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Philosophical perspectives on experimental pragmatics

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The Experimental Turn in Philosophical Pragmatics*

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Modern pragmatics has been defined as "philosophical" pragmatics, not only because its main representative authors, such as John Austin (1962) and Paul Grice (1989), were philosophers of ordinary language, but also because it has used linguistic and philosophical analysis as the key method to give an explanation of the communicative features of language. If we consider language in general as an object of analysis, on the one hand, psychological language models have focused on aspects that are studied through an empirical method: phonological and syntactic modules, models of acquisition and memorization or "storage" of lexis, biological foundations of language, etc. On the other hand, philosophical models have mainly focused on the notion of meaning and rhetorical-pragmatic aspects of verbal communication. This gap, which has deep-rooted historical origins, still persists in theories of language and in the approaches and methods of such theories, including pragmatics.

As Ira Noveck and Dan Sperber stated in their ground-breaking volume (2004), the understanding of language in context has been studied by two disciplines – pragmatics and psycholinguistics – even though there has been little communication between them. However, in the last years, plenty of studies have brought classical pragmatic theories in front of the tribunal of experience to test their power of explanation and prediction. The result has been the growth of a flourishing interdiscipline, called "Experimental

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Pragmatics", which claims that understanding an utterance requires access to the speaker's intention in specific contexts and uses experimental techniques coming from psycholinguistics, cognitive science and psychology to highlight the comprehension mechanisms of non-literal and figurative language. The aim of this issue is to discuss the main empirical results of Experimental Pragmatics and to explore its theoretical influence on "philosophical" pragmatics in its most important research subjects, such as figures of speech, presuppositions, translation, etc. How and to what extent do experimental methods and conceptual analysis interact in pragmatics? Which consequences does this experimental turn bear upon theorizing in pragmatics?

Answering these questions is the aim of this special issue of *Humana.Mente*, entitled "Philosophical Perspectives in Experimental Pragmatics". The issue collects eight papers, two book reviews, one conference review, and two interviews. The contributions are tied by a common thread, namely the view that philosophical pragmatics could and should pay attention to the main findings coming from other disciplines, such as psycholinguistics, corpus linguistics and cognitive science, to better understand the possibilities as well as the limits of its main theoretical proposals. The eight papers introduce different ways in which data and experiments can bridge the gap between concrete communicative behaviour and pragmatic theories. The range of experimental techniques presented in the volume vary from neurolinguistic experiments to the analysis of language corpora, from behavioural tests to the pathologies of communication, to show the ways data can be collected and analysed in order to test, support or falsify different theoretical perspectives.

The paper "Experimental Investigations of the typology of Presupposition Triggers" by Chris Cummins, Patricia Amaral, Napoleon Katsos, focuses on presuppositions (Van der Sandt 1988) and the problem of distinguishing backgrounded from foregrounded meanings (Shanon 1976), which influence the interpretation of incoming information in a communicative encounter. In particular, the authors address the problem of potential differences between presuppositions triggers, such as "continue", "only" or "stop". They discuss alternative theories, also coming from the study of implicatures, and present the results of a pilot study, a set of questions and answers containing presuppositions triggers, to underpin the hypothesis according to which lexical triggers entail their presupposed content and a negative answer to the presupposed content should count as a negative answer to the question.

Stavros Assimakopoulos, in his paper "On Encoded Lexical Meaning: Philosophical and Psychological Perspectives", considers the account of meaning comprehension known as the "literal first hypothesis" (literal meanings are processed first, easier and faster than figurative meanings), and argues that the very psychological implausibility of this hypothesis is one of the reason why Relevance Theory (Sperber & Wilson 1986/1995) shifts to the account of ad hoc concept construction. A pragmatic process of lexical adjustment, takes the linguistically encoded concept and generates an *ad hoc* concept in the proposition the speaker intends to communicate, in order to satisfy her expectations of relevance and make sense of the speaker's utterance (Wilson & Carston 2006). The mutual understanding does not necessarily require that the speaker and listener share the same *ad hoc* concept: an *interpretive resemblance*, i.e. a partial overlapping of logic and encyclopedic knowledge of source and target concept, is sufficient (Wilson 2000). The author argues that this view would have been incompatible with Fodorian semantics, which instead had committed Relevance Theory with the "literal first hypothesis".

A close look to the experimental data questioning the plausibility of the "literal first hypothesis" is given in the paper by Valentina Bambini and Donatella Resta, "Metaphor and experimental pragmatics: When theory meets empirical investigation". In particular, the paper addresses an open problem in non-literal language experimental literature, exploring the opposition between the "literal-first hypothesis", according to which the process of understanding figurative language is indirect since it is necessarily dependent on a previous literal interpretation (Janus & Bever, 1985) and the "direct access view", which does not imply the mandatory step of literal interpretation, supposed by the "literal-first hypothesis" (Gibbs & Gerrig, 1989). The experimental method taken into account to discuss these alternative hypotheses is functional neuroimaging and the specific application field is the cognitive processes involved in the comprehension of metaphors. The discussion concludes that the process of metaphor understanding is far from being clear, but it shows that the problem can be handled only from an experimental point of view. The research on the cognitive architecture of mind-reading abilities can indeed advance the research on metaphor, narrowing down the questions and allowing the experimental paradigms to better address their theoretical key-points.

Advances in technology and artificial intelligence techniques represent another way in which language use mechanisms come into play in the

redefinition of many questions which were previously the object of philosophical disciplines. The possibility to explore many linguistic data applying algorithms and procedures allow scholars to discover regularities and generalize relationships on texts, which represent (or can be considered a mirror of) communicative behaviour. In the paper "Automated Translation between lexicon and corpora" translations issues are examined, focusing, in particular, on ways to solve representational and translation problems in polysemy. The authors, Elisabetta Gola, Nilda Ruimy, Stefano Federici and John Wade, use tools coming from linguistics, metaphor and polysemy studies, artificial intelligence and corpus analysis and review the state of the art of Machine Translation (Hutchins 1986). They present the computational products they contributed to build up and proposed an integration between lexical resources and corpus data throughout a machine learning technique.

Neuroimaging and behavioral evidence are instead discussed in Katarzyna Bromberek-Dyzman's paper, "Affective Twist in Irony Processing", whose main theme is irony. Verbal irony is one of the most difficult communicative tasks and requires a very complex social ability. Irony adds a nuance of meaning that changes the force of what is said and a full understanding of irony would entail some appreciation of why speakers choose this communicative strategy to express their thoughts. This question is even more urgent in case of sarcasm, in which speakers are perceived as more angry and scornful (Leggitt & Gibbs 2000), or as more verbally aggressive and offensive (Toplak & Katz 2000), or more insincere, impolite, non-instructional, and ambiguous (Katz, Blasko & Kazmerski 2004) than speakers who pronounce a literal sentence. In particular, the author focuses on the study of emotional meaning and she argues that recognizing the ironic attitude is profoundly influenced by the emotional load non-propositionally attached to the propositional contents.

Other complex communicative phenomena that could be classified under the umbrella-term "humour" are jokes and puns. To puns, in particular, and to the role of context in the comprehension process, is dedicated Alberto Voltolini's paper, "Puns for Contextualists". Voltolini discusses in detail different sentences and cases of punny sentences from two points of view: the contextualists (Recanati 2004) and the non-contextualists (Predelli 2005). He argues in favour of the contextualist stand, showing that, in order to understand a pun, it is not always necessary for the interpretive readings to affect the truth-conditional level of what is said through such utterances. It is indeed crucial to be able to grasp the speaker's intention, which is a pragmatic

and contextual feature of meaning. The goal of experimental pragmatics is to experimentally underpin or falsify this hypothesis, by establishing which processes are in place among different possible ones, which range from the supposition that there is an interpretation that removes the previous one, to the judgment of "impossible" interpretations of the literal reading.

Marzia Mazzer's paper, "The Text as a Context. Blurring the Boundaries between Sentence and Discourse", shown one more time, that sentence is not enough to fully grasp a pragmatic phenomenon and thus a bigger unit of analysis is needed: the text. By reviewing data coming from recordings of event-related brain potentials, Mazzer argues that cognitive mechanisms in place in language understanding are better investigated when experimental design focuses on discourse instead of sentence. Therefore, as widely demonstrated by Josh Van Berkum and colleagues (1999, 2003, 2008, 2009), blurring the boundaries between sentence and discourse seems like a mandatory step for meaning comprehension.

