

Iconicity of Sign Languages

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1. Iconicity of Sign Languages: State of the Problem

To define iconicity a-priori, by means of the similarity between linguistic signs and referred objects, or rather the reference, is to risk a return to a prestructural epistemology in which language appears as a “bag of words” aiming at expressing a precoded universe made up of pre-existing objects. Recall that, in a structural context, objects only attain existence because there are words of which, quoting Lacan, “the concept is the time of the object,” and because the referent, a term excluded from Saussurian thought on the sign, is what comes afterwards, a more or less successful application or projection of an organization of a sign system in the extralinguistic universe. The question of what iconicity constitutes is, therefore, not pertinent; one need only note how Saussure refutes the case of onomatopœias.

However, in the case of the Sign languages, as practiced by the Deaf, similarity might apply to most of the lexical items. Consequently, iconicity, as a general principle of functioning, makes these objects quite problematic.

It is not surprising from their subject that the well-known Procrustean bed applies to them, going from extreme trivialisation (most of the research carried out in the world on Sign Languages still concerns their “phonological” level, removing the refractory structures from the pantomime) to flat and plain rejection (haunted by iconicity, the Sign Languages would have been improperly classified in the collection of languages).

Now, neither of these hypotheses agrees with a patient observation of facts. The Sign Languages are victims (that they are not the only ones is hardly a consolation), either of hurry (the submission to “publish or perish”), of too much exteriority (fear of the terrain), or of an excess of loyalty to received education (the thought of the Masters should not be exposed to questioning because of a disturbing observation).

Our “ecological” comments do not condemn us entirely to a total relativism, and we think that it is possible to elevate oneself above a comment. Yet, we have thought it worthwhile to embark on our reflection by stating the question: “iconic with respect to whom?”, rather than “with respect to what?”, a much more subtle question and one we will

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attempt to answer in closing this discussion. The chosen direction stresses in fact the linguistic nature of the object: one directs oneself at least to somebody and there is no iconicity in itself. After all, a description of a dining room by Balzac is for a French reader of a rare iconicity, if one understands by it the matching of the representation of the reader with the extralinguistic experience transmitted by the author. But for this it is necessary to postulate a shared linguistic knowledge (see also Hill, and Taylor & Waugh, this volume).

This is basically the most troubling aspect of Sign Languages, because the current practice of sign language permits the deaf to have easy and effective exchanges with anyone practicing any other sign language. Having been a witness of multiple occurrences and being fascinated by this global communication without linguistic barriers during international encounters, programmed or fortuitous, I will target the analysis on the formal nature of this shared linguistic knowledge.

2. Classification of iconic structures

While it is always embarrassing to make a choice among the large number of registers and communicative situations, it appears from our observations that accounts in French Sign Language (FSL) are composed of specific elements that are less opaque and easier to decode by the receivers of the message than are the elements of other language activities. The Deaf of different linguistic communities abandon the standard lexicon of their respective languages when they are communicating with each other and use those structures appropriate to the narrative register, common to all Sign Languages in the world. This first dichotomy, coupled with a criterion based on the utilization of discrete and non-discrete forms, allows us to distinguish between three levels of iconicity.

2.1 First order Iconicity

First-order iconicity is characterized by non-discrete linguistic elements, that defy an exhaustive description as phonological units. These elements, which we have termed "descriptors", are massively present in narrative activities and substitute for the standard lexicon. They actually replace the nominal units of the latter.

2.1.1 DESCRIPTORS AND SPECIFIERS

Descriptors consist of a sequence of minimally concatenated elements, specifiers of size or shape that are themselves composed simultaneously of a configuration of the hand (or hands) indicating a basic shape, of a movement and of an orientation of the hand (or hands) indicating the evolution of that shape in space, of a positioning that could be a location on the body of the speaker, the neutral space in front of him, or a location that has been indicated by a standard sign given before.

The movement evolves in a continuous manner; but there is only a limited inventory of configurations, which do not vary from one speaker to another. A representative sample is: thick (less or more), spherical, hemispherical, square, rectangular, oblong, tubular, vertical, long and flat, long and cylindrical, bent, crooked, pointed, short-cut and crew-cut, radiating, latticed, fan-shaped, dripping, flat and long, like a little ball, circular, and with respect to the consistency associated with the appropriate mime: soft, rough, pliable,

spongy, etc. In addition, some of these characteristics can be combined. The movement represents the evolution of the form in space, (diminishing, ending in a point, sinuous, etc.) at a particular moment.

