

# How to improve metalinguistic awareness by writing a language without writing: Sign languages and SignWriting

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## INTRODUCTION

### Sign Languages

Sign languages (SL) used by the deaf do not have their own form of writing. Being visual-gestural languages, they cannot be represented by adapting the alphabet or other forms for writing vocal languages (VL).

### Writing and deafness

Most deaf children do not have access to SL education; most deaf adults, despite a VL education, have a low level of literacy.

### Development of metalinguistic skills

Writing is fundamental for the development of metalinguistic reflections: moreover, understanding how your language works allows to better understand how other languages work and, therefore, reflecting on SL may improve proficiency in VL too.

## SIGN LANGUAGE GRAPHICAL REPRESENTATION

### Historical attempts

Since the '60s, various attempts to represent LS have been made, mostly aimed at meeting the transcription needs of linguists interested in SL.

Handwritten symbols representing sign language concepts.

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Handwritten symbols representing sign language concepts.

### Pro & Cons

Often these systems are enough to make SL transcripts for research purposes.

However, not only do they fail to represent all the characteristics of the SL, but they are also unsuitable as writing systems, since they are linear, difficult to read and difficult to memorize.

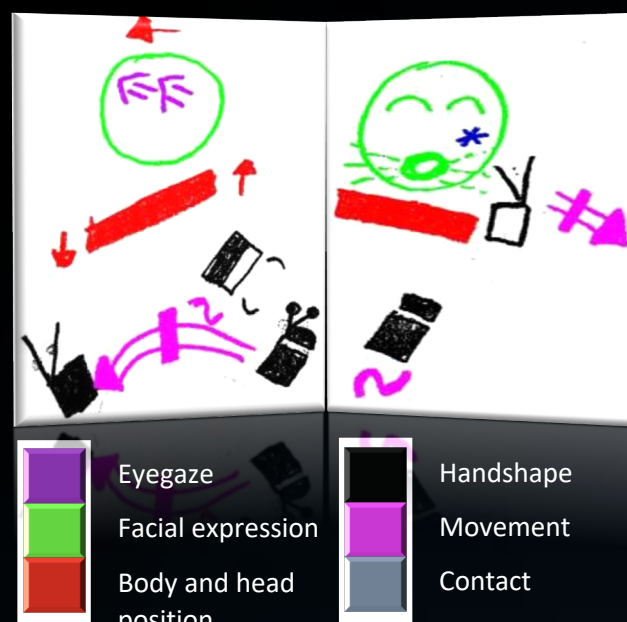
## SIGNWRITING

### Representation capability

SignWriting (SW) allows to represent all the components (manual and non-manual) of SL, thanks to SWsymbols arranged in a "vignette" that analogically reproduces the signing space.

### Ease of learning

The basics of SW can be learned in 6/8 hours, the learning speed depending on the familiarity with a SL.



### Ease of reading

SW is easy to read and allows the creation of a "signed literature" in which the texts are directly produced in written form (despite the fact that SL have been so far purely oral languages).

### A perfect system?

SW is not perfect but offers unique advantages compared to the other graphic representation systems developed for SL.

## METHODOLOGY

### Dataset 1

Data were collected at the research lab LaCAM-ISTC-CNR in Rome. Participants were deaf people with an excellent level of SL; after learning SW, participants became research technicians, gaining a solid experience in the world of scientific research on languages.

The metalinguistic reflections collected were both spontaneous and guided (to deepen previous spontaneous reflections).

### Dataset 2

Data were collected at the Linguistics department of the University of Poitiers.

Participants were students of the degree course on Linguistics and Sign Languages, with different levels of knowledge about SL and their linguistics.

The registered metalinguistic reflections arose spontaneously during the classes focused on SW.