Ines Adornetti's paper "Why Philosophical Pragmatics Needs Clinical Pragmatics" shows the ways knowledge on communicative impairments (Perkins 2007), such as aphasia and autism, can fruitfully inform the classical theoretical models in pragmatics. Classical theories in pragmatics – as those elaborated by Austin (1962) and Grice (1989) – do not fulfill the cognitive assumption necessary to explain the effective communicative behaviour. An answer comes from Relevance Theory (Sperber & Wilson 1986/1995), which try to be consistent with the data on the actual functioning of the mind. Lastly, Ines Adornetti highlights that another important area, which remains underestimated in philosophical pragmatics, should assume a more central role through clinical pragmatics: the coherence of discourse.

The "book reviews" section is dedicated to the two main experimental methods discussed in this volume: psycholinguistics and corpus linguistics. The first book review, written by Roberta Cocco, is indeed a report and a discussion of Bruno Bara, *Cognitive Pragmatics. The Mental Processes of Communication* (MIT press: Cambridge, MA, 2010). In the reviewed book, Bruno Bara joins his own theoretical proposal on the cognitive mechanisms of behaviour and conversational games with psycholinguistic data coming from his own personal research. The second book review, written by Giuliano Vivanet, is instead an introduction to the main themes and techniques covered by corpus linguistics, presented in the recent published guide edited by Anne O'Keeffe, Michael McCarthy, *The Routledge Handbook of Corpus Linguistics*

(New York: Routledge, 2012). The computational analysis of corpora is used to highlight the linguistic mechanisms involved at various levels of language production: syntactic, semantic, pragmatic, translation, etc.

The "interviews" section is mainly dedicated to two figures of speech, irony and metaphor, through a discussion of the theories proposed by two influential scholars, both employing experimental methods coming, respectively from psycholinguistics and from artificial intelligence: Rachel Giora (Tel Aviv University, Israel) and Bipin Indurkhya (International Institute of Information Technology, Hyderabad, India, AGH University of Science and Technology, Cracow, Poland). Rachel Giora discusses irony and other pragmatic phenomena, such as idioms and jokes, in the light of her Graded Salience Hypothesis (Giora 2003), a general view of language understanding that postulates the activation of salient meaning in the first stage of language processing, regardless of context. Bipin Indurkhya, discusses his work on the problem of metaphor, which escapes formalized methods and might be better handled from an experimental point of view. The interactionist theory of metaphor he proposed (Indurkhya 1992) relies on the interaction between the cognitive agent and her physical and cultural environment stands as the basic principle also used for related problems, such as categorization, analogical reasoning and creativity.

Finally, the conference report written by Tiziana Giudice (*Metaphor and Communication*, international conference organised by the Italian Society for Metaphor Studies and held in Cagliari in May 12-14, 2011) is also dedicated to the issue of metaphor in relation to different communication fields. Indeed, the main sections of the conference were concerned with i) the linguistic aspects of metaphors as an intercultural communication process; ii) the conceptual and imaginistic aspects of metaphors as an intercultural communication process; iii) the use of metaphors in political communications as a particularly relevant case study; and iv) metaphors in other forms of communication, as for instance in education, arts and media. Giudice presents the contributions of the various fields, by underlying the reasons why metaphor is a complex cognitive and communicative phenomenon, at the cross-road of semantics and pragmatics, and why it can be considered a good litmus test to experimentally investigate general hypotheses and theories.

The papers collected in this volume show that the tension between philosophical and experimental pragmatics seems to be the dialectic motor of the evolution of pragmatics itself. On the one hand, data, taken alone, do not

provide enough information to allow to produce a theoretically adequate pragmatics. On the other hand, without seriously taking into account the bottom-up constraints from neuroscience, corpora data, embodied communicative situations, we will not be able to go far in inquiring the pragmatic side of language and communication.

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Experimental Investigations of the Typology of Presupposition Triggers

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ABSTRACT

The behaviour of presupposition triggers in human language has been extensively studied and given rise to many distinct theoretical proposals. One intuitively appealing way of characterising presupposition is to argue that it constitutes backgrounded meaning, which does not contribute to updating the conversational record, and consequently may not be challenged or refuted by discourse participants. However, there are a wide range of presupposition triggers, some of which can systematically be used to introduce new information. Is there, then, a clear psychological distinction between presupposition and assertion? Do certain expressions vacillate between presupposing and asserting information? And is information backgrounding a categorical or a gradient phenomenon? In this paper we argue for the value of experimental methods in addressing these questions, and present a pilot study demonstrating backgrounding effects of presupposition triggers, and suggesting their gradience in nature. We discuss the implications of these findings for theoretical categorisations of presupposition triggers.

Keywords: presuppositions; accommodation; experimental pragmatics; information structure; QUD.

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Introduction

In conversation, information is exchanged in several different ways. One dimension of variation concerns the foregrounding and backgrounding of information. A speaker may introduce information that is available for the other conversational participants to accept or reject, and at the same time introduce other information that is in some sense 'taken for granted', which is typically not available for discussion. The former class of information is considered "foregrounded" and the latter "backgrounded".

Natural languages provide various devices to allow speakers to manipulate information structure in this way. These include lexical items such as *stop*, *only*, *manage*, *again*, and so on; and syntactic devices such as cleft constructions. For example, the speaker of (1) is understood to foreground the prediction that Balotelli will start the match (a point that invites potential disagreement), while describing him in the backgrounded content as an "outstanding striker" (in a way that does not invite disagreement). Similarly, the speaker of (2) foregrounds the prediction that Balotelli will be sent off, backgrounding the information that this has happened before.

(1) Balotelli, who is an outstanding striker, will start the match.
(2) Balotelli will be sent off again.

From a theoretical perspective (both philosophical and linguistic), various attempts have been made to characterise the difference between the foregrounded and backgrounded content of sentences. One influential approach asserts that the foregrounded meaning is that which contributes to context update (Stalnaker, 1976; Lewis, 1979) and addresses the Question Under Discussion (QUD; Roberts, 1996). However, the appropriate treatment of backgrounded content is relatively unclear, due to a great extent to the heterogeneity of this type of content.

From the perspective of experimental semantics and pragmatics, this issue invites empirical attack. Despite the intuitively appealing nature of the theoretical analysis, there is as yet little evidence that the distinction between foregrounded and backgrounded content is a psychologically real one for native speakers of a language. In particular, one might question whether these are the appropriate levels of description, or whether the heterogeneity of backgrounded content is also reflected at a psycholinguistic level. We can consider whether types of linguistic content that admit a unified theoretical

analysis also exhibit a comparable level of unity when they are used to elicit behavioural data from linguistically untrained participants (and conversely whether theoretically distinctive materials yield unexpectedly similar behavioural signatures). We wish to know, broadly speaking, whether the various ways of manipulating information structure (distinguished from one another on theoretical or philosophical grounds) actually differ from one another at a psychological or behavioural level.

Recent work in experimental pragmatics has attempted to apply some of the psycholinguistic techniques used in research on implicature (Bott & Noveck, 2004, among many others) to the problem of information structure. In particular, attention has focused on presupposition triggers, with respect both to their ability to background information and their ability to "project" semantic content. This study examines the former attribute, but both are discussed in the following section.

1. Presupposition phenomena in experimental semantics and pragmatics

Lexical items such as *again*, *stop*, and so on are customarily analysed as presupposition triggers. These have two distinctive properties: first, as discussed above, they tend to signal the presence of further meaningful content (the "presupposition"), additional to the main declarative meaning of the sentence, but intuitively less available for further discussion, e.g. for direct refutation. Secondly, unlike other forms of additional meaning such as (most) implicatures, presuppositions survive embedding under negation and other operators among the "family of sentences" tests (Chierchia & McConnell-Ginet, 1990), while the declarative meaning does not. If we negate (2), as in (3), the presupposition (that Balotelli has been sent off in the past) remains intact. This is referred to as the presupposition "projecting" from under the scope of negation.

(3) Balotelli will not be sent off again.

These two properties have given rise to rich sets of competing theoretical proposals. With respect to projection, the question arises of how the presuppositions of a complex sentence are calculable from the presuppositions of the component sentences. At least two classes of theories have been advanced to account for this: the dynamic semantic approach advanced by

Heim (1983) and Van der Sandt (1992) aims to explain projection in terms of semantic composition, while the pragmatic approach endorsed by Schlenker (2008) appeals to principles of conversational organisation.

