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Beyond Orality: The Case of Sign Languages

Abstract: The present paper reviews the main approaches developed for the linguistic analysis of sign languages, discussing the different theoretical assumptions and methodological implications applied along with the history of sign language studies. Sign language research demanded a revolution in some core beliefs of language, namely the linearity of speech, discreteness, and arbitrariness, providing a new way to look at the nature of language.

Keywords: Sign language; iconicity; simultaneity, signs transcription and annotation.

1 Introduction

Nowadays, according to the Glottologue website https://glottolog.org, there are more than 140 sign languages signed by deaf and hearing people all over the world. Sign languages do not have a traditional written form, and there is a considerable lack of linguistic resources for them (such as vocabularies, corpora, automatic recognition, and synthesis systems, etc.). Therefore, sign languages are a very special type of non-written languages, spoken silently.

For a long time, Sign Languages were addressed only for educational purposes, ignored by linguists, and considered as a minor form of gestural communication similar to pantomimes.[1]

In 1960, linguists still considered as true language only speech and as such characterized by the vocal-auditory channel, arbitrariness, and discreteness. These properties are listed in the famous 13 design-features proposed by Hockett in his paper *The Origin of Speech* and defined as shared by all the languages of the world. However, in the same year, William Stokoe published *Sign Language Structure* and finally framed American Sign Language (ASL) in the linguistic domain, proving that the vocal-auditory channel, the first design feature, was not

1 The misconception of linguists does not mean that sign language has been ignored in the past centuries. On the contrary, the interest in sign languages has been linked to the debate of the origin of language since Plato. From then on, many philosophers as Vico, Condillac and Diderot mentioned the gestural language of deaf in their reflection on the nature of language, for a proper discussion on these issues see Kendon 2002, Pennisi 1994 and Sacks 1989.

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so essential at the end. Stokoe claimed that signs have structural properties comparable to those of vocal languages showing that Sign languages are highly abstract, rule-governed, combinatorial linguistic systems and must thus be recognized as fully developed natural human languages.

Sign Language Structure described ASL as a true language, giving rise to the spread of sign language research in Europe, supported by the organization of three international symposia in 1979, 1981, and 1983 (Ahlgren/Bergman 1980; Stokoe/Volterra 1985). Nevertheless, the initial aim of sign language research was stressing the similarity between spoken and signed languages dividing down signs into smaller elements to prove sign language had phonology and morphology, and studying the rules for assembling signs to produce a sentence to prove the existence of a signed syntax.

Signs can be analyzed, breaking them up into four formational parameters: the handshape, namely the configuration of the hand; the movement; the place of sign articulation; and the palm orientation.

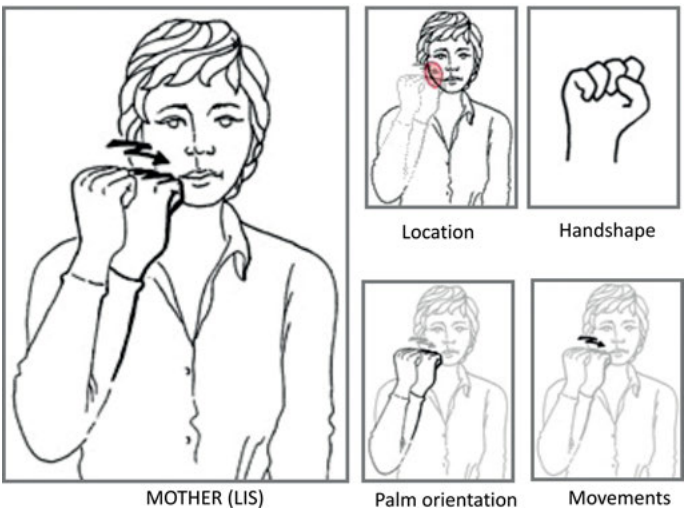

Fig. 1: The four parameters of LIS sign's MOTHER.
(c) The original figure has been conceptualized by the first author of the paper and used in an educational webpage by ISTC (currently not active).

The need to prove that signs were natural languages leads linguists to enhance the property they share with words, adopting analytic tools created for the study of written form of spoken languages, and building up a barrier between signs and gestures.

The main distinction between spoken and signed languages is the different usage of articulators: in the first case, the leading one is the vocal trait, while in the other the entire body encodes phonology, lexicon, and grammar. The use of visible articulators, instead of audible, allows signers to load of linguistic value the three-dimensional space in which signs are produced, a unique feature of sign languages not shared by speech.

This is not the only peculiar trait of using another modality: sign languages can display several blocks of linguistic content at the same time, encoding different pieces of information using simultaneously different articulators. Moreover, the use of the visual modality and bodily articulators prompts a pervasive use of iconicity, used as a source of language creativity to a greater extent than spoken languages. These peculiar properties could not be included in a framework that looked at human language as an arbitrary and linear system.

Although from the beginning some scholars such as Klima/Bellugi 1979, Schlesinger/Namir 1978 and Karlsson 1984 paid attention to aspects such as the use of space, iconicity, and simultaneity, the majority of sign language linguists tried to analyze signs by forcing ASL and other signed languages into molds that were created for studying spoken languages, or, to be precise, Indo-European written languages (Slobin 2008).

Even though in the last years there has been an increasing interest in iconicity, simultaneously organized signed structures and non-manual components in sign language, the persisting mainstream approach imposes severe limits to the advancement of Sign language research.

In the present paper, we will show how instead Sign Language Studies provide a unique opportunity to revise certain assumptions on the nature of language.

2 Putting Signs into Boxes Made for Words: the Assimilationist Approach

At the beginning of the reflection on language Aristotele identified the articulation and the combinatorial properties of sound and words as the main features of human language (De Mauro 2002, Lo Piparo 2003). Therefore, the assumption that language consists of discrete elements has been entrenched in the history of language science, starting with the ancient Greeks.

