A UNIFIED ACCOUNT OF SPECIFICITY IN CATALAN SIGN LANGUAGE (LSC)*

GEMMA BARBERÀ
Universitat Pompeu Fabra

1 Introduction

Sign Languages are natural languages that use the visual-spatial modality. Sign space is the three-dimensional space in front of the signer's body, which is not only used for articulatory reasons but, more importantly, it also carries linguistic meaning (Klima and Bellugi, 1979). At the phonological level, sign space is used contrastively in the place of articulation parameter of signs. As for the morphosyntactic level, signs are modulated in space for grammatical purposes to denote person, number and the arguments of the predicate. At the discourse level, discourse referents (DRs) are associated with certain locations in space. Catalan Sign Language (LSC) [1] makes systematic use of signs directed to the frontal plane, which extends parallel to the signer's body. This paper focuses on the grammatical distinction denoted by the two directions signs may take when localising DRs within the frontal plane, namely upper and lower. I argue that this relevant distinction stands for the overt marking of specificity and, unlike in spoken English or Catalan, indefinite noun phrases (NPs) in LSC are not ambiguous.

My claims are the following: (i) Specificity marking is overtly expressed through the direction that signs take on the frontal plane as well as on the amount of morphophonological mechanisms directed to it; (ii) The two areas on the frontal plane, namely upper and lower, stand for the overt marking of narrow and wide scope, respectively; (iii) A spatial morpheme affixed to functional and lexical elements stands for the marking of domain restriction.

The paper is structured as follows. §2 offers an overview of the properties encompassed by specificity considered under the present account. §3 presents the LSC data and outlines the

*I am grateful to Berit Gehrke, Vadim Kimmelman, Josep Quer and the audience at FEAST-Venice and SuB16-Utrecht for insightful comments which helped improve this paper. Also my deaf colleagues Santiago Frigola and Delfina Aliaga deserve special credit for stimulating discussions. The research in this paper was partly made possible thanks to the Spanish Ministry of Science and Innovation (FFI2009-10492), Generalitat de Catalunya (URLING-2009SGR00763) and SignGram Cost Action IS1006. Of course, the remaining errors are all mine.

[1] Catalan Sign Language (*llengua de signes catalana*, LSC) is the natural language used by the deaf signers in Catalonia, the north-eastern autonomy in Spain. Although the statistics are not fully clear, it is considered that around 25,000 people use LSC in their daily life.

localisation pattern this paper argues for. §4 focuses on the categories which are spatially modified within this pattern, and §5 concludes.

2 Specificity

Natural languages use different strategies to encode specificity. While some encode it on the article system, others encode it with affixes. On the one hand, Samoan and Maori, two Polynesian languages, have an article system that distinguishes specificity rather than definiteness (Lyons, 1999). Turkish, on the other hand, encodes specificity with an accusative affix. NPs with overt case morphology are specific, and NPs without case morphology are non-specific (Enç, 1991). This differs from indefinite NPs in Catalan or English which are ambiguous since specificity is not overtly marked. The English indefinite determiner 'a' is used both for specific and non-specific NPs as shown in (1). 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 (1a). Under the non-specific reading, Carlota 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) Carlota 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, which will be defined in what follows.

2.1 Scope

An expression α is in the scope of an expression β iff the interpretation of α is affected by the semantic contribution of β (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, 1997). Indefinite NPs which are outside the scope of an operator are considered to have wide scope and indefinite NPs under the scope of an operator are treated as narrow scope. The specific reading in (1a) can be paraphrased as 'There is an x such that it is a book and Carlota wants to read it', and the non-specific counterpart in (1b) can be paraphrased as 'There is an individual called Carlota such that she wants to read a book'. In Discourse Representation Theory (DRT) specificity is treated as a scope phenomenon (Kamp and Reyle, 1993). The implementation is represented with the positioning of the variables in the boxes. Wide scope is represented with the variable inserted in the main Discourse Representation Structure (DRS) and all the variables contained within are under the scope of the main universe of discourse (2). Narrow scope is represented with the variable embedded in a subordinated box (3). The simplified DRSs in this paper leave aside tense information.