The involvement of experimental work in addressing this question parallels the developments in the study of scalar implicature over the past 10 years. As in that case, competing theories can no longer be evaluated on the basis of introspection, as there is little controversy about the ultimate interpretation of the examples under discussion (Katsos & Cummins, 2010). The theories are instead distinguishable by the fact that they posit different processes, and therefore make distinctive predictions about the time-course of processing. For instance, in a case such as (4), it is not controversial that the presupposition (5) does not ultimately project, but it is also not introspectively clear whether the presupposition is calculated and then cancelled, or simply not calculated.

(4) I didn't know that whales are fish, because whales are not fish.

(5) Whales are fish.

For similar reasons, experimental work has recently commenced on the question of how presuppositions are backgrounded. An intuition is broadly shared in the literature that presupposed content is generally not addressable: that is, it is not possible for an interlocutor straightforwardly to object to a presupposition. Instead, infelicitous presuppositions must be dealt with in a more metalinguistic way, e.g. by objecting to the utterance as a whole. This observation underlies the "Hey, wait a minute" test (Shanon, 1976; von Fintel, 2004). This test is proposed on the basis that presuppositions not in the common ground can be challenged as in (6), while assertions not in the common ground cannot.

(6) A: John realised that whales are fish.
B: Hey, wait a minute! Whales are not fish.
*B: Hey, wait a minute! John didn't realise that.

However, the "Hey, wait a minute" test may not be the most sensitive diagnostic for presupposition *per se*; it seems felicitous to use "Hey, wait a minute" to object to any precondition of the utterance, no matter how obscure (and perhaps even to an aspect of foregrounded meaning, if it is particularly surprising). Moreover, there are good reasons to suppose that the delineation

of backgrounded and foregrounded content is not entirely straightforward. First, presuppositions differ in their logical relation to the content of the sentence (Zeevat, 1992), which could have implications for their addressability. Second, many researchers have observed differences in the family of presupposition triggers, e.g. between "soft" and "hard" triggers (Abusch, 2010), or have proposed a continuum ranging from structural "hard-core" triggers like clefts to "heavily context-dependent presuppositions" not associated with any particular trigger (Kadmon, 2001). Third, presuppositions can be exploited to convey information in an assertion-like fashion, i.e. to introduce new information through accommodation (Lewis, 1979; Von Fintel, 2000). Consequently, the relation between the two aspects of presupposition discussed above – the potential for presuppositional content to project, and its tendency to be informationally backgrounded – is not a trivial one.

We discuss these issues in the following subsections of this paper, and then proceed to motivate and discuss a pilot study that aims to investigate the typology of presupposition triggers with respect to their backgrounding behaviour. In this case, the broad justification for experimental work is that subtle gradations in the acceptability of forms may exist but not be available to introspection. Our aim is to test the psychological reality of the distinctions that are posited.

2. Resolution and lexical triggers

Zeevat (1992) observed that presupposition triggers could be categorised into three broad classes, differing in the extent to which they are anaphoric (following Van der Sandt 1988). One class of triggers, including for instance definite descriptions, "collect entities from the environment in order to say new things about them" (Zeevat, 1992, p. 397). By analogy with the process of anaphora resolution, these are referred to as *resolution triggers*. The second class of triggers, termed *lexical triggers* by Zeevat, are lexical items that encode preconditions for their main declarative content. *Stop* and *continue* both have this property: in (7) and (8), it is logically necessary that John smoked at some point prior to the time of utterance.

(7) John stopped smoking.
(8) John continues to smoke.

The third class, typified by too and again, is also anaphoric, in that it involves the retrieval of an entity or eventuality previously salient in the discourse. Deviating from Zeevat's use of the term, we will consider these also to be "resolution triggers". Note in particular that the backgrounded content of such items is typically unrelated, logically speaking, to the foregrounded content. For instance, in (2) and (3), the backgrounded content (that Balotelli was sent off at some time in the past) neither entails nor is entailed by the foregrounded content (Balotelli being sent off in the past is neither a necessary nor a sufficient condition for him to be sent off in the future). Contrastingly, in (7) and (8) the relation between foregrounded and backgrounded content is closer, as each may only end or prolong a preceding eventuality.

It is theoretically coherent to assume that all these categories of presuppositions behave in the same way, in respect of the foregrounding and backgrounding of information. However, intuitively, there appear to be important differences as regards the addressability of the presupposed content. For the resolution triggers, denial of the backgrounded content does not provide any information about the foregrounded content. For the lexical triggers, denial of the backgrounded content amounts to denying the truth of the statement as a whole. Therefore, it should be possible to address the presupposed content while at the same time addressing the QUD, in Roberts's (1996) terms[1].

The question of whether there are psychologically real differences between the treatment of resolutional and lexical triggers by native speakers is an empirical one. A binary judgment such as the "Hey, wait a minute" test obviously does not distinguish different levels of backgrounding. From an experimental point of view, this suggests a role for a gradient acceptability judgement task, such as we use in the pilot study presented later in this paper[2].

3. Different strengths of presupposition trigger

Several strands of research on presupposition share the intuition that there are further systematic differences that are not necessarily coterminous with the

[1] Note that to Roberts, addressing the QUD involves entailing an answer to it, but no stipulation is made as to how direct this entailment relation must be.

[2] We avoid using the "Hey, wait a minute" test in conjunction with a gradient judgment task, as there is a risk that the judgments will reflect the acceptability of using this particular kind of objection in different contexts, rather than being a direct measure of backgrounding.

above classes. Kadmon (2001) argues for a continuum of presuppositions, based on their projection behaviour (and specifically considerations such as cancellability and context-dependence). Von Fintel and Matthewson (2008) consider certain triggers, such as *too* and *again*, to be more strongly presuppositional than others. They situate this observation in the context of research by Abusch (see Abusch, 2010), proposing a distinction between "soft" and "hard" presupposition triggers, and Simons (2006), who argues that *too* and *again* serve no purpose within the sentence other than triggering a presupposition (which suggests that their presence should be a reliable cue to the presupposition being intended by the speaker).

It is tempting to interpret this as a prediction that the strongest presupposition triggers should have the most pronounced backgrounding effects. However, this may be a misinterpretation. In fact, one might argue instead that the use of a sentence that goes out of its way explicitly to convey a presupposition should render that presupposition more addressable, in that its importance is heightened by comparison with the declarative content of the sentence.

Once again, the role of experimental work here is to discern whether the intuitions of theoreticians have a psychological reality. We share the intuition that the class of presuppositions is diverse, both in respect of the nature of the material presupposed and in the extent to which that material is made cognitively salient, and consider that information structure is a useful measure of this. Our hope in this respect is that findings about the nature of backgrounding may enable us to help further refine the typology of presupposition triggers that has been proposed in the theoretical literature.

4. Exploiting accommodation

Another aspect of presupposition behaviour is that presuppositions can be used to convey additional information. When a sentence felicitously presupposes information that is not taken for granted in the context, that information is said to be *accommodated* (Lewis, 1979, drawing upon the work of Stalnaker 1976 i.a.). The possibility of exploiting accommodation to convey new information further blurs the distinction between foregrounded and backgrounded content. Consider for example (9).

(9) I just found out that John is having an affair.

In terms of information structure, this sentence declares the fact of discovery ('I just found out that *p*') and presupposes the proposition 'John is having an affair'[3]. However, intuitively, sentences such as (9) can also be used to assert the propositional content that appears to be presupposed. Moreover, felicitous responses to (9) appear more naturally to address that proposition than the overt declarative ("He isn't!" seems a more likely response than "You didn't!") In short, the presupposition does not appear to be backgrounded to any appreciable extent in such a construction.

Conversely, presuppositions can in principle be exploited to convey information that is controversial, with a view to adding this information to the common ground or causing the hearers to update their situation model accordingly. This is exploited in loaded questions, such as the classic example (10), where either a 'yes' or 'no' response can be taken to endorse the presupposition of 'stop'. Unlike examples such as (9), however, this technique exploits the fact that the presupposition is backgrounded, and is therefore difficult to address.

(10) Have you stopped beating your wife yet?

A general question here relates to how regularly speakers intend presuppositions to be accommodated: here we might make competing theoretical observations. On the one hand, the use of a presupposition is informationally redundant unless it goes to updating the situation model of the interlocutors in some way[4]. We might therefore expect that non-lexical triggers are canonically used to convey new information of some kind (e.g. *again* to convey explicitly that the event under discussion has happened before). On the other hand, if it is crucial that new information should be added to the interlocutors' situation model, it might appear uncooperative for a speaker to convey this information in the form of a presupposition, where it cannot be easily contested if it is controversial, and where it might conceivably be overlooked entirely. This raises the very broad and much-discussed issue of how a speaker most efficiently conveys information to a hearer, and the specific question of how presuppositions enter into this process.

