

# Intended Meaning and Situational Interest

Marco Cruciani (cruciani@disi.unitn.it)  
Department of Ingegneria e Scienza dell'Informazione  
University of Trento, Italy

## Abstract

The problem of determining intended meaning is a key topic in the study of linguistic processes. This paper is part of a research that attempts to answer the question: how do agents involved in a linguistic controversy determine the intended meaning of a sentence? The main thesis of the research is that the determination of meaning is driven by agents' situational interests. The process is analyzed in two phases (individual and contractual), and the thesis is respectively declined in two hypotheses. Here I analyze the first phase. The hypothesis is that an agent's situational interest drives the individual choice of meaning for ambiguous sentences. It is argued in particular that formal semantics, the dictionary, context of use and domain knowledge are not sufficiently powerful to determine a unique meaning (*condition of legitimacy*). From this it follows that an agent can *legitimately* choose a meaning (i.e. make a decision) given a set of contextually admissible interpretations. This proposal should impact on the problem of meaning under determination. The contribute consists in providing a further tool to determine how agents assign meaning to sentences of natural language. Finally, I shall sketch out a semantic function which its input is a set of contextually admissible interpretations and agent's situational interest, and its output is a ranking of ordering of interpretations. The approach is theoretical, but the research is based on cases of disputes concerning ambiguous clauses in employment contracts.

## Introduction

The paper seeks to answer the question: how is it possible to determine the intended meaning of a sentence within a linguistic interaction (cfr. Grice 1989, Sperber and Wilson 1986, Kripke 1979)? In my view, in some cases, when agents determine the meaning of a sentence, they resort to an individual decision, and then to negotiation between them. In cases where ordinary tools are not sufficiently powerful to determine a unique meaning for a sentence or expression in a given situation, an agent chooses a meaning, from a given set of admissible interpretations, which s/he believes to guarantee his/her own interest with respect to the specific situation. Once an individual choice has been made, if the agent does not agree with the other agents, then a linguistic controversy arises and a negotiation of meaning ensues.

The analysis of linguistic controversies arising from ambiguous clauses in contracts sheds clear light on real linguistic interactions, in which interactions are partially recorded, interests are sufficiently clarified, and meaning is truly important to the agents involved.

The main thesis of the paper is that in the process of determination of the intended meaning of a natural language sentence there exists a relation between possible logical models of a sentence and extra-semantic interests

of agents, or what they take to be their interests with respect to the situation. Essentially, agents' situational interests drive the determination of meaning. The process is analyzed in two phases: one individual and the other contractual, and the thesis is respectively declined in two hypotheses. These two dimensions are relevant because, as Clark puts it, "we cannot hope to understand language use without viewing it as joint action built on individual actions. The challenge is to explain how all these actions work" (Clark 1996, p. 4).

Here I analyze the first phase. The first hypothesis concerns the individual dimension of the process: in the case of a polysemous sentence, where meaning is important for an agent, s/he chooses a plausible interpretation on the basis of his/her own situational interest, making a choice from a given set of admissible meanings. In particular, given a specific situation where the same sentence, or expression, can have different meanings, even radically different ones, admitted by ordinary tools, an agent can legitimately choose among them. An agent chooses an interpretation that s/he considers to satisfy his/her interest. In my view, it is very important that an agent can *legitimately* choose this interpretation, because ordinary tools leave open a semantic space in which an agent has no further linguistic constraints. I call this lack of constraints: *condition of legitimacy*.

I shall argue that formal semantics, use of the dictionary, support of the context of use and domain knowledge reduce the set of admissible meanings, but they are unable to determine a unique meaning. I shall show that each tool imposes certain constraints, and I shall represent the operation of those constraints by means of set-theoretical relation. I shall illustrate the tools by means of a schema in which each tool is represented by a level of a cone. Each level admits to a set of possible meanings for a sentence on the basis of constraints specific to that level. I call this schema the "cone of language". In particular, the last level of the cone concerns the choice of a meaning among those selected by the previous levels. At this level, the set of possible meanings is partially ordered with respect to preferences which represent the agent's situational interests. At this point, the agent chooses a meaning.

In the last part of the paper, I shall sketch out a function that represents how agents' interests make a selection from ordered sets of interpretations.