The limited inventory of the configurations of the hand (one cannot do everything) approximately the same for each of our informants, maps, paradoxically, onto a continuum (imagine for example the specification of thickness).

These descriptors can substitute themselves entirely for the standard lexicon; to do so is even characteristic of a successful story. Thus, a story introducing two dogs describes them without utilizing the standard sign [DOG]. Similarly, in another story the series: "shape covering the thighs" (shorts), "square on breast level" (the logo of the Soccer Federation), "an object set in motion by the hand and turning around it" (the whistle), is preferred to the standard sign [ARBITER or REFEREE].

In all language activities descriptors can be associated with the social code; e.g. "grand piano:" standard spatialized sign [PIANO] + contour specifier (index finger of the dominant hand, with appropriate movement).

The presence of descriptors in a story-telling activity corresponds frequently to spoken utterances like: "it's a...", or "This is the story of..." or "The story happens in or at" when they take place at the beginning of the story. They indicate the appearance of one of the two types of a fundamental structure, the transfer, which is specialized for the construction of a reference.

2.1.2 SITUATIONAL TRANSFER

In the first type of transfer, a situational transfer, the signer aims at an iconic reproduction in the space in front of him of scenes, seen in some way from afar. The signs represent generally the spatial displacement of an actor with respect to a stable point in space. The non-dominant hand represents the location, which is structurally obligatory but often appears irrelevant to the content of the narrative. Thus, in "an animate human walks down the stairs" the non-dominant hand stands for either a door or the wall of the staircase. Very briefly, their spoken equivalents are utterances that support the enunciation of a spatial origin: "there is something/someone that...". The dominant hand, in turn, demonstrates the action that is executed (usually of displacement).

Points in space, the only examples of signs of FSL not described by movement, consist of a simple configuration of the hand called "classifier". The inventory of these configurations is closed and composed of discrete shapes. It is a subset of the specifiers mentioned above. But in distinction from the latter, which referred to objects or particular individuals within a type, the classifiers are rather supercategories of heterogeneous objects, grouped according to their referential form, composing a rather unexpected Prévert-like inventory, much like the use of numeric classifiers in Chinese (e.g., Taylor & Taylor, 1996):

- elongated and vertical form: a pole, a needle; the hands of a clock, a human standing upright, etc.
- form with two lateral prongs: a cow's head, an aeroplane, a snail, a telephone receiver, etc.

The action performed by the dominant hand also belongs to a set of discrete and limited configurations (Cuxac, 1985). Still, the movement representing the nature of the displacement describes the entire structure of situational transfer in the continuous domain.

2.1.3 PERSONAL TRANSFER

Personal transfer structures involving the entire body of the signer reproduce one or various actions carried out or undergone by the actor of the process of statement: most frequently human or animal, but sometimes also inanimate objects (for example, well-known stories in FSL have as protagonist a golf ball or a plane.) The narrator "becomes" so to speak the person he is talking about, to the point of looking like him physically for certain signers. In order to characterize these structures the Deaf utilize a sign of their language that signifies approximately "role", or "role taking".

Other than situational transfers, specialized in displacements and localization relations, personal transfers even serve to carry the totality of the process. Such structures could be translated as: "(and) here is this guy who is busy doing this or that...", because the action is considered only in the course of its execution.

Contrary to the majority of our American colleagues who assign these forms to pantomime, we think for at least two reasons that they may well integrate into Sign Languages. First, absurd utterances that still can be said, like "the chocolate eats the boy" cannot be translated in FSL by the standard signs and structures only. The signer has to utilize a personal transfer and "become" the chocolate. In addition, the cues for the transferred changes of the actors are of such economic subtlety (closure of the eyes, looking very briefly in all directions in order to enhance the high intensity produced next, ultrafast modification of posture) that there is no reason not to see the linguistic elements in it.

The transfer structures are extremely troubling in that they "wipe out" the subject of the utterance. An entire history can thus be told without bringing out the point of view of the narrator with respect to what he says. It is a real problem for Deaf children to gain access to written French, which does not rely on the story-telling activities transmitted in Sign Language. Teachers have to know precisely how the expressive cues manifest themselves linguistically during the narration. This issue will be elaborated below.