(2)

x,y
carlota (x)
book (y)
syntax (y)
□ read (x,y)

(3)

x,y
carlota (x)
□ book (y) syntax (y) read (x,y)

2.2 Partitivity

Partitive indefinite NPs have a restricted set as a possible value. Indefinite NPs receive a semantic partitive interpretation when the denotation of the NP is included within a given set. The quantification ranges over some specific, non-empty, contextually fixed set. In English, for instance, sentences like (4) are examples of partitives.

(4) a. Three of the books
b. Some of the 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, as shown in Enç (1991), the presence of accusative case on an indefinite leads to a partitive interpretation (5), as opposed to the minimal pair without the accusative case (6). The indefinite NP with accusative case has a covert partitive reading, and it introduces into the domain of discourse individuals from a previously given set.

(5) Iki kiz-i taniyordum
Two girl-Acc I-knew
'I knew two of the girls'

(6) Iki kiz taniyordum
Two girl I-knew
'I knew two girls'

Partitive specifics induce a presupposition that there is a non-empty and contextually salient set. Partitivity places a constraint on the structure of the domain of discourse and quantifies over contextually given sets, which are established by previously explicit mention as well as by means of accommodation.

2.3 Identifiability

Identifiability, also known as epistemic modality, is another phenomenon related to 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 and Sag, 1982, von Heusinger, 2002). The following example shows this distinction. While (7a) corresponds to an epistemically specific DR, which is known and identifiable by the sender, (7b) corresponds to an epistemically non-specific DRs, which is not known or identifiable.

(7) a. A student cheated on the syntax exam. It is the lady that always seats on the back row.
b. A student cheated on the syntax exam. I wonder who it was.

The identifiability property is then based on knowledge of the DR. 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 and so far no diagnostic test has been established to determine whether some referent is in the mind of someone. Since epistemic identifiability is closely connected to scope, in order to distinguish between identifiable and non-identifiable DRs the scope of the variable is the criteria used in this paper to distinguish these two sub-properties.

2.4 Specificity in sign language

Studies on sign language specificity are very scarce. So far, only descriptions of how specificity is expressed in American Sign Language (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). Indefiniteness is marked 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 in the upper part of the frontal plane, and specificity is distinguished on the determiner SOMETHING/ONE, which is an index finger pointing upwards very similar to the numeral ONE.[2] The difference is that SOMETHING/ONE involves a slight circular movement of the forearm and hand. This articulation relates to 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 (ibid:131). Non-manuals also contribute to specificity marking. As described in (Bahan, 1996) for ASL, eyegaze to mark agreement also differs according to the (non)specificity of the DR. While the expression of specific referents involves a direct eyegaze to the spatial location, non-specific referents involve a darting gaze generally towards an upward direction. As for HKSL, specificity is marked with the ONE sign (i.e. upwards index finger) moving from left to right with a tremoring motion involving the wrist (Tang and Sze, 2002). When this sign is articulated, eyegaze 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 eyegaze for non-specific reference, as well as a weak establishment of spatial location.

3 Localisation pattern

The association of DRs with spatial locations is called 'localisation'. This association may be realised by different manual and non-manual mechanisms. As for the manual component, index signs functioning as pronouns and determiners are directed to a spatial location, and lexical signs may be spatially modified (not directed to neutral space, but rather towards a lateral direction) in order to associate the DR with the spatial location. Verb agreement is also a manual strategy to localise entities. As for non-manuals, eyegaze, head tilt and body lean may be oriented towards a spatial location as well. These localisation mechanisms directed to space establish a spatial location which consists on an abstract point in space that is randomly assigned to an area on the horizontal plane which is categorically interpreted in the system (Wilbur, 2008). In non-descriptive localisations the establishment is guided by abstract motivations. The establishment on the horizontal plane is movable as it could be shifted towards the ipsilateral and the contralateral side

