associated with the most prominent DR can be shifted in space, showing that the exact direction on planes is irrelevant for the nature of (p). What is relevant is that the spatial location (p) is associated with a discourse referent (DR) from the model independently of the direction of the referring term in sign space.

The structure of this chapter is as follows. In §7.1 the theoretical ingredients for the presentation of the fine-grained hypotheses are presented, namely discourse anaphora and

underspecification, prominence and noteworthiness. In §7.2 sign language pronominal issues are laid out focusing on an important distinction between pronominal forms and DRs. §7.3 presents an implementation of a representational semantic level which integrates a theory of discourse structure with special focus on prominence. §7.4 analyses spatial locations established in long stretches of discourse and it claims that they are very underspecified forms. §7.5 summarises the main findings of the chapter.

### **7.1 Background**

This section presents the theoretical background related to discourse structure relevant for the present account. First, some notes on discourse anaphora and underspecification are presented. Then, prominence issues are introduced. And finally, noteworthiness aspects conclude this framework section.

#### **7.1.1 Discourse anaphora and underspecification**

Coreferential pronouns function as free variables and are not bound at the syntactic level. In this case, pronouns can be used without a linguistic antecedent (such contexts are cases of weak familiarity seen in chapter 5), but it can also happen that the antecedent is overt but occurs in a preceding sentence. Hence the antecedent does not need to be always overt. (1) is an example of the former case, and (2) of the latter.

- (1) *While walking into a room:*  
What is he doing here?
- (2) I couldn't reach Santi last night through Skype. He was probably at the Deaf club.

In fact, in dynamic semantics it is considered that “an anaphoric expression harkens back not to another expression, such as a noun phrase (NP) in prior discourse, but to a DR, an element of that structured information” (Roberts 2005:1). This chapter is devoted to coreferential uses. That is, it is centred on discourse anaphora of the kinds similar to (1) and (2) where there is an explicit linguistic antecedent in previous discourse, or a direct reference to an object present in the physical context, as already seen in chapter 5.<sup>1</sup> To determine the semantic value of *he* in (1) and (2) we need to know what its antecedent is and what its semantic content is. In (2) *Santi* is the antecedent, i.e. the referentially independent expression from which the anaphoric expressions gets its reference. And the pronoun *he* is the anaphor, that is to say, the referentially dependent expression. Both *Santi* and *he* refer to the same individual, thus they are co-referential. This is what is called discourse anaphora, defined as the phenomenon whereby the interpretation of an occurrence of one expression depends on the interpretation of an

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<sup>1</sup> Bound variable uses are another kind of anaphoric relation (Partee, 1970). In such contexts pronouns do not refer to individuals, as previously seen in quantified expressions in § 4.3.3. In (i) there is not a referential expression, because the antecedent is not a noun that denotes an individual and hence *him* is treated as a bound variable. Bound variables uses are outside the scope of this dissertation.

(i) Every student put a screen in front of him.

occurrence of another element, which has been explicitly or implicitly introduced in sequences of sentences.

When studying discourse anaphora, it is also relevant to look at the kind of referring terms that are used. DRs are encoded in different ways in discourse. In fact, senders make different assumptions about the information-status of that DR in the addressee's mind and then choose a referring expression accordingly (Prince, 1992; Vallduví, 1992). DRs may be prominent in the discourse, they may be known but not prominent, they may be new by the addressee, or inferrable from what the addressee knows. All these factors determine the choice of the different linguistic elements that a sender may make in order to refer to a DR, such as a definite NP, an indefinite NP, a pronoun or a null argument, depending on the language. Natural languages provide a wide range of referring terms and sign languages are not an exception. To refer to objects of thought, signers can also use a definite description, a proper noun, but also a pronominal form.

Referring terms pick up or refer to DRs of the universe of discourse, i.e. the objects of thought the conversation is about. The different kinds of referring terms present different properties. Full NPs and proper names have reference independently and they select a specific DR from the universe of discourse. In contrast, pronouns and demonstratives do not select inherently a DR from the universe of discourse. Rather they restrict the entities to which they can refer to but they do not specifically pick one DR up. An example of this

is the proper name *Francesc* which rigidly picks up the DR for “Francesc” which is ontologically connected to the real human man who is my friend. Hence between the proper name and the DR there is a direct reference connection. In contrast, pronouns have some features which allow restricting the amount of potential antecedents. The specific features of English pronouns, for instance, are gender, number and case. For example, the pronoun *he* has the features [+masc], [+sg], and [+nom]. *He* does not directly identify the specific DR to which it refers, but rather it selects a subgroup of possible entities, namely those that are [+masc], [+sg], and [+nom] from the universe of discourse domain. Once the selection is done, syntactic and pragmatic constraints allow picking up the corresponding DR among the set of possible DRs.

As underspecified and definite expressions, pronouns imply a familiarity presupposition because its mere existence in a discourse presupposes that there is already a DR corresponding to that variable. As seen in cases of weak familiarity in chapter 5, this variable can correspond to a default variable  $\delta$ , when the DR is accommodated into the common ground. The use of a pronominal form also implies that they occupy a prominent position in the discourse structure. For instance, a sentence like (3) uttered out of the blue is only felicitous if there is a prominent female DR in the linguistic context, or in the immediate physical context.

(3) She is a very smart linguist.



Underspecified referring terms, such as pronominal forms, are characterised by two main features:

- (i) They inherently specify some properties of the DR and they act as set restrictor devices among the entities from the universe of discourse.
- (ii) Their referential interpretation is dependent on a prominent DR they pick up.

As argued in chapter 5, the DR can have a corresponding overt form in the previous linguistic context, or it can be absent from the linguistic context. That is, no antecedent is found in the linguistic context, but rather the pronominal form gets its reference from the connection with the DR which has a corresponding object in the physical context of the conversation.

### **7.1.2 Prominence**

The structure of discourse is a composite of three distinct but interacting components. Following Grosz & Sidner (1986), these components are a structure of the actual sequence of utterances in the discourse, a structure of intentions (i.e. purposes) and an attentional state (i.e. focus of attention). The interaction of these three components contributes to the dynamism of discourse where DRs appear and disappear within discourse fragments. Hence in different fragments, the prominence of DRs can vary and if at some point in a discourse an entity is very prominent, at another point it may not be that prominent (Lewis, 1979). Prominence is defined as the degree of relative salience of a unit of information, at a specific

point in time, in comparison to the other units of information (Chiaros, Claus & Grabski, 2010). Nowadays, Centering Theory (CT, Brennan, Friedman & Pollard, 1987; Grosz, 1981; Grosz et al. 1995; Walker, Joshi & Prince, 1998) represents probably the most influential account of entity-based prominence in discourse. Centering is a processing model that relates the local utterance-by-utterance context and discourse anaphoric reference, which has been applied to study different languages, such as Italian (Di Eugenio, 1998), Japanese (Walker et al., 1994), Turkish (Turan, 1995), and Chinese (Qinan, 2008), among others. It constitutes a basis to theorise about local coherence, prominence and choice of referring expressions, such as the difference of use between pronominal forms and definite NPs (Grosz, Joshi & Weinstein, 1983). The parameters of the theory have been proved but also questioned in some works (see Poesio, Stevenson, Di Eugenio & Hitzeman, 2004).

CT assumes that attention has to be focused or centred in discourse. It introduces independent terminology which is adapted here. For instance, centres are defined as entities that serve to link an utterance  $U$  with other utterances. They actually have the same properties as “discourse referents” (see §4.1.3), and this is the reason why I adapt the terminology of CT to the one used in this dissertation. The most important notions are the following:

- (i) Forward Looking DRs: set of  $DR_f(U_k)$  which appear in the DRS  $K$  and that can be referred to in subsequent utterances.
- (ii) Backward Looking DR: a unique entity  $DR_b(U_k)$ , defined for each utterance  $U_k$  (except for the initial segment) that refers back to

a forward looking DR of the preceding utterance  $U_{k-1}$ , and that, intuitively represents the DR which is the centre of attention at utterance  $U_k$ .

(iii) Preferred DR:  $DR_p(U_k)$  is the one that is on the top of the hierarchy of the set of DRs in the main DRS.

The backward-looking DR( $U_k$ ) is selected from the set of  $DR_f(U_{k-1})$ . Hence  $DR_b(U_k)$  connects utterances with preceding discourse.  $DR_f(U_k)$  are organised in a prominence ranking which serves as likelihood to serve as backward-looking centre of  $DR_b(U_{k+1})$ .

$DR_f(U_k)$  are the set of variables present in the DRS. In the present account, I argue that the ordered ranking of  $DR_f(U_k)$  is not dependent on the position the variable occupies in the DRS, namely whether the variable is attached to a wide scope quantifier and hence inserted in the main DRS, or rather attached to a narrow scope quantifier and then inserted into a subordinated DRS. As we will see below in §7.3, subordinate variables can also be promoted to  $DR_p(U_k)$  as long as they are under the scope of the corresponding modal operator.