[3] This is assumed to be a presupposition based on projection, specifically that "I didn't just realise John is having an affair" also conveys that he is.

[4] This might include bringing already known information more immediately to the attention of the interlocutor.

For the purpose of this research, the crucial point here is that the role of presupposition triggers in backgrounding information is potentially negotiable. It appears quite possible for theoretically similar constructions either to background the presupposition or to foreground it at the expense of the declarative content. This suggests that we should also be interested in case-by-case variation among instances of identical triggers, as well as being concerned with the patterns that arise across the class(es) of triggers.

5. Foregrounded and backgrounded presuppositions: a pilot experimental study

In our pilot study, we aimed to investigate the extent to which a set of presupposition triggers accomplish the backgrounding of their corresponding presuppositions. We selected as a sample of triggers the resolutional *again*, and the lexical *stop* and *continue*. We also considered *only*, a trigger with debatable status (presupposition or entailment; cf. Horn, 1969; 1996, Roberts to appear); and a syntactic resolution trigger, the comparative construction, using which for instance the sentence (11) presupposes (12)[5].

(11) Jane is a better doctor than Mike.
(12) Mike is a doctor.

5.1. Methodology

Participants were presented with question-answer (Q-A) pairs and asked to rate, on a 1-5 scale, "how natural" the answer was. Response latencies were also measured and recorded. In the critical items, a presupposition trigger appears in the question, and the question was answered in the negative. In the "Foreground" condition, the negative answer addressed the foregrounded content of the question, as in (13); in the "Background" condition, the negative answer addressed the backgrounded content of the question, as in (14).

(13) Q: Did Julia stop smoking?
A: No, she smokes.

[5] This also projects from under the scope of negation: "Jane isn't a better doctor than Mike" conveys that Mike is a doctor.

(14) Q: Did Julia stop smoking?
A: No, she didn't use to smoke.

For each trigger, two Q-A pairs were administered to each subject. Two versions of the experiment were constructed, such that the items presented in the Foreground condition in version 1 were presented in the Background condition in version 2, and vice versa. The experiment was implemented in E-Prime. Participants (n=30) were native English speakers, recruited from the student body of the University of Cambridge, and were allocated randomly to either version 1 or version 2 of the experiment.

5.2. Predictions

Our general predictions are as follows. If native speakers are sensitive to the distinction between foregrounded and backgrounded information in discourse, Q-A pairs in the Foreground condition should receive higher naturalness ratings than those in the Background condition. Moreover, under the assumption that backgrounded information is harder to retrieve, we would predict a slowdown in response time (while we measure response time of the judgment, admittedly a more natural measure would be response time of the reading time of the critical segment). Comparing the resolutional to the lexical triggers, we would expect the acceptability of negating backgrounded information in the latter case to be higher than in the former case, as for lexical triggers the presupposition is entailed by the declarative content of the sentence, and therefore its failure is sufficient reason to give a felicitous negative response to the sentence.

5.3. Results

Results for the triggers *continue*, *stop* and *only* are as follows. As the materials with *again* and the comparative gave rise to unintended ambiguities in one test condition in this pilot study[6], we are unable to report counterbalanced results for these triggers. The following results are based upon each participant's

[6] The problematic sentences described two individuals of the same gender; in these cases, as well as a reading of 'he' or 'she' in which the presupposition was contested, there was a possible reading in which the declarative content was contested.

rating of two items for each trigger, both with either foreground continuations (for 15 participants) or background continuations (for the other 15).

Trigger	Mean rating (SD)		Mean response time, ms (SD)	
	Foreground	Background	Foreground	Background
Again	4.13 (0.97)	2.87 (1.11)	4509 (2906)	4052 (3268)
comparative	4.37 (1.00)	2.60 (0.77)	3460 (2006)	4464 (3080)

These preliminary results show that, as predicted, refutations in foreground conditions are preferred to those in background conditions for each type of presupposition trigger. Paired t-tests applied to the counterbalanced conditions reveal a highly significant preference in judgements for foreground rather than background conditions (all $p < 0.001$). Similar planned comparisons using paired t-tests for response times also show a preference for foreground conditions over background (*continue*, $t = 1.68$, $p < 0.05$; *stop*, $t = 2.40$, $p < 0.01$; *only*, $t = 3.55$, $p < 0.001$; all one-tailed).

Between triggers, comparisons show a significant preference in the background condition for *only* versus *stop* ($t = 3.46$, $p < 0.001$ two-tailed) and for *only* versus *continue* ($t = 3.08$, $p < 0.01$ two-tailed). However, these preferences are also significant in the foreground condition, as is the preference for *continue* versus *stop* which does not approach significance in the background condition (*only* versus *stop*, $t = 5.48$, $p < 0.001$ two-tailed; *only* versus *continue*, $t = 2.77$, $p < 0.01$ two-tailed; *continue* versus *stop*, $t = 2.70$, $p < 0.01$ two-tailed). Each of these comparisons remains significant at $p < 0.05$ with a Bonferroni correction for multiple comparisons.

Note that the reaction times exhibit a great deal of variability, possibly because these also include reading times. There is a numerical preference for foreground conditions; the exception is *again*, but this may reflect the failure to counterbalance materials in this condition.

5.4. Discussion

The results of this pilot study demonstrate that native speakers are sensitive to the distinction between foregrounded and backgrounded information, and that this is accessible to a methodology involving naturalness ratings of dialogue fragments. Conditions in which backgrounded information was refuted were

perceived as less felicitous than those in which foregrounded information was refuted. For the counterbalanced test items, foreground conditions also yielded significantly faster response times. This suggests that the retrieval of backgrounded information, which is not being used actively to update the conversational record, may result in additional processing load.

There is also considerable variability between triggers as to the acceptability of refuting backgrounded content. Our results suggest that this is significantly easier in the case of *only* than *continue* or *stop*, with *again* and the comparative construction yielding numerically intermediate acceptability ratings. This might be taken as support for the psychological reality of the distinction between resolution and lexical triggers.

Two important caveats must be taken into account, however, in attempting to interpret these findings. First, as discussed above, the status of the prejacent of *only* (e.g. the proposition *John went to the library* in the sentence *Only John went to the library*) is a theoretically-contested issue. The acceptability ratings of *only* in the background condition could be interpreted as providing support for the view that the prejacent is an entailment of *only* (cf. Horn, 1996 and Roberts, to appear).

Secondly, and more problematically, the differences that were manifest in the Background conditions were also exhibited in the Foreground conditions, in violation of our expectations. This renders any conclusion about the relative behaviour of the presupposition triggers in this experiment necessarily very tentative. It could be that the apparent disparity between these conditions is attributable simply to the materials in question varying in felicity, which might apply to both experimental conditions. An alternative conjecture is that the Foreground materials were not optimally felicitous because it is more natural to respond to a presupposition-triggering question with a response that also acknowledges the presupposition than with one that does not: compare for instance (15) and (16). In this case, the infelicity of the Foreground items might be independent of the Background items, and thus would not invalidate the comparison between presupposition triggers discussed above.

(15) Q: Did Julia give up smoking?
A: ?No, she smokes.

(16) Q: Did Julia give up smoking?
A: No, she still smokes.

In our ongoing work, we are addressing this issue, with a view to obtaining a suitable baseline for comparing the backgrounding behaviour of presuppositions (by constructing refutations that are reliably judged to be entirely felicitous).

6. General discussion and future directions

In this paper, we have aimed to give show the potential of experimental work to shed light on theoretically-contested aspects of information structure in general, and presupposition in particular. It must be acknowledged that this is a complex phenomenon, as witnessed both by the extensive theoretical literature and the relatively late development of experimental approaches to the problem. The above pilot study illustrates both some of the potential of empirical work to demonstrate the psychological reality of the distinctions posited by theoreticians, and some of the difficulties encountered in attempting to operationalise these distinctions in a meaningful way. Our study illustrates the difficulty in isolating presuppositions from other types of content in actual interpretation, and the individual variability among presupposition triggers that seems to elude neat theoretical groupings. Empirical work in this field has the potential to throw light on whether the classes of presuppositions posited in some approaches (e.g. Zeevat, 1992) are coherent, or whether it is more appropriate to situate presuppositions on a continuum (as in Kadmon, 2001). In either case, a further question concerns the status of presupposition phenomena as a potential semantic universal (cf. Von Fintel & Matthewson, 2008). The results from experimental research have shown that fine-grained judgements about types of presupposed content cannot be obtained solely from introspection. On the surface, it appears that presuppositions can take many different forms and be related to the declarative content of their triggering sentences in various different ways. If it is true that presuppositions can be organised cross-linguistically into a small set of natural kinds with a consistent behaviour, that is potentially instructive for our view of conversational interaction and indeed cognition. We hope to contribute to the cross-linguistic empirical examination of presupposition and information backgrounding in future work.

