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Deixis, Anaphora and Highly Iconic Structures: Cross-linguistic Evidence on American (ASL), French (LSF) and Italian (LIS) Signed Languages[1]

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1. Introduction

This paper explores typological, presumably modality-specific features affecting deixis and anaphora in signed languages (hereafter SL). Simplifying greatly for the sake of the present exposition, we define deictic-anaphoric structures as text cohesion devices which allow speakers or signers to introduce referents in discourse (deixis) and, subsequently, to refer back to them at later instants in time (anaphora) (Lyons, 1977; Lombardi Vallauri [2004/to appear], for a recent overview).

We focus on two major classes of dectic-anaphoric reference devices that have been described in SL. The first, hereafter referred to as the 'standard' class has been rather extensively investigated, and is realized through manual and visual indexes which establish marked positions in space, often called "loci", where referents can be symbolically assigned (for overviews highlighting typological uniformity across SL with respect to this basic mechanism see, among others, Cuxac, 2000; Liddell, 2003; Lillo-Martin & Klima, 1990; McBurney, 2002; Rathmann & Mathur, 2002;

[1] The present paper is a revised version of the presentation given by Erin Wilkinson and Marie-Anne Sallandre at the TISLR 2006 meeting in Florianopolis, Brasil (Wilkinson, Rossini, Sallandre & Pizzuto, 2006). Each author contributed equally, in different ways (and signed/written languages) to the work described in this paper. We gratefully acknowledge partial financial support from different agencies, institutions, ongoing projects: the Fulbright Mason Perkins Fund (2000-2001), for supporting Erin Wilkinson's early research at the Istituto di Scienze e Tecnologie della Cognizione of the Consiglio Nazionale delle Ricerche in Rome; the Italian and French National Research Councils (CNR-CNRS Project "Language, its formal properties and cognition: what can be learned from signed languages"); the Istituto Statale Sordi di Roma and the "Progetti Felicità" Funds (Italian project "Writing LIS and Sign Writing"); the French Project ACI Cognitique "LS-COLIN" 2000-2002 (CNRS UMR 7023, IRIT, LIMSI). We are most grateful to all the ASL, LIS and LSF signers who participated in the study, and to all the deaf and hearing colleagues at our institutions for insightful discussions on the topics we explored. All the images of signers included in this paper are reproduced with permission.

Pizzuto, 2004/to appear). Thus, to introduce a referent in discourse, a signer can produce a standard (or "frozen") manual sign[2] for the referent, and deictically mark it in the signing space via a manual and/or a gaze pointing, and/or also via morphological alteration of the sign's place of articulation (which may or may not be accompanied by visual indexes), thereby establishing a position in space (or 'locus') for the referent symbolized. Anaphoric reference is then made re-indexing roughly the same point in space via visual or manual pointings (see 1.1 for more details and one illustrative example).

However, as noted elsewhere (Pizzuto, 2004/to appear), deictic-anaphoric reference is also produced, in SL, via complex manual and nonmanual units which are neither pointing signs, nor are they listable as standard signs. These units exhibit highly iconic features and are marked by specific eye-gaze patterns which distinguish them from standard signs. Throughout this paper we will refer to these units as Highly Iconic Structures (HIS) or 'Transfers', after Cuxac (1985; 1996; 2000). Aside from specific eye-gaze patterns, HIS may be composed of: (1) manual forms encoding perceptually salient features of the referents/ referential relations, most frequently described in the SL literature with different terms such as "classifiers", "productive morphemes", "polysynthetic" or "polycomponential" signs; (2) marked facial expressions, and/or directional modifications of head, shoulders, whole trunk -- usually described in the literature as "role-shifting devices" but also with other terms (see section 1.1 below for more discussion). As we will illustrate shortly hereafter, different subtypes of HIS can be combined among themselves, or with standard signs, to simultaneously encode information on two (or even more) referents, hence allowing the specification of deictic-anaphoric reference in a multilinear fashion that appears to be unique of the visual-gestural modality.

Although the manual and nonmanual devices mentioned above have been described from different perspectives, and with different terminologies, there is little or no information on their use in deictic-anaphoric reference operations, and/or on how they interact with the 'standard' devices mentioned above. Our study provides relevant evidence on this topic through a comparative examination of short narrative texts produced in three SL: American (ASL), French (LSF) and Italian (LIS). ASL and LSF are known to be historically related, while LIS has no certain relationship with either ASL or LSF[3]. The sample of language data we scrutinize thus allows us to

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[2] Standard signs are defined here, as in most SL literature, as those signs that are commonly listed in SL dictionaries, and are often described as constituting 'the frozen lexicon'. They are distinguished from the 'productive' highly iconic forms described shortly hereafter.

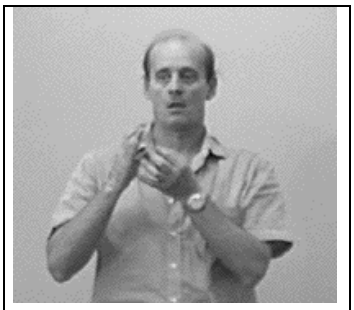
[3] It must be recalled that, due to the absence of appropriate written documentation of SL and to the complex language transmission and variation phenomena proper of SL and of different communities of SL users (Cuxac, 2000; Fusellier-Souza, 2004; 2006), it is still very difficult to ascertain the historical links among SL using the same criteria that are applied in spoken/written language research. Thus, although there are no documented historical relationship between

evaluate, albeit in part, the influence of language relations upon the phenomena investigated. If we were to find similarities only between ASL and LSF, this could be taken as evidence that the similarities identified can be attributed to the historical links between these two SL. If, however, we were to find that similar patterns hold across the three SL investigated, this evidence would suggest that similarities are grounded in more general features linked to the visual-gestural modality of language expression.