During the 20th century, linguists built their models starting from discrete elements belonging to discrete categories, governed by combinatorial rules. Following this approach, any sort of expression in sign languages that cannot be

analyzed in discrete, categorical terms is defined as gestural. The structuralist approach relies on discrete units to provide a listable linguistic description, like dictionaries, or phonological and morphological inventories. This view forced signs and words to fit in a picture that has been drawn to describe written languages whose limitations have been shown for spoken and signed languages (Albano Leoni 2009; Bybee 2010; Volterra *et al.* 2019).

As Slobin 2008 noticed, sign language linguists look similar to European colonists when encountered exotic languages in the course of building their colonial empires and tried to describe these languages using categories that they were familiar with, using linguistic tools based on the classical grammars of Greek and Latin. To give another example of the assimilationist approach, the author reports this striking analogy taken from his friend Wolfgang Klein, a German linguist who works on Chinese, fighting against the tendency to apply familiar linguistic classes to an unfamiliar language. Klein jokes about the fact that Germans know that every cuisine includes potatoes, so it is no surprise to find that Chinese cuisine also relies on small, grained potatoes: "rice can be made to fit into the category of potatoes – but only if you ignore everything else that you know about rice" (Slobin 2008, 121).

Sign Languages have been and still are addressed using vocal language tools: linguistic theory, categories, and terminology based on vocal languages. More precisely, linguists adopted the theoretical assumptions learned from the study of a single group of spoken languages, the Indo-European family.

Recently, Goldin-Meadow/Brentari 2017, in a target article, proposed a comparison between gestures and language tracing a clear dichotomy between what is discrete, countable, and categorical (language) and what instead is gradient, uncountable and vague (gestures). Following this view, as well as spoken languages have co-speech gestures, sign languages have co-signed gestures, a category including all the gradient and motivating elements excluded from the proper linguistic system. As pointed out by Occhino/Wilcox 2017, this dichotomy is too simplistic to describe both gestures and languages.

For too long academics considered only a small portion of signs as linguistic, while excluding, relegating into the darkness of non-linguistic and gestural domain about 80% of signed phenomena, as non-manual components, iconic or deictic constructions. Following the principle of discreteness, linguists even go as far as not considering "linguistic" some of the formational parameters of signs: location and movement of the signs are hard to list, and less countable compared to handshape. For this reason, even among the parameters, the only one who is given a clear linguistic status is the handshape, while the others, in particular the movement, are sometimes considered as gestural elements (Goldin-Meadow/Brentari 2017). As pointed out by McNeil "we tend to consider

linguistic what we can write down and gestures everything else" (McNeill 1985, 351).

This approach has been reinforced by the spread of a notation system that labels signs with the respective spoken translator written in capital letters and inappropriately defined as "glosses".

Researchers have often used glosses, especially for studies of sign language grammatical structure, the problem is that this system catches only partially the meaning and, more importantly, covers the signed form completely; hence no form-meaning patterns are described. Due to an unavoidable lack of consistency in the choice of translators, it is hard to recover the original sign from possible lexical variants.

The spread of glossing among Sign Language Studies led and still leads to inappropriate segmentation, inappropriate labelling, inappropriate analysis, and description of signed structures. On top of that, glossing may drive the linguist to transfer the word's properties to the signs.

Would any field linguist working on an unknown spoken language ever try to represent the form-meaning patterns of this unknown language using for this purpose primarily or only the words of his own language (e. g. English)?

Slobin 2008 sharply explains the misleading role of glossing using the example of the ASL sign usually glossed as INVITE, a sign in which the signer moves the flat hand with the palm up with a movement forward himself. As reported by the author, the sign has been included in a category called by Padden 1988 "backward verbs" since the movement is forward the signer, namely from the supposed object of the action, the person that has been invited, to the supposed subject, the person that invites. These types of verbs are said "backward" because the direction of movement is the opposite of the expected one. Generally, the movement agrees with the semantics, and it is therefore (in its citation form) from the signer, the subject, forward the object, placed in the space in front of the signer. This reasoning makes sense in the framework of the English sentence "I invite you". Nevertheless, if the linguist considers the verb as meaning something like "please, you come to me" or "I offer that you come to me" then the movement path would be appropriate: the addressee is encouraged to come to the signer (Slobin 2008, 124).

Glosses help the linguist to find English-like categories on sign language data, covering the form of signs and misinterpreting their meaning. This notation system not only masks the signed form but leaves out all the key aspects involved in the articulations, as spatial and non-manual features, that are not represented.

There is still a lack of consensus on a format to describe sign languages in a written form, many writing systems have been developed, but none of them has

reached critical mass, because it is challenging to capture the three dimensions of a visual language in a paper. In its work of 1960, Stokoe proposed a linear notation system specifically devoted to sign annotation. This type of writing is based on the discrete analysis of sublexical components of signs, linearly arranging them, reducing in sequence what comes simultaneously in signs.

Following this approach, we have specialist 'notation' systems which apparently 'work' for de-contextualized single signs as reported in sign language dictionaries, all based on the first description proposed by Stokoe 1960: the Hamburg Notation System (Prillwitz *et al.* 1989), a graphical formalism based on a set of pictograms, or Sign Font (Newkirk 1989).