## Interest and meaning

In this section I briefly introduce some concepts that I shall employ and discuss in the paper. I first consider the

notion of meaning adopted in formal semantics, because this represents a strong attempt to explain the semantic properties of language. In semantics, the meaning of a sentence is fixed by its truth-conditions. Truth-conditions represent how the world would be if the sentence was true. If an agent knows the truth-conditions of a sentence, then s/he will also know its meaning. Hence an agent knows the meaning of a sentence even if s/he *de facto* does not know if the sentence is true (Wittgenstein 1921; see Marconi 1997; Casalegno and Marconi 1992). A central notion in formal semantics is that of model. Specifying a model for a language is a way to interpret it, to confer meaning on its expressions. Since sentences can be true or false with respect to the meaning that we assign to them, we say that a sentence is true or false with regard to a certain model (Casalegno and Marconi 1992). According to the principle of the compositionality of meaning, the meaning of an atomic sentence is obtained by composition of the meanings of its constituents. From this it follows that if an agent knows the meanings of the words of a sentence, then s/he will also know the meaning of the sentence. Put otherwise: knowing the meaning of the words of a sentence is to know their semantic contribution to the meaning of the whole sentence. Similarly, the meaning of a compound sentence functionally depends on the meanings of its atomic sentences (see Chierchia 1992).

Another focus of the paper is the role performed by interest. According to Conte and Castelfranchi, an agent's interest can be represented as a state of world which favours the achievement of the agent's goal. An agent is interested in a certain state of the world  $p$ , if this implies another state  $q$  which corresponds to his/her goals (Conte and Castelfranchi 1995). On this view, interest is a relation between one state of the world and another. An interest can be considered not only as a relation between states but also as a motivation for action which realizes a state. According to Latour, "as the name 'inter-esse' indicates, 'interests are what lie *in between* actors and their goals, thus creating a tension that will make actors only what, in their own eyes, helps them reach these goals amongst many possibilities" (Latour 1987, pp.108-109). On this view, an agent is interested in a certain meaning because s/he believes that it implies her goal.

In what follows, I shall show how lack of constraints permits to agents' interests select out which is the intended meaning for a sentence of natural language.

### Cone of language

In the following subsections I shall argue that the support of formal semantics, use of the dictionary, context of use and domain knowledge are not able to determine a unique meaning for an expression. I shall argue that they are able to reduce possible meanings on the basis of some linguistic constraints, and I shall represent them by means of the 'cone of language', which is composed of four levels: formal semantics; use of the dictionary; context of use of an expression; and finally, the level of ordering preferences and decision making. Each level produces a set of meanings equal to or smaller than the previous one. We can write  $M_n \supseteq M_{n+1}$ , where  $M_n$  is the set of logical

models admitted by the level  $n$  and  $M_{n+1}$  is the set of logical models admitted by the following level  $n+1$ .

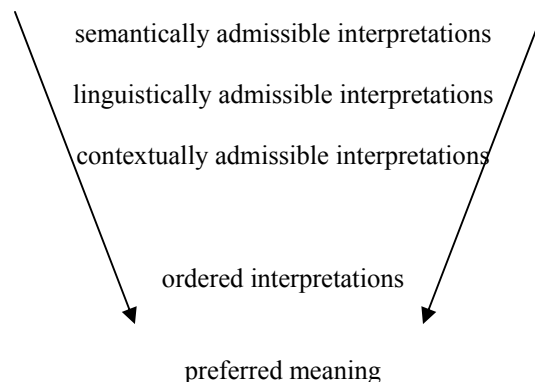


Figure 1: Cone of language

The formal semantics level admits grammatically correct sentences. Semantics provides formal interpretations of sentences and reduces the set of possible meanings for a grammatically correct sentence. The output from this level is a set of semantically admissible meanings for a sentence. The next level, that of the dictionary, provides interpretations for single terms and reduces the former set of meanings obtained by semantics. The next level, that of context of use and domain knowledge, provides knowledge which rules out some meanings with respect to the specific context and reduces the previous set of meanings obtained by dictionary. The last level concerns the agent's preferences and the individual choice. We can view this level as a function that has in input a set of contextually admissible interpretations and agent's interest, and its output is a ranking of ordering of interpretations. At this point an agent chooses an ordering which accords with his/her preferences.

### Formal semantics

In this subsection I argue that formal semantics does not capture the meaning of single terms of natural language; with the consequence that it cannot determine the intended meaning of a sentence. Formal semantics is the approach to meaning which applies analytical tools used to study the semantic properties of formalized languages, like logic and mathematics, to natural language (Casalegno and Marconi 1992). It can be regarded as the main paradigm in the analytic philosophy of language (Frixione 1994).