It is useful to clarify our theoretical framework and provide illustrative examples of the structures mentioned above.

1.1. Theoretical framework and illustrative examples of the structures we focus upon

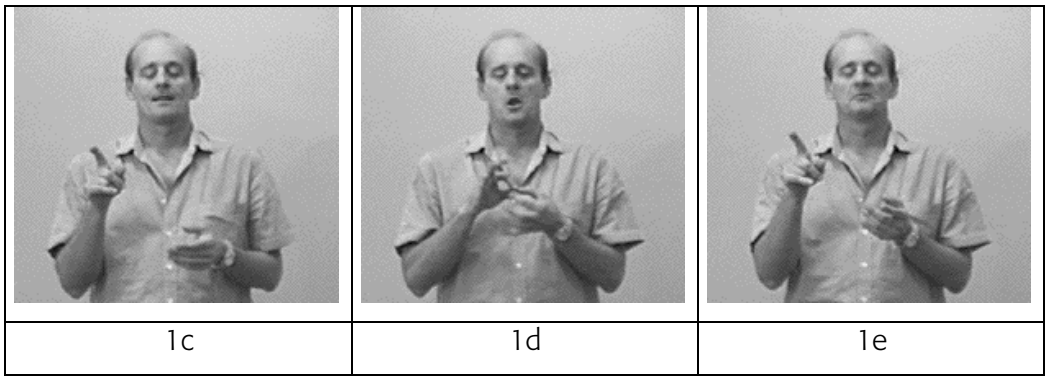
The present study stems from, and brings together theoretical and empirical work independently developed, within our research groups, on SL morphology and on deixis and anaphora in SL as compared to spoken or verbal languages (Pizzuto, 1978; 2004/to appear; Pizzuto, Giuranna & Gambino, 1990; Wilkinson, 2002), and on the crucial relevance that iconicity has in shaping SL lexicon, grammar, discourse (Cuxac, 1985; 1996; 2000; Cuxac & Sallandre, 2004/to appear; Fusellier-Souza, 2004; 2006; Russo, 2004; Russo, Giuranna & Pizzuto, 2001; Sallandre, 2003; 2007). An appropriate discussion of these theoretical foundations cannot be conducted here. We will only sketchily outline some of the major points, especially with respect to the HIS mentioned above. Before doing so, it is useful to consider briefly the 'standard' mechanism for deictic-anaphoric reference, illustrated in Example (1) below with fragments taken from a LIS text reporting an ordinary event[4].



1a

LIS, on one hand, and ASL/LSF on the other hand, we cannot exclude that, at some point in past or recent history, these SL have been in contact more than we are at present able to ascertain.

[4] From the 'Necklace theft' corpus (Fabbretti, 1997).



1c	1d	1e

(1) 'a colleague' [....] 'he, the colleague, he...'

The still videoclip in 1a shows a standard nominal sign meaning 'colleague' through which the signer deictically introduced in discourse this referent: the manual sign is dislocated at a marked position at the signer's right, and accompanied by a gaze pointing in the same direction. Stills 1c-1e show how, at a later point in discourse, the signer anaphorically referred back to the same referent first via a manual index directed towards the same position in space previously marked (1c), then by a second instance of the sign 'colleague', this time articulated in an unmarked position in neutral space (1d, compare with 1a-1b), and then by a second index (meaning 'he, the colleague, he..').

This 'standard' mechanism for deictic-anaphoric reference in signed discourse interacts extensively with morphological modifications that different classes of verbs can undertake, altering their locations in space, which we will not consider here (Cuxac, 2000; Pizzuto, 2004/to appear). The point we wish to stress is that structures such as the above, described since early research on ASL (e.g. Friedman, 1975; Klima & Bellugi, 1979; Wilbur, 1979), appears to be very similar across several different SL of the world, and it seems plausible to assume that it is universal or nearly universal (McBurney, 2002; Rathmann & Mathur, 2002; Pizzuto, 2004/to appear).

We turn now to briefly illustrate HIS and the theoretical model within which they are framed. Based on extensive analyses of LSF discourse and grammar in a cross-linguistic framework, Cuxac (1985; 1996; 2000) has proposed that all SL are grounded upon, and exploit a basic capacity that signers have in iconicizing their perceptual/practical experience of the physical world. One of the effects of this iconisation process is to endow SL with an additional semiotic dimension compared to verbal languages. In SL, unlike in verbal languages, there are two ways of signifying: either by 'telling and showing', thereby producing HIS or 'Transfers' that are unique of the signed modality, or by 'telling without showing', using the standard lexicon and pointings, and producing structures that are more comparable to those found in verbal languages.

These two ways of signifying mirror two different intents a signer can deliberately choose for articulating his/her discourse: an illustrative and a non-illustrative one. The operations signers perform when choosing an illustrative intent (and the resulting structures they produce) are defined "Transfers", and conceived as traces of cognitive operations whereby signers transfer their conceptualization of the real world into the four-dimensional world of signed discourse (the three dimensions of space plus the dimension of time).

