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# Lexematic units and highly iconic structures in Italian Sign Language (LIS): new methods of analysis aided by *ad hoc* software

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## Referential Expressions: Lexematic Units and Highly Iconic Structures

Two classes of Referential Expressions (REs) can be identified in Sign Language (SL) discourse and, more specifically, in LIS. These units have been acknowledged by most researchers, but they are still named and classified in different ways; according to Cuxac & Antinoro Pizzuto (2010) we call them:

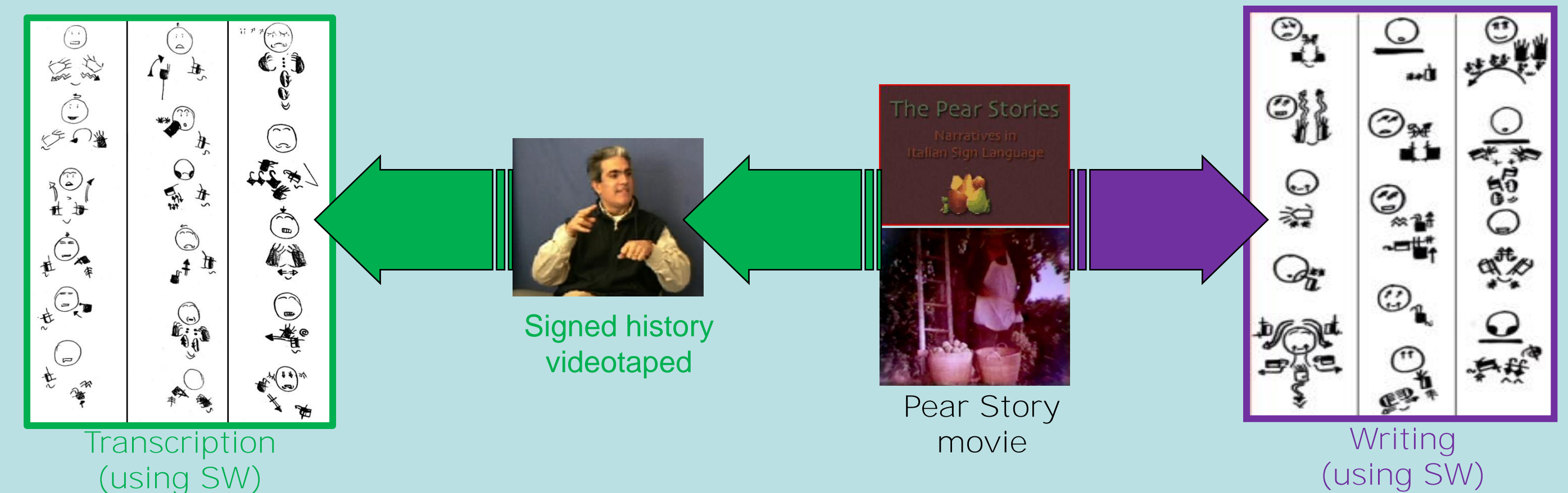
- **Lexematic Unit (LU)**: the LU is somehow comparable to a "word" in verbal language (VL) and it is often included in SL dictionaries;
- **Highly Iconic Structure (HIS)**: HIS forms a complex class of REs, recurring very often in signed discourse; HIS is formed by strongly iconic elements: some researchers consider it a non-linguistic or a partially-linguistic element therefore they claim that HIS cannot be included in dictionaries; one important consequence of this lexicographic decision is that SL dictionaries contains limited amount of items.

## Aim of the study

The presence of such REs urges to investigate the constituent units in SL lexicon and their comparability to VL units. We will deal with this question, keeping in mind the lack of appropriate forms of written representation for these languages (Antinoro Pizzuto *et al.*, 2008), affecting all the research about LS lexicon carried out so far.

## Materials and methods

In this work, we make use of LIS texts coded in SignWriting (SW); we analyzed the typology, the stability and the variability of signed forms and the form-meaning correspondence. We examined 5 LIS narrative texts produced by 3 signing deaf people after they watched the same video (the "Pear Story" by Chafe, 1980): 2 texts have been produced face-to-face and then transcribed; 3 texts have been composed directly in written form.