The degree of prominence of a DR directly affects the referring term that will be chosen to denote such a DR. The form chosen reflects the prominence of the entity within a specific fragment and, according to the literature, pronominal and weaker forms are the expressions used when the entity is actively prominent in the consciousness of the addressee (Prince, 1981; Gundel, Hedberg &

Zacharski 1993<sup>2</sup>; Ariel 1988, 1990).<sup>3</sup> Accessibility theory (AT, Ariel 1988, 1990) is the account which has influenced the present dissertation most, since it offers a procedural analysis of referring expressions, as marking varying degrees of mental accessibility. The basic idea is that referring expressions instruct the addressee to retrieve a certain piece of given information from his memory by indicating how accessible this piece of information is to him at the current stage of the discourse. One important contribution of Ariel's approach is that AT takes into account that natural languages provide senders with the means to *code* the accessibility of the DR to the addressee. As Ariel (1996: 22) claims:

“AT predicts that when antecedents are nonprominent/distant/in less cohesive units to the potentially anaphoric expressions, a relatively lower accessibility marker will be chosen. When the antecedent is prominent/recent/in highly cohesive unit, it will be coded by a relatively high accessible marker.”

AT is articulated in a hierarchy where NPs formed by full noun and a modifier are considered to be low accessibility markers, and verbal person inflections and null arguments are considered to be high accessibility markers. These form-function correlations on the accessibility marking scale are not arbitrary and there are three

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<sup>2</sup> The Givenness Hierarchy by Gundel and her colleagues is the unique proposal, to the best of my knowledge, supported by an empirical study of the distribution of referring expressions in naturally occurring discourse in six languages, namely English, Japanese, Mandarin Chinese, Russian, Spanish and ASL. See Swabey (2002) for a form-status correlation for referring expressions in ASL narratives.

<sup>3</sup> See Kibrik & Prozorova (2007) for a general analysis of referential choice in Russian Sign Language (RSL), and Barberà (2009), for some work on referential choice in LSC, focused on pronouns and entity classifiers.

partially overlapping criteria, namely (i) informativity (the amount of lexical information), (ii) rigidity (the ability to pick a unique DR, based on the form), and (iii) attenuation (phonological size/reduction). The more informative, rigid and unattenuated expressions will code a lower degree of accessibility; and the less informative, rigid and more attenuated expressions will code a higher degree of accessibility. Both the notions of informativity and rigidity are used in §7.4 in the analysis of index signs in LSC.

Accessibility factors may be influenced by different issues related to the specific discourse model. For example, if most references go to the global discourse topic, pronouns may be used even if there is a great distance between the DR and the anaphor. It seems that rather than viewing the factors separately, we should think of a combination of them for the prediction of the occurrences. Any particular instance may be coded by values both high and low in the hierarchy, and only the combination of the factors will determine the degree of accessibility used by the sender. In order to determine the degree of accessibility of a DR, Ariel proposes that different factors interact with prominence (determined by many other factors: grammatical function, high vs. low physical prominence in the context, order of mention, definiteness and quantification of the NPs), competition among other potential antecedents for an anaphoric expression, distance (recently mentioned entities are more accessible than remotely mentioned ones) and cohesion unity. One important point in the AT is the importance given to mental representations. Ariel argues that it is the discursive rather than the physical prominence of the entities

involved what determines the degree of accessibility assigned to a particular mental representation. Although the physical context does affect the discourse model, mental representations are the only direct product of the discourse model. LSC (and SLs in general) constitute a good example for this statement, as seen in deictic contexts in chapter 5. The following section is devoted to the last phenomenon related to discourse structure.

### 7.1.3 Noteworthiness

Noteworthiness requires the statement of something remarkable about the individual denoted by an indefinite NP. It has been claimed that noteworthiness depends on scope since only wide scope allows noteworthiness to arise (von Heusinger, 2011b). However, modal subordination contexts where narrow scope variables can be further referred back to contradict this claim, as seen in §6.3.3.2. This is the reason why in this dissertation noteworthiness is not considered to be a property of specificity, but rather an orthogonal phenomenon between specificity and discourse structure, because both wide and narrow scope variables can be noteworthy.

Spoken (informal) English makes use of an existential construction co-occurring with an indefinite-*this* for DRs introduced for the first time (Prince, 1981; Ionin 2006). *This*-NP functions as an indefinite and it introduces a novel individual into the discourse as in (4). When we try to use it as a definite it results in an odd construction such as (5) below.

*A colleague complaining about having problems with quantification.*

- (4) There is this book on mathematics which may be helpful.
- (5) I realised that you are having problems with the quantification of your data. Maybe you could check for some hints in a book on mathematics #and there is this book on mathematics which may be helpful.

Both Prince (1981) and Ionin (2006) claim that *this*-NPs are found in constructions denoting specific DRs since specificity tests for coreferentiality apply to them (see 6.1). Consider the well-known example in (6) with its analogue in (7):

- (6) A: John wants to marry a Norwegian.  
B: Is she tall?  
B': Must she be tall?
- (7) A: John wants to marry this Norwegian.  
B: Is she tall?  
B': #Must she be tall?

An NP can be anaphoric to a nonspecific DR, as exemplified in (6B'). But (7B') shows that the nonspecific continuation is not felicitous when the DR is introduced by an indefinite-*this* NP. Hence *this*-constructions in English are considered to be specific and indefinite (Prince, 1981; Gundel, Hedberg and Zacharski, 1993; Ionin, 2006; see von Heusinger 2011a for similar claims about German 'dies'). Indefinite-*this* NPs introduce new information into the model which is mentioned for the first time. But the new topic

they introduce is something which is going to be talked about in the following discourse.<sup>4</sup>

Noteworthiness is defined by Ionin (2006:180) as those elements for which “the speaker has a particular DR in mind, about which further information may be given” (following Maclaran 1982). The property of noteworthiness requires thus the statement of something noteworthy about the individual denoted by the indefinite (Ionin 2006). It is used to index persistent DRs in the discourse model, but also to keep track of antecedent-pronoun relations confined to the scope of quantifiers. Noteworthiness, in fact, coincides with the definition of forward looking DR, presented in the previous section according to which it is the DR from the set of  $DR_f(U_k)$  which are referred to in subsequent utterances.

As we will see, when establishing (p) in LSC this is very much connected to noteworthiness. That is, all DRs which are localised in sign space are referred back by a resumptive pronoun in most of the cases, which implies that the DR denoted is a prominent and a noteworthy entity. It is the entity on which discourse is focused and most likely it is the one that will be referred back to. Hence it constitutes the discourse topic. Although in most cases topics tend

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<sup>4</sup> In fact, Prince states that in her corpus study 86% of the DRs introduced by indefinite *this* are referred back again within a few clauses. Ionin (2006:184) reports a corresponding statistic for *a*-indefinites and *this*-indefinites in order to compare both determiners more closely. In a brief, informal search she reports that 89% of *this/these*-indefinites instances denoted a DR which was referred to again a few clauses either explicitly or implicitly. For the *a/an*-indefinite, 71% were subject to follow-up mention. Even if this difference is not a great one, it still suggests that a difference exists between the two determiners.



indeed to represent old information, this is neither a sufficient nor a necessary condition for topicality. Topics are better analysed in terms of their effect on the ongoing discourse and considering the effects of previous discourse on the given utterance, rather than as old information (Reinhart, 1981; Vallduví, 1992). This is why, as treated in §7.3, discourse topics which are prominent at a specific discourse fragment have both backward looking properties, as well as forward looking properties. It is now time to turn to the application of these concepts to LSC. First, the relation between LSC pronouns and DRs is presented.

### **7.2 Sign language pronominal issues**

Since this dissertation focuses on DRs and what the discourse is about, I will only concentrate on third person pronouns. In fact, this distinction is already made in the literature about pronouns. The term “third person” is negatively defined with respect to “first person” and “second person”: it does not correlate with any positive participant role (Lyons, 1977:638). First and second person pronouns are the most basic deictic elements because they “point to” and directly refer to the speech participants, which need to be present in order the speech act can occur.<sup>5</sup> Third person pronouns have a different nature and should not be included under the same category of pronouns (Lyons, 1977; Bhat, 2005). On the one hand, the function of first and second person pronouns is primarily to

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<sup>5</sup> Role shift contexts in which first and second person pronouns are used transferred are not included in the present analysis.

indicate the two principal speech roles, namely that of being the sender and being the addressee, respectively. Third person pronouns, on the other hand, are used to refer to the thing the discourse is about, the non-person. Of course, it may be that in some contexts the thing the discourse is about is a first or a second person. However, in such a context they do not act as conversation participants, but rather as the topic of the discourse. As my interest draws on the entities in the discourse, that is on what the discourse is about, I will narrow my focus of attention to third person pronouns, leaving aside first and second personal pronouns, which are always used locally.