[2] I follow the usual glossing conventions in the sign language literature, according to which manual signs are represented by the capitalized word corresponding to the translation of the sign. The relevant abbreviations for the purposes of this paper are the following: IX3 (index pointing sign); #-VERB-# (verb agreeing with subject and object: the numbers refer to the grammatical person); subindices mark direction towards sign space: l (low), u (up), ip (ipsilateral); cl (contralateral); ce (centre). A line above the glosses indicates the scope of nonmanuals: eg (eyegaze); br (brow raised). Reduplication of signs is indicated by +++.

without affecting the truth conditions of the sentence.[3]

However, in LSC spatial locations are not established equally on the frontal plane and DRs are not introduced uniformly into the model. It is important to note that in LSC there is an absence of formal marking to distinguish (in)definiteness in entities spatially established. A DR established in space is ambiguous between a definite (8b) or an indefinite interpretation (8a).

(8) TODAY IX1 INTERVIEW IX3 WOMAN.
   a. 'Today I have an interview with a woman.'
   b. 'Today I have an interview with the woman.'

Interestingly, signs directed to the two parts of the frontal plane, which extends parallel to the signer's body, have a different interpretation. NPs localised on the lower frontal plane corresponds to the overt marking of specificity (9) and NPs on the upper frontal plane correspond to non-specificity (10).

(9) IX1 INTERVIEW $IX3_{l}$ WOMAN
'I have an interview with a $woman_{spec}$'

(10) IX1 INTERVIEW $IX3_{u}$ WOMAN
'I have an interview with a $woman_{nonspec}$'

After a detailed analysis of a small-scale LSC corpus[4] and some data quantification, it can be concluded that in LSC localisation is not a homogeneous phenomenon and two kinds of localisation can be distinguished according to the precise realisation of morphophonological features. These features are systematically and componentially combined to denote meaning and they contribute to the construction of the specificity interpretation as a whole. The difference in the data leads to the localisation pattern this paper argues for, namely strong vs. weak localisation, which is characterised by the pairing between morphophonological features and semantic interpretation (i.e. expression of specificity). What I call strong localisation consists of the kind of localisation established with localised signs directed to the lower frontal plane. Eyegaze and index are directed towards the same spatial location, and at least two (or more) mechanisms are also directed to it. This contrasts with weak localisation in which the spatial location is weakly established with localised signs directed to the upper frontal plane. Eyegaze is not fixed and does not have a clear direction. Moreover, it does not coincide with the spatial direction of the index sign. Also at most two (or less) mechanisms are directed towards space, which do not simultaneously co-occur. As a consequence, the spatial location is very weakly established. This localisation pattern correlates with specificity. Strong localisation denotes specificity marking, and weak localisation denotes non-specificity. The localisation pattern is exemplified in what follows with three LSC minimal pairs of weak and strong localisation corresponding to the three properties encompassed by specificity (cf. §2).

[3] I am only dealing here with non-descriptive locations used to localise definite and indefinite NPs. Thus locatives and NPs used to denote hierarchical relations are outside the scope of this paper.

[4] The small-scale LSC corpus data set is formed by semi-spontaneous, elicited and recorded for other purposes data. It contains data from eight native deaf signers and it comprises 5,108 signs. For the annotation the software ELAN (http://www.lat-mpi.eu/tools/elan/) has been used, which allows to synchronise the annotation with the videos.

3.1 Scope

Wide scope is related to specificity marking. Indefinite NPs which are outside the scope of an operator denote an individual from the domain which is specific and concrete. (11) is about a concrete, specific cat.[5] As shown in the still, the NP is localised with an index determiner sign towards a lower part of the frontal plane. The localisation of the NP co-occurs with body lean, headtilt and eyegaze also directed towards the same lower location. This coincidence in spatial direction of both manual and non-manual signs is precisely what is required for the strong establishment of the spatial location. This spatial location constitutes the overt manifestation of a specific DR. The implementation of specificity marking is formally represented with the corresponding variable appearing in the main DRS (12). It has wide scope over the other possible embedded variables in the subordinated DRS.

(11) I want to buy **a cat**.
It is very obedient.

