Italian Sign Language (LIS): can we write it and transcribe it with SignWriting?

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1. Introduction

The main aim of this paper is to present and discuss some of the most relevants issues/points arising from our direct experience (as Deaf LIS signers) with the problems of representing signs. Our research has been developed within a joint ISSR/ISTC-CNR project on "Writing LIS and SignWriting". The project started in February 2005, and aimed to provide an opportunity for a small group of Deaf signers (already involved in sign language research and Deaf education) to reflect together on different notation systems that have been devised for signed languages (hereafter: SL), and to explore more in depth the possibility of using Sutton's (1995) SignWriting system (SW) for representing LIS texts in a written form that could satisfy our needs more appropriately than other notations we had previously used or explored in transcribing and analysing SL data.

Our research is grounded in previous work conducted within our group on several theoretical, methodological and practical problems arising from the fact that, to date, no SL has spontaneously evolved a written form, and there is still no general consensus on what are the most adequate tools for writing and/or transcribing SL (Fabbretti & Pizzuto, 2000; Pietrandrea, 2000; Pizzuto & al, 2000, and to appear; Bergman et al, 2001; Pennacchi et al, 2001; Pizzuto & Pietrandrea, 2001). Our work is also related to relevant crosslinguistic work on notation and representation issues carried out within an ongoing broader French/Italian crosslinguistic project on LIS and French Sign Language (LSF) (Pizzuto & Cuxac, 2004, Garcia & Dalle, 2005).

The main objectives of the work we are doing with SW are:

1) explore the adaptability/feasibility of SW as a system for transcribing/coding SL texts accurately, without using the "pseudo-standard" system of pictures and "glosses";
2) explore its usability as a LIS writing system, although it still remains to be seen whether and/or when the Italian Deaf community would adopt it as such.

The reason for choosing to explore SW instead of other notation systems is due to the fact that almost all the other notation systems (such as HamNoSys [Prillwitz & al, 1989], to cite one of them) are either Stokoe-based or focus mainly on describing in detail single signs. When using these systems with streams of signs tightly linked to each other as in a SL discourse or dialogue, notation becomes rapidly a cumbersome affair. In addition, none of these notation systems can be easily used by Deaf people as a writing system for expressing themselves in their own language.

2. "Oral" languages and writing systems

If one tries to consider the wide diversity of languages used in the world, taking in due account the fact that the largest majority of them (around 90%) do not have a writing system, and that there is also a wide variety of writing systems (Ong, 1982; Breton, 2003), the task of reflecting over the relation between an "oral" language and its writing system may seem daunting at first.

But there are some common elements that mark the difference between languages with and without written systems. The social relevance of being able to spread and preserve information through space and time is one. The fact that writing has enabled people to keep track of their language's evolution and variation through time and space is another. Another thing to note is that there isn't yet a writing system that could actually display *all* the elements of human speech. And not all writing systems are purely phonologically-based. But all serve the same purpose: to enable a reader to "rebuild" in its mind, or read aloud, what the writer wrote.

However, so far, all writing systems in use today are for languages that use voice and sound. SL are still without a writing system. This makes a large portion of Deaf people live in a diglossic environment, where they're forced to use one language (their SL) in their face-to-face interactions and another language in all other types of human interaction. And the well known fact that most Deaf people have a lower proficiency in the written language of their country, in comparison to their SL skills, renders the situation very complex from a socio-cultural point of view.

This is one of the reasons that made us try out SW, in the hope it could be a good candidate for becoming a writing system for SL, as it is structured in such a way that it can be written by hand or on a computer (by using specifically designed software), with a consistent set of visual rules that are easy to memorize.

3. Writing and transcribing LIS texts

Soon after beginning to learn and discuss the various SW glyphs[1] and their adaptability to LIS signs, we felt the need to explore the use of SW for both creating written LIS texts, conceived and expressed from the start in a written form (something we had never tried before), and for transcribing LIS narratives originally produced in the "face-to-face" modality that is prototypical of all SL. We

[1] We use this term to refer to any individual graphic element belonging to SW's set of symbols. We feel that this term is more appropriate than other definitions more semantically loaded, such as 'graphemes', 'characters' or 'symbols'.

use here the term "face-to-face" (for which we have a sign in LIS) to characterize the visual-manual form of signing, analogous to the "oral" form of spoken languages.