The manual components of these complex structures are called 'proforms'. 'Proforms' correspond to what, in most SL literature are defined as 'classifiers' (or with other terms previously mentioned - see Schembri, 2003 and the collected papers in Emmorey, for overviews). The difference between 'proforms' and 'classifiers', however, is not purely terminological but rather substantial: it is grounded on a linguistic model that attributes to iconicity a crucial, formal role in shaping SL discourse and grammar, on theoretical analyses showing the inadequacies of a 'classifier-analysis' for the elements under discussion, and on a detailed analysis of the distinctive formal and articulatory features that characterize the HIS within which proforms are embedded, most notably specific eye-gaze patterns (Cuxac, 1996; 2000). In contrast, analyses of these forms in terms of 'classifiers' focus primarily on the manual components, disregarding or underestimating the role that gaze patterns play in their specification.

Referring to Cuxac (1985; 2000) in this paper we distinguish three main types of Transfers (but see Sallandre, 2003 for a much more detailed classification):

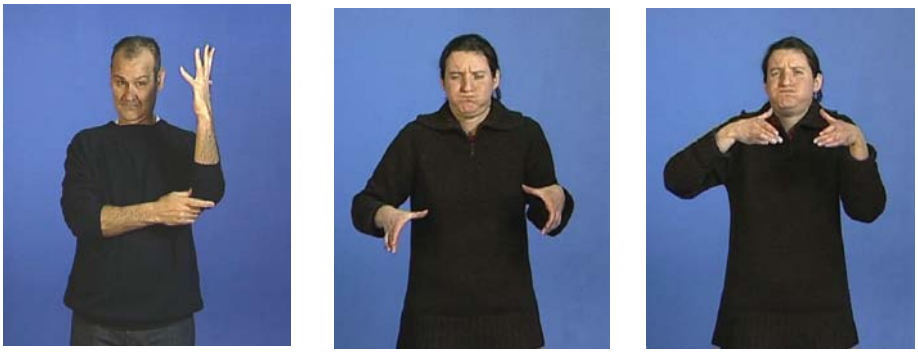
1. 'Transfers of Form and size' (TF) describe objects or persons according to their size or form (no process or role involved). The object is described by means of proforms. Gaze is oriented towards the hands, and facial expression specifies the form.
2. 'Transfers of Situation' (TS) involve the movement of an object or character (the agent, specified by the dominant hand) relative to a stable locative point of reference (specified by the non-dominant hand). The situation is shown as if the scene were observed from a distance. The signer keeps his/her distance relative to what s/he is conveying. Gaze is oriented towards the dominant hand and facial expression specifies the agent.
3. 'Transfers of Person' (TP) involve a role (agent or patient) and a process. The signer 'becomes' the entity to which s/he refers reproducing, in the course of the utterance, one or more actions carried out or sustained by this entity. The entities referred to are usually humans or animals but can also be inanimates.

The third type of Transfers, TP, have been defined in the literature with different terms including "role taking", "role shifting" (Padden, 1986) or also, in earlier work ,"Body and

Projected Body pronouns" (Kegl, 1976), "body markers" (Pizzuto & al, 1990), with a primary focus on the nonmanual features they present (marked facial expressions, gazes, body postures).

As noted, a relevant feature of HIS is that subtypes of Transfers can be combined among themselves, or with standard signs, to encode information on two (or even more) referents in a multilinear, simultaneous fashion that has no parallel in speech. This phenomenon is called 'Double Transfer' (DT) in Cuxac's terminology (e.g. combining simultaneously a TP for specifying an agent, and a TS specifying locative information or also a second agent). Similar phenomena have been described from different perspectives and with different terminologies by several authors (e.g., among others, Dudis, 2004; Russo, 2004; the collection of papers in Vermeerbergen, Leeson Crasborn, 2007). In this paper we refer to these phenomena as "Multiple Reference" (MR) operations, and we assess their incidence in the signed narratives we analyzed.

Illustrations of these Transfer types are provided below. Examples (2) and (3) are taken from LSF narratives and highlight the differences between standard signs and HIS. Note how when producing the standard signs the signer's gaze is directed towards the interlocutor. In producing HIS the gaze is directed away from the interlocutor, and oriented either towards the hands (when articulating TF and TS structures), or in different points in space reproducing the gaze of the entity represented (when articulating TP structures. Example (2) shows a standard signs and a TF, both encoding the same conceptual content: 'tree'. The proform (handshape within the TF) describes the form of the tree.



2a 2b 2c

(2) 'tree' via a standard sign (2a) and via a TF (2b-2c)

Example (3) shows a standard sign (3a) and a TP (3b), both encoding the same conceptual content 'horse'. In the TP structure, all the manual and non manual features (gaze, facial expression, body and the hands) reproduce those of the embodied entity.



(3) 'horse' via standard sign (3a) and via a TP (3b)

Example (4) below illustrates three TS structures taken from, respectively, the LIS (4a), ASL (4b) and LSF (4c) narratives analysed for the present study. Both the LIS (4a) and the ASL (4b) example refer to 'the falling of a dog out of a windowsill'. The LSF example (4c) describes 'a horse jumping over a fence'. In all TS, gaze is towards the dominant, then the non-dominant hand. The dominant hand expresses the agent with the process ('dog-falling', 'horse-jumping'), while the non-dominant hand expresses the locative, and the object implicated in the locative relation ('windowsill', 'fence'). The facial expression is congruent with the process represented.