2.2. Second-order Iconicity

Second-order iconicity affects the standard vocabulary. With respect to the nominals, it is essentially metonymic (the part of the object providing the most striking reference applies to the whole object). Referents are types, rather than particular objects such as specifiers and descriptors, or sets of objects that are functionally heterogeneous, in contrast to the classifiers.

With respect to verbs, iconicity is mostly metaphorical, even if this does not amount to much, given that metaphors often concern cultural knowledge that already exists with respect to the form of the produced sign. Thus, most mental activities, such as [THINK], [KNOW], [IMAGINE], [BELIEVE], [REFLECT], [UNDERSTAND], [DREAM], etc. are all localized on the level of the cranium.

For the following, two points should be mentioned: certain nominal standard signs can be integrated into first-order structures, for instance as locatives of situational transfer. We will examine the conditions later. Also, standard verbs, such as [CHOOSE], [SIT], [TEACH] etc. are included among the personal transfer structures. Sometimes, when dealing with activities that are not really narrative, the signer becomes the agent of the utterance just for the duration of the verbal action. This transition can be perceived:

1) by change of the intensity and direction of gaze: thus, for [TEACH] the gaze is directed at a previously memorized part of the space that marks the place of the person whom the actor teaches,

2) by meaningful modulations that annotate a movement: e.g. for the standard sign "[CHOOSE] with precautions" (role of mimic) the movement of the verbal signal has a larger amplitude.

2.3 Third-order Iconicity

Third-order iconicity has such disparate elements that it would be appropriate to proceed later with a more detailed classification. Their only point in common is that they do not involve reproduction/simulation of shapes in space, but embody temporal relations (the logical-temporal specification between parts of utterances), as well as the relation between an utterance and the characteristics added to it. This is in agreement with numerous studies devoted to the notion of iconicity applied to oral languages. Some examples follow:

- mental hypotheses are supported by an upward gaze, slightly vague and distant, without the standard signs such as [THINK], [IMAGINE], [BELIEVE], [SUPPOSE] actually being realized.
- permanence from the point of view of the signer manifests itself, among other indications, by nodding the head: "yes, yes, yes, yes, etc..." or shaking: "no, no, no, no, etc..." if the content of the message is negative.
- the plural of certain signs (e.g. [PERSON]), is realized by repeating the sign various times; usually three times.
- the tense of an expression is cued by bending the hand towards the rear of the signer (past tense; "I told him,"), bending it forward (future tense, "I will tell him,"); the time of what is expressed is indicated by transversely cutting the indicated time (from left to right or from right to left, "that she has left.").
- As in numerous oral languages (Seiler, 1983), the degrees of extralinguistic proximity in possession relations, characterized by the alienability of the possessed object, are arranged according to a structural linguistic proximity between possessor and possessed, exemplified here by a canonical ordering of the performance of signs:

the localizer before the localized object
determiner before determined

the ground before the figure in case of simultaneity of actions (Action schemes and the order of "Subject Object Verb" have been the topic of a detailed study; Cuxac, 1987).

- In mixed signs the verb-noun distinction is marked by the amplitude of the movement for the verb and by two repeats of a brief movement for the noun.
- numerous syntactic relations are indicated by means of full semantic signs: [CUT] (one action interrupting another), [FINISHED] (sign of completion), [TOUCH] (experience relation), [RESPONSIBLE] or [DO] (sign of activity), [HABIT] (iterative form);
- one way of introducing a thematic unit consists of “false questions” placed at the end of an utterance:
 - [CHOOSE] by means of personal transfer [RESPONSIBLE] [WHO?] [“SO AND SO”]: it’s “so and so” who has chosen...
 - [“SO AND SO”] [CHOOSE] [WHO?] [SPEECH THERAPISTS]: it is speech therapists that “so and so” has chosen.
- for those signs that of necessity have an assigned location in space, the location can be reutilized, as if stored in memory, by means of anaphoric pointing without the sign being repeated. Cataphoric pointing has to be mentioned as well; point at the sign itself (metalinguistic activity), locative pointing or anaphoric action references, the reference having been constructed earlier by the direction of gaze (which consequently acquires a deictic value, pointing at a spatial location). For the cohesion of the discourse these very frequent pointings (we have observed 1200 in a one hour recording) are extremely important. In addition, we have to take into account the pointings that we have termed “light” (not specifically directed at a part of the space, lack of tension of the index finger) which appear either briefly before the sign, or at the same time for those signs realized with only one hand (the non-dominant hand realizing the pointing) the semantic value of which approximates closely the expression in French.