Thus far we have produced four written texts, two transcriptions of portions of signed texts, and one translation from written Italian to written LIS of a classic tale by Aesopus. Some of these texts (all handwritten) are very short (from 8 to 14 sign/graphic units), others longer (from 31 to 57 units). The first two texts were produced, though with some "ortographic" errors, after only 6 hours of learning the basics of SW. This in itself is interesting: it indicates that the learning curve may be less steeper than one could imagine 'a priori', at least for Deaf people. We also found from the start that when texts produced by one of us were read by different signers (not just by their author), the readers were able to accurately "rebuild" (e.g.: to sign "aloud") the signs encoded in SW glyphs, and interpret the overall meaning of the texts, in a way that we have never experienced with any other notation for SL. On this basis, the ensuing discussions focused on different problems, including those related to the 'orthographic' choices to be made.

For example, one such problem concerned the left-to-right vs. top-to-bottom ordering of the sign units in the text. After trying both orderings, we found that we preferred a 'top to bottom' order. This ordering helped us to represent more clearly spatial modifications of the signs (e.g. lateral shifts in space) that convey important grammatical information in LIS.

The most interesting result we obtained from the start, however, was that, compared to other systems, the SW glyphs could be used to represent LIS signs in a way that was easier, richer, and much more efficient for signers. Most importantly for us, the SW glyphs appeared to allow us to represent relevant structural features of the visual-spatial lexicon and grammar of LIS.

3.1 Writing "standard", "non-standard" signs and relevant nonmanual components

With the SW glyphs we were able to write down not just "standard signs" that are listed in the available LIS dictionaries, but also complex signed constructions (of equally complex meaning) that are very frequent in signed discourse, yet are not listed or are just mentioned in LIS dictionaries and grammar as part of the "non-standard" or "productive" lexicon. These constructions, which we currently consider as Highly Iconic Structures (HIS) within the frame proposed by Cuxac (2000), include different types of manual and nonmanual elements that are described in the literature with various terms such as "classifiers", "role playing" or "impersonation" devices. (see Emmorey, 2003, Pizzuto & al, 2005; Russo, 2004). The two-sign sequence in Figure 1, taken from an early LIS text ("At Home") written by TL in a left-to-right order, provides one example.

Figure 1 - On the left: the standard sign meaning 'snow' on the right: a HIS with a complex meaning

In Fig. 1, the standard sign for 'snow' is followed by a HIS unit: a non-standard manual sign, with a very specific facial expression, translatable as *"a really thick coat"*. Within the context of the LIS text, the two-sign sequence means "there was a really thick coat of snow".

A feature that struck us immediately as we reflected on our written texts was our own 'spontaneous' use/non use of the SW glyphs for the nonmanual components of signs. This made us more aware of regularities in the LIS lexicon and grammar that we had not been able to detect previously (see also section 4). For example, the standard sign on the left in Figure 2 (from TL's text mentioned above), means 'stuck', and was written with a specific mouth-glyph ('half-protruted mouth'). After discussing, we discovered that this allowed us to differentiate this sign from a related one (on the right in Fig. 2) with a different mouth-glyph ('showing-teeth'), and an equally different meaning.

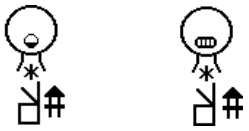

Figure 2 - Two different standard signs for "stuck"

The difference in meaning between these two standard signs appear to be broadly related to the expression of modality in LIS (Wilcox & Wilcox, 1995): while the first sign means "being stuck, and accepting this state of affairs, without any possibility to change it ", the second one means "being stuck but with the necessity, urgency and possibility to do some action directed to modify this state of affairs".