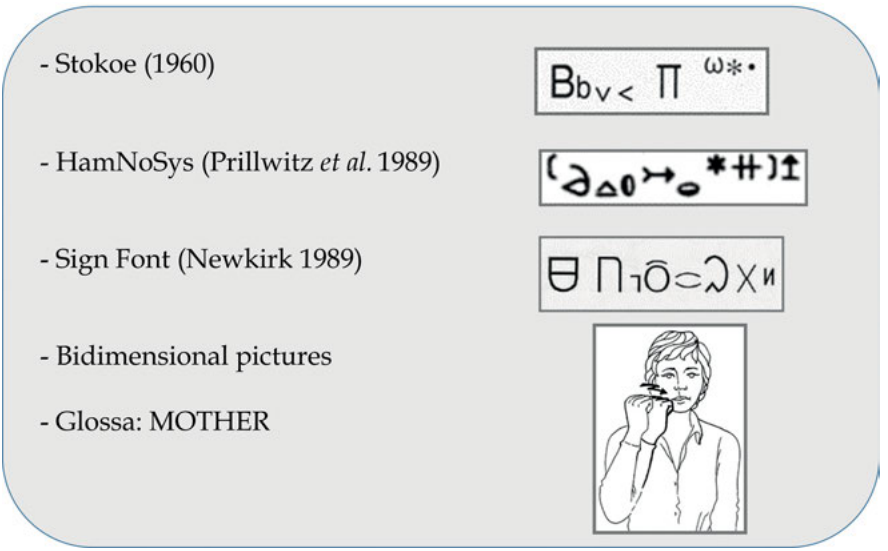

Fig. 2: Notation Systems.
(c) The original figure has been created by the first author of the paper (inspired by the work of Elena Pizzuto).

Is it by chance that in most cases this kind of notation is accompanied by pictures and illustrations? Antinoro Pizzuto *et al.* 2006 highlight four main limitations of all the notation systems based on Stokoe's 1960: first of all, these systems are based primarily on the hand's features, dismissing the relevance of non-manual components; secondly, they represent the constituents of signs in an artificial linear way; thirdly, according to the authors, they rarely success to completely represent a real signed utterance or discourse, and are easier applied

to de-contextualized signs; finally, they are rooted in the assumption that signs are words-like elements.

Nowadays, the most spread formalization is SiGML (Hanke 2004), which is a digital representation of the Hamburg Notation System (HamNoSys). HamNoSys (Prillwitz *et al.* 1989) is a simplification of sign language, designed to give humans a way to write sign languages with pen and paper, as a consequence, also SiGML is an oversimplification of sign language, describing sentences as a sequence of glosses. Only within the glosses' boundaries, there is a parallelization between manual (hands, fingers) and non-manual features (eyes, lips, nodding, etc).

Only in 2006, Huenerfauth introduced the partition-constitution approach, showing the importance of describing the motion of the two hands independently, and the need to span non-manual components across signs. His approach is however still limited, as it focuses on the description of the motor-level of the signer's body, without considering the many elements that have been already recognized and classified by linguists in the description of sign language utterances, such as their strong iconic aspects.

Languages should not be analyzed by bending them to an already pre-packaged analysis system, if anything it is the description system that has to bend to the language. Signs cannot be wrapped in a description made for spoken languages, but how represent forms in order to allow an acceptable degree of variation? How take into account simultaneity and iconicity?

3 Unboxing Signs: the Non-Assimilationist Perspective

Cuxac proposed in 1985 a radically different model to study sign languages, highlighting the crucial role of iconicity in shaping sign language semiotic (Cuxac 1985, Cuxac 2000, Cuxac 2004). While verbal and signed languages are both characterized by iconic features at every level of their structure, signed languages exploit iconic devices to a greater extent due to the peculiar features of the linguistic community they are used by. According to the model, sign languages are grounded upon the semiotic resources signers exploit to iconize their perceptual/practical experience of the physical world. One of the effects of this iconization process is to endow sign language with an additional semiotic dimension compared to vocal language. The model proposes that sign languages have two ways of signifying: by "telling without showing", using units that are broadly comparable to vocal language words and by "telling and showing", thereby pro-

ducing complex structures that can be characterized as "Transfers" or "Highly Iconic Structures" (HIS) and are unique of the signed modality.

A most relevant feature of HIS is that they can be combined among themselves, or with lexical units, to encode information on two (or even more) referents in a multilinear, simultaneous manner that has no parallel in speech. Gaze patterns play a key role in distinguishing the two ways of signifying: when producing the lexical units and therefore in the "telling" mode the signer's gaze is oriented towards the addressee, in contrast, when producing HIS generally the signer's gaze is away from the addressee, iconically mirroring the gaze of the referent whose actions are being referred. Generally, head movement, body posture and facial expression clearly differ from those used in producing the lexical units (Cuxac 2004; Antinoro Pizzuto *et al.* 2010).

The high frequency of HIS in sign language productions of different kinds (e.g. narratives, reports, cooking recipes, poetry) has been well documented in studies of LSF, and LIS (Cuxac 2004; Sallandre 2006; Antinoro Pizzuto 2009; Russo *et al.* 2001; Russo 2004a).

Antinoro Pizzuto *et al.* (2008) investigated ASL, LIS, and LSF in elicited narratives[2] pointing out the great relevance of HIS in the construction of discourse cohesion. In fact, the results show that HIS constitute the favourite constructions to carry out an anaphoric reference, covering in each narrative from 76% to as much as 95% of the reference to animate and inanimate referents. Iconic features resulted to have a structural role in signed discourse.

Comparable data have been reported on different sign languages using diverse terminology and methodologies, showing the relevance of iconic constructions as depicting constructions or constructed actions (Cormier *et al.* 2015; Liddell 2003; Schembri 2003, Tomasuolo *et al.* 2020, among others). For example, Slonimska *et al.* 2021 found a remarkable amount of iconic constructions in an experiment where the task of the LIS signer participants is to describe images to make the matcher choose the right one. If constructed action were just a tool available to the signers to render their stories more entertaining and vivid, it would be strange that they resort to this strategy when having to be concise, but yet as informative as possible, in a description task. This finding is a strong argument for reconsidering constructed action as a linguistic strategy that allows high flexibility and simultaneity of information encoding, and, as a result, is used in informative and not simply narrative contexts.

2 The LIS and ASL narratives were elicited through "Frog where are you?" (Mayer 1969) and the LSF narratives were elicited through "The Horse" story (Hickmann 2003).