### **7.2.1 Infinity and unambiguity**

It is widely considered in the sign linguistics literature that pronouns unambiguously point at their DRs and thus SL reference is unambiguous, at least within the grammatical structure of the individual sentence or of the discourse frame (see §2.4). In contexts of sloppy readings of pronouns, Lillo-Martin & Klima (1990) show that overt pronouns in ASL make the sentence non-ambiguous. However, the fallacy of the unambiguous use of space can be easily challenged by two contexts: the first one is the use of the same spatial location for both the DR and the physical location that the DR occupies (Emmorey 2002:56). The second is the context where a semantic affinity convention is used (Engberg-Pedersen, 1993 and see §3.3.1.2). That is, when two DRs sharing a semantic relation are localised in the same area of sign space. Also, according to van Hoek (1992), the same DR can be localised in two different

locations denoting different temporal moments. Importantly, some works show that there is not necessarily a one-to-one relationship between (p) and DRs (Janis, 1992; Russell & Manitoba, 2008). These works show that in ASL a single location can be used for more than one DR, and more than one location can be in fact used for a single DR. This is more evidence against the supposed referential non-ambiguity in SL pronouns, as shown too in Emmorey (1997).

It is also widely accepted that since signs can be directed to an infinite number of directions in sign space there is an infinite number of distinct pronominal forms (Lillo-Martin & Klima, 1990; Janis, 1992; Meier, 1990; Liddell, 2003, and see also §2.4). Indeed, as will be shown below, there is a potential infinite number of DRs, but not of pronominal forms. Third person pronouns consist in an index directed to sign space with specific nonmanuals which differs from second person form. Importantly, the argument concerning the infinite number of possible locations is related to the unambiguity argument. Since there is an infinite number of possible locations, each location is assigned a single DR. Therefore, the use of a pronoun will uniquely identify a DR and there will be no ambiguity (inspired by Janis, 1992). But if one thinks of a discourse model with an infinite use of locations, unambiguity and infinity are related with difficulty since it is impossible to keep track of referents unambiguously when such a big number of DRs is present in the model. In such a situation, an infinite number of locations are associated with many different DRs and hence a one-to-one

relationship will be very difficult to establish and impossible to interpret. Thus, no unambiguity can be claimed here. This shows that in fact, infinity and unambiguity are opposed and cannot co-exist. It is indeed difficult to understand why it has been argued that these two opposed concepts are present when analysing sign language pronouns.

### **7.2.2 Pronouns versus DRs**

In the SL literature there is an overlapping between the notions of “discourse referent” and “pronominal form”. For instance, Janis (1992:169) argues that “as more forms are established and thus entered into the memory, the degree of preciseness of location needed by the forms is greater. When there is only one established pronoun form, the use of any pronoun is always closer in form to it than to other pronouns, since others are nonexistent”. Frequently in the literature the expression “pronoun” is used to mean “discourse referent”. A pronoun is not established in discourse, but it is *used* in discourse to *establish* a DR. Pronouns and DRs are two related but distinct notions and they need to be kept apart. As defined in §4.1.3.2, pronouns are referring terms from natural languages expressed with a concrete morphophonological marking which denote DRs. DRs are semantic entities or objects of thought the discourse is about. It is not that there is an infinite number of possible pronominal forms, but rather an infinite number of possible associations with DRs. While pronouns are discrete and restricted units provided by natural languages, DRs are provided in the

discourse model and they can be infinite depending on each discourse model, as we will see below.

In line with the three person distinction analysis (Berenz 1998; Alibasic & Wilbur, 2006; Neidle & Lee 2006; Meurant, 2008, see §2.5.3 for the controversial analysis of person features encoded in sign language pronouns), I claim that there is a single third person pronominal form once the nonmanual component is included in the morphophonological form itself. Pronominal forms are a combination of a manual index sign with specific nonmanuals which establish (p). This establishment is realised with an alignment of hand, eye gaze, head and chest (for second person pronouns) towards (p), or with a non-alignment (for third person pronouns). The nonmanual components are morphological elements included in the pronominal forms. In Table 1 the morphological features included in the pronouns considered in this dissertation and inspired in Berenz et al.'s analysis are shown. Index handshape is the default handconfiguration used for the three pronominal forms.<sup>6</sup> But still there is a further distinction. On the one hand, “B” handshape can also be used for second person in polite and formal conversations. On the other, thumb handshape can only be used for third person when the denoted person is absent in the physical environment. Concerning sign space, second and third person pronouns establish a spatial morpheme which is body-anchored in first person pronouns. Nonmanual alignment is what distinguishes second from

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<sup>6</sup> However, assimilation processes can affect this default handshape depending on preceding and following signs, as shown in corpus work by Schembri et al. (2009).

third person pronouns. While the former follow an alignment of manual and nonmanual components, the latter show a non-alignment in the features. Obviously the cell of nonmanual alignment with first person pronouns is empty since there is not an establishment of a location in space towards which nonmanuals may be directed, but rather on the signer’s body.

<b>Person distinctions</b>	<b>Handshape</b>	<b>Spatial morpheme</b>	<b>Nonmanual alignment</b>
first person pronoun	Index	+body-anchored <sup>7</sup>	
second person pronoun	Index B	+ point-space	+ alignment
third (person) pronoun	Index Thumb	+ point-space	– alignment

Table 7.1 Features of pronominal person distinction

Once the nonmanual component is included in the pronominal form, the controversy on the three person distinction is minimised. A pronoun sign can be decomposed in different parts: a handshape, and a direction and a hold which manifests the established spatial location (p). But (p) does not indicate person distinction since person features are indicated by the (non-)alignment of manual and nonmanual components. The actual location in space indicates a DR, which can be one among an infinite number of possible DRs. A discourse model can contain an infinite number of possible DRs (i.e. variables) but the referring expressions chosen to denote them are among a limited set that natural sign languages provide. Thus

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<sup>7</sup> As seen in § 3.5, body-anchored locations are also available in the morphophonological array.

the infinity issue is transferred from pronouns to DRs and this is a permissible move since DRs are constrained by the discourse model, which can only be limited by perceptual and memory limitations, but not by purely linguistic reasons. Hence we can accept that the number of DRs in a discourse model can be infinite and they are referred to by a single third person pronominal form.

To see more closely how pronouns are distinguished from DRs we should also look at some examples. In §7.1.1 we have seen that pronouns are underspecified elements which can refer to an infinite number of DRs. They have a set of features which restrict the entities to which they can refer. The English third person masculine pronoun *he* in nominative case can refer to an infinite number of male individuals, depending on the number of male individuals present in the discourse model. But we have a unique nominative form to denote third person male, namely the referring expression *he*. Likewise, in SL there is a unique third (person) pronominal form which is a manual index that establishes a location in space and a disjoint alignment with the nonmanual component. This unique pronominal form may also be associated with a potential infinite number of DRs depending on the variables included in the discourse model. However, this has passed unnoticed among some researchers. Lillo-Martin (2002) and Meier & Lillo-Martin (2010) argue for a combination of linguistic and gestural components in the pronouns in line with the perspective held by the infinity view. Considering the English sentence in (11), Lillo-Martin argues that the speaker may point via a gesture to any location in space in order to disambiguate the pronouns. These

locations depend on the actual position of the present DRs and thus are not listable in the language. Lillo-Martin's proposal is that nonfirst singular SL pronouns (following Meier's account) are lexically and syntactically ambiguous, just as the English *him* used deictically is ambiguous in (8). However, the combination with a gesture makes the reference unambiguous.

(8) I saw him and him, but not him. (Lillo-Martin, 2002)

As said before, this kind of analysis denotes confusion between pronouns and DRs in SL and this dissertation claims for a dissociation of the two categories. Pronouns are the linguistic material which is used to refer to a DR, that is the semantic individual to whom it is associated (see the distinction between linguistic marking and semantic entity presented in §4.1.3.1). In (8) the unique pronominal form *him* can denote at least three different male individuals. But we only have one pronoun, that is one grammatical accusative form which has the potential to be associated with the three individuals in the present model. The same goes for LSC. A single element formed by a manual index sign with an establishment of (p) and a disjoint alignment with nonmanuals is used to refer to third person. This single form can be used to refer to an infinite number of possible DRs depending on the variables present in the model.

Below there is a sentence similar to (8) uttered in English and accompanied with co-speech gesture. The representation in Table



## 7.2 Sign language pronominal issues

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7.2 shows that the same pronominal form *him* can be associated with two DRs from the discourse model, namely *Frank* and *Paul*. Since it is an example of direct reference, a pointing gesture co-occurring with the two instances of *him* is needed in order to disambiguate the sentence.

“I saw him but not him”	
Referring expression (third person pronoun singular)	“him”
Discourse referents	him-1 (= ‘Frank’) him-2 (= ‘Paul’)

Table 7.2 English and co-speech gesture sentence

Table 7.3 is the same context but without co-speech gesture. Since it is again an instance of direct reference and there is no co-speech gesture accompanying the sentence, it turns out to be ambiguous.<sup>8</sup> The sentence is not felicitous in a context with two male DRs, and in an unmarked context where no DR is more prominent than the other one, the sentence is ambiguous.

“I saw him but not him”	
Referring expression (third person pronoun singular)	“him”
Discourse referents	him-1 (= ‘Frank’) him-2 (= ‘Paul’)

Table 7.3 English sentence

Table 7.4 corresponds to the LSC sentence. The unique third person pronominal form in LSC is also used to denote the two DRs from

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<sup>8</sup> Let’s accept for the interest of the argumentation that this unusual context can be found.

the model. The only difference between the English and LSC counterparts is the overt connection with the DR manifested with the establishment of the spatial location (p). The location is associated with a DR and disambiguates the reference of the third person pronoun.