(4) 4a: LIS 4b: ASL 4c:LSF

The examples in (5) illustrate two occurrences of MR taken from, respectively, the LIS (5a), and ASL (5b) narratives analysed for the present study. In 5a, the TP and TS structure produced allow the signer to anaphorically refer simultaneously to a 'child holding a dog in his arm' and to 'the dog licking the child on his cheek'. In 5b, the same type of structures allows the signer to represent 'a dog' with 'a jar' around his neck.





(5) 5a: LIS 5b: ASL

Note that TS structures such as those illustrated in (4) are also examples of MR.

1.2. Evidence from previous studies and questions investigated in the present study

Previous studies conducted on LSF have provided clear evidence on the extensive use of HIS in LSF texts of different genres. This has been shown in Cuxac's (1996; 2000) analyses of large texts produced by a small number of LSF signers, and in more recent work conducted by Sallandre (2003) on a large corpus of short narratives and 'prescriptive' (cooking recipes) texts produced by 19 signers. Sallandre's results also highlight important differences with respect to discourse genres: HIS are much more frequent in narrative (on average 70%) compared to prescriptive texts (30% on average). Disregarding terminological differences among authors, similar indications on the widespread use of HIS in different genres of signed discourse can be drawn from analyses and observations reported for LIS (Pizzuto, 2004/to appear; Pizzuto & al, 1990; Russo 2004; 2005; Russo & al, 2001; Wilkinson, 2002), for BSL (Brennan 2001), ASL (Emmorey & Reilly 1998; Emmorey, 2003), DSL (Engberg-Pedersen, 1993; 2003).

No study that we are aware of, however, has explicitly addressed the question we aimed to clarify with the present, cross-linguistic study:

1. How frequently are HIS used for performing deictic-anaphoric reference operations?
2. Are HIS more or less frequently used, for deictic-anaphoric reference purposes, compared with 'standard' signs and manual pointings?
3. In performing deictic-anaphoric reference operations via HIS, what is the incidence of MR, i.e. how frequently does the use of HIS allow signers to simultaneously introduce or re-introduce in discourse two (or even more) referents?

2. Data used for the present study

The data we used for the present study were drawn from more extensive corpora of signed discourse of different genres that have been collected in France, Italy and USA on a fairly large number of native and non native ASL, LIS and LSF signers (Wilkinson, 2002; Sallandre, 2003; 2007; Pizzuto, Rossini, Russo & Wilkinson, 2005). In the present work we analyze short narrative texts elicited through two different pictured stories that have been widely employed in much research on both SL and spoken languages. The LIS and ASL narratives were elicited through the same story, "Frog where are you?" (Mayer, 1969). The LSF narratives were elicited through "The Horse" story (Hickmann, 2003).

In the book version we used as elicitation material, the 'Frog' story is made of 24 pictures. It tells the adventures of a boy, his dog, a frog. The boy (main protagonist) finds a frog, brings it home, puts it in a jar placed in his bedroom, then goes to sleep with the dog. During the night, while the boy and the dog are sleeping, the frog jumps out of the jar and escapes. The next morning, the boy wakes up and finds out that the frog has disappeared. The boy and the dog then start searching everywhere for the frog.

The 'Horse' story is made of 5 pictures, hence much 'shorter' than the 'Frog' story. It narrates simple actions performed by a horse, a cow and a bird within the space of a lawn divided by a fence. The main protagonist is the horse, who gallops happily over one side of the lawn and is observed by the cow and the bird positioned, respectively, on the other side of the lawn, and on a picket of the dividing fence. At one point the horse jumps over the fence to join the cow on the other side, but in doing so the horse bumps on the fence, and falls on the other side, landing on its back and hurting one of its legs. The cow and the bird then come to help the horse: the bird brings a first-aid kit which is then used by the cow for bandaging the horse's leg.

These pictured stories were presented to all signers by deaf interviewers who are fluent in each of the SL examined, and with whom the signers were well familiar. All signers were allowed to familiarize themselves with the stories, with no time constraints, and then asked to retell the stories from memory.

For the present study we selected from the larger corpora mentioned above, for each SL, the productions of three native signers of comparable ages (young deaf adults, age range: 19-23 years) and socio-cultural background (middle-class, high school degree, or attending the first years of university). We focused our analysis on text sequences of comparable content (functionally similar episodes involving animate and inanimate referents), and duration in time (approximately 1' of signed productions). The ASL and LIS data consisted of portions of 'Frog Story' narratives corresponding to the sequence going from the beginning of the story through the episode in which

the dog falls from the windowsill, then the boy takes the dog in his arms, and the dog licks the boy on his cheek. The LSF data corresponded to complete narrations of the 'Horse Story'.

The reader may wonder why we used portions of the 'Frog Story' for our ASL and LIS data, and a different story, 'The Horse', for our LSF data. Our choice was in part motivated by indications provided by previous work, but also influenced by practical reasons. Research independently conducted on ASL and LIS 'Frog stories' (Wilkinson, 2002), and on LSF 'Horse stories' (Sallandre, 2003) indicated the relevance that semantic features such as animacy vs. inanimacy, and human vs. not-human may have for a clearer understanding of deictic and anaphoric devices in signed narratives. Both the stories we analysed include animate and inanimate referents, but slightly differ with respect to the 'human' vs. 'non-human' feature of their protagonists: the 'Frog' story has a human character (the boy) as the main protagonist, while in the 'Horse' story all characters are animals, hence not-human. This difference between the two stories can thus provide information on the role that the human vs. not-human feature may have (within the category of reference to animates) in the choice of deictic-anaphoric reference devices in narratives.