As sharply noted by Antinoro Pizzuto *et al.* 2010, if we reckon with the evidence of the high frequency of iconicity in signed discourses, it should be taken for granted that a proper description of any sign language should take into account iconic structures. Moreover, iconic structures cannot be diminished "as "gestural", "non-linguistic" or "partially linguistic" elements simply because it is difficult to assimilate them to what is considered "typical" vocal languages structures (e. g. to putatively "more abstract", "word-like" elements, ordered primarily in linear sequences)" (Antinoro Pizzuto *et al.* 2010, 219).

The Semiological Model proposed by Cuxac shows similarity with the approach that has been recently proposed by Ferrara/Halvorsen 2018 and Ferrara/Hodge 2018. The authors, referring to Clark's 1996 theory of language, look at signed and spoken languages as having three modes of representation: describing, indicating, and depicting. The authors point out that the three different ways to use languages proposed by Clark are handy tools to analyze sign language discourse and face to face communication, in which different semiotic practices can be mixed or used simultaneously.

Volterra *et al.* 2019 provided another elegant example of how this semiotic model can be productively applied to sign language, integrating the insight of Clark 1996 within a sociolinguistic and cognitive framework to the study of Italian Sign language (LIS). The authors conceive the recent contribution as a new description that overcame the assimilationist perspective of the first description of LIS (Volterra 1987).

Interestingly, while Cuxac's model describes "showing" as an additional semiotic mode of sign languages, insisting on the inherent productivity of the visual gestural modality; Ferrara/Halvorsen 2018, Ferrara/Hodge 2018, as well as Volterra *et al.* 2019, refer to Clark 1996 and conclude that even spoken language can vividly depict, once you look at language as a multimodal system and take the semiotic functions of gesture seriously.

Particularly relevant in the Volterra *et al.* 2019 approach, for the present discussion, is the continuity from gestures and signs, seen from a developmental perspective as routed in motor action. As proved by many pieces of research in language acquisition, review clearly by Volterra *et al.* 2018, both hearing children and deaf children acquiring a spoken or a signed language display a strong continuity from action to gesture to signs/words. The use of iconic representational strategies, common in gestures and signs, in the LIS description, shows that the idea of the formational parameters as meaningless elements to combine into meaningful units is most of the time misleading.

Moreover, the authors focus on all the components of signs showing a high degree of gradience, as the non-manual component, dismissed by the previous LIS description. In this perspective, neither the channel of transmission nor the

gradience of some elements have to stop the linguist from looking closely at them and recognizing their essential linguistic functions, as, for example, in the analysis of the oral component in LIS based on Roccaforte 2018.

Once established that the visual and gestural modality can perfectly serve the need of the faculty of language, it is crucial to not underestimate the medium of linguistic expression. The material properties of speech force words to be displayed sequentially, while signs (and gestures!) can be used simultaneously. A signer can, for example, depict a boy holding a dog that is liking his check using all its bodily articulators at the same time, to use an example taken from an actually signed occurrence described in Antinoro Pizzuto *et al.* 2008 (fig. 3). In order to encode these two simultaneously occurring events, the speaker would need a long sentence, presenting the two events sequentially. In sign languages, however, the signer can become the boy by mapping him into his own body, using his torso and eye gaze to depict the boy. The boy's holding action is encoded on the left hand. The dog is marked by the facial expression of the signer, and the licking action is encoded on the right hand and mouth of the signer.

Fig. 3: A signer encoding two simultaneously occurring events.
(c) The original figure has been recreated for demonstration purposes. See the original in Pizzuto *et al.* 2006, 483.

Recently, the use of such iconic simultaneous constructions has been shown to increase with the increase of informative demands, indicating that simultaneity can be used to achieve communicative efficiency, by Slominska *et al.* 2020. They explored whether and how signers vary the amount of simultaneously available information in a systematic and controlled, but yet ecologically valid way. In the study's design, the density of the messages that have to be encoded by deaf particpants has been altered in order to assess whether an increase in density would also increase the amount of simultaneity used. The results of the study show that Italian Sign Language (LIS) signers constructed their utterances in such a way that, as information got denser, the number and the density of their simultaneous constructions proportionally increased.

The change of perspective in sign language linguistics goes hand in hand with the development of new approaches in the language science: cognitive linguistics, cognitive grammar, and usage-based approach lead the way to redraw the boundaries of spoken and signed languages.

Cognitive linguists are giving an important contribution to the field of sign language studies, building new models starting from sign language data and enhancing the peculiarities of signs to broaden our perspective on language.

Initially, Wilcox 2004 redefined the notion of iconicity based on a cognitive grammar framework, in which both grammar and lexicon are described as symbolic structures, as pairings of form (the phonological pole) and meaning (the semantic pole). The two poles lie in our conceptual space and thus iconicity is "a relation between the form of a sign and what it refers to in the real world, but as a relation between two conceptual spaces. Cognitive iconicity is a distance relation between the phonological and semantic poles of symbolic structures" (Wilcox 2004, 122).

The notion applied to both signed and spoken languages but, in the author's words, "sign languages, by using articulators that visibly manifest the same grounded archetypes that underlie our conceptual abilities – objects moving in space within our field of vision – differ from spoken languages in that they have an enhanced potential for realizing these iconic mappings" (Wilcox 2004, 141). In this sense, the notion of cognitive iconicity relies on an embodied perspective: we experience and understand our world towards our body and language reflects these interactions.[3]

On this note, also usage-based approaches analyze language looking at domain-general cognitive processes, like schematization, categorization, and en-

3 For a recent discussion on conceptualization of space in sign language using tools of cognitive grammar see Martinez/Wilcox 2017 and Wilcox/Occhino 2016.

trenchment, as emerging from the interaction with the world. Usage-events themselves are produced by the body, and their motoric features play a role in the form-meaning mapping process in both spoken and signed language.