(12)

x y
cat(x)
□ buy (1,x)
it (y)
obedient (y)
y=x

This contrasts with the minimal pair in (13) in which the signer is referring to a non-specific, unidentifiable cat. The NP is localised towards the upper part of the frontal plane. As shown in the still, non-manuals are not directed towards the spatial location. In subsequent sentences, no other linguistic mechanisms are directed to it. Since few morphophonological mechanisms are directed towards space, the upper spatial location is weakly established. The interpretation for the DR is that of a non-specific DR. The corresponding semantic representation is a variable with narrow scope, which is implemented with a subordinate variable embedded under the necessity operator (14).

(13) I want to buy **a cat**.
It must be obedient.

(14)

□ *x y*
cat(x)
buy(1,x)
it(y)
obedient (y)
y=x

[5]For the interest of simplicity, these examples are provided with the English counterpart of the LSC sentence. The NP localised in space shown in the still is marked with boldface.

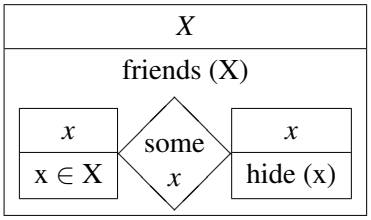
This minimal pair shows that scope differences in LSC are marked in the frontal plane. NPs localised on the lower part result into a specific reading and this is represented with wide scope. NPs localised on the upper part are weakly established and they are interpreted as non-specifics. This is represented with narrow scope.

3.2 Partitivity

Indefinite NPs receive a partitive interpretation when the denotation of the NP is included within a given set. In LSC there is a difference between NPs which have a restriction of the quantified NP and those which do not have such a restriction. This is marked in LSC with a difference on the two opposed directions of the frontal plane. Under the restriction of the quantified NP, LSC locations are established on the lower frontal plane. When there is no such restriction, the upper frontal plane is used (Quer, 2010). In (15) 'some' quantifies over the common noun 'friend'. This complex NP denotes a specific DR, namely a set formed by a concrete group of people. In LSC the quantifier is articulated towards the lower frontal plane by means of eyegaze and body lean directed to it. The quantifier 'some' is an element of the group denoted by the NP. This is shown in the corresponding DRS by the relation x ∈ X where X corresponds to a non-atomic variable that is projected in the main universe. x is an atomic variable and it is a subset of X. Although it is not projected into the main DRS, it belongs to the set (16). In actual LSC signing a set that belongs to another set corresponds to the creation of a spatial location on the lower frontal plane.

(15) **Some of the friends** were hidden there for two years.

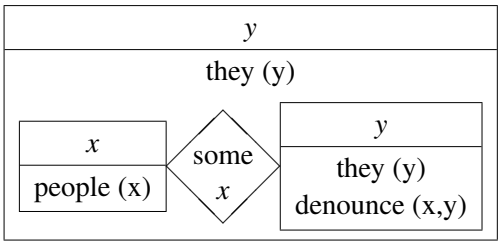
(16)



In contrast, in (17) 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 frontal plane. The localisation is only realised manually with the index sign, and no eyegaze or body lean is directed to the upper location. Hence it is weakly established. The sentence in (17) denotes a non-specific DR which does not belong to a contextually determined set. In the corresponding DRS, this is represented with an embedded variable which does not belong to any set from the main DRS, as indicated in (18). This absence of contextual determinacy is manifested in the actual LSC signing by a weak spatial location on the upper frontal plane.

(17) **Someone** denounced they were there.

(18)



In LSC partitivity is expressed on the lower frontal plane and it can only be used for entities that are under discussion, the existence of which in the model is presupposed. This parallels Diesing (1992)'s proposal which considers that partitive constructions are felicitous whenever a set of entities is under discussion. Unlike DRs established on the lower frontal plane, LSC entities localised on the upper frontal plane are not part of a partitive set under discussion. Hence, its existence is only asserted, rather than presupposed.