IX1 SEE IX3a, IX3b NOT (“I saw him but not him”)	
Referring expression (third person pronoun singular)	IX + nonalignment + (p)
Discourse referents	IX3a (= ‘Frank’) IX3b (= ‘Paul’)

Table 7.4 LSC sentence

Importantly, both the English and the LSC pronouns are proforms and as such they always need the linguistic, as well as the extra-linguistic context, to recover their meaning. But if the LSC sentence is not inserted under a discourse model, the sentence turns out to be as ambiguous as it is in spoken language (Table 7.3). Without a discourse model to interpret it, the sentence remains ambiguous (see also Quer, 2011c). The similar behaviour between contexts in Table 7.3 and Table 7.4 shows that there is no gestural component bound to the manual form in LSC. The two sentences are similarly ambiguous without a discourse model, hence the two languages behave the same way.

So far we have seen that (p) stands for the overt manifestation of a DR, as presented in (9) below.

(9) **The discourse referent hypothesis** (second version)

(p) is the overt manifestation of DRs attached to a quantifier that has wide scope.

In chapter 4 we have also seen that the coincidence in the direction of the establishment of (p) resolves the equation identity in a DRS through the construction rule for pronouns (see §4.2.2), as stated in the already introduced hypothesis:

(10) **The spatial point hypothesis** (first version)

The identity condition in the DRS is encoded through coincidence in direction of spatial establishment of (p).

According to (9) and (10), the main striking difference between SpLs and SLs is that SLs have a feature expressed overtly, which in SLs is expressed covertly, which denotes a DR. In the following section, we will see that when studying spatial locations from a discourse perspective, they are also involved in factors that derive from the dynamics of discourse and they incorporate attributes related to prominence. As we will see, the exact direction in the horizontal plane where (p) is established is irrelevant for the association with the DR. In contexts of prominent DRs, (p) denoting the same DR may be established in different areas on the horizontal plane, namely on the ipsilateral and the contralateral side, without affecting the propositional meaning. This shows that (p) consists indeed in an abstract point in space which does not depend on the direction of spatial planes where it has been established and it is still

categorically interpreted. Hence, in the following sections it is claimed that two revised hypotheses are in order. I start first with the revision of *The discourse referent hypothesis*.

## **7.3 Prominence**

### **7.3.1 Global discourse structure**

The arrangement of spatial locations associated with a DR for a signing utterance or discourse fragment is called “frame of reference” (Lillo-Martin & Klima, 1990:193). The number of DRs which can be localised in space within a frame of reference has been a frequently asked question that researchers have tried to answer (Loew, 1984; Janis, 1992; McBurney, 2002, among others). McBurney attributes the limitations to general cognitive abilities and suggests that the number of DRs in space depends on the capacity of the working memory and claims that the limit is somewhere between five and seven (based on Miller, 1956). However, according to Janis (1992:103) in ASL the number of DRs that can be expressed through role shift, which is up to 2, is smaller than the number of DRs that can be expressed by personal pronouns, which is up to 3. Ahlgren & Bergman (1990:258) claim that in Swedish Sign Language (SSL) narratives the marking for reference on spatial locations is made for the number of DRs minus one. One DR is always referred to through role shift, and hence not localised in space. This distinction on the kind of referring term indicates that the constraint is a linguistic one, rather than a constraint on memory or perception.

When a very large number of DRs is established within a fragment of discourse, the LIST sign is used. This has been labelled “list buoy” (Liddell, 2003:223ff, but also Liddell et al., 2007; Vogt-Svendsen & Bergman, 2007 for a cross-linguistic comparison among ASL, Norwegian and Swedish SL). It consists in an open non-active hand, with the fingers extended horizontally. According to Liddell, the finger tips stand for associations with entities and they are a substitute for spatial location establishment. However, although there is an association between a tip of the finger and an entity, it mainly serves to enumerate a list of entities. The main function of the LIST sign is to establish an order among entities introduced.

In the small-scale LSC corpus, when two DRs are present in the model they are established in space. Whenever more than two DRs are present in the same fragment of discourse the LIST sign is used to enumerate them and establish an order. However, it is usually the case that one DR is more prominent than the others. In order to analyse prominence, the DRT semantic representation of the discourse used so far in the dissertation is not enough. A new version of DRT which combines a representational semantic level with a theory of discourse structure (with special emphasis on prominence) such as Centering theory is presented here.

### 7.3.2 Topicality

To the best of my knowledge, the first and only attempt to do such combination is Pinkal (1986) and Roberts (1998). These proposals combine DRT with the first works on Centering Theory (CT, Grosz & Sidner, 1986). But since CT has been the focus of later research, I take as a basis subsequent works (Grosz, Joshi & Weinstein, 1995; Walker, Joshi & Prince, 1998). Based on the introduction of CT proposed in §7.1.2, I propose that a DR is linked to the discourse topic of the fragment of discourse (i.e. it is the most prominent entity of that specific fragment) if it verifies the following formula:

$$(11) \quad DR_b(U_n)=DR_b(U_{n-1}) \wedge DR_b(U_n)=DR_p(U_n)$$

As previously said in §7.1, the discourse topic, which is the most prominent entity at a specific point in discourse, is better analysed in terms of its effects on the ongoing discourse, as well as considering the effects of previous discourse on the given utterance (Reinhart, 1981; Vallduví, 1992). This is why the first argument of (11) verifies the previous utterance ( $DR_b(U_n)=DR_b(U_{n-1})$ ), but the second argument verifies the subsequent utterance ( $DR_b(U_n)=DR_p(U_n)$ ). The intersection between the backward looking  $DR_b(U_k)$  and the preferred  $DR_p(U_k)$  of the current utterance yields the most prominent  $DR_k$  at a specific point in a discourse. Importantly, the DR that verifies the formula in (11) combines the backward properties as well as forward properties to determine the prominent DR. Since the prominence of DRs may vary in different

contexts, the formula in (11) needs to be verified in every fragment of discourse.

### 7.3.3 Topical variables

The set of forward looking variables  $DR_f(U_k)$  are not only restricted to the ones appearing on the main DRS, but also to subordinated variables as long as they are embedded under the corresponding operator. In LSC, the  $DR_p(U_k)$  chosen among the  $DR_f(U_k)$  will be correlated with a spatial location as long as it verifies (11) and independently of the scope of the quantifier attached to the variable. An example of a wide scope variable which is prominent in this fragment of discourse is shown in (12), which is the continuation of example (27) in chapter 6.

(12)

\_\_\_\_\_eg:ip-1  
IX1 1-OFFER-3<sub>ip-1</sub> ONE PERSON-3<sub>ip-1</sub> PEN-DRIVE COMPUTER PEN-DRIVE

\_\_\_\_\_eg:ip-1 \_\_\_\_\_eg:ip-1  
1-OFFER-3<sub>ip-1</sub>, BECAUSE PERSON-3<sub>ip-1</sub> ALWAYS++ WORK THEME

IS/SAME COMPUTER.

PEN-DRIVE ADEQUATE IX1 \_\_\_\_\_eg:ip-1  
1-OFFER-3<sub>ip-1</sub> IX3<sub>ip-1</sub> PEN-DRIVE.

IX3<sub>ip-1</sub> HAPPY, ENJOY.

‘I will offer the pen-drive to someone, since he/she/this person always works with computers. I find it very adequate to offer the pen-drive to him/her. And he will be very happy and enjoy it a lot.’

(P\_Obj 00:01)

The semantic representation for the first sentence is built and the corresponding DRS is shown in (13).

(13)

x, y, z
pen-drive (x)
person (y)
offer (1, x, y)
work-computer (y)

In the second and third sentence pronominal forms appear. Thus the construction rule for pronouns is used (see Appendix A for the complete list of construction rules used in this dissertation). The variables are established and the identity equation is introduced.

CR.PRON: Upon encountering a pronominal form,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]], and
- and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. check which variable in the main DRS shares the features  $\alpha$  has, and
4. if no suitable variable is found, go to CR.PRON2; if the suitable variable is found introduce an identity equation  $\alpha = \gamma$
5. go to CR.PROM

The algorithm tells then to go to the following construction rule for prominence. According to it, the variables in the equation need to verify the formula presented above as (11).



### 7.3 Prominence

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CR.PROM: Upon encountering an identity equation  $\alpha = \gamma$ ,

1. check the variable that verifies the prominence rule:  

$$DR_b(U_n) = DR_b(U_{n-1}) \wedge DR_b(U_n) = DR_p(U_n)$$
2. assign the superindex  $p$  to the variable,
3. check the conditions in the DRS equated to the variable  $\beta = \alpha$ ,
4. assign the superindex  $p$  to the suitable variable

The variables which verify the formula are assigned a superindex  $p$  in the semantic representation. For sentence in (12), it is variable  $z$  and  $w$ , as shown in (14).

- (14) a.  $[DR_b(U_n) = DR_b(U_{n-1}) \wedge DR_b(U_n) = DR_p(U_n)] \equiv z$   
 b.  $[DR_b(U_n) = DR_b(U_{n-1}) \wedge DR_b(U_n) = DR_p(U_n)] \equiv w$

(15)

x, y, z
pen-drive (x)
person (y)
offer (1, x, y)
work-computer (y)
he (z) <sup>p</sup>
happy (z)
z=y
he (w) <sup>p</sup>
enjoy (w)
w=y

The resulting DRS in (15) shows the semantic representation for the fragment of discourse, which is incorporated to the discourse structure since the most prominent variables are marked differently.