Following the usage-based approach and the insight from the concept of cognitive iconicity, Occhino 2017 addressed the distribution of handshapes in two different sign languages and outlined a new framework she called "embodied phonology" to investigate both language-internal and external sources of motivation that led to the form-meaning mappings.

One of the core assumptions of the usage-based approach is to see linguistic structure as emergent from the repeated application of underlying processes, rather than given by combinatorial rules, and that is why language has to be seen as a gradient system (Bybee 2010).

Considering the distorted perspective that the linguist's need for discreteness imposed to sign languages, leading to inaccuracies and mistakes, is it clear why usage-based approaches are very promising for the sign language field. In this respect, Lepic/Occhino 2018 explain how the usage-based framework could help to overcome the focus on discrete and listable elements considering language in terms of constructions, conventional patterns of meaning and form containing both fixed elements and variable slots and organized in a structured network. The authors analyzed different morphological constructions in ASL, and an English spoken discourse as multimodal events (gestures and speech) and gradient structures did not pose any obstacles to the analysis. In fact, the assumption of their approach is that: "all linguistic constructions show gradient structure, and highly schematic constructions are emergent generalizations extracted by language users through their experiences with language. Under a usage-based approach, gradient structure is not gesture: it is grammar." (Lepic/Occhino 2018, 166).

To complete a trustworthy usage-based analysis, looking at frequency and linguistic data in contest is essential to have at linguist's disposal a robust corpus. Unfortunately, sign language corpora represent an emerging practice in sign language research. Most sign language corpora are currently in progress: these are primarily large datasets consisting of spontaneous and elicited signing that has been annotated (Fenlon *et al.* 2015). Nevertheless, it should be at least mentioned the ongoing project for documenting German Sign Language (DGS) (Prillwitz *et al.* 2008), collecting data from a wide variety of users and contexts; the British Sign Language Corpus (https://bslcorpusproject.org/projects/); and the Australian Sign Language Corpus.

A modern corpus should cover different linguistic registers to be representative of real language usage and has to be in a machine-readable form. Therefore, the lack of a recognized transcription system and time-aligned video annotation

software slowed down the creation of corpora at the very beginning of sign language research (Crasborn *et al.* 2008; Fenlon *et al.* 2015).

Luckily, technology has proven to be extremely helpful for sign language research introducing annotation software suitable for video and sign language analysis. The most used multimedia annotation software program in the field of signed linguistics is ELAN (Max Planck Institute for Psycholinguistics Language Archiving Technology Group, 2009). ELAN allows to create, edit and explore annotations for video data, it is possible to overlap annotations on the same signed chunk, on different tiers according to the levels of analysis.

The use of new annotation technologies does not, however, dismiss the transcription problem. Fenlon *et al.* 2015 report that the most used practice among signed corpus in the use of "ID gloss", referring to the practice of using one unique identifying gloss for each sign, one along with all its phonological and morphological variants. The authors compare the ID gloss with the concept of lemma and lemmatization, but it should be noticed that in the case of sign language the citation form is given in another language (a spoken one!), a significant difference.

Fenlon *et al.* 2015 point out that the practice of using ID glossing is supposed to be consistent along with the corpora and annotators, the translations in the spoken language are linked to the ID gloss in separate tiers.

However, there is another way to avoid the use of glosses and translations: namely to directly write signs using SignWriting, a "movement-writing-alphabet" which uses visual symbols to represent the handshapes, movements, and facial expressions of signed languages (https://www.signwriting.org/). SignWriting is based on Sutton Dance Writing, a notation system for representing dance movements that Valerie Sutton developed in 1972 and is designed to write any sign language (Sutton 1999; Di Renzo *et al.* 2011).

Pizzuto *et al.* 2006, Di Renzo *et al.* 2006, and, more recently, Volterra *et al.* 2019 experimented the use of SignWriting on LIS, as a tool for both composing LIS texts directly in written form and transcribing signed face to face dataset. Pizzuto *et al.* 2008 explain how the research activity of the Italian team has been developed with the direct involvement of experienced Italian deaf signers and that SignWriting has proven to be an effective tool, and easy to use, for representing the form-meaning patterns of the language.

It has taken several decades to overcome the initial biases that influenced the first sign language research. We briefly examined the semiotic models proposed firstly by Cuxac, the cognitive linguistic theories, that provide the analytical tools to discover what is unique about signed languages, and then the usage-based approaches, which view the constructions of language as built-up and abstracted from experience (Bybee 2010; Langacker 1987 and Langacker 2008). Fi-

nally, we saw how the use of a new framework on sign language analysis required the development of new linguistic tools, as corpora and signwriting.

4 Unboxing Language: Lessons from Sign Language Research

Sign languages provide us with a way to expand our knowledge to all human language, through a revision of what were believed to be the basic tenets about language, not merely the spoken modality, but the arbitrariness, the categorical nature, and the linearity.

The tendency towards categorizing is a product of researchers' needs and originates from an alphabet-based culture that influences our idea of the linguistic environment irreversibly. On the contrary, we saw how sign language studies demand the revision of the dichotomy between linguistic (categorical, invariable, arbitrary) and para-linguistic (gradient, variable, iconic) primarily, improving the development of a new approach to language as a form of action.

The prejudice of sign studies against iconicity is rooted in the assumptions that iconicity and arbitrariness are opposite, and they cannot coexist in the language system, purely arbitrary.

In the sign language literature, it is often mentioned Saussure as the modern theoretician of this notion. As the fundamental work of De Mauro demonstrated (De Mauro 1967), this is a misinterpretation based on the diffusion of the *Saussurean vulgate* that failed to report the deeper meaning of the Saussurean notion of arbitrariness (see Russo 2004b for a detailed discussion of this notion and sign language studies).