When we planned the research reported here, we intended to expand our data base in order to perform our analyses on *both* "Frog " and "Horse" stories produced in the three SL we examined. However, time and funding constraints did not allow us to pursue this objective. The present comparative study was thus re-designed, and should be intended, as a first exploration of the topic we focus upon. We acknowledge that a more comprehensive analysis will require more data based on the same language elicitation materials across languages.

2.1. Data transcription, coding and analysis

The transcription methodology, and the analytic categories we used for coding were agreed upon among all co-authors on the ground of theoretical work and empirical analyses of signed discourse as described in Cuxac (2000), Sallandre (2003) Cuxac & Sallandre (2004/to appear), Pizzuto (2004/to appear), Pizzuto et al (2005).

All signed productions were transcribed and coded in a common format on excel files by signers that were fluent in each of the national SL we considered[5]. We used so-called 'glosses' for annotating in, respectively, written English, French and Italian the basic meaning of the linguistic units we identified in the ASL, LSF and LIS narratives[6]. This 'gloss' notation was integrated, in the

[5] Erin Wilkinson transcribed the ASL data, Paolo Rossini the LIS data, Marie-Anne Sallandre the LSF data

[6] We are keenly aware that a so-called gloss-based notation, albeit still commonly used by practically all sign language researchers, imposes severe limitations to the analysis of signed utterances and discourse, and more appropriate systems for annotating in written form signed productions are sorely needed. For some recent work on this topic, and indications

excel transcripts we produced, with information on the timing of each unit singled out, and on relevant formal and articulatory features of such sign units (e.g. coding each unit as a standard sign or a HIS of the TF, TS or TP type, the presence/absence of spatial dislocation, the hand/s engaged in producing the manual components of the sign units).

All transcripts realized were subsequently exchanged among all co-authors (along with the original data recorded on DVDs) for cross-checking the uniformity of our transcription and coding methodologies.

The analyses focused upon the referential expressions that were used in the text to introduce (deictically) and to keep track (anaphorically) of the animate and inanimate referents symbolized in the narratives. We distinguished all referential expressions in two major classes: (a) standard signs (b) HIS.

The first class (hereafter std) included: (1) all content-loaded signs that are most commonly listed in SL dictionaries (e.g. the standard signs for 'frog', 'house', 'jar'); (2) manual pointings used to position referents at marked locations in the signing space.

The second class included all HIS, distinguished in the three major types of TF, TS and TP, as described in section 1.1 above. Note that for the purposes of the present paper, in the description of our findings to be provided below, the TF and TS subtypes of HIS were grouped in a single category (TF/TS).

We distinguished a third type of deictic-anaphoric productions that included 'mixed' (hereafter 'mix') combinations of HIS and std signs (e.g. a TF produced with one hand vehiculated the meaning of 'jar' accompanied by a manual pointing produced with the other hand pointed to mean 'this jar').

In examining the distribution of std signs vs HIS in deictic and anaphoric reference operations we explored possible differences linked to the animate vs. inanimate status of the referents that were symbolized in discourse. Finally, we examined the incidence of MR (as defined and described above - see examples [4] and [5]), computing their proportion in the texts as follows. We grouped together all occurrences of deictic-anaphoric reference operations produced, and then divided the number of cases in which a MR was realized by the total number of deictic-anaphoric reference operations produced.

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on possible solutions, the interested reader is referred to Di Renzo & al (2006), Garcia & Boutet (2006), Pizzuto, Rossini & Russo (2006).

3. Results: the prominence of HIS as deictic-anaphoric devices in signed narratives

The major results of our study are summarized in Table 1 and in Figures 1 through 5 below. In the table as in the Figures individual signers are indicated by their language and distinguished by numbers (e.g. LIS-1, LIS-2 and LIS-3 indicate the three LIS signers). Table 1 shows the number (and relative percentages) of all tokens of deictic and anaphoric reference devices (grouped together) identified in the texts produced by each signer, distinguished in standard signs, HIS, and mixed productions consisting of standard signs and HIS.

Table 1

Overall distribution (number and relative percentages) of standard signs (STD), HIS, and mixed productions of std and HIS (mix) used as deictic-anaphoric reference devices in the 'Frog story' texts produced by the three LIS and ASL signers and in the 'Horse story' texts produced by the three LSF signers

Language / Signers	Number of tokens					%				
	STD	**HIS**	**mix**	***TOT***			**std**	**HIS**	**mix**	***TOT***
LIS-1	26	77	0	*103*		LIS-1	25	75	0	*100*
LIS-2	23	96	0	*119*		LIS-2	19	81	0	*100*
LIS-3	27	118	1	*146*		LIS-3	18	81	1	*100*
ASL-1	28	96	3	*127*		ASL-1	22	76	2	*100*
ASL-2	38	105	0	*143*		ASL-2	27	73	0	*100*
ASL-3	26	100	0	*126*		ASL-3	21	79	0	*100*
LSF-1	5	41	0	*46*		LSF-1	11	89	0	*100*
LSF-2	12	42	0	*54*		LSF-2	22	78	0	*100*
LSF-3	8	62	1	*71*		LSF-3	11	87	1	*100*

Looking at the total number of tokens on the left side of Table 1, it can be observed that, although all the signed texts we analyzed were of comparable time length (1'), the 'Horse' stories produced by the LSF signers contained a smaller number of deictic-anaphoric reference tokens (between 46 and 71) compared to the larger number of such tokens found in the 'Frog' story sequences by the LIS and ASL signers (between 103 and 146, i.e. approximately twice as much). This shows that, not surprisingly, the specific story used, most likely the different 'length' of the stories in terms of number of pictures of which they are made, influences language production, at least from a quantitative standpoint.

