

The dynamic nature of meaning

Claudia Arrighi

Philosophy Department, Stanford University, CA, USA
carrighi@stanford.edu

Roberta Ferrario

Laboratorio di Ontologia Applicata, Consiglio Nazionale delle Ricerche, Trento, Italy
roberta.ferrario@loa-cnr.it

Extended Abstract

Introduction : theories of meaning

The central issue of this paper is that of showing that there is not such a thing like the exact meaning of a word or expression, but meaning is something that gradually evolves from the dynamic processes of communication.

This is a viable solution to a long-lasting philosophical problem that rests upon a lively debate that has recently animated computer scientists: the artificial agents they are dealing with don't always have access to a common and conveniently labeled ontology, they have their own representations of things, and maybe their own names, but they have to "communicate" things to each other: how can this be done, practically? One of the solutions proposed is to imitate the way in which humans understand each other, by negotiating the intended meaning of words and expressions while engaged in conversations.

It seems thus fairly clear that the study of the processes of meaning negotiation is one of the points in which the studies in philosophy and in computer science can merge and therefore obtain reciprocal enhancement.

We start by giving a brief account of the different approaches that have been historically developed in the analysis of meaning. We single out four of these approaches: the first one identifies the meaning of a word with its referent, the second one identifies meaning with a mental representation possessed by the agent who's using the word; the third one interprets the meaning as given by the conditions that have to hold in order for the word or expression to be effective, and the fourth holds that the meaning of a word comes from the use a community makes of it, as suggested by Ludwig Wittgenstein in his *Philosophical investigations* (Wittgenstein 1958). This

overview will help us in highlighting the most important desiderata a theory of meaning should achieve. In our opinion, such a theory should possess the following features:

- it must be able to *identify* a referent, but must not tie a meaning to a *particular* referent;
- it must be *related* with the mental content of the speaker, but it must not be *tied* to this one either;
- it must take in account the conditions of satisfaction, but doesn't consider them as fixed;
- it must consider important the *variability* of use of a linguistic expression, but have to clarify the *constraints and boundaries* of this variation.
- finally, it has to give an account of the intuitive difference between a *literal* and a *speaker's* meaning.

This last point is particularly important: even if we are claiming that there is not a fixed meaning for a word, the classical difference between *literal* and *speaker's* meaning has to be accounted for. In order to do this, we will consider two different levels of dynamically changing meaning, a *private* and a *public* one.

Draft of a theory: private and public meaning

The draft of a theory that meets all these requirements is twofold: on the one hand, it describes how the private meaning is formed as a mental state of individual agents and, on the other hand, it shows how a public meaning emerges from communication between agents and social practices.

Private meaning

As a possibility to represent private meaning we take a flexible semantic network, where words (or concepts) are connected one another when they frequently present themselves together in the experience of the agent.

The basic idea of a semantic network, as conceived in (Quillian 1966), is to represent a semantic field as a graph where the nodes represent words (or concepts, or features), and the links between the nodes represent relationships. The links, or connections, between the nodes can have different nature (similarity, inclusion, converse...), and different strength (more or less similar, for example). The nodes of such a network are activated when the corresponding concept is in use, and this activation spreads to the connected nodes, according to the distance, or the strength, or the nature of the connection. A psychological theory of spreading activation as a model for semantic processing was originally presented in (Collins and Loftus 1975) and has been applied with success to explain psychological phenomena like semantic priming. Implemented examples of

semantic networks include WordNet (Miller 1990) or Semantica, an expansion of SemNet (Fisher 2000). What we are interested in is a flexible kind of semantic network, where nodes and connections can be reshaped as a consequence of use (cf. Slipnet, Mitchell 1993).

Public meaning

We can say that the speaker's private meaning of a linguistic expression is a mental representation consisting of a variable set of conceptual features that don't represent a specific description that has to be satisfied by a candidate referent for the word, but rather must be considered just as tools to use when we engage in any linguistic exchange.

The linguistic exchange has a twofold purpose: the speakers try to find an agreement on the intended reference for a given word or expression, meshing their individual perspectives, and at the same time they refine their internal representation of the meaning in order to be more successful in future exchanges. The set of conceptual features is variable in two ways: it varies in time for the same speaker, due to the exposure to multiple linguistic interactions, hence to multiple refinement processes; it varies amongst different speakers, because there are hardly two speakers that have been through exactly the same series of refinement processes. What has been called public meaning, or also literal meaning, of a word in a given language is also a set of conceptual features, but it is an abstract set and not the specific mental content of a person. It grows as a generalization from the most common conceptual features representing the speakers' meaning in widespread successful linguistic interactions¹. We are then speaking of an abstraction, a "mean" value extracted from the speakers' usage of that meaning, and being the mean amongst values that vary in time, it also varies in time, even if slower. How is this mean value calculated? In everyday life it is not really calculated, but just estimated according to the best knowledge we have of a language. Compiling dictionaries is a professional performance of this estimation, which tries hard to extrapolate from as wide a basin of language usage as possible.

To sum up, our proposal consists of a treatment of meaning as emerging from processes of communication and negotiation taking place among agents: these processes can reshape the representation of private meaning, and in the long run the abstract representation of the public meaning. As (Rapaport 2003) puts it: "We almost *always* fail [...]. Yet we almost always nearly succeed: This is the paradox of communication." (p. 402)

¹ Language (or semantic) games, as described in (Hintikka 1976) are a very interesting logical tool that has been proposed for the formalization of these processes.

References

- Collins, A. M. and E. F. Loftus (1975). "A spreading-activation theory of semantic processing." Psychological Review **82**(6): 407-428.
- Fisher, K. M. (2000). SemNet® Semantic Networking. Mapping biology knowledge. K. M. Fisher, J. H. Wandersee and D. Moody. Dordrecht, Netherlands, Kluwer: 143-165.
- Hintikka, J. (1976). "Language-Games." Acta Philosophica Fennica **XXVIII**(1-3): 105-125.
- Miller, G. A. (1990). "WordNet: An on-line lexical database." Inter. Journal of Lexicography **3**(4): 235-312.
- Mitchell, M. (1993). Analogy-Making as Perception. Cambridge, Bradford Books/MIT Press.
- Quillian, M. R. (1966). Semantic memory, Carnegie Institute of Technology.
- Rapaport, W. J. (2003). "What Did You Mean by That? Misunderstanding, Negotiation, and Syntactic Semantics." Minds and Machines **13**(3): 397-427.
- Wittgenstein, L. (1958). Philosophical investigations. New York, The Macmillan Company.