DISTRIBUTED COGNITION & THE EMERGENCE OF LANGUAGE: LANGUAGE AS A NEW MEDIUM TO TRANSFER MEANING

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Paleoanthropologists, archaeologists and other researchers concerned with the biological and cultural frame in which language developed during prehistory often disagree on various issues. What time periods are relevant? Which species were gifted with such or such cognitive or linguistic feature? How did biology and culture interact during the process?

However, a general consensus does exist on the idea that the emergence of our communication system, or rather the emergence of its modern attributes, was accompanied by the appearance of other symbolic activities. Body ornaments, ritual burials, rock painting or carving, sea-crossings and others are often quoted i) as *made possible by a sophisticated communication system* or ii) *sharing with it essential semiotic properties*. Although scientists still debate about this, some of these activities, as symbolic engravings (d'Errico et al., 2001) or body ornaments, arguably started as soon as the birth of our species in Africa some 150,000 years ago (McBrearty & Brooks, 2000). On the other hand, some others only appeared after the so-called symbolic revolution 50,000 years ago (Klein, 1999), as it seems to be the case for rock-art. Sound explanations for such time discrepancies are still missing, and are needed to better sketch out the cultural development of *Homo sapiens*. The situation of earlier species is even more confused.

In this paper, we would like to suggest that the previous relationship between language and other symbolic activities, which could be stated as a "weak positive correlation", may benefit from a deeper analysis. More explicitly, we would like to suggest that the gradual development of modern features of language perhaps allowed new behaviours to emerge, but more generally deeply redefined the way meaning/information were being conveyed along various channels between individuals. There are rather *interactions* than correlations between the previous semiotic activities, and language is one of them rather than the unavoidable and initial condition. In particular, the incremental building of language could have led to new ways of transferring information, which could have triggered new cultural manifestations and/or inhibited others, events that we can observe today in the material culture. Our approach stays at a rather theoretical level; we can however make plausible hypotheses about prehistory, by considering more recent and concrete analogies (e.g. the impact of photography ands its relation to reality on painted representations). One may ask for example i) how the development of precise linguistic tools to express social identity modified other vehicles like body ornaments, or ii) how fine-grained linguistic devices to specify time, space or aspect possibly erased behaviours previously partially devoted to this task, or reinforced others like shared metaphysical representations (as needed for ritual burials)

To flesh out this proposal, we rely on the insights of a recent paradigm in cognitive science, namely *distributed cognition*. In this approach pioneered by Hutchins in the 90's, cognitive systems are not restricted to individuals' minds, but may encompass external devices as well, or gather several interacting individuals and/or devices (Hutchins, 1995). Cognition and cognitive activities are both inside and outside people's head. This conception is obviously appealing if one wants to highlight the relevance of interactions between individuals, and the possible mediation played by artefacts of various nature, other members

of the group, elements of the environment etc. It is also of specific interest when it comes to prehistory, since we lack direct observations of our ancestors' cognitive activities, and can only rely on indirect behavioural cues scattered along time and archaeological sites. Some authors have already highlighted the potential of distributed cognition when one deals with remote past situations or non-human cognition. Strum and Forster (2001) stressed that some situations analyzed with distributed cognition could reveal themselves less demanding in terms of cognitive abilities for the subjects involved. Conceptually distributing cognitive activities in larger systems actually reduces the load on individual subjects, who do not need to "rationally" master the situation, but rather join a social, contextualized and mediated flow of cognitive activity. An example from ethology is agonistic buffering in baboons, the action of using another monkey's body as a protection which deflects and neutralizes the aggressivity of an opponent: there is no reason to assume complex cognitive abilities like mind-reading, but rather simpler sequences of actions, affects and cognitive operations.

One notion of distributed cognition we especially put the emphasis on is the concept of *medium of representation*. It can be loosely defined as a channel conveying informational representations in an extended cognitive system. We may identify:

- Various representational media during prehistory: body ornaments, non functional engravings, shapes of tools, other individuals during specific interactions (like in agonistic buffering), language, abstract or figurative drawings on cave walls etc.;
- Various properties exhibited or not by these media: persistence of the information through time, precision of the encoding, availability of the information to others etc.;
- According to their properties, differential adequacies to convey different kind of information: expression of social identity, of precise time domains or geographical locations, of metaphysical conceptions, of logical demonstrations...

Our investigation therefore focuses on how the global load of information that is conveyed between individuals is distributed and balanced (a "semiotic balance") on various representational media according to their properties, especially in cases where some properties of these media undergo changes or a new medium develops (e.g. language).

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