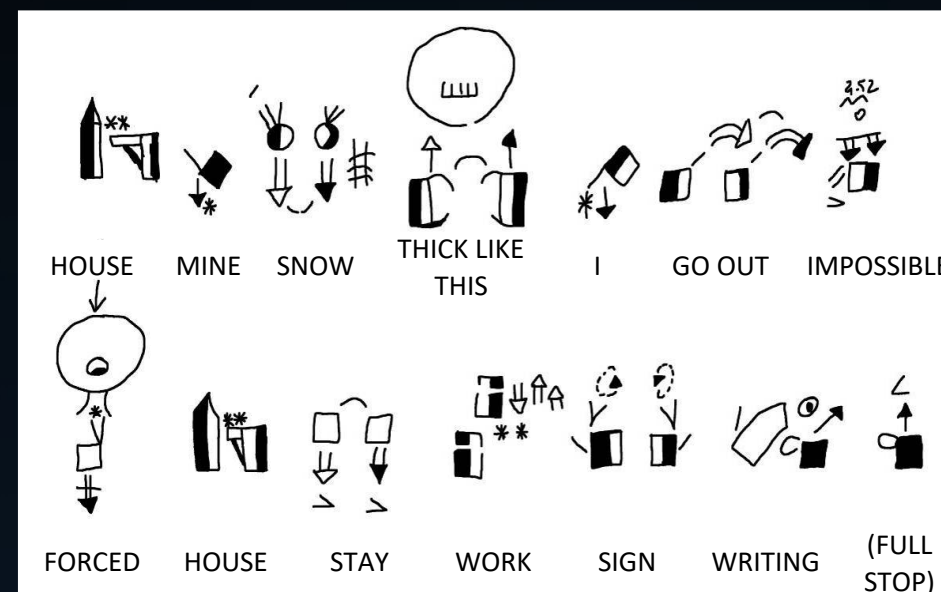
## RESULTS

### Metalinguistic awareness

Since the creation of the first SW texts, there has been a spontaneous production of many and various metalinguistic reflections concerning aspects hitherto not taken into consideration by the signers/speakers.

### Orality vs. writing

SW allows to put SL black on white without losing any essential characteristics, making possible to reflect on the SL structure but also, for the first time, to think about what should / could change passing from an "oral" SL to a written SL.



### Reflections on the system

Moreover, the use of SW generates reflections on the potential and limitations of the system itself, emphasizing the importance of readability in the development of a writing system.

## CONCLUSIONS

### Conclusions

Improving the metalinguistic awareness of SL allows the deaf not only to better understand the functioning of their language, but also to improve the literacy level in the VL.

### Acknowledgements

LaCAM staff, students of University of Poitiers, Elena Antinoro Pizzuto†, and Dominique Boutet†.

«Elena, the books made by hearing people are written or transcribed?»

# Sign Languages

## Sign Languages

- Sign Languages (SL) are the visual-gestural languages used by a large number of deaf people as their preferred language
- SL are not "gestural transpositions" of vocal languages (VL), but real languages with specific vocabulary and syntax; they are not "invented" languages and they are not even international
- SL are minority languages without territory and need to be preserved
- SL are oral-only languages, meaning that none of them has ever developed its own written form
- But SL are non-audiophonatory languages, thus it is not possible to represent them by adapting a system developed for VL

## Writing and deafness

- The history of the deaf education has had long periods of obscurantism in which the use of SL at school, but also in daily life, was prohibited
- In France, SL has been recognized as a language since 2005 and the government grants the parents the right to choose a bilingual education for their children
- The bilingual education is based on the principle of one language for each modality: SL for oral use; VL for writing use
- Due to the lack of bilingual structures, the majority of deaf children in France do not have access to SL at school, thus they learn only through written (sometimes also oral) French
- Due to pedagogical and educational factors, most deaf adult have a much lower proficiency in written VL than the average of the hearing people: 80% of French deaf people are considered illiterate

## Development of metalinguistic skills

- One of the advances allowed by the invention of writing is the possibility of "lying down" the language and reflecting on its characteristics: writing allows the development of metalinguistic skills
- The absence of SL writing and the lack of competence in the VL do not favor on the deaf the development of metalinguistic reflections on the SL nor on VL
- This work will show how the development of a readable form of writing for SL allows to bring out metalinguistic reflections on them; these reflections can be used both to improve one's knowledge of SL and to better understand the functioning of VL

# Sign Languages graphical representation

The image features a vibrant blue background with dynamic, glowing light rays emanating from the top. In the foreground, a dense collection of black silhouettes of human hands is shown, each in a different raised position and gesture, representing various signs in sign language. The overall composition is energetic and visually represents the concept of graphical representation for sign languages.

## Historical attempts



## [HOUSE] - Stokoe Notation System (1960)



[HOUSE] - HamNoSys (1989)



[HOUSE] – SignFont (1989)



[HOUSE] – ASLphabet (1990)

## Pro...

- Few characters
- Writable with a normal or slightly adapted keyboard
- They allow automated searches on the different parameters of the SL they represent

## ... & Cons

- These systems were created to allow scientists to analyze SL but not to allow the deaf to read and write their language
- Failure to represent the multilinearity and simultaneity of the phenomena
- Lack of iconicity: difficulties in memorizing and reading
- Emphasis on just the manual components of the sign and therefore omission of fundamental elements for the meaning transmission in SL



It is possible to find other systems looking at the popular site  
<https://aslfont.github.io>

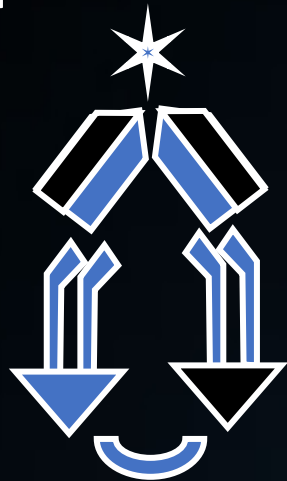
# SignWriting

## Representation capability

- "SWsymbols" (37,000) allow to represent both manual components (shape, orientation, location and movement of the hands) and non-manual components (body postures, facial expressions)
- SWsyms are arranged in a "vignette", which is a 2D analog representation of the 3D signing space
- Signs are written from the point of view of the signer, thus fostering readability

