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# Use and Functions of Spatial Planes in Catalan Sign Language (LSC) Discourse

## Abstract

Although the phonological description of spatial planes that configure signing space is very detailed (Brentari 1998; Liddell and Johnson 1989; Sandler 1989), our knowledge of their use and functions at the discourse level is still very limited. This article describes the use of the spatial planes in Catalan Sign Language (LSC). It provides a unified treatment of various linguistic phenomena (e.g., hierarchical relations and locatives) that have hitherto been described separately in the sign language literature and of other aspects (e.g., encoding of specificity) that have not yet been the subject of research in LSC or other signed languages. The features found in two of the three spatial planes as described in the phonological literature are also relevant beyond the sentence level and serve well-defined discourse functions.

WHEN ONE looks at a signed conversation, perhaps the most striking aspect that one notices is that sign languages (SLs) use space for the representation of meaning. Whereas spoken languages use the audio-vocal modality, SLs use the visual-spatial modality. As a consequence of this modality, signing space, which is the three-dimensional space in front of the signer's body, is thoroughly utilized. Linguistic expressions in SLs rely on signing space, and the various components of the grammar show dependence on it. At the phonological level, space is used contrastively in the articulation of signs (Brentari 1998; Sandler 1989). At the morphosyntactic level, signs are modulated in

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space for grammatical purposes to express number, person, and verb arguments (Janis 1992; Mathur 2000; Padden 1988). At the discourse level, spatial locations are associated with discourse referents (Klima and Bellugi 1979).

Nevertheless, the analysis of space in SLs is not free of controversy, and it has been a matter of debate among SL researchers. Signs directed to space may externally be seen as very similar to cospeech gesture, and this has led some researchers to argue that signs that obligatorily use locations in space (such as pronouns and verb agreement) comprise both a linguistic and a gestural component (Liddell 1990, 2003; Meier 1990). This implies that locations are analyzed as a gradient continuum and very rarely as categorical elements. Conversely, the referential locus view maintains that spatial locations denote a formal relationship between referent and location for further use later in the discourse (Friedman 1975; Kegl [1976] 2003; Lillo-Martin and Klima 1991; Neidle et al. 2000). This view maintains that, although the syntactic literature generally assumes that noun phrases (NPs) contain abstract referential features, SLs show the overt morphological expression of referential distinctions through the association of distinct referents with specific spatial locations. Hence, locations in space are analyzed as the overt manifestation of referential indices.

This article argues that Catalan Sign Language (*Llengua de signes catalana* [LSC]) systematically uses two of the three spatial planes, namely the horizontal and the frontal planes, as part of its syntax. On the basis of small-scale corpus data, I describe how these two spatial planes are used in discourse. I concentrate only on the so-called syntactic use of space, leaving the topographic one and, even more interestingly, the interaction between these two for future research. A categorical division of a three-dimensional area such as signing space into different directions is available due to the systematic use of spatial planes in LSC with respect to their function in discourse. Drawing on the ongoing debate over the nature of space in the signed modality and its connection with gestural and linguistic properties, this article recognizes particular uses of spatial planes to express discourse categories, which contributes to the characterization of the abstract import of signing space.

The small-scale corpus used for the present study includes data from seven native deaf signers, three women and four men, between

41 and 62 years of age and living in the area of Barcelona. At present this LSC corpus comprises about 5,108 signs and is a composite of genres (e.g., news, interviews, documentaries, tales), as well as various discourse modes (e.g., narrative, explicative, conversational). It consists of three types of data, namely semispontaneous discourses, videos recorded for other purposes, and elicited data (see Barberà 2012 for a complete description of the data set).

The rest of the article is organized as follows. The next section examines the use of signing space beyond the sentence level, presents the spatial morpheme, and reviews the two main spatial functions. The section after that describes the three spatial planes and the features of nondescriptive locations. The next section analyzes the use and functions of spatial planes, and the last section summarizes the main findings.

### Signing Space

The space where the articulations of signs take place is called *signing space*. It is considered to be constrained by both the horizontal plane and the frontal plane (i.e., the latter is in front of the signer's torso) (figure 1).<sup>1</sup> The signer's body may also be used as a location for the articulation of signs. In fact, signing space is used not only to allow the hands and the arms to move (articulate) but also, and more important, to convey linguistic meaning (Klima and Bellugi 1979).

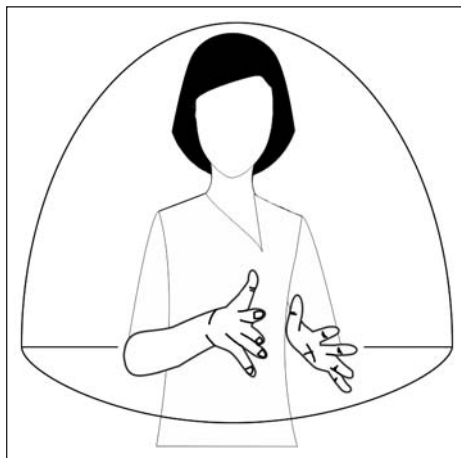


FIGURE 1. Signing space.