Interestingly, it is also possible that a variable attached to a narrow scope quantifier may be the prominent DR at a specific point in a discourse, as shown in the following minimal pair in (16), which is the continuation of (29) in the preceding chapter.

(16)

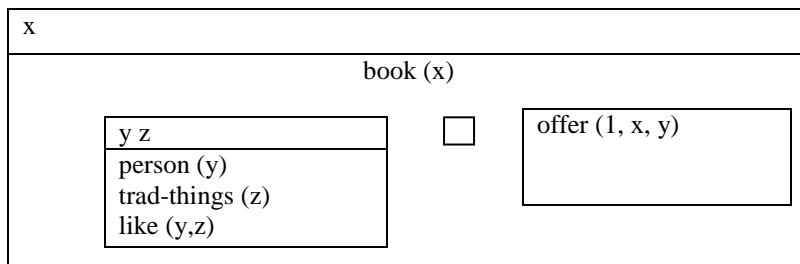
\_\_\_\_\_eg:book \_\_\_\_\_eg:ip-u  
 IX1 THINK IX3 BOOK 1-OFFER-3 ADEQUATE PERSON-3<sub>ip-u</sub>  
 \_\_\_\_\_eg:cl-u \_\_\_\_\_eg:c  
 MUST PERSON-3<sub>cent</sub> LIKE HOBBY IS/SAME TRADITIONAL PAST  
  
 \_\_\_\_\_eg:ip-l  
 SAME/ALWAYS. IX3<sub>ip-l</sub> IX1 1-OFFER-3 PERSON-3<sub>ip-l</sub> IX3<sub>ip-l</sub>  
 IX3<sub>ip-l</sub> HAPPY, ENJOY.

‘I think that I would offer this book to someone<sub>non-spec...</sub>  
 It must be someone who likes traditional things.  
 Definitely, I would offer it to him. He would be very happy and he would enjoy it  
 a lot.’

(S\_Obj 00:42)

Again, first the semantic representation is built in the corresponding DRS. The variables contained in both the antecedent and the consequent need to be bound by the corresponding operator.

(17)

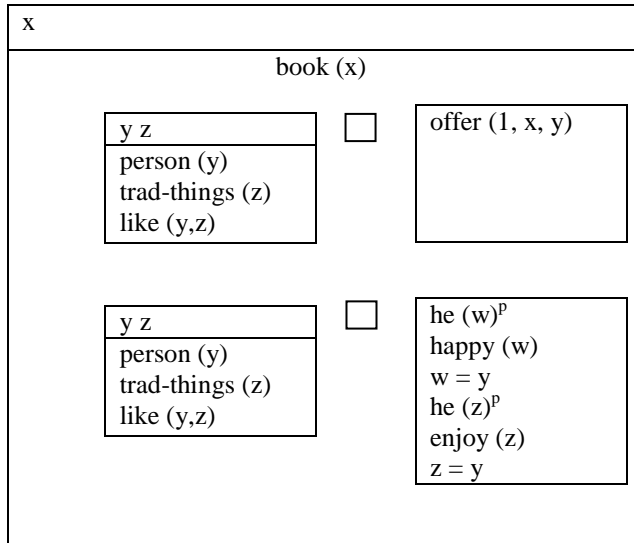


### 7.3 Prominence

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The continuation of the fragment of discourse contains two pronominal forms. Since the modal operator binds the variable it is a felicitous continuation. The construction rule for pronouns is used. According to the construction rule for prominence, it is checked which variables verify the formula for prominence. Then subindex  $p$  is assigned in the DRS for the narrow scope variables, as in (19).

- (18) a.  $[DR_b(U_n)=DR_b(U_{n-1}) \wedge DR_b(U_n)=DR_p(U_n)] \equiv w$   
 b.  $[DR_b(U_n)=DR_b(U_{n-1}) \wedge DR_b(U_n)=DR_p(U_n)] \equiv z$
- (19)



Again in (19) the semantic representation is fused with the structure of discourse, and the most prominent variables, although being embedded, are specifically marked.

In LSC, thus, the establishment of lower spatial locations is represented with variables attached to both narrow and wide scope

quantifiers, as long as they denote the most prominent DR. Both narrow and wide scope quantifiers attached to variables can be linked to the discourse topic and hence represent the most prominent DR. In such a context, a lower spatial location is established in sign space in LSC, independently of the scope of the quantifier attached to the variable. As for the semantic representation, the most prominent variable is assigned a superindex  $p$  in the DRS. Correspondingly, in LSC a spatial location established on the lower frontal plane corresponds to the establishment of superindex  $p$  in the DRS.

Hence, *The discourse referent hypothesis* presented in (9) above (and also in (64) in chapter 4) needs to be revised. Since variables attached to narrow scope quantifiers may also establish a spatial location (p) when they denote the most prominent DR, the following hypothesis is formulated here:

(20) **The discourse referent hypothesis** (final version)

(p) is the overt manifestation of DRs established on the lower frontal plane when the corresponding variable, without regard to its scope, denotes the most prominent DR.

The establishment of (p) marks that the DR denoted is the topic of that fragment of discourse and also a noteworthy entity, since the discourse will be centred on it, even if it is a variable attached to a narrow scope quantifier.

Importantly, when connected discourse is considered, it is observed that there is not a one-to-one relation between the spatial location (p) where the index sign is directed to and the DR denoted. In some contexts, spatial locations can be reversed by factors related to discourse prominence. When the DR is the discourse topic, spatial locations associated with the same DR can be established in different directions of spatial planes, or even the same location is associated with more than one DR. In the first case the location is established in different lateral directions and shifts between ipsilateral and contralateral parts. In the second case, the most prominent DR is established on a spatial location previously established for another DR. This shows that (p) is not associated with a concrete direction but it is actually an abstract point established in sign space. As seen in chapter 3 and 6, in LSC only the two features on the frontal plane, namely upper and lower, are relevant for the grammar of the language, but this is not the case concerning the lateral parts, namely ipsilateral and contralateral. In the following section it is shown that the direction of index signs towards the horizontal plane is not relevant, since it may be directed to the two opposed directions to denote the same DR in different moments of the discourse without affecting the propositional meaning. Hence, what is relevant is that the index sign establishes an abstract point in space (p) which is associated with an individual from the discourse model, independently of the direction on spatial planes, as defined by Wilbur (2008) and already explained in §3.4. The following section delves into this issue and provides examples from the LSC small-scale corpus.

## 7.4 Underspecification

In the sign linguistics literature, spatial locations are traditionally viewed as points in space. Only some authors talk about areas or regions established in space through signs directed to it (Engberg-Pedersen, 1993; Russell & Manitoba, 2008). Russell & Manitoba argue that locations of ASL pronouns are regions established within the articulatory space, instead of points. They compare these regions with another linguistic system of categorical regions such as spoken-language vowels. They conclude that the ASL pronominal system is not analogue, infinite, non-categorical, non-linguistic, since it shares many of the features that the spoken language (SpL) vowel system shows. Also, Baker and Cokely (1980) use clouds instead of points in space to represent spatial locations.

In this section it is shown that very weak referring terms are used when the DR is very prominent. Weak pronouns are anaphoric, they are not adjacent to the verb, they cannot be reduplicated and their duration is in between a strong pronoun and a clitic (Cardinaletti & Starke, 1999; Bertone & Cardinaletti, 2011). From the careful analysis of our LSC corpus, it should be added to this list of properties that weak pronouns also have a very weak realisation, and the direction towards space can be shifted to the lateral parts on the horizontal plane. This shows that the direction on the horizontal plane where (p) is established is in fact irrelevant for the grammar of LSC.

It is important that the shifting in space I am referring to here is not confused with what I call “temporal locus-shifting” described in the

literature as locus-shifting. Padden (1988:185), Janis (1992:83) and Emmorey (2002:56) present some ASL examples of locus shifting which are expressed through classifiers. In these examples, the subject of a classifier predicate appears in position *x* and in the following sentence the location of the coreferential pronoun shifts to the position of the end point of the verb, namely *y*. In such cases, the motion of the verb has a linear movement, from one side of sign space to the other. The locus position is thus shifted from *x* to *y*. Van Hoek (1992) also presents examples in which a person is moving from one city to another and this is assigned two spatial locations, each associated with the aspects of the life of the DR in each corresponding city. Because classifier constructions imply spatiotemporal information in the construction itself, I consider these examples of locus shifting to be motivated by spatiotemporal information reasons. If we sign a classifier predicate at a different location in space than previously assigned, the connection with the DR will be the same but it will be implied that a spatiotemporal setting change has taken place. A spatial location shift involves time elapse (that is, the duration time of the event), as well as association with different temporal moments, as shown in van Hoek (1992). Although this shifting is very relevant for the study of discourse structure, it is not the kind of shifting I am dealing with here. Rather here I am focusing on cases where the shift does not contribute any temporal change in meaning, as we will see below.