According to Bianchi, the main thesis in semantics is that the rules or conventions of a language are able to fix the meaning of every expression of that language. Semantics concerns itself with the meanings of linguistic expressions independently of the situation in which they are used, and it investigates the relation between linguistic expressions and objects in the world. Semantics is:

1. *conventional*, that is, meaning depends on linguistic rules applied to form of expression;
2. *truth-conditional*, that is, the meaning of a sentence identifies with its truth-conditions. And the meanings of words identifies with their contribution to the truth-conditions of the sentence in which they appear;
3. *compositional*, that is, the meaning of a compound sentence functionally depends on the meanings of its components (Bianchi 2003).

To provide a semantic interpretation of a natural language sentence, we must first translate the sentence into a formal language  $L$  expressive enough with respect to the universe of discourse, and we must then assign interpretations to its non-logical components. We assign interpretations by means of a function  $I$  that associates elements of  $L$  with objects in a domain  $D$  (the universe of discourse). The couple  $M = (I, D)$  is called ‘model’; a semantic interpretation can be true or false with respect to a model.

The models of a sentence can be infinite because infinite objects can satisfy the formal conditions expressed in a semantic interpretation. According to Frixione, formal semantics does not fix, for example, which sub-set of  $D$  the function  $I$  should associate with “glass”. Similarly, it does not specify the difference between “glass” and “table”. In essence, formal semantics explains the semantic properties of a compound sentence through the semantic properties of its elements, but it says nothing about these elements, which are considered as given (Frixione 1994). In this respect, formal semantics does not contribute to the problem of intended meanings in natural language because it does not contribute to resolving the problem of lexical meaning. According to Thomason, the problems of semantics should be distinguished from those of lexicography. Formal semantics explains how different types of meanings are connected to different syntactic categories, but it does not explain how two expressions belonging to the same syntactic category differ with respect to their meanings. Formal semantics does not concern itself with which entities are correct or intended with respect to an interpretation of a language (Thomason 1974). From this it follows that, in order to understand the intended meanings of natural language sentences, we must support formal semantics with respect to the lexicon. In my view the best candidate is the dictionary.

## Dictionary

In this subsection I argue that the dictionary does not provide support powerful enough to individuate a unique meaning for a word, and therefore that it is not able to determine the intended meaning. This is so in two respects: in the case of polysemy, the dictionary does not provide a criterion with which to determine a unique meaning; but also in the case of a unique definition, the dictionary provides ‘only’ the conventional meaning, that is, it does not provide sufficient information with which to determine truth-conditions (*de facto* it underdetermines

truth-conditions). Therefore in both cases it is unable to determine the intended meaning.

According to Putnam, it is the fact that we write dictionaries that founds the idea of semantics (Putnam 1975). What is a dictionary? It is a list of words, each of which is followed by a definition of its meaning. A dictionary has at least three functions:

- f<sub>1</sub>) it shows that a word exists and belongs to the vocabulary of the language;
- f<sub>2</sub>) it defines the meaning of a word by means of vocabulary;
- f<sub>3</sub>) provides some alternative interpretations, if necessary.

According to Bouquet, “dictionaries have two interesting properties:

- p<sub>1</sub>) they provide a *publicly accessible* and *socially negotiated* list of acceptable interpretations for a word;
- p<sub>2</sub>) however, interpretations cannot *ipso facto* be equated with a list of shared meanings for the speakers of that language, as interpretations are (circularly) defined through other words, and do not contain the concept itself” (Bouquet 2007, p. 23).

On this view, a dictionary furnishes a network of socially accepted lexical relations which constrain concepts, but it does not contain them. According to Bouquet a linguistic community can be defined as a group of speakers who agree on a common dictionary (Bouquet 2007). On this view, speakers can reach linguistic agreement independently of actual references of words. However, I maintain that, in real situations, the dictionary provides a linguistic support which reduces possible interpretations in a linguistic community with respect to formal semantics.

In what follows, I report a case of an ambiguous clause and illustrate that the Dem Mauro dictionary is unable to provide a unique plausible interpretation of it. I have translated the clause from Italian into English, because the dispute occurred in Italy, but I believe it plausible that the analysis is equivalent. The clause runs as follows:

“In particular, it is understood that the employment relationship established with you will be resolved upon *cessation of the absence* of Miss Maria Rossi, and however not beyond 23 December 2005”.