*Beyond the Sentence*

Discourse referents (DRs) in SLs are associated with spatial locations, which may be further referred to in coreferential contexts (Klima and Bellugi 1979). Such spatial location is called a “referential locus” or an “r-locus” (Lillo-Martin and Klima 1991), and it may be established across sentence boundaries. For instance, in example 1, the signer associates the nominal “son” with a spatial location by directing an index sign toward the contralateral area (i.e., for a right-handed signer, this is the area to the left; see the later section on horizontal planes). In the second clause in example 1, two index signs are directed to the same locus, and the coincidence of the direction triggers a coreferential interpretation:<sup>2</sup>

1. IX<sub>3c</sub> LAPTOP I-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 one.”

The following figure contains a sequence of the two index signs that appear in example 1. The stills in figure 2a correspond to the introduction and the spatial association of the DR SON. Figure 2b, corresponding to an index sign in the second sentence in example 1, shows that further mentions of the DR are realized by a pronominal index sign pointing to the same direction on the horizontal plane previously established.



FIGURE 2. First and further mention of a localized discourse referent.

The set of linguistic mechanisms used to both establish a DR in space and to later refer to it have been described for specific SLs, namely American Sign Language (Winston 1995), British Sign Language (Morgan 1996), and LSC (Barberà 2012). The most commonly used mechanisms are index signs (the so-called pointing signs), agreeing verbs, weak hand in dominance-reversal sequences, body lean, and classifier handshapes. These mechanisms not only establish a DR in signing space but also contribute to keeping the referent active in the discourse and constitute strategies for reference tracking. Although the association between DRs and signing space is typical of SLs and this spatial use may seem to be a unique and differential aspect of SLs due to their visual-spatial modality, the interpretation and resolution of coreferential relations do not differ across language modalities (Emmorey 2007).

#### *Spatial Morpheme*

Some authors have argued for a phonemic/phonetic distinction in the direction that index signs may take because they are directed to a three-dimensional extension and the value for an r-locus is thus difficult to categorize (Janis 1992; Kooij 2002). Even though the phonology of index signs is considered to consist of abstract points in space, the phonetics of these signs is their actual direction and thus the broader dimension they may acquire. The different directions that an index sign may point at are in fact considered a gradient property, which can be compared to the opening of vowels (that is, the way that the regions for vowel categories are deployed and used) in spoken languages (Rathmann and Mathur 2002; Russell and Janzen 2008). In the syntax-discourse interface, the challenge of r-loci is that researchers have focused primarily on the physical point in space that index signs point or refer to, neglecting the fact that what matters is not the exact location but rather its categorical interpretation in the linguistic system.

Following Wilbur (2008), I maintain that the spatial direction to which index signs point is an abstract and a unique point in space. What matters is not the exact area but rather the abstract end point, which is expressed with the localization of signs and is interpreted in the grammar as a categorical element rather than a gradient one.

Wilbur's account is relevant because she asserts that the spatial point must be categorically defined and interpreted within the linguistic system. Moreover, this article shows that the abstract point may be established on different areas in the spatial plane, which are categorically distinguished. Thus, the grammar of the language utilizes a unique spatial morpheme that consists of an abstract point toward which indexical signs and other localization mechanisms are oriented and that may be established in different categorical areas within spatial planes.

### *Spatial Functions*

Since the beginnings of linguistic research on SLs, it has been argued that space undertakes two functions, namely a syntactic and a topographic one (Poizner, Klima, and Bellugi 1987). The syntactic function is an abstract use of space in which DRs are arbitrarily localized to identify the arguments of the verb. A particular r-locus is assigned to a DR, which can be moved without affecting the truth conditions of the sentence. The topographic function, in contrast, is used to express spatial relations among objects and is represented by meaningful locations that exploit the iconic properties of the visual-spatial modality. Topographic loci are meaningful in and of themselves, so a small change in the location may affect its truth conditions. In this latter case, space is used to represent spatial arrangements via signed descriptions, and the spatial relations of signs are significant. To avoid implying that the topographic use of space is nonsyntactic, I call the localizations occurring in the topographic use of space "descriptive" and those that occur in the syntactic use of space "nondescriptive" (Quer et al. 2005). The descriptive localization in figure 3a represents a bike leaning against a tree. Figure 3b represents a person seated in a tree. They are motivated by a mapping with the situation described, and they are represented by meaningful loci.

This contrasts with nondescriptive localizations that are arbitrarily and abstractly established (see figure 2). A comparison of descriptive and nondescriptive localizations shows that descriptions of spatial layout use the same horizontal plane of signing space as do SL nominals, pronominal reference, and verb-agreement devices. Both functions make use of r-loci; the difference lies in their significance: loci in signed descriptions are meaningful because they represent actual spatial (topographical) relations, whereas abstract loci are not



a. Bike leaning against a tree



b. Person seated in a tree

FIGURE 3. Descriptive localization.

meaningful in and of themselves by virtue of the fact that they are established for syntactic and discourse purposes.