Examining the distribution of the different types of deictic-anaphoric devices in the three languages examined, the relative percentages in the right side of Table 1 highlight that across languages HIS are by far the most frequent device used for deictic-anaphoric reference purposes. They are in fact represented in similar, very high proportions in LIS (75% to 81%), ASL (73% to 79%), and LSF (78% to 89%). In contrast, the category of std signs are represented in markedly smaller proportions (from 11% to a maximum of 25%), while mixed productions constituted an overall negligible proportion, ranging from 0 to 2%.

Figures 1 through 5 below provide a more detailed description of the regularities we identified across languages. Figure 1 focuses on deictic reference to both animate and inanimate referents (grouped in a single category), showing the distribution (relative %) of std signs, HIS and mixed productions.

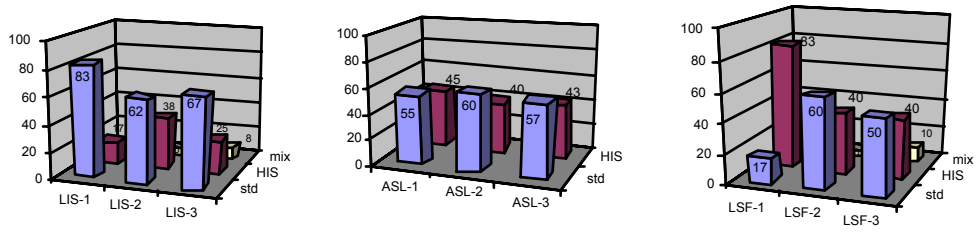


Figure 1- Deictic reference to animate and inanimate referents: distribution (%) of standard signs (std), HIS and mixed productions (mix) in the texts of the LIS, ASL and LSF signers

The data in Figure 1 highlight that in all three SL, with only one exception, standard signs were the preferred means for the first (deictic) introduction of animate and inanimate referents in discourse (ranging from 50% to 83%), while HIS were less frequent, albeit still in appreciable proportions (17% to 45%). One signer (LSF-1) did not follow this pattern, and used much more frequently HIS (83%) rather than standard signs. Mixed productions were also represented in the texts of two signers (LIS-3 and LSF-3), in small proportions.

Figure 2 shows the distribution of HIS vs. standard signs in anaphoric reference to animate and inanimate referents. The data evidence strong cross-linguistic similarities: HIS appear to be by far the prevailing means for carrying out anaphoric reference, in proportions ranging from 76% to as much as 95%. With respect to the use of standard signs, it is of interest to note that a very small proportion of anaphoric reference was performed only via manual pointings. These were absent in the production of the LSF signers, and very poorly represented in the texts by the ASL (1% to 3%) and LIS (5 to 7%) signers.

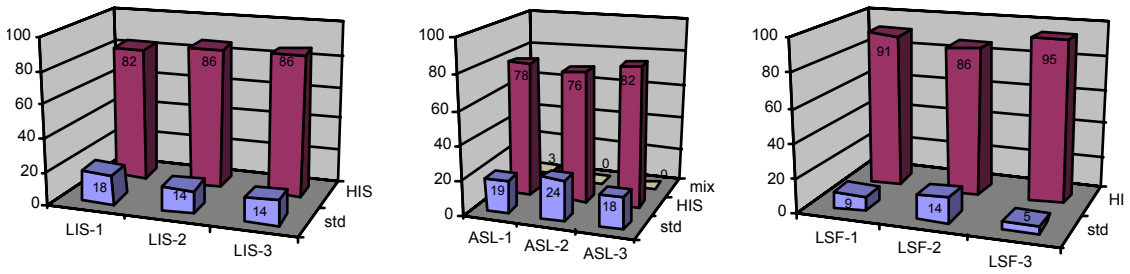


Figure 2 - Anaphoric reference to animate and inanimate referents: distribution (%) of standard signs (std), HIS and mixed productions (mix) in the texts of the LIS, ASL and LSF signers

Figures 3a and 3b provide a more analytic view of deictic reference operations, taking into account the animate/inanimate variable, and distinguishing the subtypes of HIS that signers employed (i.e. TP and TF/TS as previously described). It should be noted that, due to the structure of the stories we examined, the number of referents that were introduced in discourse, hence the number of tokens of deictic reference operations performed, was limited to: (a) only three animate referents (the boy, dog and frog for the LIS and ASL signers, and the horse, cow and bird for the LSF signers), and: (b) a small number of inanimate referents (from 4 to 10 depending upon the language and the individual signer).