The main focus in this section is the relation between prominence of the DR and underspecification of the referring term used to denote

it. When studying connected discourse, DRs can be associated with different directions on the horizontal plane without further implying any temporal information. The referring term used is a much underspecified one. This shows that the exact direction on the horizontal plane where the location is established is not relevant for the grammar of LSC. Hence in connected discourse there is not a strict one-to-one mapping in the spatial direction and the DR associated since in some contexts the establishment of (p) can be reversed on the horizontal plane by factors related to discourse prominence and signers may not exactly use the same area for the same referent (Barberà, 2010).<sup>9</sup> My claim is that the prominence of DRs can override spatial location setting given the dynamic nature of discourse. Here I revise *The spatial point hypothesis*, previously introduced.

(21) **The spatial point hypothesis** (first version)

The identity condition in the DRS is encoded through coincidence in direction of spatial establishment of (p).

The study of connected discourse shows that location is not one of the SLs features used for the disambiguation of the identity

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<sup>9</sup> Concerning the kind of localisation mechanisms used to refer to prominent DRs, Rinfret (2009) claims that in LSQ there is a difference in use. When a DR is localized with manual mechanisms, it is considered to be less prominent, than when it is localised with non-manual. Non-manual localisation with body lean, eye gaze indicates that the DR is very active in the consciousness of the addressee. Low prominence in LSQ is marked with index signs directed to space, and the marked realization of signs (ibid:252). No such distinction has been found so far in our LSC small-scale corpus.



condition (contra Zwitserlood & van Gijn, 2003, and in line with Quer, 2009), as it is shown below.

### **7.4.1 Informativity**

In §7.1.2 we have seen that as discourse progresses, the linguistic elements used to refer to entities can vary. The more prominent an entity is at a specific point in the conversation, the more attenuated the referring form will be. Hence an important characteristic of anaphoric elements is that as discourse unfolds, the referential expressions which function anaphorically become more attenuated, less informative and less rigid as long as the DR remains activated (Ariel 1988, 1990). Informativity concerns the amount of information that referring expressions have in terms of lexical content. The information load of pronominal forms is indeed very small. And in fact, there is a correlation between degree of accessibility and information load: the more accessible an entity is, the less informative the referring expression used will be.

If we consider SL pronouns, an index handshake directed to space provides very little information about the entity that we are talking about. According to the general assumption, pronouns do not include gender information, but only location and number (Zwitserlood & van Gijn, 2006; Sandler & Lillo-Martin, 2006). However, the information that location provides can happen to be not very informative. As shown in this section, in some contexts there is not a one-to-one mapping between the DR and the location establishment, and this relation is sometimes modified by discourse

prominence reasons. Hence in LSC connected discourse, location is not a reliable cue for the identification of the DR associated.

This chapter revises the hypothesis presented in §4.2.2 where it has been claimed that in SLs the association between the pronominal form and the DR is overt due to the establishment in sign space. While this has been commonly accepted when considering isolated sentences, connected discourse forces us to revise this hypothesis.

When the discourse contains two variables (i.e. two DRs), the horizontal plane is usually divided into two parts, namely ipsilateral vs. contralateral parts. These opposed locations in space distinguish the two DRs and are interpreted as contrastive topics (see §3.3.1.2). They are in fact two clauses in which two DRs are introduced in each clause and their respective verbs predicate two different, opposing eventualities. Sign space is then restricted to the two variables and references to one or the other will be represented by a direction in the two opposed lateral parts on the horizontal plane, as shown in Figure 7.1.



a. Contralateral location for DR (x)

b. Ipsilateral location for DR (y)

Figure 7.1 Contrastive locations

Unless the DR is reintroduced by the nominal, the distinction ipsilateral-contralateral is kept throughout the discourse as long as there is no shift in the frame of reference. However, in some contexts this general tendency is reversed and the prominence of the DR affects the one-to-one relation between the direction of establishment of the spatial location and the DR. This change in the usual tendency is motivated by the prominent status that a DR has. This is shown in the example below taken from the Aesop's fables "The lion and the mouse". Along the discourse the two main DRs (i.e. the lion and the mouse) are localised in opposing sides of sign space. The referential shift is indicated by modifications in the signer's facial expression and body position. In the fragment glossed in (22) the two DRs are not distinguished by two contrasted spatial areas, but rather they are set in the same area, namely the contralateral part. As shown in (22) and in stills Figure 7.2a it is the lion that is first localised on the contralateral part. In the third utterance in (22) the signer directs a pronoun to the same direction to denote "mouse" (Figure 7.2b). As a consequence of this lack of a

one-to-one relation between a spatial direction and the DR, the coreferential subindices and area of sign space do not coincide in the glosses in (22).

(22)

THEN/SO MOUSE<sub>k</sub> ALREADY 1-FAVOR-3<sub>cl-j</sub> IX3<sub>cl-j</sub> LION<sub>j</sub>  
 BEFORE (null)<sub>k</sub> 1-TELL PROMISE THEN/CLEAR  
 IMAGINE LION<sub>j</sub> DIE ALMOST **IX3**<sub>cl-k</sub> 3<sub>cl-k</sub>-SAVE-3<sub>ipsi-j</sub> ABLE  
 ‘And so the mouse<sub>k</sub> had favoured the lion<sub>j</sub>  
 Before (null)<sub>k</sub> had promised so  
 Imagine! The lion<sub>j</sub> almost died, but he<sub>k</sub> was capable to save him<sub>j</sub>’  
 (S\_LleoRat 02:06)



a. IX3<sub>cl</sub> LION

b. IX3<sub>cl</sub> (mouse)

Figure 7.2 Same location for two DRs

The relation between the two DRs does not follow the convention of semantic affinity as described by Engberg-Pedersen by which DRs have a close relationship and they are grouped in the same area (as already explained in §3.3.1.2). Rather, it is a clear case of contrastive use in which the signer is comparing and contrasting the performance of the two animals in the story. However since one of the DRs (i.e. the mouse) is more prominent than the other, the corresponding direction of the spatial location associated is shifted. Thus the two DRs are localised on the same side without being

ambiguous. The pronoun direction towards the contralateral part does not affect the propositional meaning of the sentence. On the one hand, the high prominence of the DR “mouse” helps us understand that an overt pronoun directed to an area already established for a referent can be re-established by an accessible one. On the other hand, the semantics of the verb SAVE also triggers a disambiguation of the pronoun.<sup>10</sup>

The disposition of spatial locations shown in (22) is not the most canonical one, but it happens to appear especially in spontaneous signing. The most canonical situation would be to direct the pronoun IX3 for the second DR to the area opposed (i.e. ipsilateral) in order to contrast it with the first entity previously localised on the contralateral part, and also to agree the verb keeping the contrastive disposition, as exemplified in (23).

- (23) IMAGINE, LION<sub>j</sub> DIE ALMOST, IX3<sub>ip-k</sub> 3<sub>ip-k</sub>-SAVE-3<sub>cl-j</sub>  
 ABLE  
 ‘Imagine! The lion<sub>j</sub> almost died, but he<sub>k</sub> was capable to save him<sub>j</sub>’

Another canonical option would be to have a null argument with the verb still agreed according to the contrastive locus. In (24) the subject of the second sentence is a null argument. This null argument is licensed by verbal agreement (Lillo-Martin 1986), because the plain verb of the second sentence (SAVE) is articulated

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<sup>10</sup> In Figure 7.2b the signer directs a body lean to the contralateral part. The simultaneous use of manual forms (the index pronominal sign directed towards the contralateral part) and non-manual forms (body lean towards the contralateral side and marked facial expression) is an interesting avenue for future research which is not included here.

as an agreeing verb realised from one location (i.e. ipsilateral) to the other (i.e. contralateral). Since the verb is realised with the body of the signer<sup>11</sup> on the ipsilateral side which was previously associated with the DR “mouse”, the verb will be interpreted as having this DR as the subject.

- (24) IMAGINE, LION<sub>j</sub> DIE ALMOST, 3<sub>ip-k</sub>-SAVE-3<sub>cl-j</sub> ABLE  
‘Imagine! The lion<sub>j</sub> almost died, but (null)<sub>k</sub> was capable to save him<sub>j</sub>’

Another possibility would be to have a null argument but to keep the agreeing locus disposition of the verb as it is in the original example in (22), in which case the subject of the sentence would be the same as in the first one but the meaning would be the opposite, as shown below. (25) is the canonical utterance that we would get if we did not consider the prominence of the DR. Note that the prominence of the DR and the accessibility of referring expressions used need to be considered to get the right interpretation of a pronominal form directed to space.

- (25) IMAGINE, LION<sub>j</sub> DIE ALMOST, 3<sub>cl-j</sub>-SAVE-3<sub>ip-k</sub> ABLE  
Imagine! The lion<sub>j</sub> almost died, but (null)<sub>j</sub> was capable to save him<sub>k</sub>

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<sup>11</sup> Kegl (1986:480ff) does not consider the verb movement to spatial locations as the agreement which licenses null arguments. Rather, the position of the signer's body with respect to the locations, which she considers a clitic, licenses empty arguments. Both Lillo-Martin and Kegl analyses are compatible with my argumentation.