According to some works, nondescriptive localizations consist of conceptualizations of spatial relations of objects, which are conceptualized under some frame of reference. Various sign languages make use of different perspectives and frames of reference (Arik 2009; Perniss 2007).<sup>3</sup> The main difference between descriptive and nondescriptive localizations with regard to interpretation and analytical level is that the former conceptualize the position of the object in signing space, while the latter establish a formal, abstract relationship between the object and its corresponding r-locus. Moreover, they present another difference at the form level: while descriptive uses of space exploit richer and freer sets of r-loci in three-dimensional space, nondescriptive ones are composed of spatial planes and fixed trajectories within each plane. Importantly, nondescriptive r-loci are not restricted to the horizontal plane in front of the signer, as originally argued by Klima and Bellugi (1979). Some authors note that nouns can also be assigned r-loci vertically (i.e., above or below the horizontal plane) in certain circumstances (Fischer and Gough 1978; Morales-López et al. 2005; Schlenker and Lamberton 2012; Shepard-Kegl 1985).

A detailed phonological analysis of locations and a thorough description of body locations for the production of signs has been provided (Brentari 1998; Liddell and Johnson 1989; Sandler 1989). Locations occur in three planes projected with respect to the signer's body (Brentari 1998, 120). First, the horizontal plane, which is perpendicular to the signer's body, is the default plane (i.e., where the



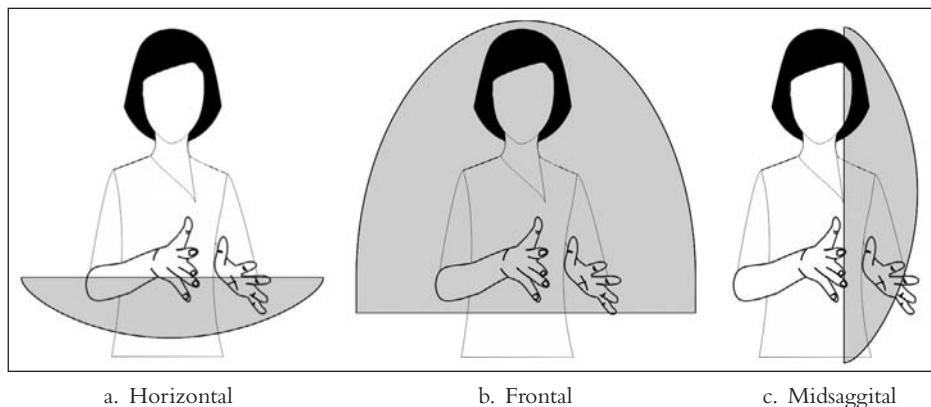


FIGURE 4. Spatial planes.

majority of signs are localized) (figure 4a). Second, the frontal plane is defined by all of the points in the plane that is parallel to the signer's body (figure 4b). Finally, the midsagittal plane is vertically perpendicular to the signer's body (figure 4c).

However, when one analyzes space as used in discourse, the description is not as detailed as it is at the lexical level. The authors of the works discussed agree that the syntax-discourse interface determines the position of the sign in space, and they postulate some major spatial areas that are associated with the discourse domain. Nondescriptive locations, which are the main topic of this article, are constrained within these three planes. The following section describes each plane and its relevant features.

### Spatial Planes and Features

Nondescriptive locations are used to identify the arguments of the verb, which are arbitrarily localized. They are categorically defined as occurring in the three spatial planes projected with respect to the signer's body. My description of the planes is based on Brentari (1998), and the major features are presented according to the phonological account in Liddell and Johnson (1989) and Sandler (1989). To the best of my knowledge, no previous work has been done on the application and extension of the spatial planes and their features in discourse.

The geometrical units into which space may be divided are points, axes, and planes. Points are zero-dimensional elements that intersect

the three spatial planes. Axes are one-dimensional lines that consist of a set of points whose coordinates satisfy a given linear equation. Finally, planes are sets of points that extend in two dimensions. Although points and axes have been used to analyze pronominal and agreement verbs in signing space (Padden et al. 2010; Wilbur 2008), I use the notion of spatial plane because it allows me to focus on the different features contained in a two-dimensional area. The features established on each plane are the result of a particular direction of index signs or other localization mechanisms. What matters is not the particular point in space but rather the area in that plane that is activated through the direction articulated with the index sign, as already explained in the section on the spatial morpheme.

#### *Horizontal Plane*

The horizontal plane is perpendicular to the signer's body, and in SL linguistics research it has commonly been considered the default plane (Klima and Bellugi 1979). The horizontal plane can be divided into ipsilateral and contralateral areas (Sandler 1989). In Liddell and Johnson's (1989) model, the horizontal plane also has a "center." Following the latter work, the features are distinguished in accordance with the signer's body: [center] is in line with the breast; [ipsilateral] is in line with the outside edge of the dominant shoulder, and [contralateral] aligns with the nondominant shoulder. Figure 5 is an example of the

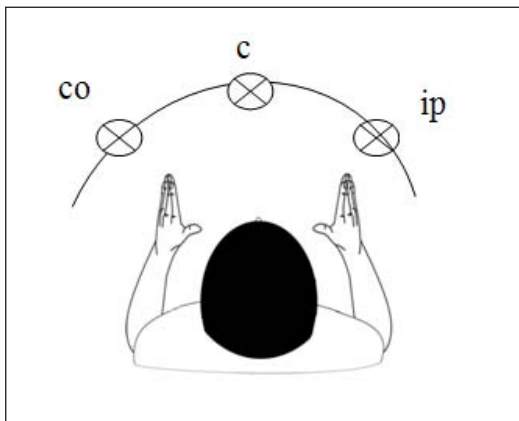


FIGURE 5. Horizontal plane.

divisions of the horizontal plane for a right-handed signer, in which the ipsilateral area aligns with the signer's right hand. This tripartite distinction is found in LSC, and a DR may be associated with an r-locus established in one of these three areas.