3. Morphodynamic theories of iconicity

We yet must interpret the preceding facts while trying to give the notion of iconicity an epistemological framework, in place of the simple observations so far presented.

First, we will contest the point of view proposed by Frishberg (1975) according to whom Sign Languages would tend towards arbitrariness. Nothing in FSL supports such a statement. It is true that there is some socio-linguistic pressure both from the dominant language, at least in its written form, and from hearing signers/receivers who practice Sign Language (currently in the United States their number surpasses that of the Deaf); but these pressures cannot be attributed to an intrinsic evolutionary law.

Neither is there any reason to see in signs, as does P. Sero-Guillaume (1989), functional extrapolations (compensating for deafness) of gestures observed in the hearing adult who did not have to develop this means of communication

There are basically two polar possibilities for an explanation. Either, these are fully localized gesture sequences, accessible to awareness and controllable—featuring in addition important individual variations—or the gestures are expressive, affective in origin, and consequently detached from representation systems. If the former, it is hard to see how

one could uncover even the beginning of a genesis; if the latter, who would pretend that the same type of vocal productions in babies would constitute proof of their future language? Turning the reasoning upside down, to do so would even imply that one would have to consider the spontaneous vocal productions of deaf speakers as the embryo of what should become a language for the hearing. Yet, Sero-Guillaume (1989) insists that iconicity is a datum of Sign Languages that is non-pertinent, in that deaf “speakers” are not aware of it when they communicate, or rather that they do not need to be aware of it. But it is the way of stating this as a problem that is non-pertinent: nobody has ever asserted that all linguistic production owes, to its originator, a metalinguistic thought that preceded it, accompanied it or followed it. It is evidently incorrect to state that the metalinguistic reflections of the Deaf are exempt from any link to a notion of iconicity.

From the start linguists have mistrusted the phenomenon of iconicity by assimilating it to pseudo-rationalizations (in particular the resort to etymology) of the speakers of oral languages. Next, linguists slowly were forced to acknowledge that discussions held by the Deaf on their own language had remarkable explanatory value with respect to the motivational link between actual practice and their linguistic counterpart in signs. For example, in an experiment on communicating the place relations among a number of objects, Deaf signers used a temporally ordered “execution” which presupposed the presence of the placing person (usually the least displaceable of the objects). Since, in FSL, the configuration is expressed by the spatial relations among the objects, and not by functional tools, the message is conveyed when the most displaceable object positions itself with respect to the least displaceable object, which has already been linguistically spatialized. Similarly, scientific teaching requires numerous lexical creations, and when multiple neologisms compete, the Deaf justify their choice of one term at the expense of another by its larger iconic value.

Far from being stuck without alternative or with a trivial aspect of sign language, we think that iconicity must be seen foremost as an organizing principle. In fact, the ability of these languages to use the three dimensions of space should, according to all mathematical logic, multiply the diversity of possible structures. In contrast, we seem to be confronted with a homogenization of possible structures. Let us recall briefly what the Sign languages have in common:

- not only are the class of iconic phenomena of the first order (specifiers and descriptors, structures and transfers) present in all sign languages, but the minimal units of the schema of forms retained by every linguistic community are very similar from one Sign Language to another. With respect to the utilization of these structures we have employed the term “anamorphosis principle” which accounts better for their *raison d’être* than that of iconicity. The anamorphosis principle refers to the translation of forms into another universe and the evolution of these forms in the space and time of that universe.
- Sign Languages also have in common the canonical structure of not marking the distinction between the localizer and the localized object, reflecting the pragmatic constraints of the “given”, the stable, the whole, the containing, versus the “new”, the displaceable, the part, the content. The complex notion of density,

defined by Thom (1973) seems to us the most appropriate to account for this phenomenon. In particular, in French Sign Language (in which loans from the dominant oral and written language are relatively few) the order of the elements in the utterance is generally in the direction of decreasing density. Also, in a four-dimensional language, as FSL iconicity could be characterized, among others, by the neutralization of the opposition established by Thom between structures that facilitate sending the message and those that facilitate receiving it (Cuxac, 1985).