3.3 Identifiability

Identifiability has been defined as the interpretive property of those indefinite NPs known by the sender, and this is overtly codified in LSC. In the sentence in (19) the signer is talking about a concrete person to whom she will offer a pen-drive. It is an identifiable and specific DR, which is introduced by the indefinite NP ONE PERSON 'someone'. This NP is localised with both manual and non-manual mechanisms, as shown in the still. The NP is strongly established on the lower frontal plane. The corresponding semantic representation (20) places a wide scope variable in the main DRS. Again, there is a direct relation between placing a variable in the main DRS and establishing a lower spatial location in actual signing.

(19) I will offer the pen-drive to **someone** who always works with computers.

(20)

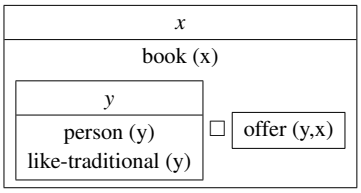
x
pen-drive (x) person (y) work-computer (y)

The establishment of this identifiable DR contrasts with the corresponding non-identifiable minimal pair example. In (21) the signer is explaining what books are used for and to whom he would offer one to. The indefinite NP 'someone' has a clear non-specific interpretation, which arises from the localisation process. The indefinite NP is weakly established towards the upper frontal plane and very few morphophonological mechanisms are directed to it. Hence, an upper spatial location is weakly established for a non-specific entity referring to a person. Importantly, eyegaze behaviour is significant when denoting non-identifiable DRs. A darting eyegaze is directed first to the ipsilateral side and then towards the contralateral side, as shown in the sequence of stills in (21). Eyegaze is thus not directed to a concrete location, but rather it moves around in sign space. A location is thus not strongly established. This upper darting movement of eyegaze has scope over the restrictor, marked with square brackets in the English counterpart of the LSC sentence. This darting eyegaze narrows down the context set over which the modal operator may range. As shown, both manual and non-manuals weakly establish an upper spatial location.

The corresponding DRS (22) places a variable for the unidentifiable DR in an embedded DRS bound by the modal operator. The direction of eyegaze towards the upper frontal plane and the weakly established spatial location stand in direct relation to the formal implementation of the variable in an embedded context. Hence, upper space and weakly established location is a marking for narrow scope contexts to denote non-identifiability.

(21) I would offer this book to [**someone** who likes traditional things].

(22)



The minimal pairs shown in (11) to (21) point to the localisation pattern this paper argues for. Specificity is marked with strong localisation of the DR towards the lower frontal plane. It is semantically represented by wide scope variables, partitives and identifiable DRs. Non-specificity is marked with weak localisation. Semantically, it is represented by narrow scope variables, non-partitives and non-identifiable DRs.

Moreover, some particular constructions conflate the two directions on the frontal plane of weak and strong localisation, as shown in the following section.

3.4 Dual nature of localisation

The localisation pattern is sometimes conflated in the same construction. In LSC this is shown in contexts of modal subordination and non-specific partitives. Modal subordination is an anaphoric context in which the scope of the variable appears under a propositional attitude predicate (Roberts, 1989). It combines narrow scope contexts with anaphoricity, which traditionally has been attributed to wide scope ones. However, as Roberts shows, as long as the variable is under the scope of the relevant operator it can correspond to a noteworthy DR and the discourse can continue being centred on it.

In (21) the DR corresponds to a narrow scope variable appearing under the scope of a modal operator. Importantly, the variable is connected to the discourse topic, which is the entity the fragment is about (Asher, 2004). The variable denotes a DR which corresponds to a major question that guides the discourse, namely 'to which person would you offer x?'. Being the answer to this big question, the variable denotes the discourse topic. In actual discourse, the NP in (21) is localised with a darting eyegaze towards an upper location and the spatial location is weakly established, as already seen. Yet, the connection with the discourse topic allows for (21) to be continued with (23). A resumptive pronoun can thus refer back to the previously established DR even though it occurs under the scope of a modal operator. The resumptive pronoun establishes a location on the lower frontal plane, as indicated by the subindex.

(23) $IX3_l$ HAPPY.
'He would be very happy.'