This clause regulated the working conditions and hours of a recent graduate hired by an insurance company to substitute M.R. while she was on maternity leave. During the substitution period, M.R. resigned, and the employer terminated the graduate’s employment on the grounds that the absence of M.R. had ‘ceased’. The graduate argued that the clause referred to the absence of M.R. during maternity leave, not to her absence due to resignation.

The linguistic controversy arose with regard to the expression “cessation of the absence”. We may use the dictionary to determine the meaning of the expression. I have translated the definitions from Italian into English.

The Italian Demauro dictionary provides two possible interpretations for the word “cessation”:

- a) termination;
- b) interruption, suspension.

It gives three possible interpretations for the word “absence”:

- c) being away: *absence from work*;
- d) lack: *lack of air, lack of light, lack of gravity*;
- e) temporary loss of consciousness.

We can interpret the expression “cessation of the absence” through different combinations (compositionality) of the various interpretations of the single terms. The dictionary provides some socially accepted interpretations of words which constrain the admissible meanings of a sentence in which the words appear. On the other hand, the dictionary is unable to determine a unique meaning for an expression, because it does not provide a criterion with which to choose one interpretation rather than another: they are on the same plane. How can we decide which interpretation is plausible?

I first introduce the context of use. We can coherently individuate the expression “interruption of absence from work” among the others because it is compatible with the context under examination. For brevity, we suppose that it is the sole interpretation available from the dictionary. But if we compare it with the interpretations of the two agents, we see that it is compatible with both of them. It does not sufficiently specify the truth-conditions with respect to the real situation. How can we discern which is the meaning in cases where we have several interpretations on the same plane; or, conversely, in cases where we have insufficient information from the dictionary? We can rely on a combination of domain knowledge and the context.

### Context of use

In this sub-section I argue that information concerning the context of use of an expression and domain knowledge do not suffice to determine a unique meaning for an expression, and that they are therefore unable to determine the intended meaning.

The philosophy of language considers two kinds of context: semantic and pragmatic. The semantic context represents relevant information through variables associated with the utterance: that is, it fixes the identity of speakers and interlocutors, the place, the time, etc. It contributes to determining literal meaning, and it is used in particular in cases of ellipsis, indexicality and ambiguity. The pragmatic context is composed of a network of interlocutor beliefs, intentions and activities, and it contributes to determining the communicative intentions of speakers (Bianchi 2003). The pragmatic context can have pre-semantic and post-semantic uses (Perry 1997). In the former case, the pragmatic context intervenes before the semantic context assigns an interpretation (e.g. in case of polysemy); in the latter, it intervenes after interpretation has been made to determine the actual communication (“speaker’s meaning” – Grice 1989) with respect to the conventional meaning previously fixed by the semantic context (Bianchi 2003).

We need the pre-semantic and post-semantic uses of context because “the encoded meaning of the linguistic expressions underdetermines the proposition explicitly expressed by the utterance: meaning underdetermines truth conditions. [...] According to contextualism:

- i) the meaning of *any* sentence underdetermines its truth conditions - underdetermination becomes a *general property* of meaning;
- ii) the contextual factors that could be relevant for determining the truth conditions of a sentence cannot be specified in advance, and are not codified in the conventional meaning of the sentence” (Bianchi and Vassallo 2007, p. 78).

However, in the case examined here, some relevant pragmatic information is available in advance from domain knowledge concerning activities related to contracts. I believe it plausible that the goals, intentions and beliefs of agents must be at least compatible with contract-making rules (e.g. see civil code), otherwise a contract cannot be stipulated. I consider the context of use and domain knowledge to be collapsed together, and I refer to their intersection in accordance with what Bouquet and Giunchiglia (1995) called “context of work”. On this view, the contextual information relevant to interpretation of a sentence in a particular context can be regarded as a subset of domain knowledge.