The features of the horizontal plane are grammatically relevant in the expression of plurality, temporality, and aspect. For plurality, signs that are directed toward the axis that unifies the contralateral and the ipsilateral areas and are repeated up to three times denote reduplication. This same axis is also used to express sequences of temporal units in the anaphoric axis, which is used to establish events with respect to a temporal point of reference (Brennan 1983; Engberg-Pedersen 1993). Moreover, the sequential temporal axis also makes use of this plane to move the different temporal events or nominals from the contralateral to the ipsilateral area. As for aspectual information, the distributive aspect, for example, is produced by repeating the sign in different areas on the horizontal plane without any formational changes.

#### *Frontal Plane*

The frontal plane, according to Brentari's (1998) terminology, extends vertically in relation to the signer's body. The features [lower] and [upper] (see Sandler 1989) are clearly distinguished with regard to the shoulders and the head (see figure 6). The space from the shoulders

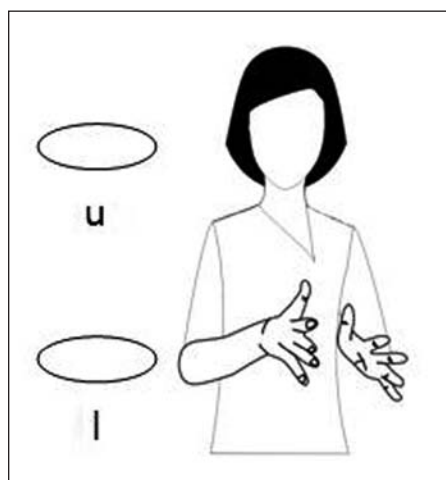


FIGURE 6. Frontal plane.

upward is considered to be the upper part. The lower part extends below the shoulders.

In LSC the lower part of the frontal plane is the default area, and this is where an r-locus is established (which coincides with the lateral part of the horizontal plane). Interestingly, the upper part is also used to associate DRs, but this upper establishment gives rise to a marked meaning, as I explain later.

### *Midsagittal*

The midsagittal plane extends vertically and perpendicularly to the signer's body. The two features associated with it are as follows: “[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). The distinction between the two features is thus established in relation to the angle of the elbow: the [proximal] feature is triggered when the angle of the elbow is less than  $90^\circ$ , and the [distal] feature when the angle is greater than  $90^\circ$  (see figure 7).

The features [proximal] and [distal] unify the axis that is used to express temporal information: present tense is signed in the proximal area, and future tense is signed in the distal area. These features are also

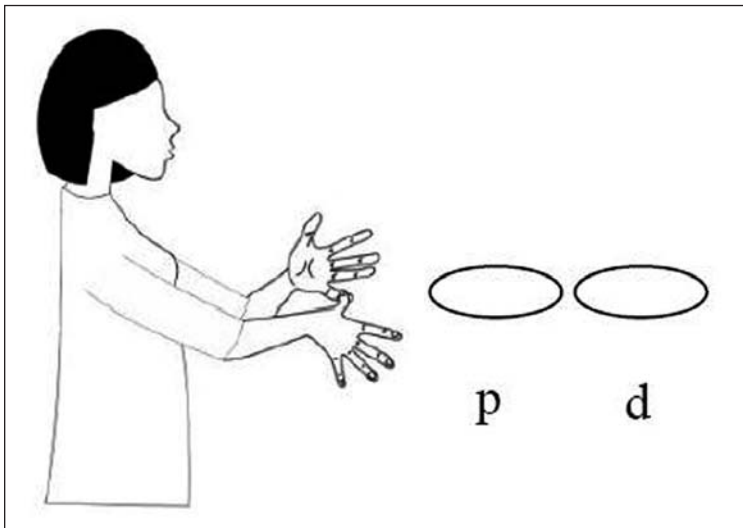


FIGURE 7. Midsagittal plane.

relevant at the lexical level. In LSC, *TOMORROW* is signed in the proximal area, and *THE-DAY-AFTER-TOMORROW* is signed in the distal area. This axis also forms the mixed temporal axis (Engberg-Pedersen 1993), which conflates the anaphoric and the deictic axes. That is, the temporal information in this axis is marked in the discourse and anchored in the context, and lexical signs like *FROM-NOW-ON* and *UNTIL-NOW* begin in the proximal area and move toward a distal area with respect to the signer's body.

This article focuses mainly on nondescriptive r-loci established in the three spatial planes just presented. However, locations can also occur as body-anchored forms since the signer's body and the spatial area immediately in front of it are also part of signing space. In such contexts the signer's body is used as the location parameter. Body-anchored locations are realized with verbs agreeing with the signer's body (generally assigned to first person). Importantly, they need to be distinguished from signs that have an internal phonological specification (i.e., the location parameter is phonologically specified either closer to or in contact with the signer's body). Since the final goal here is to describe how locations in signing space work at the discourse level, I leave body-anchored locations for future research.

### Use and Functions

In this section, the areas within spatial planes are presented with respect to their discourse function in nondescriptive contexts in LSC. A subsection is devoted to each plane.