With the previous examples it has been shown that the presence or absence of the pronoun and the agreeing features of the verb contribute to the meaning. However what matters most in the original version (22) is that there is an overt pronoun which indicates a contrastive topic and thus a different subject from the first sentence. Although the spatial direction of the index sign is the same, the overt pronoun triggers a different subject interpretation due to the contrastive use. (p) established towards the same direction on the horizontal plane may be associated with two DRs and more than one DR can be thus localised on the same horizontal direction. This shows that space appears to have few informative properties.

### **7.4.2 Rigidity**

The criterion of rigidity consists in the ability to pick a unique DR, based on the form. Anaphoric forms referring to prominent entities are rigid. Since the DR is very prominent in the discourse, the anaphoric form does not have to be very rigid. Again the accessibility scale is in correlation with the degree of rigidity: the more prominent the entity is, the less rigid the anaphoric element will be.

As said before, the general tendency is that signers pick one specific lateral direction to localise a DR. However, in contexts where the entity is very prominent, the direction in sign space used to localise can be shifted without affecting the propositional meaning. In contexts of prominent entities, different locations in space can be

used to denote the same DR. The entity can be localised on one side and later on be picked up on the other side.<sup>12</sup> In such cases either there is only one variable in the model or in case there is more than one variable present, one is more prominent than the others. For the prominent entity, (p) may be established in different directions on the horizontal plane.

Discourse fragments with one DR have only one variable (x) and thus only one location is used. Because the DR is accessible enough and there is no competition among other variables, the location (p) is usually localised in one area of the signing space. But in informal settings there is not always a one-to-one mapping and (p) can be localised in different areas, sometimes even switching between ipsilateral/contralateral, which affects neither the propositional meaning nor the interpretation of the utterance, as also seen in the previous section. The fragment cannot be qualified as incoherent because space is used consistently between an index directed to a spatial location (p) which is associated with the most prominent DR. The prominence of the DR makes the localisations towards opposed parts on the horizontal plane possible.

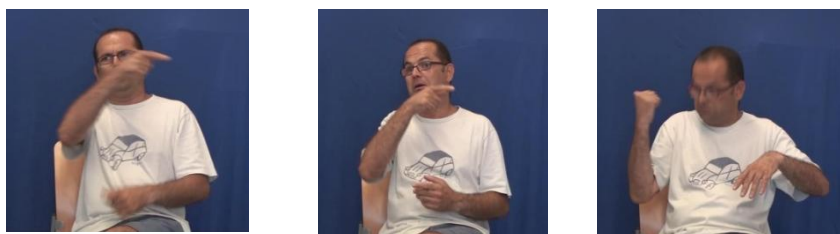
This is shown in Figure 7.3, where the signer established (p) denoting DR x towards the two lateral parts of sign space. In the first two mentions, he directs the index sign towards the

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<sup>12</sup> Engberg-Pedersen (1993:100) also presents an example in Danish Sign language where the same DR is localised in two different loci. The signer introduces the chairman of the National Association of the Deaf. She refers to him twice. The first time it is introduced on the ipsilateral part. The second time she refers to him it is much later but she does not use the same locus and the determiner made with the index finger points towards the contralateral part.



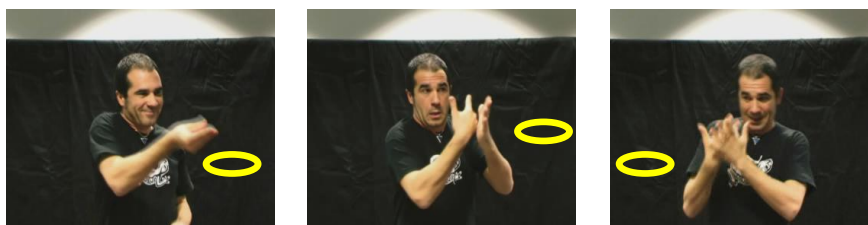
contralateral part (Figure 7.3a and Figure 7.3b). But later on in the discourse, he directs the index sign referring to *x* towards the ipsilateral part (Figure 7.3c). Importantly, in this fragment of discourse DR *x* is the most prominent entity in the fragment, since it is the thing the fragment is about. He is not contrasting *x* to any other entity.



a. DR(*x*) - Contralateral    b. DR(*x*) - Contralateral    c. DR(*x*) - Ipsilateral

Figure 7.3 Two lateral directions for the same DR

Another example is shown in Figure 7.4 where the signer establishes the same DR in two lateral directions within the discourse fragment. In the first two mentions, agreement verbs are directed towards the contralateral part (Figure 7.4a and Figure 7.4b). But in the following sequence of utterances, the same DR is established on the ipsilateral part and referred back to with an agreement verb (Figure 7.4c). However, it is important to note that in this fragment two DRs are present. One is localised in space, and the other is referred to by a role shift construction. The interaction between role shift and prominence is an interesting issue which is left for future research.



a. 1-GIVE-3k

b. 3k-EXPLAIN-1

c. 3k-EXPLAIN-1

Figure 7.4 Two lateral directions for the same DR II

The examples in the two preceding figures show that (p) is a very abstract point which can be established in different directions on the horizontal plane, but importantly it is categorically interpreted as being associated with the most prominent DR.<sup>13</sup> Hence, connected discourse is the domain where it is more evident that (p) is indeed an abstract point in space, no matter the direction on the horizontal plane where it is established. The definition of the nature of (p) is described as follows:

(26) **The abstract point in space** (revised)

(p) is an abstract point in space no matter the direction on the horizontal plane where it is established.

It is important to note that the LSC examples shown in this section are not very frequent in the small-scale corpus. This is mainly due to two reasons. First, most of the signers which participate in the corpus are LSC teachers and they are thus aware of what has been

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<sup>13</sup> This is coherent with studies focused on role shift in which it has been claimed that in role shift the most important feature for the referential shift is facial expression and eye gaze in particular rather than body lean or manual signs directed to sign space (see Costello et al. 2008; Herrmann & Steinback, 2009).

said of the grammar of SL. Hence, whenever they are in front of a camera and ready to sign the more common situation is that they use a quite standard register of LSC. Second, the data which comprises the small-scale corpus may not be as naturalistic as the contexts where these examples may usually appear. The more relaxed and the more natural the context is, the more chances that spatial locations are shifted on the horizontal plane, even with LSC teachers. The principles stated so far have paved the area of the use of spatial locations in connected discourse. A follow-up study based on a large LSC corpus should help confirm the generalisations and the analysis provided here on the basis of naturalistic data.

### **7.5 Summary**

This chapter has presented two fine-grained versions of hypotheses concerning (p), which have enhanced the analysis of LSC spatial locations by offering a discourse structure perspective. First, we have seen that lower spatial locations correspond to discourse prominence, defined as variables with backward looking properties as well as forward looking properties, independently of the scope of the quantifier attached to the variable. Also, the nature of spatial locations has been presented by considering data from connected discourse. (p) is an abstract point in space which does not correspond to an exact point nor it is related to a specific direction in spatial planes. In connected discourse, locations associated with the most prominent DR can be shifted in space, showing that the exact direction on planes is irrelevant for the nature of (p). What is

relevant is that the spatial location (p) is associated with a DR from the model independently of the direction of the referring term in sign space.

In the review of literature in chapter 5 concerning the definiteness information spatial locations encode (see §5.1.4), I have revised the hypotheses of some works concerning the lack of definiteness. Thus I agree with Engberg-Pedersen, Winston and Rinfret that spatial locations denote discourse prominence, rather than definiteness. However, the route I have taken in the overall dissertation is more indirect, but also more interesting, because specificity marking has also been included in the analysis of LSC locations.

# **Chapter 8**

## **Final remarks**

## **8.0 Conclusions and major contributions**

This dissertation has shown that non-descriptive locations are categorically defined as being realized in the different areas within the three spatial planes projected with respect to the body of the signer. Signs directed to the different parts of spatial planes contribute to the establishment of a grammatical morpheme that consists in an abstract point in space, which is categorically interpreted within the linguistic system. In LSC, the spatial location (p) can be abstractly established in different parts of the three spatial planes. The different features within each plane are specialised in the meaning they denote and, more importantly, they belong to the grammar of LSC. As stated in chapter 1 three goals led the direction of this research, which claimed the following:

### **G1. To show that spatial locations are integrated into the grammar of LSC and, even more, they denote specificity.**

This dissertation has shown that spatial locations undertake a semantic function: that of being the overt manifestation of discourse referents (DRs). This assumption has been first presented as (1).

- (1) **The discourse referent hypothesis** (first version)  
(p) is the overt manifestation of the DR the referring term denotes.

Under the specific Discourse Representation Theory formalisation, the discourse referent established in space corresponds to a variable established in the main universe of discourse. Hence, the

establishment of (p) is the marking for DRs which have wide scope. In contrast, variables attached to narrow scope quantifiers lack a spatial location establishment. Hence, (1) has been slightly revised and extended to (2).

(2) **The discourse referent hypothesis** (second version)

(p) is the overt manifestation of DRs attached to a quantifier that has wide scope.