We uncovered, in other texts, other cases in which a different mouth gesture vehiculates differences in meaning between standard signs that have the same manual form. Another example, enlightening also for its variability across signers, is given below, in Figure 3.

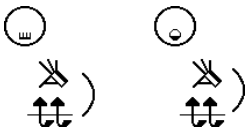

Figure 3 - Other two signs, both meaning "very special"

Both signs mean "very special". Sign (a), on the left, is taken from a text written by LL; the other sign (b) was identified following discussions over the mouth gestures that appear to be an integral part of these signs: an 'upper teeth over lower lip' for (a), and 'half-protruted tongue' for (b). For some signers the two sign variants can be used interchangeably, whereas for other signers they cannot: variant (a) must be used when the "very special" quality attributed to something is based on somebody's internal judgement, while (b) is required when the same quality is 'more objective', stemming from the object itself.

The point of these observations is that the analysis of different form-meaning correspondencies, as it could be accomplished via written representations of LIS texts, provided valuable indications on the relevant manual and nonmanual components of the signs interconnected in a text, and their stability and/or variability across signers (this variability is to be expected, given the lack of a written tradition in LIS).

3.2 Representing morphological modifications and discourse relations

Figure 4 shows a more complex sequence, extracted from a text written by LL (top-to-bottom order), in which the author describes how, on a Christmas-vacation day, his father woke him up to ask him to go together to the father's home village. The fragment reported below describes a direct-discourse interaction between the author and his father, and could be translated as follows: *"(...) I woke up reluctantly and, from under the blankets, asked him "what do you want?" He said "let's go, the two of us, to my home village (…)".*

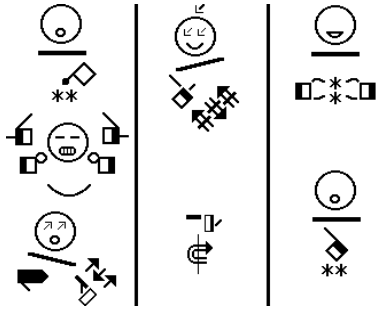

Figure 4 - Excerpt from a text written by LL

We found especially valuable the way in which the SW glyphs allowed the author to represent, and the readers to successfully rebuild, structural features that are unique to the signed modality. For example, the glyphs for the manual and nonmanual components of the second sign in the first column accurately represent the alterations of the movements of the hands, and of the facial expression which mark a morphological, aspectual modification of the base sign for 'wake-up' to vehiculate the meaning 'wake-up-reluctantly'.

Even more interesting for us was to find out how effectively the SW could represent another kind of HIS typical of LIS (and more generally SL) face-to-face discourse. These are usually described by signers as "impersonation" devices because, via changes in gaze directions and postural modifications of the shoulders or upper trunk orientation, the signer appears to "impersonate" the referents he is reporting about, or whose utterances he is quoting, as in the fragment described in Figure 4.

In the third and fourth major graphic units in Fig. 4 these impersonation markers are represented by the eye-glyphs encoding 'eye gaze up diagonally' and 'eye gaze down diagonally' (the two arrows within the circles in the third and fourth unit, respectively), together with the shoulder-glyphs encoding congruent 'shoulder orientation modifications' (the horizontal 'bars' oriented upwards and downwards in the same units three and four).

These glyphs are superimposed on those for the manual signs: the resulting "gestalt" of spatial disposition encodes very clearly the structural links between the manual and nonmanual components because it mirrors how, in actual signed discourse, nonmanual impersonation devices are temporally superimposed on manual signs, and distinguish the referents they identify. In this case, the impersonation marker in the third written unit identifies the writer/author, while the one in the fourth written unit identifies the author's father, both referents being represented in a "first person role". Due to space constraints, our considerations will be limited to the glyphs that compose the third complex unit of this written text.