#### *Horizontal Plane: Contrast*

*Kinds of Spatial Entities.* In LSC, not all of the DRs are equally localized in signing space, and the kinds of entities that occupy an r-locus within the horizontal plane are restricted. The motivation for this restriction is found in ontological classes. Reference to third (person) entities identifies the topic of the conversation by locating it with reference to the spatiotemporal location of the event. Moreover, with respect to localization on the horizontal plane, LSC distinguishes between the expression of DRs and other types of referents (e.g., facts, propositions, events). When third (person) DRs are mentioned, the LSC index sign is directed toward the lateral sides of the signing space

(i.e., ipsilateral and contralateral). In contrast, when an index sign refers to a fact, a proposition, or an event, the index sign is directed toward the center. For the sake of simplicity, I call this second cluster of classes “nonentities.” In this informal description, I define nonentities as being negatively identified with respect to DRs, which are entities denoting the object of thought or the topic of conversation. These entities map linguistic expressions to constructs that are built along the discourse progression (Karttunen 1976). According to my data, the areas of the horizontal plane are specialized: DRs are associated with an r-locus in the lateral parts, and nonentities with an r-locus in the center. A further distinction between DRs and nonentities has to do with the anaphoric behavior of the latter. Unlike DRs, which are localized during first mention and can be picked up by distant and nondistant resumptive pronouns, nonentities are never localized during first mention but are instead introduced into the discourse without being spatially established. However, they may have nondistant anaphoric pronouns that refer to them. Although they are characterized as nonentities, they can also serve as antecedents of resumptive pronouns (e.g., in the case of propositions). Distant resumptive pronouns linked to nonentities have not been found in the small-scale corpus. An example of a localized entity is shown in example 1, repeated here for convenience as example 2, with the addition of a subsequent utterance that contains both a nondistant and a distant pronoun (shown in boldface type):

2. IX<sub>3c</sub> LAPTOP I-OFFER-3 SON IX<sub>3cl</sub> FOR NEW 3-SELECT-3 WORK  
 IX<sub>3cl</sub> NEED LAPTOP IX<sub>3cl</sub>. . . . IXI SURE IX<sub>3cl</sub> HAPPY.

“I will offer this laptop to my son because he has been selected for a new job and he needs one. . . . I’m sure he will be very happy.”

Example 2 contrasts with the following example, in which a nonentity is introduced although not localized. However, in the subsequent sentence, a resumptive pronoun that consists of a lax pointing directed toward the center is used. In example 3 the nonentity (i.e., Hitler becoming the German chancellor) is not established in space. However, a nondistant resumptive pronoun refers to the just-introduced nonentity (i.e., the proposition). This is realized with a lax pointing sign directed to the center (see figure 8):



FIGURE 8. Coreferential index referring to a nonentity in LSC.

3. YEAR 1933 HITLER PERSON-3<sub>ip</sub> START I-APPOINT-3<sub>ip</sub> EQUAL  
SAME RESPONSIBLE MAXIMUM GERMANY ZONE. IX<sub>3c</sub> NOVELTY  
LAW

“In 1933 Hitler was appointed chancellor of Germany. This (issue) entailed the creation of a new law.”

A clear distinction between the entity-like properties of the lateral parts of LSC signing space and the nonentity-like properties of the central part is present in the use of the horizontal plane in LSC.

*Contrastive Topics.* In LSC the two features of the horizontal plane used to localize DRs are not grammatically relevant. That is, whether an r-locus is established in the ipsilateral or the contralateral area has no effect on the grammar of LSC. The interpretation of examples 4a and 4b is not dependent on the lateral area where each NP is localized:

4a. YESTERDAY JOAN<sub>ip</sub> 3<sub>ip</sub>-TELL-I PILAR IX<sub>3cl</sub> SICK

4b. YESTERDAY JOAN<sub>cl</sub> 3<sub>cl</sub>-TELL-I PILAR IX<sub>3ip</sub> SICK

“Yesterday Joan told me that Pilar was sick.”

In LSC the main motivations forcing the localization of a DR, either contra- or ipsilaterally are the result of assimilation and economy processes, which are beyond the grammatical restrictions of the language. However, when both the ipsilateral and the contralateral areas are used in the same fragment of discourse to localize two DRs, a contrastive relation arises. This is an overt marking of the expression of contrastive topics (Vallduví and Vilkkuna 1998, for contrast in the spoken language literature; Wilbur 2012, for a general overview of signed languages). Engberg-Pedersen (1993, 74) descriptively defines this as a convention



a. Contralateral r-locus for referent x

b. ipsilateral r-locus for referent y

FIGURE 9. Contrastive r-loci.

for comparing two DRs. In LSC, this contrastive use of the lateral areas coincides with a double contrast (Mayol 2010). That is, two clause discourses in which two DRs are introduced in each clause, and their respective verbs express two contrasting actions. The opposed r-loci distinguish the two DRs and are interpreted as contrastive topics. Signing space is then restricted to the two variables, and references to one or the other are represented by directing the index sign to the two opposed lateral areas of the horizontal plane (figure 9).