## Ease of learning

- Both deaf and hearing people can learn the basics to read and write SW in 6/8 hours of lessons
- In our experience, the better the SL competence, the greater the SW learning speed and effectiveness



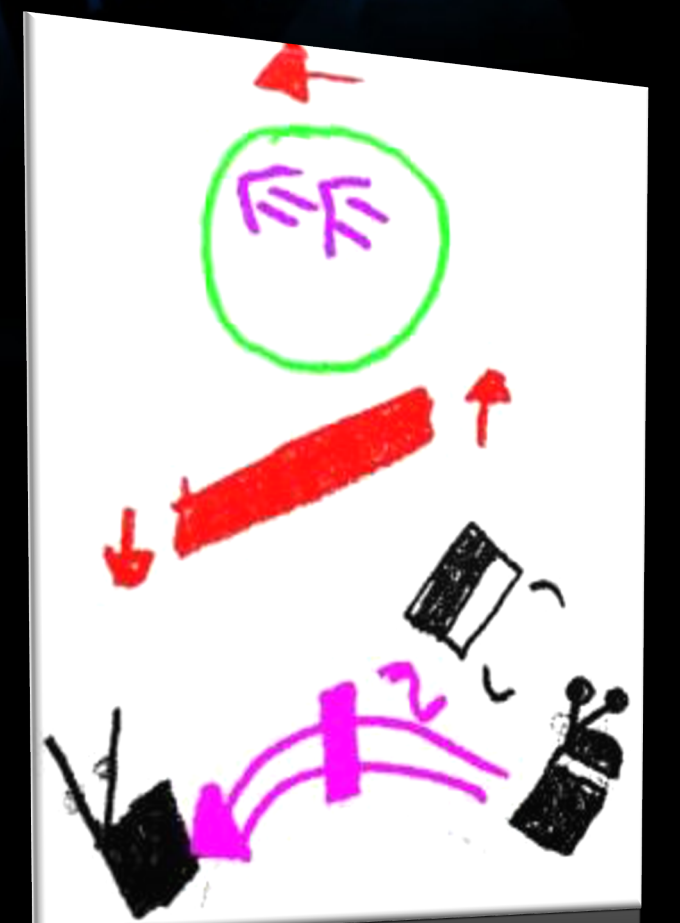
[HOUSE] – SignWriting (1974)

## Ease of reading

- SW is the first form of SL writing that allows a quick and intuitive reading of the signs, without the need to know the system in depth
- Therefore, it lets to reflect on different kinds of signed productions:
  - signed in "oral" SL and thereafter transcribed using SW:
    - this is a novelty!
  - directly written in SL using SW:
    - this is an absolute novelty!!

## A perfect system?

- Writing SL by hand is a long process and requires a deep knowledge of the system and some graphic skills
- The computerized writing of SW, despite being recognized by Unicode, is complicated by its non-linearity and by special software that are not very ergonomic
- The poor querability of SW makes its use difficult if you intend to have a quantitative approach to SL linguistics
- But all these disadvantages cannot undermine the capability of SW to stimulate metalinguistic reflections, thanks to its great readability



- Eyegaze
- Facial expression
- Body and head position
- Handshape
- Movement
- Contact

# Methodology

## 1<sup>st</sup> data set

### Data source

- Data collected from 2007 to 2011 at the LaCAM-ISTC-CNR lab in Rome, within the research team "LIS-Scritta", directed by E. Antinoro Pizzuto
- Metalinguistic reflections of team members originate from the analysis of texts written and transcribed with SW, produced for the team research needs (in particular the corpus "Pear Stories in LIS") or spontaneously

### Participants

- In 2000, a first group of deaf signers learn SW and start collaborating regularly with LaCAM, founding the team "LIS-Scritta"
- Between 2005 and 2012: the team is involved in experimenting with a form of graphic representation of SL; the group consisted of 3 hearing people with a good knowledge of Italian SL (LIS), and 6 deaf experts of LIS (but not necessarily of written Italian), regular collaborators of LaCAM, with a long knowledge of SW
- After 2012, the team work continues under another name (and it is not documented here)

### Data recording

- Different data collection situations:
  - Spontaneous (not registered): metalinguistic reflections emerging from discussions among the deaf members on data represented in SW
  - Controlled (video-recorded): sessions organized specifically to discuss the use of SW in the team research, proposing *ad hoc* material to deepen reflections that had emerged spontaneously