In the first sentence in (21) narrow scope context correlates with weak localisation. The modal operator co-occurs with a darting eyegaze towards the upper part which extends along the discourse as long as there is no further modality shift. The resumptive pronoun directed to the lower frontal plane in the subsequent sentence (23) forces the establishment of a spatial location. This is an instance of strong localisation since the resumptive pronoun is clearly directed to the lower part of the frontal plane. Hence, while the establishment of the DR corresponds to a weakly established location, the following sentences are correlated with strong localisation, which show the conflation between the two kinds of localisation in the same structure.

The dual nature of localisation is also shown in cases of non-specific partitives. In LSC partitive constructions denote specificity, but they may co-occur with quantifiers denoting both specific and non-specific DRs. As for specific constructions, the partitive establishes the domain of quantification, and then the specific quantifier that ranges over it is uttered (24). The domain of quantification is first strongly established on the lower frontal plane (Fig. A). Immediately after the specific quantifier that ranges over it is also uttered (Fig. B).

(24) BOOK IX3$_{l}$, IX1 NEED ONE$_{l}$
I need one$_{spec}$ of those books


Figure A. 'Those (books)'


Figure B. 'One$_{spec}$'

As for the non-specific counterpart, the domain of quantification is also strongly established but in this case it co-occurs with a non-specific quantifier (25). As shown in Fig. D, this non-specific quantifier is localised with an upper direction which weakly establishes an upper location. Again, strong localisation is characterised by the signs directed to the lower frontal plane (Fig. C) and weak localisation is marked with the quantifier directed to the upper frontal plane (Fig. D).

(25) BOOK IX3$_{l}$, IX1 NEED ONE$_{u}$
I need one$_{non.spec}$ of those books

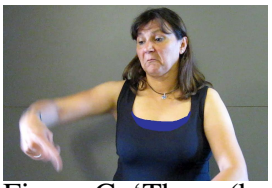


Figure C. 'Those (books)'


Figure D. 'One$_{non.spec}$'

The localisation pattern distinguishes the two kinds of localisation which in some contexts may co-occur, as the examples in this section have shown. The data and the localisation pattern presented so far constitute strong evidence for the fact that in LSC there is a different semantic interpretation according to the direction on the frontal plane and hence that the spatial location may have different interpretations depending on the two parts. Within the strong localisation the spatial morpheme established has the feature [low], which correlates with specificity marking.

Within the weak localisation process, the spatial morpheme has the feature [up] which denotes non-specificity. Moreover, there is also further refinement concerning the linguistic categories to which these two features may be affixed to, as shown in the following section.

4 Spatially modified categories

The features [low] and [up] established through strong and weak localisation respectively add different constraints on the categories they can be attached to. As argued in §3, the articulation of signs can be spatially modified, i.e. not signed in a neutral location, but rather in a marked one. Concerning lexical signs, non-anchored common nouns and plain verbs (i.e. the type of verbs which do not agree for subject and object (Padden, 1988)) can be spatially modified and hence localised on the lower frontal plane (26a). However any attempt to spatially modify them on the upper part results in an ungrammatical construction (26b).

(26) a. HOUSE_{l}, $\text{THERE-IS}_{\text{l}}$
b. *HOUSE_{u}, *$\text{THERE-IS}_{\text{u}}$

Concerning functional elements, agreement inflection and quantifiers are considered here. As for inflection, agreement verbs (i.e. a type of verbs which are inflected for subject and object) are localised on the lower frontal plane as the default marking to denote some specific DR (27a). Interestingly, they can also be localised on the upper frontal plane when denoting a non-specific DR (27b).

(27) a. 3_{l}-ADVISE-1
'Some specific person advised me'
b. 3_{u}-ADVISE-1
'Some non-specific person advised me'
(adapted from Quer (2010))

However, as for quantifiers there is a strict distinction in the kind of elements which may be localised. Weak quantifiers are grammatically localised both on the lower and the upper frontal plane. LSC weak quantifiers, such as ONE, ANY, SOME, ONE+++ ('few') can be spatially modified as shown in (28).