Example 5 shows two DRs, “Francesc” and “Joana,” which are localized in the ipsilateral area and the contralateral area, respectively. For each one a different predicate is expressed, and the double contrast is overtly expressed with the establishment of the two r-loci:

\_\_\_\_\_br  
 5. IX3<sub>ip</sub> FRANCESC TWO-IXI<sub>ip</sub> WORK TOGETHER SEE<sub>ip</sub> EVERY-DAY.  
 \_\_\_\_\_br

IX3<sub>cl</sub> JOANA WORK SCHOOL ANOTHER<sub>cl</sub> TWO-IXI<sub>cl</sub> SEE<sub>cl</sub> ONE<sub>u</sub>.

“As for Francesc, we work together, and we see each other every day.  
 But Joana works at another school, and we see each other only once  
 in a while.”

Unless the DR is reintroduced by the nominal, the distinction “ipsilateral-contralateral” is maintained throughout the discourse as long as the frame of reference does not change.

*Frontal Plane: Bundle of Meanings*

In LSC the frontal plane is the area between the [upper] and the [lower] features. The lower part is the default area, where DRs are



generally localized. The upper part is a marked area that includes a bundle of particular meanings. Morphophonologically, the feature [upper] is instantiated with a homomorphic morpheme that denotes four particular meanings. Homomorphs are morphemes with the same form but different meanings. 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 LSC, the homomorph represented by the feature [upper] has four different meanings, indicated in example 6:

6. [upper]: {hierarchical position, locative information, nonspecificity, absence in the physical context}

*Hierarchical Relations.* The upper part of the frontal plane is used to denote hierarchical social relations, especially superiority. The contrast between the upper and lower frontal planes is used to express asymmetrical relations such as parents-children, boss-worker, and professor-student. In such contexts, an r-locus established in the upper part of the frontal plane denotes the individual who has a higher social ranking. This has been previously described for LSC (Morales-López et al. 2005), for Indo-Pakistani Sign Language (Zeshan 2000), and for ASL (Liddell 1990; Schlenker and Lamberton 2012). Definite NPs formed by common nouns such as MINISTRY, GOVERNMENT (figure 10), BOSS, DEAN, FATHER^MOTHER, and UNIVERSITY are generally associated with the upper part of the frontal plane. Also, name signs that denote someone with a higher social ranking are associated with



IX 3 GOVERNMENT

FIGURE 10. Denotation of hierarchical relations.

an upper r-locus. This hierarchical use is an instance of social deixis, which marks references to the social characteristics of, or distinctions between, the participants in the speech event (Levinson 1983). In a signed event, social deixis is represented with r-loci established in the upper frontal plane.

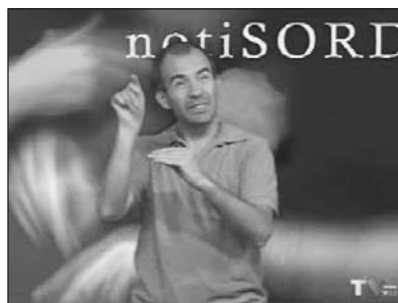
Within this use, only definite NPs referred to by pronouns and name signs (i.e., signs used as proper names within the Deaf community) are localized in the upper frontal plane. In fact, this contrasts importantly with another use that denotes nonspecificity and is operative only when localizing indefinite NPs (see the later section on specificity).

*Locatives.* Locative NPs denote spatial locations such as places, cities, regions, and physical locations. In LSC they are usually accompanied by an index sign (Quer et al. 2005). This index sign tends to be localized in the upper frontal plane when denoting countries and larger regions. Locative NPs are thus generally directed to an upper part of the frontal plane, both for singular (figure 11a) and for plural DRs (figure 11b). It is interesting to note that plural indexes functioning as locatives mark correlative points in space, in contrast to 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 also be extended on the horizontal plane.

When more than one locative is used in a fragment of discourse, they are localized in the frontal plane, which is used as if it were a



a. Singular locative



b. Plural locative

FIGURE 11. Locative signs directed toward the upper frontal plane.

map, and the distance between the real-world places is considered to be represented at a certain scale in that plane. This use is reminiscent of absolute localization, where real-world locations are transferred to signing space.

*Specificity.* The two parts of the frontal plane are also used when the signer wants to convey the specificity of the DR. The English indefinite determiner *a* is used both for specific and nonspecific NPs. The first sentence in example 8 has two possible readings: a specific and a nonspecific one. Yet specificity in English has observable effects on coreference, and the resumptive pronoun disambiguates the two possible readings (Partee 1970). Under the specific reading, the indefinite NP refers to an identifiable book (8a). Under the nonspecific reading, Celia is looking for a “syntax book,” but there is not any particular book that the sender has in mind when uttering example 8b:

8. Celia wants to read a book about syntax . . .
  - a. but she cannot find it.
  - b. but she cannot find one.

The denotation of the same nominal localized in the upper and the lower frontal plane results in different interpretations, showing that specificity is overtly marked in LSC (Barberà 2012). An NP localized in the lower part of the frontal plane is interpreted as specific (example 9), which means that the signer has a particular woman in mind while uttering it. The DR is known by the signer but not by the addressee. In contrast, the nominal localized in the upper part is understood as nonspecific (example 10), which means that neither the signer nor the addressee has a particular woman in mind while uttering the sentence. A subsequent utterance with a resumptive pronoun is infelicitous, as shown by the symbol # in example 10:

9. IXI INTERVIEW IX 3<sub>L</sub> WOMAN. IX 3<sub>L</sub> SMART.  
 “I have an interview with a woman<sub>spec</sub>. She is smart.”
10. IXI INTERVIEW IX 3<sub>u</sub> WOMAN. #IX 3<sub>L</sub> SMART.  
 “I have an interview with a woman<sub>nonspec</sub>. #She is smart.”