To clarify this point, I report two criteria (out of many) with which to disambiguate clauses of contracts stipulated under Italian law: *literal meaning* and *exegesis of common intentions of the parties*. These criteria are used to settle judicial and extra-judicial disputes. The former concerns the semantic context and pre-semantic uses of the pragmatic context; and the latter concerns post-semantic uses of the pragmatic context. Let us consider the first criterion: literal meaning. Suppose that we want to determine the conventional meaning of the sentence “the bank is wet”. Before assigning an interpretation to the sentence, we must assign interpretations to its constituents: “bank” and “wet”, and then compose the meanings of the single terms. But we cannot assign an interpretation to the single words because we must first know whether we are speaking about a river or a financial institute. In this sense, pre-semantic uses of context are based on specific information about the agent’s activities related to the sentence. For example, “bank” may refer to “border of river” or “financial institute” and “wet” may refer to “damp” or “weak”, respectively if an agent is going to fish or if s/he is talking to a board of directors. Hence, contextual information provides a criterion with which to decide which interpretations are plausible with respect to the situation. However, we have seen that in the case of “cessation of the absence” the literal meaning underdetermines the truth-conditions; hence both interpretations are compatible with the context. From this it follows that uses of the semantic and pre-semantic context are unable to indicate which interpretation is plausible. The second criterion – common intentions – serves to determine what was the practical agreement between the agents, and subsequently, to determine the meaning compatible with the original agreement.

However, some clauses/sentences admit different possible interpretations of ‘common intention’ which are legitimately defensible by the parties. In the case of “cessation of the absence”, the common intention of the parties is to replace an employee (MR) with a temporary worker during the former’s absence due to maternity leave. It is not foreseen in the common intention that MR may resign and, in any case, the common intention does not capture certain aspects of the real situation. The disagreement arises because the company maintains that MR is no longer an employee; on the other hand, the new graduate maintains that the maternity leave of MR has not ceased. Hence they must refer to the terms of the contract: “23 December” and not to the condition: “cessation of the absence”. Essentially, in some cases even the contribution of the post-semantic context is not sufficiently powerful to determine a unique meaning for a sentence. In cases of this kind, when there are no further linguistic tools available, how can we determine the intended meaning of a sentence? We must resort to a decision.

### Individual choice

In this section I employ some basic notions from decision theory (Resnik 1987; Myerson 1991; Hansson 1994) to describe the process of choice upon which decision-making is based. First of all, I wish to stress that, from an epistemological point of view, it is very important that an agent can *legitimately* choose an interpretation, among those admissible, because linguistic tools leave a semantic space open in which *de facto* every choice is legitimate.

Following decision theory, I maintain that agents’ interests can be described with the language of preferences, and that a choice is made coherently with the agents’ ordering preferences. Decision theory uses three comparative notions of preference: “better than” ( $>$ ); “equal in value to” ( $\equiv$ ); “at least good as” ( $\geq$ ). Using this language we can write, for instance,  $(m_1 > m_2)_{Ag_1}$ , that is, agent  $Ag_1$  prefers the meaning  $m_1$  rather than the meaning  $m_2$ . In our case, the set of contextually admissible meanings  $M_3$  represents the set of options which agents order with respect to their preferences. Decision theory assumes that a ‘rational’ agent can ‘correctly’ choose an option if the set of options is ordered in accordance with some formal properties. Here, I consider only two essential properties: completeness and transitivity.

The formal property of completeness (for weak preference  $\geq$ ) is defined for a relation and its domain:

- the relation  $\geq$  is complete if and only if for any element  $A$  and  $B$  of its domain, either  $A \geq B$ , or  $B \geq A$ .

This property guarantees that an agent is able to compare between two options. The formal property of transitivity (for weak preference  $\geq$ ) is defined as follows:

- the relation  $\geq$  is transitive if and only if it holds for all elements  $A$ ,  $B$ , and  $C$ , of its domain that if  $A \geq B$  and  $B \geq C$ , then  $A \geq C$ .

This property guarantees that an agent is able coherently to compare among options. Indeed, “it is expected that the preferences that guide decisions are in many cases

incapable of being represented by a complete preference relation. Nevertheless, in decision theory preferences completeness is usually accepted as a simplifying assumption, (...) although it is often a highly problematic assumption”, as well as the assumption of transitivity (Hansson 1994, p.17). But in our case, agents consider only a reduced set of all options because ordering involves only some possible interpretations: that is, the admissible meanings previously selected by linguistic tools. Therefore we can consider a partial ordering of preferences in which an agent ‘coherently’ makes a decision in accordance with the rule that states: “an alternative is (*uniquely*) best if and only if it is better than all the other alternatives. If there is a uniquely best alternative, choose it” (Hansson 1994, p.19). In synthesis, an agent legitimately chooses a meaning from a set of selected interpretations because it satisfies his/her interest.