We also hope to unify this work with research on some of the other open questions about presupposition discussed in this paper. For instance, presupposition projection is plausibly linked to information backgrounding:

we have seen how information may be presented at different levels of 'grounding' in order to achieve particular cognitive effects. The question of how this aspect of information structure is used to influence the interlocutor's situation model does not appear to have been tackled in any generality. Nevertheless, there is a strong and widely-shared intuition that presuppositions may be used to introduce information into the discourse. By better understanding how presupposition triggers are processed by speaker and hearer, we will better be able to offer an account of the role of presupposition in efficient communication. Appeal to experimental data should enable research in this field to proceed within a constrained and tractable hypothesis space.

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On Encoded Lexical Meaning: Philosophical and Psychological Perspectives *

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ABSTRACT

The past few years have seen quite a bit of speculation over relevance theorists' commitment to Fodorian semantics as a means to account for the notion of encoded lexical meaning that they put forth in their framework. In this paper, I take on the issue, arguing that this view of lexical semantics compromises Relevance Theory's aim of psychological plausibility, since it effectively binds it with the 'literal first' hypothesis that has been deemed unrealistic from a psycholinguistic viewpoint. After discussing the incompatibility of Fodor's philosophical account with the perspective that relevance theorists adopt, I briefly suggest ways in which further behavioural research on the semantics/pragmatics distinction could help advance more cognitively-oriented accounts of encoded lexical meaning.

Keywords: lexical pragmatics, Fodorian semantics, relevance theory, "literal-first" hypothesis, polysemy.

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Introduction

Ever since its inception in the seminal philosophical work of Paul Grice (1989), contemporary linguistic pragmatics has been typically viewed as an add-on to the more fundamental study of semantics, which deals with linguistic meaning in abstraction of its context of use. In this view, the recognition of speaker intentions, albeit instrumental for the recovery of 'what is implicated' by the utterance of a sentence, has been supposed to play little, if any role in the delineation of its semantic content, i.e. what Grice is customarily taken to have originally referred to as 'what is said' by it.

This way of distinguishing between semantic content and pragmatic import may still reflect the received view in the work of most contemporary researchers who are interested in linguistic meaning, but it has been repeatedly attacked in the past few decades. On a number of occasions, various scholars[1] have pursued the argument that, even over and above the obvious context-sensitivity of indexical expressions (such as *I*, *you*, *here*, *now*, etc), 'what is said' by a sentence cannot always be identified in isolation from the context of its utterance. Among them, relevance theorists have right from the beginning (at least as far back as Wilson & Sperber, 1981) insisted that the linguistically encoded meaning of an utterance, that is, its underlying sentence's semantics, falls short of determining the proposition explicitly expressed by it, and that the hearer has to undertake processes of pragmatic inference in order to work this proposition out. The thorough investigation of this claim primarily by Robyn Carston in a number of publications, culminating in her *Thoughts and Utterances* (2002), has eventually led Relevance Theory (henceforth RT) to take up a radical version of it, according to which, "linguistically encoded meaning *never* fully determines the intended proposition expressed" (Carston 2002, p. 49, emphasis in original).

The espousal of this position, which has been dubbed the *linguistic underdeterminacy thesis*, has obviously placed RT in direct opposition to the traditional way of carving the semantics/pragmatics distinction at the propositional level. Quite predictably, this has in turn sparked the reaction of various philosophers of language, who have criticized this deviation from the long-established way of studying linguistic meaning, counter-proposing

[1] See, for example, Searle (1978), Travis (1981, 1997), Sperber & Wilson (1986/1995), Carston (1988, 1999, 2002, 2004, 2008), Atlas (1989, 2005), Recanati (1989, 2001, 2002, 2004, 2010), Bach (1994a, 1994b, 1999), Levinson (2000), Jaszczolt (2005).

minimalist theories of semantic content that defend the context-independence of the proposition explicitly expressed by an utterance (e.g. Borg, 2004; Cappelen & Lepore, 2005). However, even minimalists themselves have at times recognized that "if communication can be shown to proceed without hearers processing the literal meaning of the sentence, i.e. without grasping minimal propositions, then the claim that minimal propositions have a unique role to play in actual communicative exchanges is undermined" (Borg, 2007, p. 353). In this respect, the linguistic underdeterminacy thesis seems to be vindicated by the existence of a quite substantial body of psycholinguistic research which has shown that the comprehension of figurative language does not necessarily involve the prior processing of the surface literal meaning (for representative overviews, see, Gibbs, 1994; Glucksberg, 2001).

Moving from propositional to lexical meaning, it is this very psychological implausibility of the so-called '*literal first*' hypothesis that has also motivated, as Deirdre Wilson herself notes (2011, p. 15), one of the latest developments within RT, that is, its account of ad hoc concept construction. Based on experimental research which has shown that our categorisation behaviour is highly context-dependent (e.g. Barsalou, 1987, 1992), relevance theorists have advanced the argument that the concept communicated through the use of some particular lexical item can be distinct from the concept it encodes, and thus requires a spontaneous process of pragmatic enrichment to be reached at during interpretation.

Even though the experimental investigation of the particular proposals that relevance theorists have put forth with respect to lexical pragmatics is still very limited, I will attempt in this short paper to show that their theoretical proposals have far-reaching implications for the discussion of word meaning, to the extent that they could even challenge the current view of encoded lexical meaning within RT itself. To this end, I will start off with a brief overview of the framework's assumptions that are relevant to the present discussion and will then move on to assess the account of lexical pragmatics put forth by relevance theorists and the tension it creates for traditional approaches to lexical semantics and, more specifically, the Fodorian one that relevance theorists have adopted right from the beginning. Wrapping up this paper, I will consider how the present argumentation can motivate new directions for behavioural research on the semantics/pragmatics interface.

1. Relevance-theoretic assumptions

Right from its emergence, RT has aimed at providing a thoroughgoing cognitive account of utterance interpretation. For this reason, relevance theorists draw the semantics/pragmatics distinction in terms of the different kinds of mental processing they take each of these types of meaning to be the output of, instead of discussing them at a theoretically abstract level, as most philosophers have so far tended to. From their perspective, semantic content is provided via decoding, which is performed by an autonomous linguistic mental module, while pragmatically derived meanings are taken to be generated by an inferential processor, which is in turn dedicated to the comprehension of deliberately communicated stimuli and effectively integrates the output of decoding with readily available contextual assumptions in the interest of calculating a reasonable hypothesis about the original speaker-intended meaning. Without getting into too much detail, which is after all unnecessary for my current purposes, RT predicts that a hearer will automatically comprehend a deliberately communicated utterance by following a path of least effort, according to which, he will assess interpretive hypotheses in order of accessibility until his expectations for an interpretation that will uncover the speaker's intended meaning are satisfied (or, in the case of miscommunication, abandoned).

In the current setting, the crucial aspect of the RT account is that it does not take inference to work on the overall output of decoding during the comprehension of a single utterance, as a traditional Gricean approach would have it; rather, the two modules work simultaneously, with the decoding one feeding input to the inferential every step of the way during the processing of the linguistically encoded stimulus. Obviously, the replacement of Fregean-style thoughts with subjective and context-dependent propositions – what relevance theorists call *explicatures* – makes it tempting to assume, as semantic minimalists have on occasion, that the framework encompasses some radically contextualist notion of semantics in its premises. On closer inspection, however, it turns out that this is not the case. As Daniel Wedgwood (2007) extensively discusses, the sole difference between the minimalist's way of describing semantic content and the relevance-theoretic notion of 'encoded meaning' lies in the contention of the former that sentences do actually encode full propositions; other than that, encoded meaning is equally 'properly'

semantic, in the traditional sense, for relevance theorists too. Considering the following passage from *Relevance*, this conclusion seems to be warranted:

> By definition the semantic representation of a sentence, as assigned to it by a generative grammar, can take no account of such non-linguistic properties as, for example, the time and place of utterance, the identity of the speaker, the speaker's intentions, and so on. The semantic representation of a sentence deals with a sort of common core of meaning shared by every utterance of it. (Sperber & Wilson, 1986/1995, p. 9)

This identification of encoded meaning as essentially context-independent within RT also follows from the adherence of relevance theorists to Fodorian semantics. As Carston asserts (2002, p. 58), RT follows Fodor in assuming that 'real' semantics deals with the explication in truth-conditional terms of the relation between our mental representations and that which they represent, while linguistic semantics is merely 'translational', in the sense that public-language forms inherit their meaning directly from the Mentalese forms they encode. Therefore, since in the resulting picture the only actual bearer of semantic content is Mentalese, which consists in concepts, and, as Jerry Fodor has it, a concept is an unanalysable, monolithic atom that is individuated by some property of the real-world entity to which it is nomologically locked, it becomes virtually impossible for encoded semantic contents to vary across different contexts.