Another pair of sentences in LSC is shown in examples 11 and 12. While example 11 mentions a specific referent, example 12 refers to a nonspecific, nonidentifiable entity. The sentences are graphically



FIGURE 12. Lower r-locus (denoting specificity).

represented, and the stills in figures 12 and 13 correspond to the determiners. When the r-locus is established in the lower part of the frontal plane, it overtly expresses a specific DR (figure 12), whereas an r-locus established in the upper part indicates a nonspecific DR (figure 13):

II. GROUP<sub>ip-l</sub> FRIEND SOME<sub>ip-l</sub> INSIDE IX3<sub>c</sub> HIDE DURING  
YEAR-TWO.

“Some of the friends were hidden there for two years.”

12. IX3.pl<sub>ip-u</sub> SOME I-DENOUNCE-3<sub>ip-u</sub> IX3-C THERE-IS.

“Someone revealed they were there.”

Importantly, the nonspecific use is distinguished from the hierarchical use presented (see the section on hierarchical relations) since only NPs that are interpreted as indefinite (i.e., not part of the common ground) are marked for nonspecificity. In contrast, when denoting hierarchical relations, definite NPs (e.g., name signs, pronouns, definite descriptions) are used to localize the corresponding entity. The



FIGURE 13. Upper r-locus (denoting nonspecificity).



FIGURE 14. Nonmanual marking of indefiniteness.

difference between these two denotations is marked with nonmanuals coarticulated in nonspecific contexts. Indefiniteness in LSC is marked by sucking the cheeks in and pulling the corners of the mouth down (figures 13 and 14).

In some contexts, two different uses of the frontal plane denoting dissimilar meanings may conflate. This is the case when, for instance, a lower r-locus expressed in one element is conflated in the same NP with an upper r-locus expressed in another element. In such cases two opposed r-loci are established, although they are minimized for phonological reasons. That is, the lower r-locus tends to be marked loosely and with a tendency toward an upper r-locus. In example 13 the determiner denotes a specific DR and hence has a direction toward the lower part. The nominal denotes a DR higher in the social hierarchy, which is commonly localized in the upper area. The two opposed directions are marked, although the lower direction of the determiner SOME starts before the onset of the nominal:

- \_\_\_\_\_br  
 13. UNIVERSITY<sub>u</sub> SOME<sub>l</sub> EVENT PARTICIPATE.

“Some of the universities participated in the event.”

*Absence in the Physical Context.* A final use of the frontal plane is to denote the absence of a DR in the immediate physical context. This is especially prevalent in LSC when the [+human] entity is a DR not present in the conversational environment. Name signs and common nouns used to refer to someone who is not present co-occur with an index sign pointing toward the upper part of the frontal plane. In



a. Reference to absent discourse referent



b. Reference to present discourse referent

FIGURE 15. Distinction between absence and presence.

the case of common nouns, the index sign co-occurring with the noun is not articulated with the characteristic nonmanuals denoting indefiniteness (figure 15). The lack of this nonmanual articulation disambiguates the upper localization, denoting absence in the immediate physical context rather than nonspecificity.

As I have shown so far, the uses of the upper part of the frontal plane in LSC cover four main functions. First, hierarchical relations are distinguished in this area. Second, locative signs are mainly directed to this area. Third, nonspecificity marking is overtly expressed when DRs are established in this area. And fourth, nonpresence in the immediate physical context, especially when denoting human beings, is also marked with an index sign toward the upper area. Importantly, I have shown that r-loci established in the upper frontal plane may denote four different meanings.

#### Midsagittal: Lack of Distinctive Discourse Functions

This final section describes discourse functions in the midsagittal plane or, to be more precise, the lack of distinctive discourse functions. While the features found in the horizontal and the frontal planes have different discourse functions, this is not the case with the midsagittal plane. The distinction proximal-distal, found in the lexicon and in the morphosyntax of LSC especially to denote temporal information, is not relevant when establishing DRs in signing space. Entities are not abstractly established in LSC in the proximal as opposed to the distal area. Rather, the midsagittal plane is used as a single extension, and no distinguishable areas can be established when localizing referents.

Thus a singleton feature, [front], is distinguished, and an r-locus is established in it without conveying further distinctions.<sup>4</sup>

However, the deictic use of a demonstrative sign to indicate an object present in the physical environment conflates descriptive (i.e., because of the deictic component) and nondescriptive uses of space. The demonstrative pointing is always in the direction of the object. As already mentioned, descriptive uses of space are freer, and categorical distinctions are difficult to establish. Due to the descriptive component of these conflated structures, no straightforward distinction between [proximal] and [distal] can be made. This is why in nondescriptive uses the midsagittal plane is described as a single extension where no further distinctive functions are found in discourse.