The impersonation mark encoding the writer in a first person role is superimposed on the glyphs for two manual signs, meaning, respectively: 'staying under the blankets' (on the left) and 'what do you want?' (on the right). The spatial disposition of these two written signs, one next to the other, also shows that they 'co-occur in space'. This spatial arrangement of the written units mirrors the spatial-temporal arrangement the corresponding manual signs may have in actual signing, where they could be either simultaneusly co-articulated or one sign could be maintained in space and time while producing the other, i.e. articulating with the left hand the sign written on the left, and with the right hand the sign on the right. In fact this is how the written text was read and signed "aloud" by readers other than the author.

Another thing to note about the "gestalt" of the written signs under discussion, is the mouth-glyph (the small circle whithin the wider circle of the 'face-glyph'). We found that this mouth-glyph was necessary to distinguish the hand-glyph on the left ("what do you want?") from an almost "homographic" glyph for a partially (semantically) related LIS sign meaning "why?". In their signed, face-to-face forms, these two LIS signs have the same handshape and movement, but different mouth gestures (see Fig. 5 below), and this distinction was quite naturally signalled in the written rendition of the two signs.

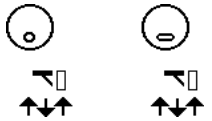

Figure 5 - On the left: the standard sign for "what do you want?"
On the right: the standard sign for "why?"

3.3 Writing vs. transcribing

A relevant outcome of our work has been a much more thorough, empirically grounded understanding of the important differences between 'writing' and 'transcribing'.

We realized that, when writing, choosing the glyphs to represent what we meant was relatively simple: we put down on paper only those "articulatory gestures" that, relying on implicit intuitions, we believe we make when producing signs meaningfully structured in discourse (e.g. see example in Fig. 4). Then we "tried out" the efficacy with which our written texts conveyed what we meant by having others read them.

Obviously, since we are not used to create written LIS texts, in some cases our writing was somewhat too close to the 'face-to-face' LIS form, and some ambiguities arose. For example, in one case, the written text did not provide sufficient information to identify which of two characters of a narrative performed a given action. But the ambiguities we spotted appeared to be on the whole comparable to those that may be found in texts written by vocal language speakers who are not very familiar with the written modality of language expression, hence produce texts that are closer to an "oral" form of language, where information that is necessary in writing can often be omitted without compromising speakers' comprehension.

When producing transcriptions, clearly we could not rely on our own intuitions on how signs are made. We had to try to transpose on paper, as accurately as possible, all the articulatory gestures that we felt were meaningful for subsequently "rebuilding" and analysing the original signed performance. But this objective poses many more problems that one can think of beforehand. We will briefly illustrate here only the most general and rather obvious one: the need of deciding what exactly is relevant, for

producing an accurate transcription, and what can be left out.

The example in Figure 6 was excerpted from the first version of a transcription, made by LL, of a text in which a signer reported on "four monkeys escaping from their cage". The short sequence in Fig. 6 represents: (a) in the left column, two signs meaning 'cage', marked at two locations in space to mean that 'there were two cages'; (b) in the right column, three signs meaning 'closed', also marked at three different locations in space to mean that 'each of three cages [referred to] was closed'.

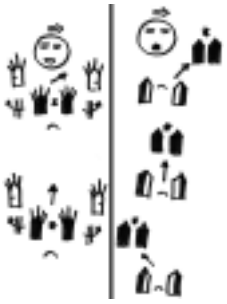

Figure 6 - Excerpt from a transcription made by LL

The transcription revealed that the original signed text contained an 'error': the sign for 'cage' should have been produced three times instead of only two times, because the 'cages' referred to were three, not two. But we wish to note here also another aspect relevant for understanding the problems we faced. Upon reading, the glpyhs allowed us to "recover" on our own some important nonmanual aspects that we knew must have been in the original signed text, but didn't appear in the transcript. Thus a discussion arose as to whether the transcription was accurate and consistent, especially with respect to nonmanual signals.

We checked the original signed version, and we found that *each* dislocation in space of the manual signs occurred with congruent nonmanual markers (shoulder, eye-gaze and head displacements) which, however, the transcription represented only partially (e.g. by a head-displacement glyph, annotated only over the first sign for 'cage' and the first for 'closed'). The displacements of the manual signs were also transcribed somewhat differently: only via arrow-glyphs for 'cage' vs. arrow-glyphs plus a different collocation on the page for 'closed'. These observations led us to revise the transcription, adding a more complete description of nonmanuals and spatial dislocations.