- Beyond the formal similarities between the graphs of the elementary morphologies systematized by Thom (1972), and the concepts which in Sign Language correspond with those (type "capture", "emit", "give", "end", "fail", "jump", "repeat") one could mention the metonymies, based on the relationship between perceptual saliences of the referent and the signing gestures. The same holds for parametric editing of the signs of the standard lexicon in: 1) movement (morphology of the action), 2) configuration (formal reappearance of one of the participants of the process: subject, object or instrumental), 3) orientation (casual roles adopted by the participants in the process of uttering or of the utterance), 4) placement (initial or final location of a displacement process).

These characteristics common to Sign Languages, mostly based on the genesis, the evolution and/or the interruptions of forms, correspond best with the hypothesis of visual anchoring of linguistic representations, as has also been postulated for oral languages. But also, the semantic specialization of the construction parameters of the signs (placement, configuration, orientation, movement) can be related to the most recent discoveries of the functioning of the visual system, revealing the Sign Languages to be particularly fruitful objects of investigation in the framework of so-called proto-linguistics by Petitot (1991).

4. Iconicity and utterance

Going beyond the linguistics of reference, our observations on FSL, as well as of other Sign languages allow us to define a "hyperspecialisation" of parametric constituents used by signers to control the features of the utterance and the changes of language register.

4.1 Hyperspecialisation of parameters

We have seen earlier that the elements relevant for iconicity of the first order were specialized for the construction of references. But they can also appear in other contexts, and this was the topic of one of our investigations on metalinguistic activities. We asked Deaf informants to define very iconic units, which, depending on the context, could be either signs of the standard lexicon or classifiers: e.g. [PLANE], or "object with lateral extensions in movement"; [FISH], or "flat object, longer than high, making a sinuous movement in advancing". The gaze of our informants was not directed at the signs while they were being defined. In contrast, when signs had to be contextualized in a referential operation they were watched by the signer.

Similarly, we have been able to observe that standard signs with very iconic (by metonymy), formal characteristics could in some way become "object signs" if the gaze of the signer was directed on them from the onset of the realization. To this category belong signs like [BOAT] (form of the bow of a boat), [TREE] (form of the trunk and branches), [HOUSE] (form of gabled roof), etc. With respect to this we have spoken of "remotivation" of these signs, i.e. of a relevant utilization of resources that by themselves have a non-relevant iconicity during non-referential language activities.

Thus, the part used for the whole, which is characteristic of signs (iconic metonymy), becomes again the part itself if the sign for the part (the bow of the boat) is watched. The sign may represent the part (the bow of the boat), the whole (the boat), or the whole and its part (the boat and its bow: gaze+pointing at the form of the dominant hand with the non-dominant hand). Does this imply that it is impossible to utilize these standard signs in metaphorical constructions? (Cuxac, 1987)

This possibility leads us to consider the units of FSL as being multipolar, like the words of a spoken language. But where words necessitate specific structural framing ("It is", "there is" or a recourse to modalities), for referencing, signs can easily switch from one role to another, simply by using the direction of gaze, because of their iconicity.

An anecdote may illustrate the great importance of the role played by the gaze in FSL and the difficulty for sign readers who can hear, even if they have frequent contact with Deaf people, to identify the language register they are confronted with, because the transition from one to the other is very hard to perceive—the consequence of a single glance, often very brief. Recently, a hearing friend of mine asked for the title of a painting by a deaf artist. A long and figurative reply followed, which seemed at first sight a sort of descriptive commentary of what was to be seen on the canvas. When this friend mentioned that the iconicity of the Sign Language could well be the source of confusion between description and title (nominalization), I made him note that his interlocutor had not once directed his gaze onto his hands and that, consequently, had been dealing with the title of the painting.

The presence/absence of the directed gaze produced the same effect as the presence/absence of the demonstrative: "this sunset over the Thames"/"sunset over the Thames".