Therefore, even though relevance theorists maintain that sentences cannot be attributed any fully propositional semantics, they cannot but accept that lexical items[2] do encode context-independent meanings; that is, the ones that they directly inherit from their associated atomic concepts.[3] And this is indeed what they seem to have had in mind ever since they first entertained the idea that "words in a language can be used to convey not only the concepts they encode, but also indefinitely many other related concepts to which they might point in a given context" (Sperber & Wilson, 1998, p. 197), since, in the standard RT picture, in order for such ad hoc concepts to be constructed, the corresponding encoded concepts crucially need to be used as a starting point.

In order to briefly illustrate the rationale behind the RT account of ad hoc concept construction now, let's consider the following examples:

[2] Much like most relevant discussions, the present one deals exclusively with monomorphemic 'open-class' lexical items, i.e. words that have some descriptive content (unlike indexicals, connectives and the like).

[3] For a recently presented, yet still speculative, alternative view, see Carston (2012).

(1) John has a temperature.
(2) The fridge is empty.

It should be pretty straightforward that in order to come up with the proposition explicitly expressed by the utterances (1) and (2) in certain, most likely familiar, contexts, the hearer would have to somehow adjust the encoded meaning of 'temperature' and 'empty'. In (1), the word 'temperature' could be easily attributed the interpretation of 'a high temperature' rather than its actual denotational content provided by the concept TEMPERATURE, as this can be taken to be used in utterances like 'Celcius is a scale for temperature measurement'. Similarly, in (2) the fridge might not be interpreted as being totally empty, but rather as being insufficiently filled with the goods that are needed by a household on a daily basis. In this case, the encoded concept EMPTY would again need to be adjusted so that the 'not entirely empty, but insufficiently full' interpretation can be yielded.

According to the RT account, the construction of ad hoc concepts, like TEMPERATURE* and EMPTY* (to use their common notation), is the outcome of two pragmatic processes that can either individually or in unison contextually adjust the meaning that a lexical item's encoded concept carries. The first one, which is dubbed *narrowing*, results in meanings that are typically more specific than the encoded ones, such as the one of TEMPERATURE* in (1), while the second, *broadening*, respectively generates looser word interpretations. Apart from general approximation cases, like the one of EMPTY* exemplified above, concept broadening is also assumed to mediate the interpretation of hyperboles and metaphors, as well as category extensions (e.g. when a brand name, like 'typex' is used as an umbrella term for all products with a common function), neologisms and word coinages.[4]

As I have already noted in the previous section, the RT account of lexical pragmatics was originally motivated by Lawrence Barsalou's behavioural research on conceptual categorisation, a point that in itself gives the account a quite high degree of psychological plausibility. However, it has often been noted[5] that this plausibility is compromised when it is coupled with Fodor's philosophical semantics, which relevance theorists have adopted for the

[4] For detailed overviews of the RT account of lexical pragmatics, see Carston (2002: chapter 5), Wilson (2004), Wilson & Carston (2007).
[5] See, for example, Vicente (2005), Burton-Roberts (2007), Groefsema (2007), Assimakopoulos (2008), Reboul (2008), Vicente & Martinez Manrique (2010).

purposes of describing what gets decoded and fed into the inferential processor during interpretation. As Anne Reboul puts it, "the notion of an ad hoc concept has rendered visible a long-standing tension in Relevance Theory, viz. that between the adoption of an (atomistic and externalist) view of concepts (such as Fodor's) and the description that Relevance Theory effectively gives to concepts" (2008, p. 523). In the following section, I will turn to this tension and will attempt to show that the argument that relevance theorists have used against its existence runs into trouble when psychological considerations enter the picture.

2. Ad hoc concepts and the literal-first hypothesis

Based on descriptions similar to the one provided above, albeit much more detailed of course, Vicente (2005) and Groefsema (2007) have justifiably noted that the formation of communicated lexical meanings by means of broadening and narrowing suggests that encoded concepts must have some kind of internal structure, as it is only by way of manipulating such a structure that the construction of a speaker-intended ad hoc concept can be made possible. Naturally, if this is the case, encoded concepts cannot be conceived of as Fodorian atoms to begin with, since it is by definition impossible to either 'narrow down' or 'loosen up' a non-decomposable atom. This criticism seems to be further motivated by the description of concepts within RT itself, according to which, logical, lexical and encyclopaedic information is standardly assumed to be stored in different entries of a conceptual address. Given the explicit recognition of such different types of information associated with a concept and their implementation in various discussions of ad hoc concept construction, like, for example, when Carston suggests that, in narrowing, an encyclopaedic property of a lexically encoded concept can be 'elevated' to a logical (or content-constitutive) status (2002, p. 339), it certainly becomes all the more tempting to assume that encoded concepts must have some more substantive content than a monolithic atom would normally allow for in order for ad hoc concepts to be constructed on their basis.

The way in which RT addresses this criticism, however, can be easily located in Carston's parallelism (2010a, pp. 174–175, fn.6) of the relevance-theoretic notion of a conceptual address with what Fodor has recently called a 'mental file':

> When you are introduced to John [...] you assign him a Mentalese name and you open a mental file, and the same Mentalese expression (M(John)) *serves both as John's Mentalese name and as the name of the file that contains your information about John*; [...] according to this story, *we think in file names*; tokens of file names serve both as the constituents of our thoughts and as the Mentalese expressions that we use to refer to things we think about. (Fodor, 2008, pp. 94–95, emphasis in original)

Taking into consideration Fodor's description, it becomes clear that from the corresponding RT perspective, the various kinds of information that are thought to be associated with a concept do not form part of its semantic content per se, and thus play no role whatsoever in the decoding process as far as relevance theorists are concerned. Consequently, as a theoretical construct, an ad hoc concept would not appear to pose any particular problems for the way in which RT views semantics, as it is essentially the output of inference, with the input from decoding being solely the respective atomic concept (i.e. the Fodorian mental file name).

This line of argument, which Carston (2010a, 2010b) has followed in response to a slightly different, but comparable critique that Vicente & Martínez Manrique (2010) have put forth, is certainly reasonable when it comes to the deflation of the argument that relevance theorists would be better off employing a decompositional picture of lexical semantics rather than Fodor's atomistic account in their framework; yet, when the overall RT aim of developing a cognitively realistic account of communication is taken into consideration, it seems to be binding relevance theorists with a view that, as we have seen, they otherwise explicitly seek to distance themselves from, i.e. the 'literal-first' hypothesis.

Given the current RT account of ad hoc concept construction, according to which, the inferential enrichment of encoded concepts is standardly treated as an optional, top-down process, if decoding provides the inferential processor with the content of a word's encoded concept, this content cannot but be the first interpretive hypothesis that the hearer will test for relevance during the comprehension procedure. Consider, for example, the meaning communicated by the word 'temperature' during the interpretation of 'John has a temperature' in the aforementioned context in which John has a fever. Here, according to the current RT view, the output of the decoding of 'temperature' would be the concept TEMPERATURE, which carries the real, context-insensitive, and hence literal semantic content associated with the

word. For the inferential processor to construct the relevant ad hoc concept TEMPERATURE*, it will need to do so after testing the content of this encoded concept as a plausible hypothesis about the speaker-intended meaning, since, being by definition an unanalyzable atom, TEMPERATURE will necessarily be wholly employed in the process. But if the comprehension of figurative language is equivalent to that of literal meaning in processing terms, as the relevant experimental evidence suggests, the priority of this encoded meaning over the pragmatically enriched one is seriously compromised.[6] Given the mechanics of the cognitive systems that RT posits, even Wilson's recent suggestion that "the concept encoded by a word is *activated* during comprehension, but not necessarily *deployed* (2011, p. 16, emphasis in original) seems unsatisfactory, since again RT currently has no way of accounting for the activation of a concept without its initial incorporation in (and, if deemed unsatisfactory, potential discarding from) the mental representation that the inferential processor calculates as an utterance's basic explicature. In general, if the encoded denotational content of any concept can be bypassed during comprehension, it follows that the inferential processor has some way of discarding 'irrelevant' lexical meanings before actually assessing them as intended interpretations. But since the inferential processor's task is precisely to carry out this assessment in the first place, it has no way of knowing beforehand which encoded concept it will eventually keep intact and which it will need to enrich into an ad hoc concept.