We noticed also that, when comparing transcriptions with written texts, the SW transcripts tend to contain more facial glyphs that aren't strictly related to the content of the narrative, such as prosodic expressions, like hesitations or "pauses of reflection", while in the written texts we produced this kind of prosodic glyphs are absent. This detail made us even more aware of the conceptual and empirical differences between transcribing and writing.

This type of problems are largely comparable to those found in transcribing spoken language data. As Ochs (1979) has clearly shown with respect to spoken texts, transcription is a theory, and deciding what needs to be selected or not to be written down, and how to annotate it for producing an appropriate transcription is a very complex task, highly dependent from the specific objectives pursued in equally specific investigations. Both the objectives pursued and the criteria adopted for transcribing must be made explicit and motivated on theoretical grounds. This task is difficult in research on spoken languages, and clearly even more difficult in research on SL, where the absence of a written tradition renders everything more problematic.

4. Writing decontextualized signs

As we proceeded in our work with LIS texts, we realized that we needed to do a complete adaptation of Sutton's (1999) SW manual for use within the Italian Deaf community. When we started, we relied upon a partial adaptation of the manual, including an Italian translation of the English text (realized by Cecco [2001]), but illustrative examples were still based on American Sign Language (ASL). A clear understanding of how to use the SW glyphs thus required knowledge of ASL signs, which some of us had, but others did not. In order to use the SW manual more productively among ourselves, and also for making it accessible and usable outside of our small group, within the broad community of LIS signers, we needed to illustrate the SW glyphs with appropriate examples based on LIS, not on ASL.

At first, this task seemed simple enough: we thought we would just look for LIS signs that would be adequate substitutes for the original ASL signs. But, when we started working on this, we found out that there were many other issues to deal with.

For example the fact that a sign can be written in more than one way, depending on what level of detail one desires to convey, and on the fact that the reader must still be able to understand it without being overwhelmed by information overload.

Or the fact that ASL and LIS present differences in the frequency of usage of different hand configurations. SW's set of hand-glyphs includes all handshapes that a human being could make, but each SL has different handshape usage frequencies (Volterra, 1987/2004). However, at least for LIS, these frequencies of usage have been extrapolated from LIS dictionaries (Pietrandrea, 1997; Radutzky, 1997). Unfortunately, in our opinion, these dictionaries are based on the flawed assumption that the citation form of a sign would also be the most used within "face-to-face" LIS communication. We think that, in order to produce more reliable LIS dictionaries (i.e.: more descriptive of real LIS usage), it is necessary to analyze also "real" signs, such as one might find within a SL text, either written or "face-to-face" (and then transcribed).

While hunting for LIS examples to use in the adaptation of Sutton's SW manual, we have collected and written down about 600 single signs which we have, in some sense, extracted from our 'mental lexicon'. It has been quite natural for us to reflect on similarities and differences between the ways in which we have represented these decontextualized signs, compared to the signs occurring within our written and transcribed texts. We mention here only two of the major similarities and differences we have noted.

First, almost all of the decontextualized signs we have written for illustrating the SW glyphs appear to belong to the class of "standard" signs, while very few belong to the class of HIS. This seems to us particularly interesting if we think that the use of HIS *is* very common in actual signed discourse. It indicates us two things: (a) that decontextualized signs alone cannot be used as the only or primary source of informations on the LIS lexicon; (b) that HIS signs are, by their nature, highly interconnected with their context of usage and cannot be decontextualized without some "semantic damage". In our opinion, this

means that, if we want to have in some future really accurate LIS dictionaries, we have to revise their present structure and procedures for collecting lexical items.