Just as every parameter of sign formation is in some manner specialized for indicating the syntactic/semantic relations specific to an utterance grammar, one could, going even further, present the links interwoven among the signs as indicating changes of register—transitions from one language activity to another. For example, the relations between the direction of gaze and the mimic allow the signer to establish the intrusion of expressive features into the discourse. In a dialogue where "I" and "you" are the protagonists of the utterance, it is important that the gaze of the originator is directed at the face of his interlocutor². The signs refer to the process of what is being expressed and the facial mimic of the signer functions as a modal marker.

When the originator of the message is engaged in story-telling activity related to the construction of a reference, the triad "signs, mimic, gaze" depends on the type of structure:

²The Deaf are extremely embarrassed when a hearing signer does not respect this (linguistic) rule and engages in a dialogue relation in which he signs without watching the receiver of the message.

1. A situational transfer: the gaze is directed at the signs (dominant hand: the action and the agent of the action of the topic; non-dominant hand: obligatory locative). The mimic indicates an aspect of the action that is in some way "objective", i.e. independent of the point of view of the protagonist, or independent of the effect of the outcome on the protagonist: e.g. the action is extended in time, brief or repetitive. The gaze rests on the signs during the entire message, or is directed at a neutral position (after having been directed at the signs), and does not return to the interlocutor until the dialogue activity has been resumed.

2. A personal transfer (or a double transfer): before the "assumption of the role" by the initiator, the gaze leaves the face of the interlocutor; it "flees" and "hunts in all directions", without fixating on a particular object. The facial expression is as neutral as possible. Next, very quickly, the mimic and the gaze become animated again. The signer has then become the protagonist of the story to be told. As such, and because he "is" in another world than that of the situation he is relating, he cannot stare at the face of the receiver of the message. Any intrusion in the situation of relating in the midst of the features of the story is actually banned. The signs indicate the action, which, transferred into the space of the utterance, is apparently happening rather than being related by an observer. The gaze has become that of the protagonist of the story and does, or does not bear on the signs being produced. If it does, this simply indicates that the action being realized requires from the actor some visual control (e.g. change the time on a watch, hitting a nail.) The mimic conveys information concerning the state of mind of the protagonist of the topic as he accomplishes the action—preoccupation, etc.,—or the effect of the action on himself—intensity of effort, ease, etc. If so, the gaze is directed at the hands or on the body parts involved in the realization of the process. Simplifying to the extreme, in view of the complexity of the issue, one might present things in the following way in the Sign Languages, and not only in FSL:

- the signs (standard or specific to the structure of transfer) are specialized to indicate the progress of the utterance.

- the gaze marks the language activities with respect to whether a reference is constructed or not.

- the mimic relates to the state of mind of the protagonist of the topic during language activities devoted to the construction of a reference. When, in a dialogue, there is dissociation between the two protagonists ("he" or "you" of the utterance versus "I" of the signer), the events of the expression gain the upper hand and the mimic is a mode that gives information about the point of view of the message originator.

3. A last point concerns intrusions in a referential activity of a reported dialogue that is completely framed in the structures of a personal transfer. The gaze of the originator fixating on an imaginary interlocutor, who has been referred to spatially, should evidently not bear on the addressee of the message. The cue that

a dialogue is being represented, in addition to the semantics of the utilized signs and the simulation of an interaction in personal transfer, manifests itself in our principal informer by the marker of a "reported dialogue" which is repeated by the opening/closure of the mouth, occurring at the beginning and at the end of the quoted discourse. When the quoted discourse continues for a long time, the marker opening/closure of the mouth may be repeated several times.

4.2 Visual Anchorage

It seems interesting to cross the classifications arrived at from the notion of first-, second- and third- order iconicity with the hypothesis of visual anchoring of the linguistic representations and structures (Descles, 1991, from whom we borrow the definitions.) Considering first-order iconicity (the anamorphosis principle) the specifiers of size and shape are elements specialized for "a qualitative representation in a spatial reference system, R1, structured by static topological position relations between objects and places".

Forms of situational transfer represent "phases of movement in a spatio-temporal reference system, R2, structured by the coordinates of an object in motion" (dominant hand), "with respect to privileged locations" (locative of the non-dominant hand).