#### *Features and Discourse Functions*

This final section examines a one-to-one correlation between a cluster of features characterizing r-loci and the corresponding discourse function. R-loci may be formed by combinations of clusters of features since various spatial features are found: three features on the horizontal plane ([ipsi], [contra], [center]); two features on the frontal plane ([low] and [up]), and one feature on the midsagittal plane ([front]). Although these six combinations could potentially be the spatial areas used in the grammar, in LSC only five directions formed by such clusters are indeed found in discourse. The [front] area on the midsagittal plane is not further divided into [low] and [up] but 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]. 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 my data, the combinations in example 14 are possible:

14. a. {[front], [ipsi], [low]}
- b. {[front], [ipsi], [up]}
- c. {[front], [center]}
- d. {[front], [contra], [low]}
- e. {[front], [contra], [up]}

These five clusters of features represent the directions in which an r-locus 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 reasons of economy. Concerning the lateral areas, what matters is the establishment of the two opposing sides rather than the particular side of localization. Hence, although five directions are possible, only three clusters of features are relevant in LSC grammar. The reason for this is that the cluster formed by {[front], [ipsi], [low]} in example 15 is the mirror image of {[front], [contra], [low]}, and the cluster {[front], [ipsi], [up]} is the mirror image of {[front], [contra], [up]}.

15. {[front], [ipsi], [low]}  $\equiv$  {[front], [contra], [low]}  
 {[front], [ipsi], [up]}  $\equiv$  {[front], [contra], [up]}

Even though 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. As detailed earlier, NPs localized in the upper part are associated with some particular and marked meanings, while the lower part is the default marking. Whereas the two features of the frontal plane are relevant and play a very specific role in LSC grammar, this is not the case for the lateral features. Three clusters of features are relevant for LSC and characterize an r-locus. Moreover, the analysis of the small-scale LSC corpus shows that each of these clusters in example 16 is specialized in the contribution of referential aspects and discourse functions.

16. a. {[front], [ipsi]/[contra], [low]}: specific discourse referents and contrastive topics  
 b. {[front], [ipsi]/[contra], [up]}: hierarchical relations, locative information, nonspecificity, absence in the physical context  
 c. {[front], [center]}: nonentities

## Conclusions

This article has described the uses and functions of spatial planes to express discourse categories, which contributes to the characterization of the abstract import of signing space. According to the small-scale data set, a categorical division into different directions of a three-dimensional area such as signing space is possible due to the systematic use of spatial planes in LSC with respect to their function in the discourse. The present description shows that, besides the modality differences between spoken and signed languages, the features within



spatial planes constitute a finite set of elements, and the discourse use of r-loci in LSC can be discretely distinguished. The main aim of this article has been to develop a qualitative study by observing and analyzing the tendencies that the naturalistic, semispontaneous, and elicited data from the small-scale LSC corpus provide. The results of this data set should be taken as a strong tendency of real data associated with discourse functions. A follow-up study based on a yet non-existent large LSC corpus should help confirm the generalizations and the analysis provided here on the basis of naturalistic data.

In this article, new insights into the ongoing debate on the nature of space in the signed modality in terms of linguistic properties have been presented. These insights constitute a first step toward the characterization of the study of spatial planes in discourse use, which needs to be contrasted with other sign languages in order to expand our cross-linguistic knowledge specifically of discourse. Also, the spatial expression of scalar values and gradability, on the one hand, and the interaction between descriptive and nondescriptive uses of signing space, on the other, opens up an interesting avenue of research that needs to be further explored both in intra- and interlanguage studies.

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### Notes

1. The description of space given in this article focuses only on LSC, which shares many features with other Western urban sign languages. However, nonurban SLs are increasingly the subject of study in different corners of the world. As described so far, these nonurban SLs show differences in their grammars and use of space. For instance, Kata Kolok, a village sign

language in northern Bali, uses a much larger signing space that goes beyond the limits described here (Marsaja 2008; De Vos 2012).

2. I have employed the usual glossing conventions in the sign language literature. Thus, manual signs are represented by the words (shown in small capital letters) that correspond to their translation. The relevant abbreviations here are the following: IX<sub>3</sub> (index sign); #-VERB-# (verb agreeing with subject and object: the numbers refer to the grammatical person); subindices mark the direction to the signing space: l (low), u (up), ip (ipsilateral); cl (contralateral); ce (center). A line above the glosses indicates the scope of nonmanuals (e.g., eg = eyegaze; br = brow raised). Reduplication is indicated by +++.

3. It is interesting to note that some village SLs have been described as making extensive use of descriptive localizations. The sign language used in Kata Kolok predominantly employs topographical space (Marsaja 2008; De Vos 2012). Despite the ambiguities, signers use real-world locations instead of establishing abstract ones (e.g., the sign for a place may be localized differently depending on where the signer is in relation to the referent). Kata Kolok uses an absolute frame of reference (Levinson 1996), which is used to a lesser extent in western SLs.

4. A reviewer has proposed a proximal-distal distinction in the mid-sagittal plane, as attested for ASL (Taub 2001). According to my data set, LSC shows a language-specific difference with respect to ASL since DRs are not abstractly established in the proximal as opposed to the distal areas of the midsagittal plane. These results are based on a strong tendency attested in the small-scale corpus data. Still, a follow-up study based on a nonexistent large LSC corpus should help confirm the generalizations and the analysis provided here on the basis of naturalistic data.

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