### Features of a semantic function

In this subsection I show a schema in which is represented relation between elements of the model and sketch out the features of the *situational semantic function*.

I call situational semantic function  $F_{ss}$  a function that, given a situational goal  $G$ , assigns a numerical value  $\psi$  ( $\alpha$ ,  $\beta$ ,  $\gamma$ , ...) to each possible ordering of contextually admissible interpretations  $I_c$ .

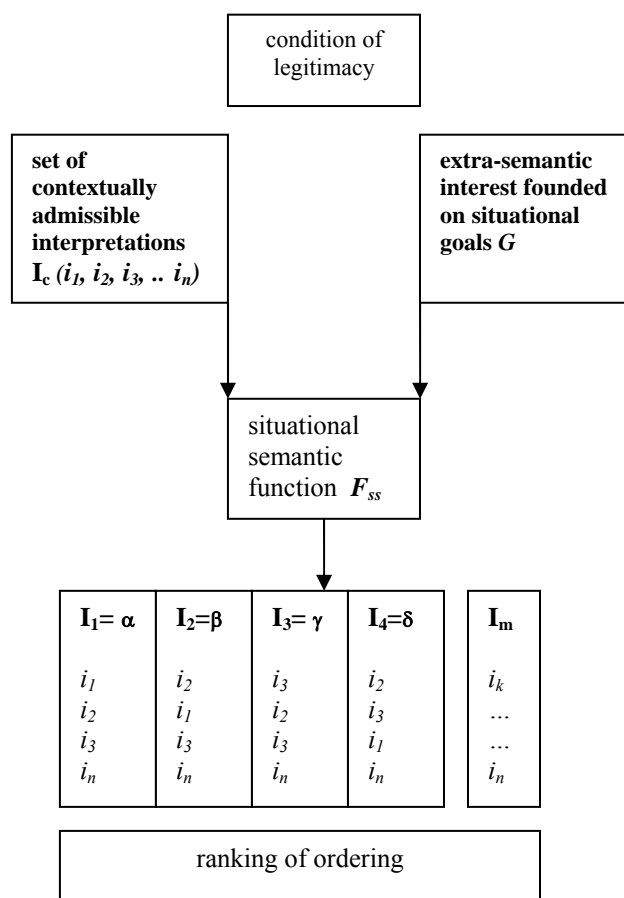


Figure 2: Schema of the model

*Definition:* Let  $G$  be a goal of agent and  $I_m$  an ordered set of admissible interpretations in a context  $c$ . The situational semantic function  $F_{ss}$  is the function which outputs a numerical value for each couple  $(G, I_m)$ .

Essentially,  $F_{ss}$  is a function which for each possible combination of interpretations  $I_m (i_1, i_2, i_3, \dots i_n)$  provides a number with respect to the situational goal. The higher number corresponds to preferred ordering of contextually admissible interpretations on the basis of which we can decide the intended meaning.

## Summary

We have seen that, in some cases, ordinary linguistic tools are unable to grasp the meanings of natural language sentences and expressions. They reduce the possible meanings on the basis of different kinds of linguistic constraints, but they are unable to determine a unique meaning. Thus, an agent can legitimately choose an intended meaning from a set of admissible meanings previously selected by linguistic tools. S/he chooses a meaning which favours his/her interest. It is in this sense that situational interest drives the determination of the intended meaning.

## Acknowledgments

Current research is possible in force of funding provided by European Network of Excellence "KnowledgeWeb" ([www.knowledge.semanticweb.com](http://www.knowledge.semanticweb.com) – knowledge web project FP6 507482) and by OKKAM project [www.okkam.org](http://www.okkam.org)