(28) a. HOUSE SOME_{l}, HOUSE FEW_{l}, HOUSE ANY_{l}
b. HOUSE SOME_{u}, HOUSE FEW_{u}, HOUSE ANY_{u}

In English, weak quantifiers are ambiguous between denoting presupposition and assertion (Diesing, 1992). In LSC this ambiguity is not present due to a different interpretation induced by the direction of localisation on the frontal plane. When the weak quantifier is established on the lower frontal plane (28a) it has a presuppositional reading, and hence the DR denotes that there exists an entity under discussion. Examples in (28a) can then be paraphrased as 'some of the houses', 'few of the houses' and 'any of the houses'. 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 features attached to the determiner system with a weak quantifier directed towards the upper part. The non-presupposition of existence is marked with the spatial

modification of quantifiers towards the upper frontal plane. Hence the upper part denotes non-contextual determinacy and examples in (28b) are paraphrased as 'some houses', 'few houses', 'any houses'. This shows that the feature [low] affixed to the quantifier 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 (29).

(29) a. a. FRIEND SOME_{u}
'$\text{Some}_{\text{nonspec}}$ friends'
b. STUDENT ONE_{u}
'$\text{One}_{\text{nonspec}}$ friend'

Strong quantifiers in LSC are much more restricted in that they can only occur on the lower frontal plane (30a). As shown in (30b), spatially modified strong quantifiers on the upper part are considered to be ungrammatical.

(30) a. HOUSE ALL_{l}, HOUSE HALF_{l}
b. *HOUSE ALL_{u}, *HOUSE HALF_{u}

This restriction shows that the presupposition of existence that strong quantifiers denote cannot be grammatically encoded on the upper part. Moreover, whenever a strong quantifier is spatially modified towards a lower spatial location, only a restricted set of elements is denoted. In (31) not most students in the universe are intended to come but rather only the set under discussion. This restriction of the set is overtly encoded with the quantifier MOST being spatially modified towards the lower part and being thus attached to the [low] feature.

(31) STUDENT, MOST_{l} COME.
'Most students came.'

Since the feature [low] marks domain restriction, a universal quantifier localised on the lower frontal plane denotes that the set referred to is not empty, and it thus refers to a contextually determined set.

In LSC the spatial morpheme established on the lower frontal plane denotes a specific DR. It marks that the DR is in the model. Hence since it is included in the model, it is restricted within a domain. Domain restriction is marked by this spatial morpheme established on the lower frontal plane. The feature [low], established by strong localisation, combines with lexical and functional elements to denote domain restriction and forces the quantifier that is attached to to refer to a set of relevant elements. 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. This is shown in (32), where the denotation of the feature [low] is formalised. [low] denotes a function (f) that chooses an individual or a set of individual (x), which are restricted to a particular domain (C). The function only chooses individuals which are intersected with domain restriction.

(32) $[[\text{low}]] = \lambda\ \text{P}\ \text{f}(\lambda[\text{P}(\text{x}) \wedge \text{C}(\text{x})])$

On the contrary, the feature [up], established by weak localisation, is affixed to some functional categories only. It is a marked feature denoting absence of domain restriction. Since there is no restriction in the domain, NPs with [up] are used to denote non-specific DRs. The feature [up] combines with weak quantifiers and verb inflection to denote absence of domain restriction.

5 Conclusions

This paper has offered a dynamic semantic account of NPs in LSC, where variables have been analysed as corresponding to a spatial location established in sign space (cf. also Schlenker (to appear)). It has shown that LSC has an overt specificity marking expressed on the two parts of the frontal plane. While specific indefinites are localised on the lower frontal plane, the upper frontal plane is only reserved for non-specific DRs. The three properties encompassed by specificity can be distinguished by the localisation pattern I have presented. Strong localisation correlates with wide scope marking, partitivity and identifiability, and denotes specific DRs. Weak localisation correlates with narrow scope marking, non-partitivity and non-identifiability, and denotes non-specificity. Finally, it has been proposed that a lower spatial morpheme affixed to functional and lexical elements marks domain restriction.