The forms of personal transfer are "representations organized on the basis of integrated predication schemes, reference system R4", entirely short-circuiting the "spatio-temporal reference system centred on the person R3" (the subject-speaker).

The direction of gaze has the major role of indicating changes of the referential pole of the gesture units. Thus,

R1: gaze fixed continuously on the sign,

R2: on its point of departure or end,

R3: on the partner of the conversation, with all the exchanges between R3 and R4.

This last point accounts for the redundancy often observed in different sign languages, and wrongly considered to be mere repetition. A brief transfer to an R4 without R3, through personal transfer of a standard sign, in which the gaze of the signer (actually that of the transferred subject agent) carefully avoids the co-signer, followed by a repeat of the same utterance without transfer (change of mimic), in which the gaze, now held on the interlocutor, signals that the message is now taken on by the signer, and the "yes, yes, yes" and other nods of the head reinforce this indication.

5. Iconicity and system

Non-linguists experience iconicity often as an obstacle to expressing abstract concepts. Linguistically this might be reformulated by doubting that the semantic value of signs could emerge negatively from a schema of possible units in a given context. The multipolarity of signs, then, would be restricted to narrative and pragmatic functions. According to the same view transposed to the areas of psycholinguistics and psychoanalysis, the sign languages, non-closed, non-discrete, analogue, ignorant of de Saussure's radical principle of arbitrariness, would rather function according to the laws of the primary process: displacement (the metonymy of standard signs), condensation (simultaneity of information) and associativity

(forms evoking one another). For this reason the unconscious could flow into it, as if from an open sky, without the defenses and the characteristic censorship of forms of secondary order. Sign languages and oral languages would, therefore, be thought of and treated as epistemologically distinct objects with only partial overlap (Virole, 1990).

Some examples will suffice to demonstrate that iconicity does not impede the differential and systematic functioning of meaningful units and does not drag a retinue of object representations in its trail.

- the sign [to OPEN] may recall, or perhaps have as its origin the opening of the two parts of a double door, but in numerous contexts it draws its meaning from a scheme of elements within which it differentiates itself from, among others, [to END], and [to REDO]. It is often translated most closely as “begin”. In the context of an adjectival predicate this same sign may mean approximately “open”, “one who has broad views”. Finally, the conservation of movement and of its configuration constitute the basis of a metaphorical construction like “open one’s heart, or one’s mind”, etc.

In the same range of ideas a subset of the personal transfers can be established of postures and cultural stereotypical mimics inspired by real-life observations of comic strips, cinema, pictorial art, sculpture, all of which may be decoded on a denotational level, as scene descriptions, but also on a connotational level. Thus, scratching the head signifies the perplexity of the actor, grasping the chin the intensity of thought, rubbing the hands contentment, puffing unceasingly on a cigarette nervousness, lighting one cigarette after another anxiety, lifting the arms to the sky helplessness. The inventory of these transfer stereotypes varies greatly from one signer to another. Our principal informer often uses them and continues to create new expressions. Some among these are reused so frequently by the community that they become lexicalized and solidify in their metaphoric value. For others, subtle cues allow the receiver of the message to attribute descriptive or metaphoric value to them.

The art of the narrator consists of playing on these two levels, without specification, allowing his audience free interpretation.

- Another example that demonstrates that the principle of iconicity of the Sign languages does not contradict the differential value of the lexical units is supplied by the existence of generic or comprehensive terms. For more detail see Newport and Bellugi (1979) on American Sign Language (ASL). In FSL generic terms like [FURNITURE], [VEGETABLES], [FRUIT] are certainly lexicalized, but, like [FRUIT], know numerous regional variants, or, like [VEGETABLES] or [FURNITURE] are unknown to many signers. As to the latter, conceptual equivalences are realized by the concatenation of two or three of the more frequent terms belonging to the scheme of the so-called category: thus [CARROT, POTATO, CABBAGE] followed by the sign [ETC...] means [VEGETABLES]. Similarly, [NEWSPAPER, TELEVISION, ETC...] and [PLANE, TRAIN, VEHICLE, ETC...] mean “media” and “means of transport”,

respectively. However, only the whole sequence acquires a semantic value which is different from the sum of the meaning of its parts. Newport and Bellugi (1979) have shown that in ASL utterances such as “the [BED, CHAIR, WARDROBE, ETC...] have burned, only the wardrobe has survived the fire” are not at all inconceivable. This holds also for FSL, with the reservation that, though it is conceivable, such utterances are unlikely, as the narrator prefers to choose items in the sequence other than those which bear on the exception.