In the words of Pietrandrea/Russo 2007, 52:

> how can highly iconic language phenomena coexist with the formal and structural needs of a linguistic system? We claim that the iconic phenomena in signed languages, as well as those in verbal languages, are not just an incidental feature of the surface form of signs. Indeed the coexistence of iconicity and arbitrariness must lie at the heart of the complex interplay between the formal requirements of the linguistic system and the pragmatic constraints which guide the interpretation of a linguistic utterance. On the one hand, each particular linguistic unit responds to certain formal requirements at the phonological, morphological and syntactic level (rules for the combination of single units in a meaningful proposition included). On the other hand, textual and situational context always add additional information to the interpretation of the linguistic units.

Dingemanse 2018 in his elegant review of studies on ideophones in vocal languages, invites us to reflect on some critical questions in linguistics that could find answers if we tried to widen the boundaries of language:

> here I argue that this narrative of marginalisation, though historically justified [...], has outlived its usefulness: it risks obscuring insights from a rich history of research and stands in the way of progress on key questions in linguistics. How does form link to meaning? What are the limits of language? How do subsystems in language relate to each other? How does language ideology shape linguistic inquiry? (Dingemanse 2018, 1).

We believe that the study of sign languages offers a significant contribution to answering these questions, teaching us at least three valuable lessons:

1. *Iconicity is deeply arbitrary, and Symbols grow from Icons*. Iconicity and arbitrariness are not opposite semantic properties, they coexist in verbal and signed languages, even if they play different roles in the structures of the linguistic system (Perniss *et al*. 2010).
2. The linguistic sign is *underspecified, deformable, not systematically discrete and categories are fuzzy, placed in a dynamic flux, negotiable and context-dependent*. The semantic vagueness of linguistic units makes it possible that these can be interpreted in context and can change meaning and form (De Mauro 1982 and De Mauro 1991). Signs and words (with gestures, ideophones, prosody) can be used both as descriptions and depictions, and we should look at usage events as objects to place somewhere on a continuum between these two semiotic strategies instead of separating them into two distinct categories.
3. *Language is embedded in use as a form of action*. Being a linguist does not necessarily mean to set the boundaries of what is linguistic and what is para-linguistic. Language Science should describe how people use language as an act of communication and comprehension, paying attention to all the multimodal aspects of communication. If we follow this approach, as Kendon suggests, "*languaging, or doing language*, would become the object of study" (Kendon 2014, 13).

If we really tried to follow Slobin 2008 and Kendon 2014 advice, and begin with a description of language use as a form of action, trying to observe and describe the linguistic phenomena for what they are, spoken or signed, we will succeed to unbox the nature of language and start exploring it in its full complexity.

References

Ahlgren, I. / Bergman, B. (eds). (1980), *Papers from the First International Symposium on Sign Language Research: A Compilation of Papers Presented at Stockholm – 79, International Symposium on Sign Language Research*, June 10 – 16, 1979, Skepparholmen.

Albano Leoni, F. (2009), *Dei suoni e dei sensi. Il volto fonico delle parole*, Bologna.

Antinoro Pizzuto, E. (2009), "Meccanismi di coesione testuale e strutture di grande iconicità nella lingua dei segni italiana (LIS)", in: C. Bertone / A. Cardinaletti (eds.)*, Alcuni capitoli della grammatica della LIS,* Venezia, 130 – 151.

Antinoro Pizzuto, E. / Chiari, I. / Rossini, P. (2008), "The Representation Issue and Its Multifaceted Aspects in Constructing Sign Language Corpora: Questions, Answers, Further Problems", in: *LREC 2008. Proceeding of the 3rd Workshop on the Representation and Processing of Sign Languages: Construction and Exploitation of Sign Language Corpora*, Marrakech, 150 – 158.

Antinoro Pizzuto, E. / Rossini, P. / Sallandre, M.-A. / Wilkinson, E. (2008); "Deixis, Anaphora and Highly Iconic Structures: Cross-Linguistic Evidence on American (ASL), French (LSF) and Italian (LIS) Signed Languages Deixis, Anaphora and Highly Iconic Structures: Cross-Linguistic Evidence on American (ASL), French (LSF) and Italia", in: *Sign Languages: Spinning and Unravelling the Past, Present and Future.* TISLR9, 45 papers and 3 posters from the 9th Theoretical Issues in Sign Language Research Conference, Florianopolis, Brazil, December 2006, Florianopolis, 475 – 495.

Antinoro Pizzuto, E. / Chiari, I. / Rossini, P. (2010), "Representing Signed Languages: Theoretical, Methodological and Practical Issues.", in: M. Pettorino / A. Giannini / I. Chiari / F. M. Dovetto (eds.), *Spoken communication*, Cambridge, 144 – 176.

Bybee, J. (2010), *Language, Usage and Cognition*, New York.

Boyes Braem, P. (1981), *Features of the Handshape of American Sign Language*, Unpublished Diss., Berkeley.

Clark, H. H. (1996), *Using Language*, Cambridge.

Clark, H. H. (2016), "Depicting as a Method of Communication", in: *Psychological Review* 123 (3), 324 – 347.

Cormier, K. / Smith, S. / Sevcikova-Sehyr, Z. (2015), "Rethinking Constructed Action", in: *Sign Language & Linguistics* 18 (2), 167 – 204.

Crasborn, O. / Efthimiou, E. / Hanke, T. / Thoutenhoofd, E. / Zwitserlood, I. (eds.) (2008), *Construction. and Exploitation of Sign Language Corpora. Proceedings of The 3rd Workshop on the Representation and Processings of Sign Languages, LREC*, Marrakech – Paris.

Croft, W. / Cruse, D. A. (2004), *Cognitive Linguistics*, Cambridge.

Cuxac, C. (1985), "Langues orales et langues gestuelles: évaluation de leur écart structurel", in: *Études de Linguistique Appliquée* 57, 66.