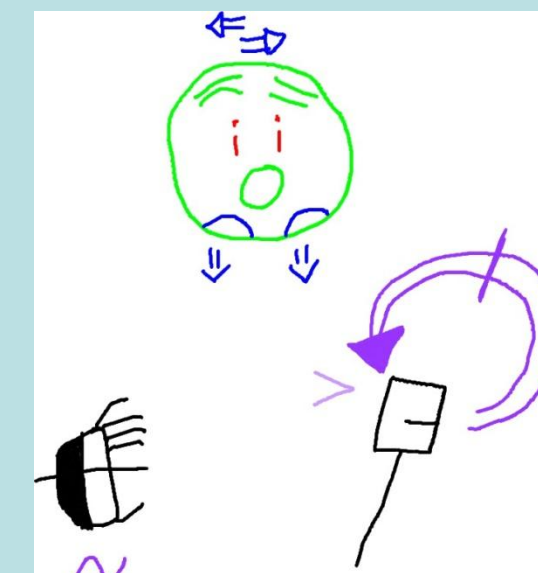


Aided by the SignManager (Borgia, 2010), we identified the expressive forms used for a common set of entities and actions mentioned in the texts. Eight of the more frequent expressions in the texts (man, child, tree, pear, basket, bicycle, to move, and to look) were chosen for more detailed analysis.

In this presentation we focus the analysis of the action "to look".

## The notation system: SignWriting

Signs, both written or transcribed, are annotated using the SignWriting system (SW) of Sutton (1995), which allows to represent the manual components as well as the non manual components, thanks to a set of symbols called glyphs. This writing system has the advantage of being global and iconic, thus allowing an easy reading of the represented signs.



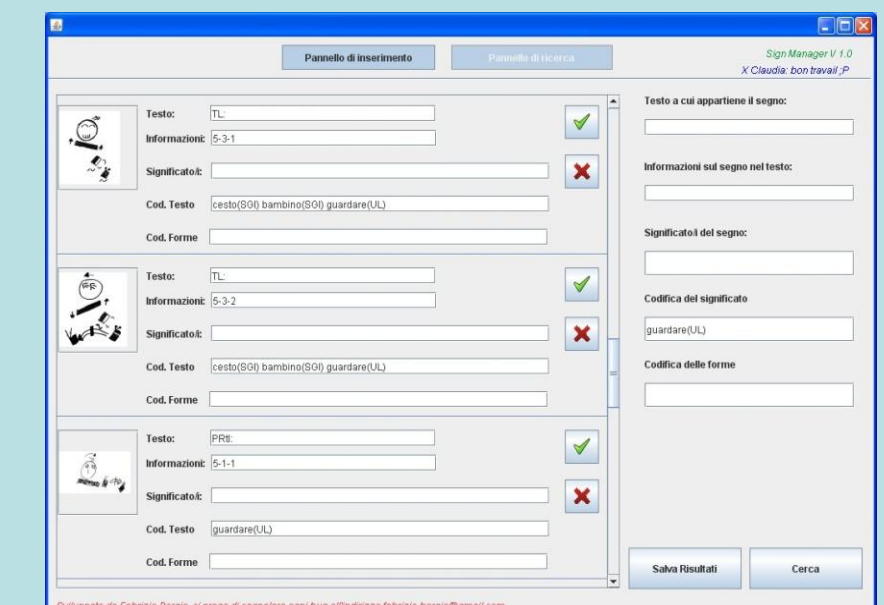
The eye-gaze has been represented following the SW rules, but adding a new glyph for the utilization of the eye-gaze on the "recipient person" (see the example on the right), created by us for specific research aims.