- Another illustration concerns the pair “small/large”. In spoken French this opposition functions independently of the actual size of the objects: “a large ant”/“a small elephant”. It has often been asserted that the lexicon of FSL, being too referential, did not offer the possibility of such relative opposition. An attentive examination shows that it does. It is certainly true that in FSL the expression of size specifiers is ordinarily translated by “just as this”, “of that size...”, “of that thickness...”. But such a sign may be associated with a specific mimic that marks an intervention from the point of view of the signer. It is this mimic, and it alone that, when the originator keeps eye contact with the receiver of the message, determines the equivalent of opposing pairs “small/large” (and even “average”), “thin/thick”, etc.

So, for a unique specifier “of that thickness”:

- frowning the eyebrows and puffing out the cheeks will detail: “and (what I consider to be) large”,
- squinting the eyes and creasing the forehead together with a rounded tightening of the lips: “and (what I consider to be) small”,
- a light frowning of the eyebrows with a pout: “and (what I consider to be) average”.

Every mimic can be accompanied by mimic markers of intensity such as “very”, “a little”, etc.

6. Conclusion

Throughout the debate between nominalists and realists, from Cratylus to de Saussure, centuries of philosophical tradition have imposed on the definition of languages a form of theorizing in which two viewpoints mutually exclude each other.

In a less dichotomized current scientific context, the Sign Languages help us to relativize things, at least somewhat.

- 1) First by considering “iconic” not as opposed to “arbitrary (in the sense of absence of resemblance between referent and the signifying part of the sign)”, but as one pole of a continuum in which the direction chosen depends on the constraints imposed by the channel used (one- or four-dimensional), and perhaps more difficult perceptual discrimination of the kind of auditory saliences than of visual saliences.
- 2) On the other hand, from the point of view of the epistemology of language activities one could see that the Saussurian value, and the language system of

differences are more closely related to a functional characteristic and a particular polarity among languages, i.e. the metalinguistic activity, than the intimate being of "The Language"

The following contradiction, then, is only apparent. The metalinguistic dimension can be seen in the framework of child development as present only in the form of predisposition, or can be seen as something that systematically affects the child:

- 1) by the adult language activities that surround it,
- 2) by its belongingness to the species, considered in a symbolic framework woven in a net of differences.

There is no reason, then, to oppose the points of view represented in the two different epistemologies:

- 1) epistemology of the ontogeny and of the development of the child (words for things, then for absent things and the principle of anamorphosis, before the words concerning the words,
- 2) epistemology of the phylogeny and of the (qualitative?) leap of the species (words concerning words and the principle of radical arbitrariness).

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A Taxonomy for Users' Behaviour in Human Computer Interaction

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1. Overview

Multimodal interaction with a computer can only take place to the advantage of the user, with efficiency and smoothness, when the system is built to support the variety and structure of behaviours required by the user. In order to build such a system the designer must understand the complexities of these behaviours and to this end it is proposed that a taxonomical approach is useful—it sets out what the users might do and it thereby clarifies the notion of multimodal as being a set or blend of different behaviours.

Further, the taxonomical approach makes it easier to identify the interface as the intermediary between a user's intentions and their observable behaviour. By systematically categorizing behaviours and intentions the cognitive scientist enables the designer to dispense with ad hoc categories of interface technologies which have no utility as generalizations. The functionality of the interface, and of each component in a multimodal interface, should be identified in relation to intention and behaviour, not in terms of the technology itself.

The paper is an elaboration of work originally presented at Maratea, and since worked on. In the original spirit it is offered here more as a 'think-piece' than a fully supported scientific result.

2. Introduction

In the original presentation at the workshop in Maratea the point was made that behaviours with computers appeared to be restricted to a few distinct types: direct manipulation, selection, description, instruction, and information. It was further suggested that understanding multimodality in HCI meant that designers had to understand these categories and how to build interfaces (or interface components) to suit them. Subsequently (Edmondson 1993) the categories were elaborated and it was also suggested that it was necessary to understand the user's intentions as well as their behaviours.

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