Cuxac, C. (2000), *La Langue des Signes Française; les Voies de l'Iconicite*, Paris.

Cuxac, C. (2004), "Phonétique de la LSF: une formalisation problématique", in: *Linguistique de la LSF: recherches actuelles*, *(Silexicales, 4), CNRS/Université de Lille 3*, 93 – 113.

Cuxac, C. / Sallandre, M.-A. (2007), "Iconicity and Arbitrariness in French Sign Language-Highly Iconic Structures, Degenerated Iconicity and Diagrammatic Iconicity", in: *Empirical Approaches to Language Typology* 36, 13.

De Mauro, T. (1967), *Ferdinand De Saussure*, *Corso di linguistica generale*. Introduzione, traduzione e commento di T. De Mauro. Bari.
De Mauro, T. (1982), *Minisemantica delle lingue verbali e non verbali*, Rome – Bari.
De Mauro, T. (1991), "Ancora Saussure e la semantica", in: *Cahiers Ferdinand de Saussure* 45, 101–109.
De Mauro, T. (2002), *Prima lezione sul linguaggio*, Rome – Bari.
Dingemanse, M. (2018), "Redrawing the Margins of Language: Lessons from Research on Ideophones", in: *Glossa: A Journal of General Linguistics* 3 (1), 1–30.
Dingemanse, M. / Blasi, D. E./ Lupyan, G. / Christiansen, M. H./ Monaghan, P. (2015), "Arbitrariness, Iconicity, and Systematicity in Language", in: *Trends in Cognitive Sciences* 19 (10), 603–615.
Di Renzo, A. / Lamano, L. / Lucioli, T. / Pennacchi, B. / Ponzo, L. (2006), "Italian Sign Language: Can we Write it and Transcribe it with Sign Writing?", in: *LREC 2006. Workshop Proceedings (W-15). Second Workshop on the Representation and Processing of Sign Languages: Lexicographic Matters and Didactic Scenarios*, Genoa, 11–16.
Di Renzo, A. / Lamano, L. / Lucioli, T. / Pennacchi, B. / Gianfreda, G. / Petitta, G. / Bianchini, C. S. / Rossini, P. / Antinoro Pizzuto, E. (2011), *Scrivere La LIS Con Il SignWriting: Manuale Introduttivo*, Rome.
Fenlon, J. / Schembri, A. / Johnston, T. / Cormier , K. (2015), "Documentary and Corpus Approaches to Sign Language Research", in: E. Orfanidou / B. Woll / G. Morgan (eds.), *Research Methods in Sign Language Studies*, Hoboken, NJ, 156–172.
Ferrara, L. / Halvorsen, R. P. (2018), "Depicting and Describing Meanings with Iconic Signs in Norwegian Sign Language", in: *Gesture* 16 (3), 371–395.
Ferrara, L. / Hodge, G. (2018), "Language as Description, Indication, and Depiction", in: *Frontiers in Psychology* 9, 1–15.
Goldin-Meadow, S. / Brentari, D. (2017), "Gesture, Sign, and Language: The Coming of Age of Sign Language and Gesture Studies", in: *Behavioral and Brain Sciences* 40, 1–17.
Hanke, T. (2004), "HamNoSys-representing Sign Language Data in Language Resources and Language Processing Contexts", in: *LREC* 4, 1–6.
Huenerfauth, M. (2006), *Generating American Sign Language Classifier Predicates for English-to-ASL Machine Translation*, Unpublished Diss., Pennsylvania (https://repository.upenn.edu/dissertations/AAI3246169).
Hockett, C. F. (1960), "The Origin of Speech", in: *Scientific American* 203, 88–111.
Karlsson, F. (1984), "Structure and Iconicity in Sign Language", in: F. Loncke / P. Boyes-Braem / Y. Lebrun (eds.), *Recent Research on European Sign Languages*, Lisse, 149–155.
Kendon, A. (2002), "Historical Observations on the Relationship Between Research on Sign Languages and Language Origins Theory", in: D. Armstrong / M. A. Karchmar / J. V. Va Cleve (eds.), *The Study of Signed Languages: Essays in Honor of William C. Stokoe*, Washington, 35–52.
Kendon, A. (2014), "Semiotic Diversity in Utterance Production and the Concept of 'Language' ", in: *Philosophical Transactions of the Royal Society B* 369, 1–13.
Klima, E. S. / Bellugi, U. (1979), *The Signs of Language*, Harvard.
Langacker, R. W. (1987), *Foundations of Cognitive Grammar*, Stanford, Calif.
Langacker, R. W. (2008), *Cognitive Grammar: A Basic Introduction*, Oxford.

Lepic, R. / Occhino, C. (2018), "A Construction Morphology Approach to Sign Language Analysis", in: *The Construction of Word. Studies in Morphology* 4, 141–172.

Liddell, S. K. (2003), *Grammar, Gesture, and Meaning in American Sign Language*, Cambridge.

Lo Piparo, F. (2003), *Aristotele e il linguaggio: Cosa fa di una lingua una lingua*, Rome – Bari.

Martínez, R. / Wilcox, S. (2017), "Pointing and Placing: Nominal Grounding in Argentine Sign Language", in: *Cognitive Linguistics* 30 (1), 85–121.

McNeill, D. (1985), "So you Think Gestures are Nonverbal?", in: *Psychological Review* 92 (3), 350.

Newkirk, D. (1989), *Sign Font Handbook*, Redmond.

Occhino, C. (2017), "An Introduction to Embodied Cognitive Phonology: Claw-5 Hand-Shape Distribution in ASL and Libras", in: *Complutense Journal of English Studies* 25, 69–103.

Occhino, C. / Sherman, W. (2017), "Gesture or Sign? A Categorization Problem", in: *Behavioral and Brain Sciences* 40, 36–37.

Padden, C. (1988), *Interaction of Morphology and Syntax in American Sign Language*, New York.