If this line of reasoning is on the right track, it reveals a challenge that RT would need to tackle in order to satisfy its overarching aim of psychological plausibility. And while the relevant literature has focused almost exclusively on the implications that the account of ad hoc concept construction carries for the discussion of a concept's internal composition (or lack thereof), I believe that an equally important question that needs to be addressed is how well the philosophical discussion of lexical meaning that RT clings to can fit its

[6] A potential counter-argument that has been brought to my attention is that the experimental evidence against the literal-first hypothesis only carries implications for the discussion of propositional and not for that of lexical meaning. I think this is highly debatable since the metaphors used in the relevant literature often consist of a topic followed directly by the metaphor vehicle, as in the case of 'Her surgeon was a butcher' or 'My job is a jail'. According to the current RT account of lexical pragmatics then, it is only the concepts BUTCHER and JAIL that would need to get enriched for the figurative interpretation to become available, which effectively means that metaphor interpretation pertains more to the discussion of communicated meaning at the lexical rather than the propositional level (in at least such cases).

psychological orientation. As I will now turn to argue the two perspectives are quite hard to reconcile, and for good reason.

3. Philosophy and the psychology of encoded lexical meaning (all too briefly)

As we have already seen, much like Fodor, relevance theorists take on the commonplace assumption that semantic theory aims at providing an account of linguistic meaning at a level of abstraction from its actual use; 'a sort of common core of meaning shared by every utterance of a sentence'. Given the RT on-line processing picture, however, it is only natural to expect that the inferential processor will have already enriched bits and pieces of an utterance by the time it has been fully heard in an actual communicative setting. In this respect, even though the decoding of this utterance will generate a concatenation of context-independent conceptual representations, by the time an utterance's explicitly expressed meaning is constructed, it will inevitably present various degrees of deviation from the type proposition that Fodor's semantic theory puts forth. Following this rationale, Carston recently observed that even if a sentence's encoded meaning did somehow turn out to typically express a full proposition like the minimalist holds, the repercussions of this discovery would not be "a devastating blow for the central tenets of RT", as "the propositions concerned would usually be very weak/general or absurdly strong, often either truisms or obvious falsehoods", which would "almost never be the sort of contents that speakers want to communicate" (2010b, p. 268).

Indeed, considering the particular cognitive processing that mediates the comprehension of linguistic stimuli against the traditional philosophical context of studying semantics, Carston's remark appears to be on the right track, but from the very same psychological perspective, a pressing question also arises: if, without any contextual input, the thoughts that 'there are cats' or that 'it's raining' that Fodor alludes to in his discussions are never 'the sort of contents that speakers want to communicate', is there any principled reason for which we need to accept that they are thoughts that we ever even entertain? And if the answer to this question is negative, as I think it is, what is the reason for which we need to maintain that these semantic contents are actual thoughts - rather than artificial examples pertaining to an abstract model of thought - to begin with?

Turning to lexical semantic content, this problem becomes even more obvious. As Carston herself discusses (2002, p. 360),

> Focusing on the word 'happy', let's consider the concept that it is supposed to encode, a concept which is to provide communicative access to a wide range of other more specific concepts [...]. The idea is that the lexically encoded concept HAPPY is distinct from all of these; it is more general and abstract than any of them, but provides the basis, in appropriate contexts, for processes of pragmatic enrichment so that addressees can come to grasp one of the more specific concepts and incorporate it into their representation of the speaker's thought. But what is not at all clear is whether we ever actually have (hence sometimes try to communicate) thoughts in which this very general lexicalized concept features as a constituent, or indeed what the property of being HAPPY is, as opposed to being HAPPY* or HAPPY**, etc.

Clearly, this worry is not exclusive to 'happy', but rather seems to present itself when the encoded meaning of any gradable adjective, where no absolute denotational property exists, or even that of commonly used verbs like 'open' or 'stop' are put into scrutiny.[7] Even when we turn to nouns, the postulation by relevance theorists of ad hoc concepts in the mind, raises important questions regarding their implementation in the individual's everyday thinking too. So, when the doctor thinks that John has a temperature in our familiar by now context, is she thinking that he has a TEMPERATURE or rather a TEMPERATURE*? Similarly, when Mary thinks that she wants to meet a bachelor, to use another well-worn example from the RT literature, does she implement in her mental processing the concept BACHELOR, whose denotation includes all male individuals who are not married, or the narrower concept BACHELOR*, whose denotation includes those male individuals who are not married, but who would also be eligible candidates for her to marry (obviously not the Pope or some very old or gay man)? If, as I take it, the answer to these questions points to the ad hoc rather than the encoded concept, it follows that these concepts coexist in our conceptual repertoire alongside their Fodorian realist counterparts TEMPERATURE and BACHELOR. And even if relevance theorists argue that "most occasional representations of a property (or an object, event or state) do not stabilise into a concept" (Sperber & Wilson, 1998, p. 198), they would still have to accept that at least some ad hoc meanings, which are very often used in everyday

[7] For the arguments here, see Sperber & Wilson (1998) and Carston (2012) respectively.

communication, like TEMPERATURE* and BACHELOR* (possibly also BACHELOR**, a stereotypical bachelor who is untidy, or even BACHELOR***, a man who seeks ephemeral relationships and so on and so forth), eventually get to be stored in the mental lexicon; and this time these seemingly ad hoc concepts would effectively be 'semantic', that is, decodable rather than inferred.

This *rampant encoded polysemy*, as Vicente and Martínez Manrique (2010) have aptly called it, would be problematic from a philosophical viewpoint, as it effectively violates Grice's Modified Occam's Razor. And although Carston has noted that such a proliferation of word senses in the lexicon would not necessarily be problematic for RT, since "within a theory of utterance interpretation conceived as a matter of on-line cognitive processes, it might well be more economical to retrieve a clutch of stored senses and choose among them, than to construct an interpretation out of a single sense and contextual information" (2002, p. 219, fn.50), when combined with the preceding discussion of the encoded meaning of words like 'happy' or 'open', this remark certainly raises questions regarding the relevance theorists' need to postulate single, general concepts that encode the meaning of such words in the first place.

Fodor has based his account of semantics on the presupposition that the content of a natural language sentence or a lexical item is entirely isomorphic to some determinate thought or atomic concept that they correspondingly encode. In this respect, apart from the few cases of homonymy, as in the two distinct meanings of the word 'bank', a lexical item carries a single meaning that is referentially derived. That is largely because of the issues that he has sought to address in the first place; issues for which context-sensitivity has traditionally been thought of as problematic, such as compositionality, the assignment of satisfaction conditions to semantically evaluable expressions, intentional explanation and so on and so forth. But this isomorphism does not work when psychological considerations enter the picture, a point that has been made by Sperber and Wilson themselves from at least as far back as (1998). When it comes to actual verbal communication, even Fodor agrees that "language is strikingly elliptical and inexplicit about the thoughts it expresses" (2001, p. 11), but this does not compromise his account, since it has little, if anything, to do with the actual processing of linguistic stimuli per se; it is "an account of the metaphysical character of the (primitive) semantic properties and relations" rather than "a specification of the semantic

properties of the expressions in a language" (Fodor, 2008, p. 18, fn.34). In fact, like most philosophers, Fodor has emphasized time and again that confusing psychology with semantics "is a very bad idea" and that "*there is, as a matter of principle, no such thing as a psychological theory of meaning*", since semantics is by definition about "constitutive relations between representations and the world" (Fodor, 2008, p. 88, emphasis in original).