Some questions related to the topic treated here remain still unanswered. It has been shown that many morphophonological features contribute to the localisation, namely index signs and spatial modification of signs towards spatial locations, as well as non-manual mechanisms directed to it. Interestingly, in the previous examples there seems to be a specialisation tendency: while partitivity and scope are mainly determined in the direction of manual signs on the frontal plane, identifiability is mostly determined by darting eyegaze which can be analysed as an overt marking for *de dicto* mode. Further research is needed to settle this issue. Also, instances of intermediate scope have not been included. This is left for future work in order to give a more fine-grained analysis of the upper and lower frontal plane distinction in relation to scope.

References

Asher, Nicholas. 2004. Discourse topic. *Theoretical Linguistics* 30:163–202.

Bahan, Benjamin. 1996. Non-manual realization of agreement in American Sign Language. PhD Dissertation. Boston University, Boston, MA.

Bahan, Benjamin, Judy Kegl, Dawn MacLaughlin, and Carol Neidle. 1995. Convergent evidence for the structure of determiner phrases in American Sign Language. In *FLSMVI. Proceedings of the Sixth Annual Meeting of the Formal Linguistics Society of Mid-America. Volume II: Syntax & Semantics/Pragmatics*, ed. Leslie Gabriele, Debra Hardison, and Robert Westmoreland. Indiana University Linguistics Club.

Diesing, Molly. 1992. *Indefinites*. Cambridge, MA: The MIT Press.

Enç, Murvet. 1991. The semantics of specificity. *Linguistic Inquiry* 22:1–25.

Farkas, Donka F. 1997. Dependent indefinites. In *Empirical issues in formal syntax and semantics*, ed. D. Godard F. Corblin and JM Marandin, 243–267. Peter Lang Publishers.

Farkas, Donka F. 2000. Scope matters. In *Reference and anaphoric relations*, ed. K. von Heusinger and U. Egli, 79–108. The Netherlands: Kluwer Academic Publishers.

Fodor, Janet Dean, and Ivan Sag. 1982. Referential and quantificational indefinites. *Linguistics and Philosophy* 5:355–398.

Geurts, Bart. 1999. Specifics. In *Focus and presupposition in multi-speaker discourse*, ed. B. Geurts, M. Krifka, and R. van der Sandt, 99–129. Utrecht: ESSLLI 99.

von Heusinger, Klaus. 2002. Specificity and definiteness in sentence and discourse structure. *Journal of Semantics* 19:245–274.

Kamp, Hans, and Uwe Reyle. 1993. *From discourse to logic. introduction to modeltheoretic semantics of natural language, formal logic and discourse representation theory*. Dordrecht: Kluwer Academic Press.

Klima, Edward, and Ursula Bellugi. 1979. *The signs of language*. Cambridge, MA: Harvard University Press.

Lyons, Christopher. 1999. *Definiteness*. Cambridge: Cambridge University Press.

MacLaughlin, Dawn. 1997. The structure of determiner phrases: evidence from American Sign Language. PhD Dissertation. Boston University, Boston, MA.

Padden, Carol. 1988. *Interaction of morphology and syntax in american sign language*. New York: Garland Press.

Partee, Barbara. 1970. Opacity, coreference, and pronouns. *Synthese* 21:359 385.

Quer, Josep. 2010. Signed agreement: Putting some more arguments together. Presentation at TISLR10. Purdue University, Indiana.

Roberts, Craige. 1989. Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy* 12:683–721.

Schlenker, Philippe. to appear. Donkey anaphora: the view from sign language (ASL and LSF). *Linguistics & Philosophy* .

Tang, Gladys, and Felix Sze. 2002. Nominal expressions in Hong Kong Sign Language: Does modality make a difference? In *Modality and structure in signed and spoken languages*, ed. Richard Meier, David Quinto-Pozos, and Kearsy Cormier, 296–320. Cambridge: Cambridge University Press.

Wilbur, Ronnie. 2008. Complex predicates involving events, time and aspect: Is this why sign languages look so similar? In *Signs of the time. Selected papers from TISLR 8*, ed. Josep Quer, 217–250. Hamburg: Signum Verlag.