Pennisi, A. (1994), *Le lingue mutole: le patologie del linguaggio fra teoria e storia*, Rome.

Perniss, P. / Thompson, R. L. / Vigliocco, G. (2010), "Iconicity as a General Property of Language: Evidence from Spoken and Signed Languages", in: *Frontiers in Psychology* 1, 227.

Pietrandrea, P. / Russo, T. (2007), "Diagrammatic and Imagic Hypoicons in Signed and Verbal Language", in: E. Pizzuto / P. Pietrandrea / R. Simone (eds.), *Verbal and Signed Languages. Comparing Structures, Constructs and Methodologies*, Berlin, 35–56.

Pizzuto, E. / Rossini, P. / Russo, T. (2006), "Representing Signed Languages in Written Form: Questions that Need to be Posed", in: ELRA (eds.), LREC 2006 – Workshop Proceedings (W-15): Second Workshop on the Representation and Processing of Sign Languages, 1–6.

Prillwitz, S. / Leven, R. / Zienert, H. / Hanke, T. / Henning, J. (1989), *HamNoSys Version 2.0. International Studies on Sign Language and Communication of the Deaf*, Hamburg.

Prillwitz, S. / Hanke, T. / König, S. / Reiner, K. / Langer, G. / Schwarz, A. (2008), "DGS Corpus Project – Development of a Corpus Based Electronic Dictionary German Sign Language/German", in: O. Crasborn / E. Efthimiou / T. Hanke / E. Thountenhoofd / I. Zwitserhood (eds.), *Construction and Exploitation of Sign Language Corpora. Proceedings of the 3rd Workshop on the Representation and Processing of Sign Languages.* 6th International Conference on Language Resources and Evaluation, LREC 2008, Marrakech – Paris, 159–164.

Rinaldi, P. / Caselli, M. C. / Lucioli, T. / Lamano, L. / Volterra, V. (2018), "Sign Language Skills Assessed Through a Sentence Reproduction Task", in: *Journal of Deaf Studies and Deaf Education* 23 (4), 408–421.

Roccaforte, M. (2018), *Le componenti orali della lingua dei segni italiana: analisi linguistica, indagini sperimentali e implicazioni glottodidattiche*, Rome.

Russo, T. (2004a), "Iconicity and Productivity in Sign Language Discourse: An Analysis of Three LIS Discourse Registers", in: *Sign Language Studies* 4 (2), 164–197.

Russo, T. (2004b), *La mappa poggiata sull'isola: iconicità e metafora nelle lingue dei segni e nelle lingue vocali*, Cosenza.

Russo, T. / Giuranna, R. / Pizzuto, E. (2001), "Italian Sign Language (LIS) Poetry: Iconic Properties and Structural Regularities", in: *Sign Language Studies*, 2(1 Fall), 84 – 102.

Sallandre, M.-A. (2006), "Iconicity and Space in French Sign Language", in: *Typological Studies In Language* 66, 239 – 254.

Sacks, O. (1989), *Seeing Voices: A Journey into the World of the Deaf*, Los Angeles – Berkeley.

Schembri, A. (2003), "Rethinking 'Classifiers' in Signed Languages", in: K. Emmorey (ed.), *Perspectives on Classifier Constructions in Sign Languages*, New York – London, 13 – 44.

Schlesinger, I. M. / Namir, L. (1978), *Sign Language of the Deaf, Psychological, Linguistic and Sociological Perspectives*, New York.

Slobin, D. I. (2008), "Breaking the Molds: Signed Languages and the Nature of Human Language", in: *Sign Language Studies* 8 (2), 114 – 130.

Slonimska, A. / Ozyurek, A. / Capirci, O. (2020), "The Role of Iconicity and Simultaneity for Efficient Communication: The Case of Italian Sign Language (LIS)", in: *Cognition* 200, 104 – 246 (https://doi.org/10.1016/j.cognition.2020.104246).

Slonimska, A. / Ozyurek, A. / Capirci, O. (2021), "Using Depiction for Efficient Communication in Italian Sign Language", in: *Language and Cognition* 13, 367 – 396 (https://doi.org/10.1017/langcog.2021.7).

Stokoe, W. C. (1960), "Sign Language Structure: An Outline of the Visual Communication Systems of the American Deaf", in: *Studies in Linguistics. Occasional Papers* 8, 1 – 78.

Stokoe, W. C. / Volterra, V. (eds.) (1985), *SLR'83: Proceedings of the III. In International Symposium on Sign Language Research*, Rome.

Sutton, V. (1999), *Lessons in SignWriting. Textbook & Workbook*, La Jolla, CA.

Tomasuolo, E. / Bonsignori, C. / Rinaldi, P. / Volterra V. (2020), "The Representation of Action in Italian Sign Language (LIS)", in: *Cognitive Linguistics* 31(1), 1 – 36.

Volterra, V. (ed.) (1987), *La lingua italiana dei segni: la comunicazione visivo-gestuale dei sordi*, Bologna.

Volterra, V. / Capirci, O. / Rinaldi, P. / Sparaci, L. (2018), "From Action to Spoken and Signed Language through Gesture: Some Basic Issues for a Discussion on the Evolution of the Human Language-ready Brain", in: *Interaction Studies* 19 (1 – 2), 216 – 238.

Volterra, V. / Roccaforte, M. / Di Renzo, A. / Fontana, S. (2019), *Descrivere la lingua dei segni italiana. Una prospettiva cognitiva e sociosemiotica*, Bologna.

Wilcox, S. (2004), "Cognitive Iconicity: Conceptual Spaces, Meaning, and Gesture in Signed Language", in: *Cognitive Linguistics* 15 (2), 119 – 147.

Wilcox, S. / Occhino, C. (2016), "Constructing Signs: Place as a Symbolic Structure in Signed Languages", in: *Cognitive Linguistics* 27, 371 – 404.