## The annotation system: SignManager



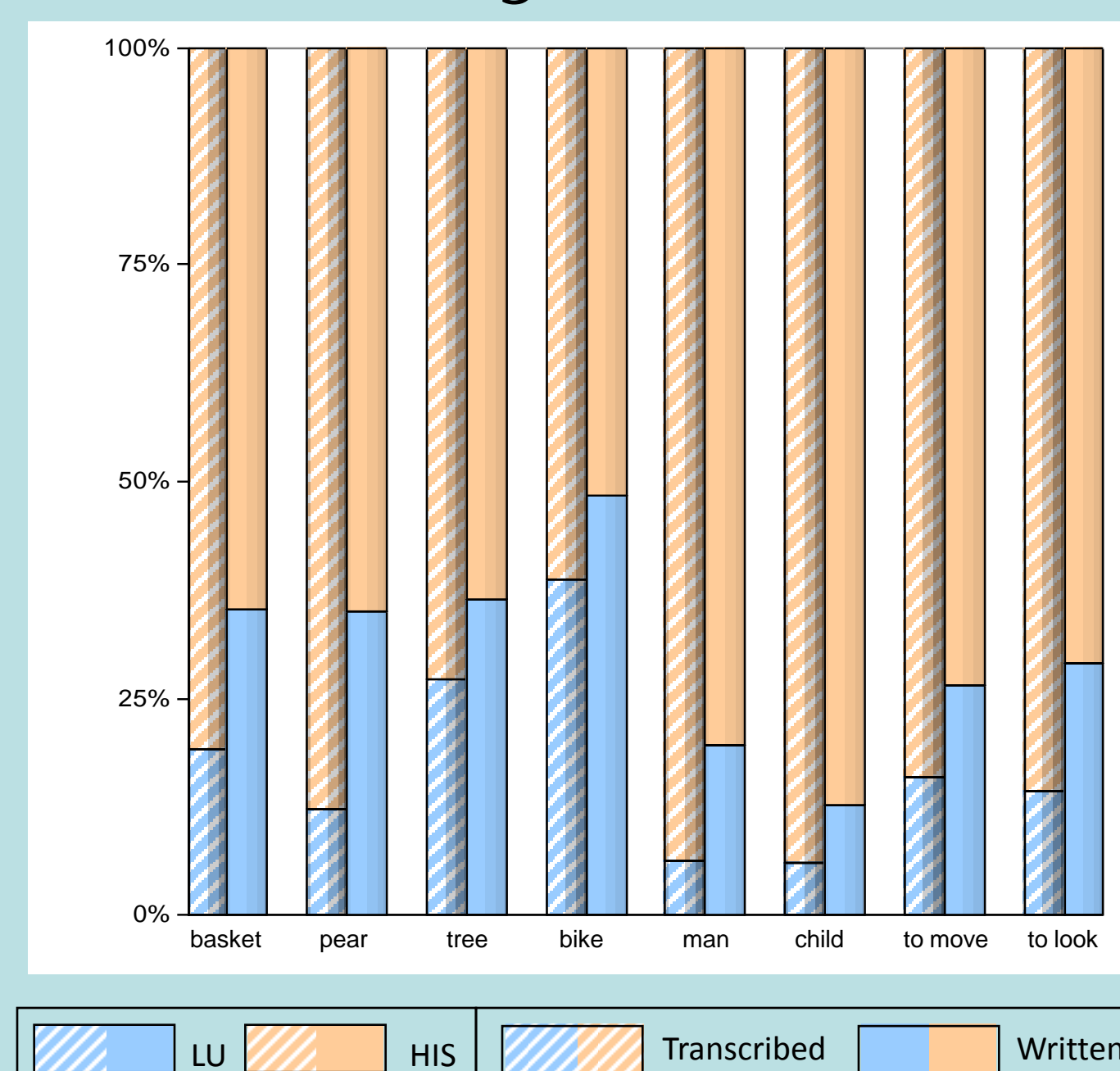
Given the need to annotate texts written in SW, an *ad hoc* software, called SignManager, has been developed by Borgia (2010); even in its early stages, this program allows to add tags to the images created in SW, and therefore easier ranging and analysis.

In the future, the SignManager instrument should be improved for better performance and for integrated data management with traditional annotation softwares (i.e. Elan, Anvil...)



## Quantitative analysis

Our data confirm earlier works, where the prevalence of HIS vs. LU has already been stressed (Sallandre 2003: 70% of HIS in narrative and 30% in prescriptive texts; Antinoro Pizzuto *et al.* 2008: HIS are present in 80%-95% of the expressions used in anaphoric relationship or holding the reference). In written texts, the amount of HISs is lower than in transcribed text: is that a consequence of greater lexical control, or a stylistic choice?