## 2<sup>nd</sup> data set

### Data source

- Data collected since 2012 till present at the degree SDL-LSF "Sciences du Langage et Langues des Signes Française" of the University of Poitiers during classes about the graphic representation of languages (both signed and oral)

### Participants

- About 150 students of 1<sup>st</sup> and 2<sup>nd</sup> year of the degree in SDL-LSF, with different levels of knowledge about SL (from novice to expert) and linguistics (from basic to intermediate)

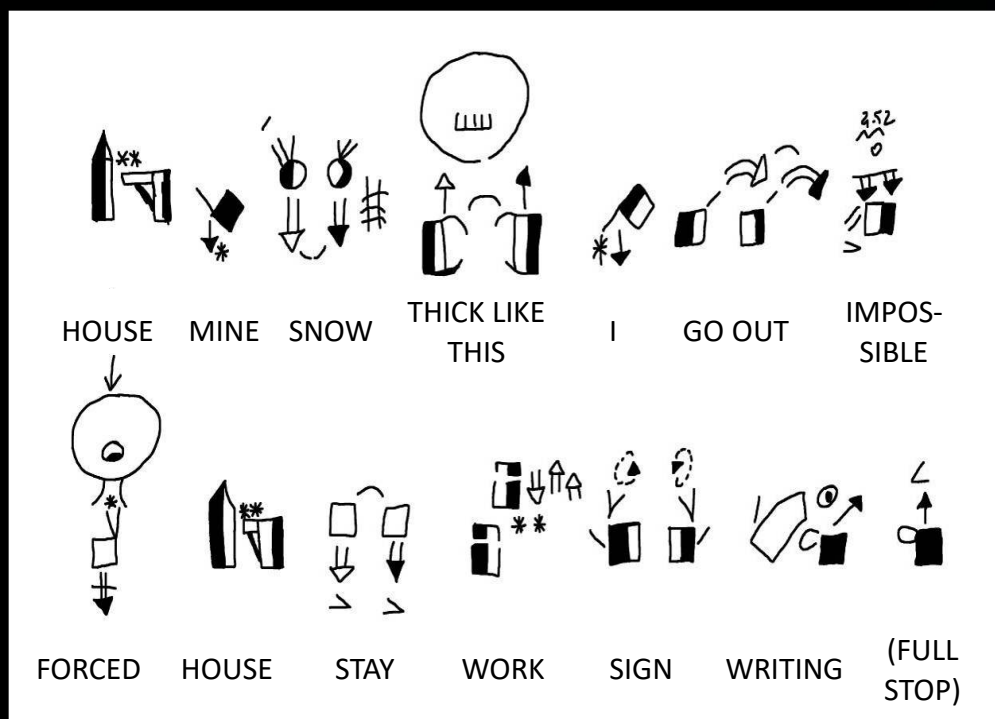
### Data recording

- The metalinguistic reflections arose spontaneously during the classes focused on learning and using SW, as well as from exercises and homework on SW

# Results

## Metalinguistic awareness

- SW appeared immediately as an excellent tool to encourage the emergence of metalinguistic reflections
- After only 6 hours of lessons the first text, “House”, and the firsts metalinguistic reflections



- the role of facial expression (*forced*)
- the use of specific structures in SL (*thick\_like\_this*)
- the need for punctuation (*full stop*)
- the definition of “right spelling” in SW
- etc.

## Orality vs. writing

- For the first time, it becomes possible to compare the "oral" SL with "written" SL
- In written SL the information is spontaneously reorganized, even in subjects with low VL literacy
  - Information redundancy
  - Taking into account the absence of context but the presence of co-text
  - More explicit constructions but maintaining the iconicity of the SL, in order not to distort the characteristics of the language
- Opening to reflections on the difference between written SL and written VL:
  - Comparison on the use of particular registers and styles in written SL and VL
  - Reflections on the necessity in written SL and VL to explicit and organize the information, in order to overcome the lack of context, but also the need not to repeat information already provided by the co-text

## Reflection on the system

- For the first time, it is possible to "read at high marks" productions in SL
- The "right spelling" criterion is linked to the legibility of the productions
- Reading highlights irregularities and gaps in the system, leading to propose changes and improvements
- Some of the proposed changes reflect the theoretical positioning of the working group / teacher
  - Insertion of glyphs to represent linguistic phenomena such as the gaze pointed at the interlocutor, which marks the presence of lexematic units



# Conclusions

## Conclusions

- Acquiring a metalinguistic awareness of one's "strong" language allows, by comparison, to better understand also the functioning of the other languages to be learned
- SW is the only writing system that allows the development of a metalinguistic awareness of SL
- By learning to reflect on their own language, deaf people can compare VL with SL, thus improving also their understanding of the typical phenomena of VL and therefore their literacy too

***«Elena, the books  
made by hearing  
people are written  
or transcribed?»***

## Acknowledgements

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