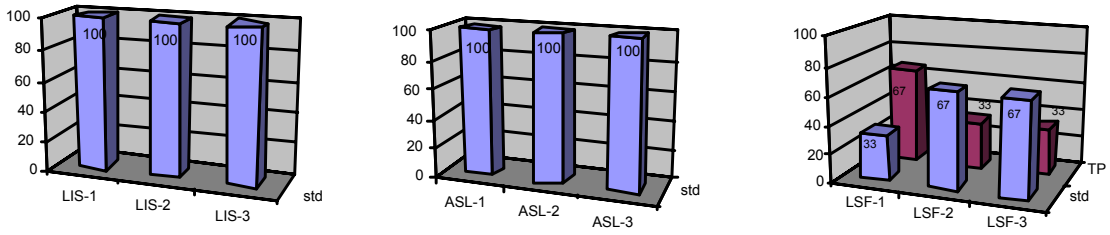


Figure 3a - Deictic reference to animate referents: distribution (%) of standard signs (std), and HIS (TP) in the texts of the LIS, ASL and LSF signers

The data in Figure 3a show different patterns for LIS and ASL, on one hand, and LSF on the other hand. In both LIS and ASL, signers' first reference to the three main, animate protagonists of the 'Frog' story is performed exclusively via standard signs (the names for these referents). In contrast, LSF signers' first reference to the three animate referents of the 'Horse story' is done either via standard signs (in one or two over three possible cases, depending upon the signer), or via HIS, and precisely via TP (in the remaining cases). It is of interest to recall that while the 'Frog' story includes a human animate referent (the boy) in addition to two animal referents, the 'Horse' story has all animal animate referent. We cannot exclude that the LSF signers' use of TP structures for deictic reference (in addition to standard signs) was at least in part influenced by this property

of the referents they talked about. We also found that all three LSF signers used a TP structure to introduce the 'cow' referent of their story, articulating very similar manual components or 'proforms' within such structures. This suggests an interaction between semantic properties and formational properties of manual signs for the referents that needs to be further investigated.

Figure 3b illustrates the use of standard vs. HIS as deictic devices for inanimate referents.

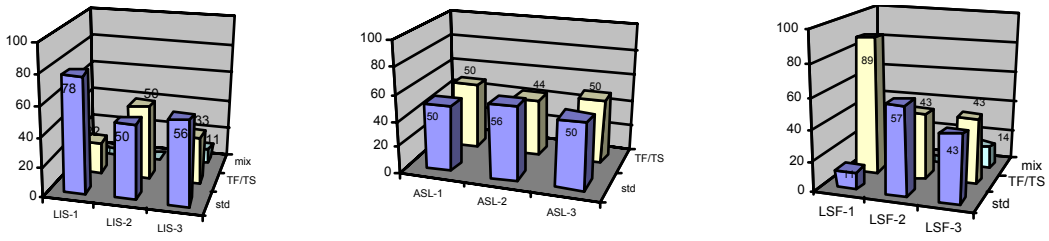


Figure 3b - Deictic reference to inanimate referents: distribution (%) of standard signs (std), HIS (TP, TF/TS), and mixed productions (mix) in the texts of the LIS, ASL and LSF signers

Looking at the figure, it can be seen that the HIS employed in this case belonged to the TF/TS categories. Major crosslinguistic similarities across the three languages can be noted. In all signers but one (LSF-1), inanimate referents are introduced frequently via standard signs (in proportions ranging from 43% to 78%), but HIS are also well represented either by themselves (from 22% to 50%), or also in combinations with pointings (in the 'mixed' category). The use of TF/TS structures is magnified in the production of LSF-1 (89%), suggesting that individual variation also needs to be carefully assessed for a clearer understanding of the topic we are exploring.

Figures 4a and 4b focus on anaphoric reference to, respectively, animate and inanimate referents, and clarify the major trends, and cross-linguistic similarities highlighted in Table 1 and in Figure 2 above.

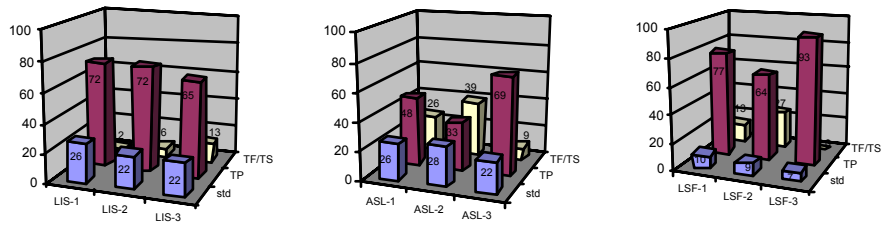


Figure 4a - Anaphoric reference to animate referents: distribution (%) of standard signs (std) and HIS (TP, TF/TS) in the texts of the LIS, ASL and LSF signers

Figure 4a shows that in all three SL the re-introduction in discourse of animate referents was performed primarily via HIS, most frequently of the TP type. In the production of 8 out of 9 signers anaphoric TP were represented in proportions ranging from 48% to 93%, while in one signer (ASL-2) TP were in smaller but still remarkable proportion (33%). Almost all signers also used anaphoric TF/TS structures: these were on average in smaller proportions (between 2% and 27%) except in the production of ASL-2 signer, who used anaphoric TF/TS more frequently (39%) than anaphoric TP (33%). The use of standard signs for anaphoric reference was markedly less frequent (e.g. between 22% and 26 % in the LIS and ASL signers, from 7% to 10% in the LSF signers).

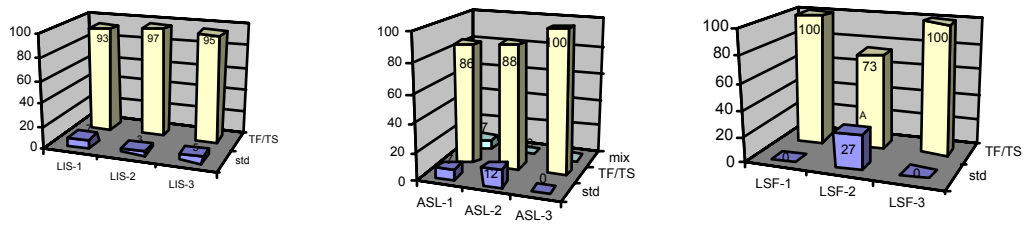


Figure 4b - Anaphoric reference to inanimate referents: distribution (%) of standard signs (std), HIS (TF/TS), and mixed productions (mix) in the texts of the LIS, ASL and LSF signers

Figure 4b illustrates that basically the same pattern held for anaphoric reference to inanimate referents: in all three SL we observe a very extensive use of HIS, most notably of the TF/TS type. The very high proportion of anaphoric TF/TS structures (from 73% to 100%) is in sharp contrast with the markedly more limited use of standard signs. These were absent from the production of three signers (ASL-3, LSF-1 and LSF-3), and ranged from 3% to 27% in the remaining signers.