## References

- Bianchi, C. (2003). *Pragmatica del linguaggio*. Roma-Bari: Laterza.
- Bianchi, C. and Vassallo, N. (2007). Meaning, contexts and justification. In B. Kokinov, et al. (Eds.). *Modeling and Using Context*. Berlin Heidelberg: Springer-Verlag.
- Bouquet, P. (2007). Context and ontologies in schema matching. In P. Bouquet et al. Proc. *Context and ontologies representation and reasoning*. Roskilde University: Roskilde DK.
- Bouquet, P. and Giunchiglia, F. (1995). Reasoning about theory adequacy. A new solution to the qualification problem. *Fundamenta Informaticae* 23, 247-262.
- Bouquet, P. and Warglien, M. (2002). Meaning negotiation: an invitation. In P. Bouquet (Eds.). *Meaning negotiation papers AAAI workshop*. Edmonton: AAAI Press.
- Casalegno, P. and Marconi, D. (1992). Alle origini della semantica formale. In M. Santambrogio (Ed.) *Introduzione alla filosofia del linguaggio*. Roma-Bari: Laterza.
- Clark, H.H. (1992). *Arenas of language use*. Chicago: University Chicago Press e CSLI.
- Clark, H.H. (1996). *Using Language*. Cambridge: Cambridge University Press.
- Chierchia, G. (1992). Logica e linguistica. Il contributo di Montague. In M. Santambrogio (Ed.) *Introduzione alla filosofia del linguaggio*. Roma-Bari: Laterza.
- Cruciani, M. (2008). Cone of language. 8<sup>th</sup> Italian Conference of Analytic Philosophy. Bergamo, Italy, 23-25 Sept.
- Cruciani, M. (2008). Meaning negotiation and situational interest. (ma) Proc. 30<sup>th</sup> Annual Conference of Cognitive Science Society. New York: Taylor and Francis.
- Cruciani, M. (2008). Interesse e significato. Dept. Cognitive Sciences and Education, Univ. of Trento, Italy, Phd dissertation.
- Cruciani M. (2007) Situational interests and meaning. (ma) Proc. 29<sup>th</sup> Annual Conference of Cognitive Science Society. New York: Taylor and Francis.
- Cruciani, M. (2007). Interesse situazionale, decisione e significato. In G. Giardini et al. (Eds.) Proc. 4<sup>th</sup> Italian Conference on Cognitive Sciences. Roma: AISC.
- Cruciani, M. (2007). Negoziazione degli interessi e significato come epifenomeno. In G. Giardini et al. (Eds.). Proc. 4<sup>th</sup> Italian Conference on Cognitive Sciences. Roma: AISC.
- Cruciani, M. (2007). Meaning and interests. In P. Bouquet (Ed.) <http://context-07.ruc.dk/Context2007DocCons.pdf>.
- Cruciani, M. (2006). Interesse e significato. In A. Greco et al., (Eds.) Proc. 3<sup>rd</sup> Italian Conference on Cognitive Sciences. Genova: Erga.
- Conte, R. and Castelfranchi, C. (1995). *Cognitive and social action*. London: University College.
- Frixione, M. (1994). *Logica, significato e intelligenza artificiale*. Milano: Angeli.
- Gaucker, C. (1997). Domain of discourse. In *Mind* 106, pp. 1-32.
- Gaucker, C. (1998). What is a context of utterance? In *Philosophical Studies*, 91, 149-172.
- Grice, P. (1989). *Studies the way of words*. Cambridge: University Press.
- Hansson, S.O. (1994). *Decision theory*. Royal Inst. of Technology. [www.infra.kth.se/~soh/decisiontheory.pdf](http://www.infra.kth.se/~soh/decisiontheory.pdf).
- Kripke, S. (1979). Speaker's reference and semantic reference. In A. French, et al. (Eds.) *Contemporary perspective in the philosophy of language*. Dordrecht: Reidel, pp. 6-27.
- Latour, B. (1987). *Science in action*. Cambridge MA: Harvard University Press.
- Marconi, D. (1997). *Lexical competence*. MA: MIT.
- Myerson, R. B. (1991). *Game theory: Analysis of conflict*. Cambridge (MA): Harvard University Press.
- Penco, C. (1999). Objective and cognitive context. In *Lecture notes in artificial intelligence*, 1688. Berlin: Springer, pp. 270-283.
- Penco, C. (2002). Context and contract. In P. Bouquet et al. (Eds.) *Contexts*. Stanford: CSLI.
- Perry, J. (1997). Indexical and demonstratives. In B. Hale and C. Wright (Eds.) *A Companion of philosophy of language*. Oxford: Blackwell; pp.586-612.
- Putnam, H. (1975). *Mind, language and reality*. Cambridge: University Press.
- Resnik, M. (1987). *Choices*. Minnesota: University Press.
- Sperber, D. e Wilson, D. (1986) *Relevance theory: communication and cognition*. Oxford: Blackwell.
- Thomason, R. (1974). Introduction to R. Montague *Formal philosophy*. New Haven: Yale University Press.
- Wittgenstein, L. (1921). *Tractatus logico-philosophicus*. Oxford: Blackwell 1961.