Second, there were marked differences in the way we used glyphs for meaningful nonmanual signals, especially facial expressions, when writing decontextualized signs vs. text-framed signs. In general, most decontextualized signs appeared to not require nonmanual glyphs, while for most signs framed within a text we felt that nonmanuals were necessary components to be written down.

These impressions were supported by a preliminary analysis we made by comparing all the LIS sign units within our written texts and transcriptions (232 units), with an equivalent number of decontextualized LIS signs taken from our adaptation of the SW manual. We found that 70% of text-framed units were written with glyphs for meaningful facial/gaze/mouth/postural gestures (in addition to the glyphs for the manual parts), while the remaining 30% showed only the signs' manual components. This distribution was reversed in decontextualized signs: the vast majority (75%) were represented with glyphs for only the manual components, while a markedly smaller proportion (25%) included also glyphs for nonmanuals.

5. Some indications for further research

Our project is still ongoing. We have almost completeted the LIS/Italian adaptation of the SW manual, and we are producing more written texts and transcriptions. However, the corpus of texts and individual signs we have assembled thus far is certainly not enough to evaluate to what extent SW will prove to be a valuable tool for both writing and transcribing LIS.

We need to collect and analyze more texts written directly in LIS, and more transcriptions of different genres (e.g. monologues, dialogues, free and elicitated narratives, poetry, texts produced during lectures or of 'explicative' rather than narrative type). We have planned relevant crosslinguistic comparisons between LIS and LSF data.

We want also to broaden our reflections on writing systems in general, as this can certainly help us in our search for the best way to write down our language.

The analyses we want to conduct require the creation of databases, and the improvement/development of computational tools. We plan to use SignPuddle (http://www.signbank.org/signpuddle), with appropriate implementations as needed for LIS data. Currently, there are some attempts to include SW glyphs within Unicode, the Universal Character Encoding containing all different graphemes of almost all world's written languages. The inclusion of SW glyphs in Unicode may well ease considerably the creation and the use of present/future databases and writing and/or research software (see http://www.signwriting.org/archive/docs1/sw0037-SW-In-Unicode.pdf and Aznar, G. & Dalle, P. in this volume).

While much remains to be done before saying anything more conclusive, the results obtained so far provide some relevant indications with respect to: (1) the representation of signed language data; (2) corpus collection and construction for signed languages (at the lexical and textual levels).

With respect to corpus collection and construction, our work suggest that it is very important to focus from the start on the problems posed by text corpora, rather than focusing only on corpora built from annotating/eliciting individual lexical items. In other words, and contrary to what has been and still largely remain a common practice in much lexicographic work on signed languages, we believe that adequate dictionaries need to be based on extensive corpora of signed texts of different genres, along the lines pointed out by Russo (2005). In addition, in our view, it would be very useful to create and analyze not only transcriptions of signed data (which reflect the equivalent of the "oral" modality of spoken language use), but also corpora of texts *conceived and expressed directly in a written form*, as exemplified above.

We have found that many insights on the structure of LIS lexicon and grammar can be gained by reflecting on the structure of texts, on how the individual components of a text need to be segmented and are at the same time interrelated to express meanings. Comparing the individual units identified in text corpora, and examining how their form changes or remains unaltered, depending upon the grammatical and discourse context, is a powerful theoretical-methodological tool for identifying "citation forms" that may eventually be used for creating dictionaries based on actual usage, as suggested by Russo (2005).

At the same time, it is quite obvious that the actual capability of a written representation system (regardless of its use as a writing or transcription tool) must be tested on *both* individual signs and textual units. Thus in principle, as well as for practical purposes, the problem of representing corpora of individual signs (as when building dictionaries) cannot and, in our view, should never be separated from the problem of representing corpora of signed texts.

We also believe that, in order to be appropriately addressed, the issue of representing signed languages requires a profound metalinguistic awareness of "writing" as distinguished from "transcribing". This distinction is often taken for granted in spoken language research, but is rarely made clear in research on signed languages. We strongly believe that a thorough awareness of this distinction is quite crucial when dealing with four-dimensional languages that have not spontaneously evolved a written form, such as our language, LIS.

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