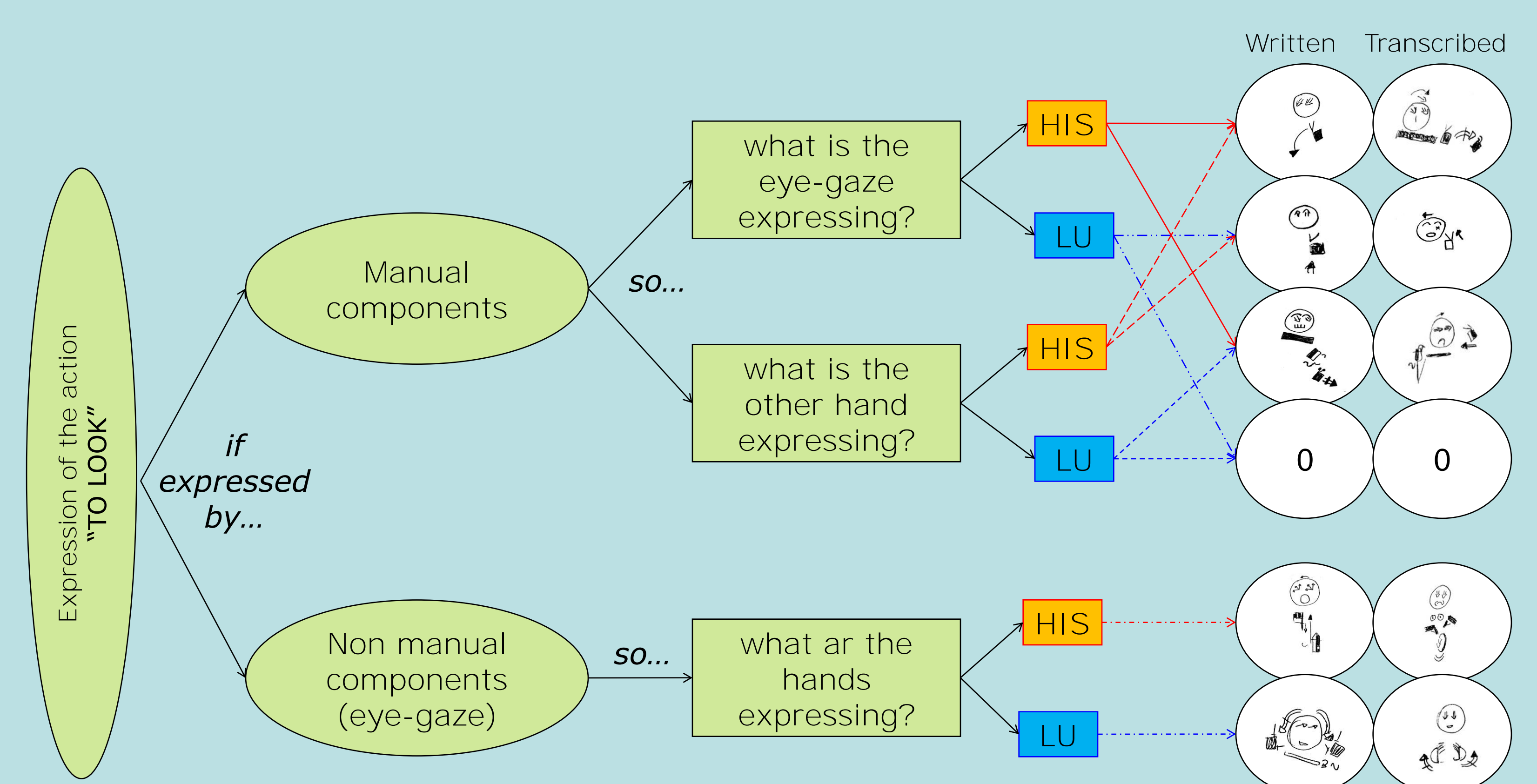


## Conclusions

The results show recurring patterns in the identified expressive forms including both LU and HIS. Referring to the same units of meaning, HISs were used more frequently than LUs, in narrative texts. Contrary to the conclusions of most papers, we observed strong regularities among the HIS elements, and among the composition choices. In addition, HIS recurring elements were more heavily contextualized than the LUs. This finding suggests the need to include these elements among the constituent units of LIS.