Interestingly, the notion of specificity plays an important role in the establishment of (p) and it has been proposed that (p) encodes specificity. The frontal plane is grammatically relevant for specificity marking: lower spatial locations correlate with specific discourse referents, whereas upper spatial locations correlate with non-specific ones. In LSC two kinds of localisation on the frontal plane are found, namely a strong and a weak localisation. Strong localisation is instantiated by the feature (p), while weak localisation is instantiated by the marked feature (p)[up]. This is framed under the following hypothesis in (3), which is a fine-grained version of (2), and that shows that lower spatial locations denote specificity.

(3) **The discourse referent hypothesis** (specificity version)

(p) is the overt manifestation of wide scope which denotes specificity

But also, weak localisation establishes an upper location on the frontal plane, for those variables being under the scope of a quantifier denoting non-specificity.

- (4) **The discourse referent hypothesis** (non-specificity version)  
(p)[up] is the overt manifestation of narrow scope which denotes non-specificity

Moreover, the incorporation of discourse structure into the analysis has offered a new and interesting perspective to the analysis of spatial locations. I have addressed the fact that lower spatial locations correspond to discourse prominence, defined as the intersection between backward looking properties and forward looking properties. Hence, here it has been shown that independently of the scope of the quantifier attached to the variable, narrow scope variables which are linked to the prominent DR at a specific point in a discourse behave like wide scope ones and establish a lower spatial location. The wide-scope hypothesis is revised and transformed into (5).

- (5) **The discourse referent hypothesis** (final version)  
(p) is the overt manifestation of DRs established on the lower frontal plane when the corresponding variable, without regard to its scope, denotes the most prominent DR.

Although these hypotheses seem at first sight to be contradictory, along the dissertation it is shown that they are in fact



complementary once the proper ingredients are incorporated to the analysis.

### **G2. To analyse how spatial locations are set, given the dynamic nature of discourse.**

We have also seen that (p) is an abstract point in space which does not correspond to an exact point nor it is related to a specific direction in spatial planes. Discourse referents which are coreferential are commonly associated with the same direction on the horizontal plane. The coreferential link is done through the coincidence in the direction of establishment of (p). At a first stage of the dissertation, this has been formulated as hypothesis (6) below.

#### **(6) The spatial point hypothesis (first version)**

The identity condition in the DRS is encoded through coincidence in direction of spatial establishment of (p).

However, in connected discourse, locations associated with the most prominent DR can be shifted in space, showing that the exact direction on the horizontal plane is irrelevant for the nature of (p). What it is relevant is that the spatial location (p) is associated with a DR from the model independently of the direction in sign space and this is categorically interpreted within the linguistic system. *The spatial point hypothesis* in (6) is thus developed to (7).

(7) **The spatial point hypothesis** (revised)

(p) is an abstract point in space no matter the direction on the horizontal plane where it is established.

**G.3 To apply a dynamic semantic theory, such as classical Discourse Representation Theory, to a visual-spatial language like LSC.**

This dissertation has offered an innovative approach that classical DRT lacks. It has incorporated the properties of a visual-spatial language which also contribute to the semantic representation. First, sign space has been adequately incorporated into the semantic representation of LSC discourse. On the one hand, the sentence level has been considered by claiming that the identity condition in the DRS is resolved through coincidence in direction of spatial establishment of (p). But on the other, the analysis of connected discourse has shown that (p) is in fact an abstract point in space no matter the direction on the horizontal plane where it is established, as stated in G2. Second, deictic pronominal uses, typical of face-to-face communication, have been added to the DRT construction rules needed in contexts of deictic elements. This has shown that in LSC references are anaphoric to the discourse model, although in some contexts DRs are introduced to the common ground without an explicit linguistic antecedent.

Finally, the present approach has incorporated discourse structure to the semantic representation by analysing how prominence is integrated. A theory of discourse structure with special focus on prominence has been integrated into the

representational semantic level. The prominence of the variables at different fragments of discourse is determined and marked in the semantic representation, by considering the backward and the forward properties of the discourse referent

This dissertation has contributed to enhance our understanding of sign space in LSC, and more specifically of the grammatical role that non-descriptive locations play. The concrete major contributions of this dissertation are basically two-fold. On the one hand, a semantic formalisation such as DRT has been used within which the hypotheses have been framed and shown. The theoretical background of DRT has provided a detailed framework which supplies the tools for an implementation to concretely define the grammatical role of spatial locations. Importantly, the features which characterise visual-spatial languages, namely the use of sign space and deictic contexts, have also been taken into account and the corresponding implementations have been incorporated, as described in G3 above. On the other hand, the analysis of spatial locations and the referential properties in LSC have been investigated on the basis of a small-scale LSC corpus, containing semi-spontaneous, videos recorded for other purposes, and elicited data. In the end, it has been connected discourse in the language under investigation which has provided the most important clues for analysis of these grammatical domains

## 8.1 Future directions

At the end of this dissertation many questions regarding the topics touched upon here remain unanswered, mainly due to the fact that a broad topic has been addressed.

As for localisation, it would be interesting to analyse whether a nominal followed or preceded by an index sign is best analysed as a whole clause or rather as a phrase. Kegl (1986) makes a clear distinction between index signs functioning referentially, and those having a predicative function. The first occur in indexing phrases and the second, in indexing clauses. However, it should be seen whether topicalised constituents occur in these structures, which would point towards the phrase analysis of indexing.

Concerning existential clauses, it should also be explored whether the introduction of DRs into the model can be considered to be a case of existential sentences. A sentence like (8) indicates that a man is present in the discourse model.

- (8) IX3<sub>a</sub> MAN  
'There is a/*this* man.'

Interestingly, it could be argued that this syntactic structure conflates two semantic structures. On the one hand, an existence statement where it is predicated that a DR exists in the current model. On the other hand, localisation predicts that an entity is at a deictically determined location *a*, which is found in sign space. This conflation which has been analysed for Italian existential sentences

(Zamparelli, 1995) might be also present in LSC indexing sentences.

Another issue that could be the topic of future research is the specialisation of morphophonological features denoting specificity presented in chapter 6. In LSC there seems to be a specialisation in the property of specificity the features mark: while eye gaze seems to denote identifiability; signs localised in space seem to express more wide scope and partitivity. As shown in chapter 6, identifiability as one of the properties that specificity encompasses is mostly marked with eye gaze being directed to a spatial location for specific reference, or with an upper darting eye gaze for non-specific reference. In contrast, scope and partitivity mainly distinguish specific and non-specific reference with the direction of sign towards the lower and upper parts of the frontal plane, respectively. In this respect, contexts of intermediate scope where a variable receives wide scope with respect to one quantifier and narrow scope with respect to another could also contribute to the analysis of scope marking specificity and localisation on the frontal plane.

Finally, an additional research project would be to refine the kind of motivations which lead to the prominence hierarchy presented in chapter 7. Three possibilities could be analysed: whether prominence is a syntactic issue where the hierarchy goes from subject > object > other, a semantic issue (animate > inanimate), or a pragmatic issue (topic > comment). But more interestingly, the

interaction among the three levels of analysis should be further explored.

An additional note concerning the methodology needs to be made. The main aim in this dissertation has been to develop a qualitative study by observing and analysing the tendencies that naturalistic, semi-spontaneous and elicited data from our small-scale LSC corpus can provide. The results of the small-scale corpus data should be taken as a strong tendency of real data which is associated with a theoretical model. A follow-up study based on a yet non-existent large LSC corpus should help confirm the generalisations and the analysis provided here on the basis of naturalistic data.

As said before, this dissertation has focused on a broad topic, such as the semantic and pragmatic properties of sign space in LSC. Obviously many questions remain unanswered, but at least the way has been paved for more fine-grained future proposals.

# 9. Appendix

## Appendix A: Noun Phrase construction rules

CR.PN: Upon encountering a proper noun,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]], and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. introduce the predicate condition  $\beta(\alpha)$

CR.N: Upon encountering a common noun co-occurring with a determiner,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]], and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. introduce the predicate condition  $\beta(\alpha)$

CR.PRON: Upon encountering a pronominal form,

1. trigger the syntactic configuration [<sub>s</sub> NP $\alpha$  [VP]] or [<sub>s</sub> VP [NP $\alpha$ ]], and
2. introduce a novel discourse referent  $\alpha$  into the main DRS, and
3. check which variable in the main DRS shares the features  $\alpha$  has, and
4. if no suitable variable is found, go to CR.PRON2; if the suitable variable is found introduce an identity equation  $\alpha = \gamma$
5. go to CR.PROM

CR.PRON2: Upon encountering a pronominal form,

1. go to the main DRS and take the default variable  $\delta$ ,
2. introduce an identity equation  $\alpha = \delta$
3. go to CR. PROM

CR.PROM: Upon encountering an identity equation  $\alpha = \gamma$ ,

1. check the variable that verifies the prominence rule:

$$DR_b(U_n) = DR_b(U_{n-1}) \wedge DR_b(U_n) = DR_p(U_n)$$

2. assign the superindex  $p$  to the variable,
3. check the conditions in the DRS equated to the variable  $\beta = \alpha$ ,
4. assign the superindex  $p$  to the suitable variable

### **Appendix B: LSC data**

See the CD-Rom attached, which contains the LSC videos used in this dissertation. An excel file is also included with a complete list of all the data.



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