3.1. The incidence of multiple reference operations

Figure 5 illustrates how frequently the use of HIS allowed signers to produce what we defined 'multiple reference' (MR), i.e. a multilinear organization of information whereby two or even more referents can be simultaneously specified, and/or maintained in time and space in a fashion that appears to be unique of SL (see examples in section 1.1).

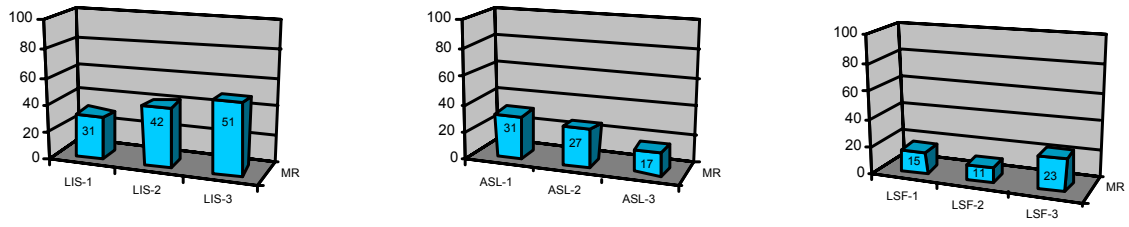


Figure 5 - Proportion of multiple reference (MR) deictic-anaphoric operations performed via the use of HIS in the texts of the LIS, ASL and LSF signers

The data in figure 5 show that MR was realized in all three SL, albeit in variable proportions: it was markedly more frequent in LIS signers (from 31% to 51%), relatively less frequent in ASL (17% to 31%) and in LSF signers (11% to 23%). Although individual, and also language differences are noted, it seems unquestionable that MR is a relevant phenomenon that deserves to be taken fully into account in analyses and descriptions of signed narratives.

4. Concluding remarks

Recalling the questions we formulated, the data we have described evidence clear cross-linguistic similarities among the three SL we examined. These data show that HIS are the most frequent device for realizing anaphoric reference in signed discourse, using primarily TP structures for animate referents, and TF/TS structures for inanimate referents. It was of interest to find that HIS can also be employed for the first, deictic introduction of animate referents (via TP, as noted only in LSF signers), and of inanimate referents (via TF/TS structures, as found in variable but appreciable proportions in all three SL).

Our data also show that in all three SL (in variable but again appreciable proportions), HIS allow MR deictic-anaphoric operations, a unique feature of signed discourse that has been highlighted, from different perspectives, in several recent and less recent studies (Dudis, 2004; Pizzuto & al, 1990; Russo, 2004; Russo & al 2001; Vermeerbergen & al, 2007, among others).

The cross-linguistic similarities we identified appear to be linked more to features proper of the visual-gestural modality rather than to a specific language. In fact, beyond individual differences, we found globally similar patterns not only in ASL and LSF, two languages that are known to be historically related, but also in LIS, a language that has no documented links with either ASL or LSF.

More extensive cross-linguistic research is certainly needed before more conclusive statements can be made on the generalizability of the patterns we found. It will be necessary to

collect and analyze more data on historically unrelated, geographically distant SL, and to examine different genres of signed discourse. Sallandre' (2003) analyses of different types of LSF discourse has already demonstrated that the frequency with which HIS are used is significantly influenced by discourse types. As noted, HIS are much more frequent in LSF narratives than in 'prescriptive/descriptive' texts such as cooking recipes. Comparable findings have been reported for LIS, using a different terminology, in Russo's work comparing LIS poetic texts with expository texts (Russo, 2004; Russo & al, 2001). Although these studies, unlike the present one, were not specifically concerned with the deictic-anaphoric functions of HIS vs. standard signs, they clearly indicate that discourse genre is an important variable that needs to be taken into account.

Recalling the theoretical framework outlined in section 1.1, the following can be noted. The evidence we have discussed questions the more or less widely shared view that establishing 'loci' in space is the primary or 'standard' way for performing deictic-reference operations in SL. As noted, in the narratives we analysed, this strategy was never used by the LSF signers, and rather infrequently used by the ASL and LIS signers.

Our data are more consistent with, and support formal models that attribute a key structural role to iconic features in shaping signed discourse at different levels of analyses (Cuxac, 1985; 1996; 2000; Cuxac & Sallandre, 2004/to appear; Pietrandrea & Russo, 2004/to appear; Pizzuto, 2004/to appear; Russo, 2004; Russo & al, 2001; Sallandre, 2003; 2006; 2007; Sallandre & Cuxac, 2002). Insofar as deictic-anaphoric operations are conceived as a universal function of human language for realizing text cohesion, the pervasive use of HIS in such operations is an additional indication of the relevance of iconic properties for a clearer understanding , and description, of SL grammar.

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