

Blueprint for a theory of gestures

- The discourse on gestures is doubly constrained by descriptive strategies that rely on elementary narratives and by the bi-dimensional representations of the narrative agents and their dynamic paths. In general, a limb or a moveable part of a limb is said to do something that consists of producing a stable or dynamic visual pattern in relation to another part of the body, another body, or a material object. These patterns are usually represented on the plane of a bi-dimensional support (printed page, drawing board, or screen). The source of the agency is explicitly or implicitly assigned to a human subject whether the movement is considered deliberate, intentional, automatic, or accidental. A frequent convention for representing such movements includes two outlines of the limb concerned linked by arrows which indicates the direction of the movements from a point of departure to a point of arrival. The iteration of a gesture is conveyed by double arrows pointing in opposite directions. When the third dimension is critically involved the figure is rotated so as to be represented on a plane that is perceived laterally by a virtual observer. Various conventions allow to twist the basic plane and to represent the switching of planes. The switching of planes is, of course, a representational strategy of the researcher, not a particular behavior of the agent who, in real life and real time, is always located in tri-dimensional space. The verbal and visual methods that transform gestures into data create abstracts schemata which are consistent from the point of view of an observer. Photographs add some degree of realism to the representations but obey the same constraints. The process depends on both narrative structures and representational conventions which are intimately related. Coded recordings such as Labanotation, are sets of instructions addressed to a subject with a view to achieving specific gestures.
- Like for all constructions of data a particular point of view is arbitrarily (heuristically) chosen by the investigator of gestures. First, a level of discrimination of visual information is selected and gestures which are thus identified undergo a process of calibration. The rough edges of the observation are ironed out. Secondly, the choice of the visual medium as the relevant modality leads to eliminate a range of information in other modalities: haptic, acoustic, and olfactory. Moreover, since dynamic behavior occurs prominently in dyadic and triadic verbal conversations, gestures can be observed in relation with (or as co-occurrence with) words, sentences, complex discourses. The investigator identifies regular or singular co-occurrences in real time interactions (or in videos of such interactions) and tends to generalize with the purpose of elucidating more general patterns that transcend idiosyncrasies but adumbrate cultural and social norms. Naturally, social and age classes, ranking within the classes, specifics of the topics discussed, make-up of the dyads and triads, interpretation of the observed-observer situation, and countless other factors that may impact particular modes of communication, etc., are not generally captured in this sort of investigations. After all, there is not such a thing as a neutral interaction. Another

difficulty is that it is practically impossible to notice the absence of a gesture or the difference between a gesture that is slightly modified due to circumstances and a gesture that is entirely outside the range of voluntary control of the subject. Example of the simians at the Berlin gesture colloquium (too complicated to take the third agent into consideration)..

- A still more serious problem is the presence of undetectable subliminal information which cannot be directly investigated with the usual technology. Alex Pentland (at MIT) has shown that irrespective of the phenomenological monitoring of an interaction, the recording of micro events through the wearing of extra-sensitive devices can help predict whether the interaction produces the desirable outcome. It proves that more is going on than meets the eyes in dyadic interactions. This leads to heuristically question the validity of methods that for long have fore-grounded articulate language and considered gestures either as a substitute, a complement, or an adjuvant in communication. Recent advances (Enfield) integrate gesture and language through the notion of (synergic) “move”, a multimodal complex that is endowed with its own dynamic and temporal consistency (enchrony). However, following our “verbocentrism” language serves as the thread (so to speak) from which gestures hang in flowing sequences. What Pentland and other are trying to do is to heuristically reverse the focus – produce a kind of negative of the method, by focusing on the body line, so to speak, from which strings of utterances hang in sequence. A gedanken experiment could be to observe a multimodal interaction in context and test how much can be understood by an observer if the sound was removed.
- It is all the more likely that gestures are primal in communication (verbal or otherwise) because primates, and assumedly their common ancestor, shared information and negotiated situations before articulate language evolved. From an evolutionary point of view, we all know that language is a very recent “innovation” and that the much more recent emergence of writing is based on specialized gestures. The case has often been made that language was indeed entirely gestural. But these critical observations do not amount to adumbrating a theory of gestures. They suggest a broader basis for the integrated descriptions of human interactions but they have no explanatory value. The knowledge of the “how” has been greatly improved during the last few decades and more progress is made everyday. However, the “why” question has been hardly answered. To start understanding gestures, we have to plunge in the deep time of evolution.
- Adaptive limbs and appendages evolved in many species but our limbs started with the first tetrapodes. To make a long story short: the common ancestor (now identified as *Ardipithecus hamidi*) was adapted to tree-dwelling
- Because research has been almost exclusively uni-modal by abstraction (and convenience). Multi-modality appears always as a challenge. But evolutionary processes take place in multimodal environments and the brain constantly handles multimodal information, and does so in part in peripheral regions such as the vestibular system which becomes immediately multisensory and multimodal and contributes to many brain functions including motor coordination. Gestures should be investigated on this level not only with reference to mirror neurons.

- There is a disparity of formalization between language and gesture. (trying to match words and gestures is like comparing astrolabes and elephants). A century of measurement and scrutiny for the former. Only gross assessment and narrative models for the latter. It seems that advances in the understanding of gestures depends on the capacity to construe the dynamic patterns of the articulated body as a scientific object. This measurement cannot be equated with anatomic knowledge because the communicative capacity of gestures (the ways in which they are perceived) does not involve functional parts but the perception of time-space objects (i.e. 4-D objects. How to express mathematically, quantitatively such objects? They describe volumes in space and these volumes intersect. Time is constitutive of these virtual objects. (soap bubbles image). The goal should be to discover an equation that would express their essential properties. These volumes and their temporality are always inscribed into a world and are integral parts of it. They are transformative like words are. This is the only way that gestures could be virtually isolated and measured as 4-D populations of objects.
- Interesting perspectives: Gyorgy Buzsáki, Andy Clark, Alex Pentland, Andy Clark.
- References:

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Why do we refuse to equate the mind with the brain? Because the body (essentially the limbs) are represented in the brain and are defining an extended space and time, as does the tools which further extend our reach
 For this reason gestures are a part of our ontology