Overall, results suggest the need to deeply review a model of LIS lexicon, now conceived on the basis of VL lexicon; it also suggests the need to identify more appropriate forms in order to take into account the particular iconic and multilinear SL traits.

## Qualitative analysis of "to look": signs and eye-gaze



The "to look" action might be expressed by manual and non manual components, the last ones "representing iconically the eye-gaze of entity simbolized" (Antinoro Pizzuto, 2009: 145)

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## **LEXEMATIC UNITS AND HIGHLY ICONIC STRUCTURES IN ITALIAN SIGN LANGUAGE: NEW METHODS OF ANALYSIS AIDED BY *AD HOC* SOFTWARE**

Two classes of Referential Expressions (RE) can be identified in Italian Sign Language (LIS) discourse and in Sign Language (SL) discourse generally: according to Cuxac (2000) and Cuxac & Antinoro Pizzuto (2010) they are named Lexematic Unit (LU) and Highly Iconic Structures (HIS). These units have been acknowledged by the whole academic community, but they are still named and classified in different ways. The LU are somehow comparable to “words” in Verbal Language (VL) and they are often included in SL dictionaries; on the other hand, HIS form a more complex class of RE, recurring very often in signed discourse (30% to 70% of recognizable RE, see Russo, 2004; Sallandre, 2003; Antinoro Pizzuto *et al.*, 2008). HIS are formed by strongly iconic elements, many academics consider them non-linguistic or partially-linguistic elements therefore they claim HIS can't be included in dictionaries (e.g. see Johnston, 2008). One important consequence of this lexicographic decision is the seeming “poorness” of SL dictionaries, which contain from 2500 up to 5000 terms on average.

The presence of such ER urges to investigate about the constituent units in SL lexicon and about their comparability to VL units. We will deal with this interrogative, keeping in mind the lack of appropriate forms of written representation for these languages (see Russo, 2005; Antinoro Pizzuto *et al.*, 2008), affecting all the research about LS lexicon carried out so far.

Experiences conducted with competent LIS signers has shown that SignWriting (SW), a SL representation system developed by Sutton years ago (1999), but little used in research, could be effective tool to transcribe signed face-to-face productions (video recorded data) and to compose texts conceived in written LIS (Di Renzo *et al.*, 2006; Gianfreda *et al.*, 2009).

In this work, we make use of LIS texts coded in SW; we analyzed the typology, the stability and the variability of signed forms and the form-meaning correspondence. We examined 5 LIS narrative texts produced (at different times) by 3 signing deaf people after they watched the same video (the “Pear Story” by Chafe, 1980): 2 texts have been produced face-to-face and then transcribed and 3 texts have been composed directly in written form. Aided by the SignManager (v. 1.1), an annotation software developed *ad hoc* for SW text analysis (Borgia, 2010), we identified the expressive forms used for a common set of entities (animate and inanimate) and actions mentioned in the texts. Eight out of the more frequent expressions in the 5 texts (more specifically: man, child, tree, pear, basket, bicycle, to move, and to look) were chosen for more detailed analysis.

Together with the LIS signers who produced the texts we investigated (starting from the SW representation in their text) the nature of the chosen expressions, later we discussed about the eventual citation forms, analyzing the similarities and the differences between the latter and the expression produced in the text.

The results show recurring patterns in the identified expressive forms including both LU and HIS. Referring to the same units of meaning HIS were used more frequently than LU.

Unlike the conclusions of most research, we observed strong regularities among the HIS elements, and among the composition choices. In addition HIS recurring elements were more heavily contextualized than the LU. This finding suggests the need to include these elements among the LIS constituent units.

Overall, the results suggest the need to deeply review the modeling of the LIS lexicon (and SL in general) based on forms conceived for the VL, it also suggests the need to identify more appropriate forms in order to take into account the particular iconic and multilinear SL traits.

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