Relevance theorists are in all likelihood equally aware of the more general dichotomy of interest between philosophers and psychologists who study linguistic meaning as they seem to acknowledge that "it is far from obvious that the label 'concept' refers to the same entity for both parties (and very clear that the term 'semantic' does not) so that little conciliatory progress is likely to be made until these differences are mapped out and resolved" (Carston, 2010a, p. 175, fn.8). Even so, they choose to ignore semantics from their research agenda. For instance, in a recent paper, Carston indirectly responded to the criticisms that RT has been receiving regarding what minimalists perceive to be its semantic commitments by noting that discussions concerning semantics are not central to what the theory is all about and suggesting that the label 'radical pragmaticism' fits the theory's orientation much better than 'radical contextualism'. As she argues, "it is us, the users of language, who are sensitive to context, and, as rational communicating/interpreting agents, we are able, by exploiting this sensitivity in each other, to get linguistic expressions to do a lot more than simply express their standing linguistic meaning" (2010b, p. 266). In this way, Carston distinguishes the study of the cognitive processing that underlies linguistic communication from that of semantic content, or 'standing linguistic meaning' as she calls it. Since RT's concern has always been to account for the ways in which the dedicated inferential process enriches and complements the semantic representation of linguistic strings, the argument goes, it should have nothing more to say about the nature of these representations other than that they are structured strings of Fodorian-style atomic concepts, which in turn need considerable contextual enrichment to reach full propositional status.

As we have seen, however, the implementation of Fodorian-style concepts as actual processing units that lexical decoding feeds into the inferential processor during utterance interpretation appears to be creating problems in its own right; from a psychological perspective, RT's inability to escape the literal-first hypothesis is a case in point, while from a philosophical one, the proliferation of word senses creates an uncontrollable system, where it

becomes very difficult to keep track of how many senses a word effectively encodes. Against this background, relevance theorists might need to explore alternative ways of accounting for encoded lexical meaning, since abstract philosophical models of lexical semantics of the type that Fodor offers do not fit the bill, nor are they supposed to. Therefore, a more psychologically-oriented approach to the question of what an expression's encoded linguistic meaning effectively is seems needed and, to this effect, behavioural research from the domain of psycholinguistics would undoubtedly have a pivotal role to play.

4. Experimental prospects

Given the detailed account of lexical pragmatics that relevance theorists have recently developed, it would certainly be interesting in its own right to see the extent to which the experimental research that has challenged the 'literal first' hypothesis with respect to the processing of figurative language could also be applied to the study of the processing of other types of pragmatically enriched lexical interpretations, like narrowings, approximations, category extensions, neologisms and word coinages. As Wilson and Carston note, some preliminary data on examples from the last two categories (Clark & Clark, 1979; Clark & Gerrig, 1983) suggest that they are "no harder to understand than regular uses" (2007, p. 237), but it remains to be seen how fast the interpretation of neologisms and word coinages takes place in comparison to the processing of literal meaning. Turning to cases of lexical narrowing, like the one presented in (1), and approximation, like the one in (2), I think it would be quite counterintuitive to expect any delays in their processing, but again there is, to my knowledge, a complete lack of experimental evidence to support this intuition.

From the current discussion's perspective, experimentation on different varieties of lexical meaning adjustment would be able to give us a clearer idea of how different types of enriched interpretations of a word relate to its literal meaning. If no significant difference is documented, this would strengthen not only the assumption that literal lexical meaning is in no way exceptional but also the need to come up with more psychologically-oriented accounts of the mental lexicon and more essentially its particular contribution during verbal communication. One of the few experimental studies on lexical pragmatics from an RT perspective that has surfaced in the recent years, for example, suggests that certain context-independent properties of a word's meaning

remain activated even after a metaphorical (Rubio-Fernández, 2007) or narrower interpretation (Rubio-Fernández, 2008) have been reached. However, even though this set of experiments has been extensively quoted in the RT literature, no full explanation has been provided about what these properties are and how they relate to the equally context-independent atomic concept that the same word encodes. Foreseeing that a 'core' relevance theorist's response would be that they are part of the information that is attached to the word's conceptual address and thus not part of its content (as per the discussion of Fodorian mental files above), it still is curious why these particular properties are obligatorily activated during spontaneous interpretation, which in itself gives the impression that they are decoded rather than inferred.

It goes without saying of course that the suggested behavioural research would not be without its limitations either. For instance, it can certainly be argued that it is dangerous to rely too much on time-reaction measurements, which most of the relevant experiments have implemented either way, since they cannot, on their own provide any direct evidence for the contention that we actually interpret literal and non-literal language by using the same types of mental processes.[8] To this effect, using more advanced experimental techniques, and also potentially looking into what neurolinguistics would have to say could provide us with much more solid conclusions. Regardless of any such limitation, however, I am convinced that the tension between the philosophical analysis of lexical meaning and its psychological consideration that the RT discussion of ad hoc concept construction seems to have involuntarily revealed can open up new and exciting prospects not only for theoretical analysis, but also for experimental research on the semantics/pragmatics interface, at a time when the field seems to be dealing almost exclusively with tropes, scalar implicatures and presupposition projection.

[8] For a discussion along these lines from a psycholinguistic perspective, see McElree & Nordlie (1999), a paper suggested to me by John Tomlinson Jr.

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Metaphor and Experimental Pragmatics: When Theory Meets Empirical Investigation

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ABSTRACT

In this contribution we focus on one phenomenon that has a special role in pragmatic theorizing, namely metaphor, and select two issues deriving from theoretical models and prone to be tested experimentally. The first issue concerns the comprehension procedure, that is whether access to metaphorical meaning goes through a mandatory literal stage and thus is indirect, as predicted by a Gricean inspired account, or rather is retrieved directly. The question will be discussed by referring to behavioral and neurophysiological studies, which advanced our understanding of the time course of metaphorical interpretation but proved not fully suitable to answer the question. The second issue revolves around the cognitive architecture of the pragmatic system as it operates in the case of metaphor comprehension. We will illustrate the contribution that functional neuroimaging, coupled with clinical investigations can provide to fine-tune the architecture of the system responsible for metaphor processing. Some outstanding questions are highlighted in the final part, aiming at sketching our interpretation of the experimental pragmatic enterprise.

Keywords: metaphor, experimental pragmatics, neuropragmatics, literal-first hypothesis, mind-reading

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Introduction

Research in pragmatics follows a thread that originated in philosophy, developed in linguistics and cognitive science, and more recently experienced an expansion indeed a real turn into experimental investigation. This introduction briefly traces this evolution, with the aim of presenting the background upon which metaphor studies have moved and are still moving.

The study of pragmatics finds its origin in the philosophical tradition, and mostly in the attempt of distinguishing formal language from actual linguistic usage. First references can be traced back to Charles Morris's semiotic theory (Morris, 1938), who defined pragmatics as the study of the relations between signs and their users, in opposition to syntax (the relation of signs to one another) and semantics (the relation of signs to what they denote). The field developed in the 1970s after the contribution of philosophers adhering to the so-called ordinary language philosophy, namely the late Wittgenstein, Austin (with his famous lecture "How to do things with words") and Strawson, highlighting the complexity of meanings and the variety of forms of verbal communication, and assuming an unbridgeable gap between the semantics of formal language and that of natural languages. In his William James Lectures at Harvard in 1967, Herbert Paul Grice claimed that the gap between formal and natural language could be reduced by way of distinguishing linguistic meaning from speaker's meaning (Grice, 1989). He showed that, when considered in specific contexts of use, linguistic meaning can convey richer and fuzzier speaker's meanings, made up not only of "what is said", but also of "what is implicated". In doing so, he introduced new conceptual tools, in particular the notion of "implicature" that became the foundation for modern pragmatic theories. One of the merits of Grice is to have shown that pragmatics identifies a form of behavior, and thus, ultimately, deals with mind faculties. His Cooperative principle ("Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged"; Grice, 1989) was intended as a general law of human rationality. In this frame, meaning became primarily a psychological phenomenon, and only derivatively a linguistic one. Although it is widely recognized that Grice intended to offer only a rational reconstruction rather than a real-time description of pragmatic processes (Bach, 2005), his work paved the way to a consideration of pragmatics at the interface between language and cognition.

A full account of pragmatics in psychologically plausible terms developed in the late 1980s, when pragmatic processes were considered in a mentalistic perspective, and the term "cognitive pragmatics" started to circulate. Major issues became the description of comprehension procedure and mechanisms, and the identification of the pragmatic system with respect to the general architecture of cognition (Kasher, 1984; Bara & Tirassa, 1999). Upon this background, Relevance Theory appears as the most full-fledged account of pragmatic processes, and specifically verbal communication.[1] By revisiting the Gricean maxims in terms of Relevance, i.e., as a function of processing efforts and contextual effects, and by promoting Relevance to the status of a key principle in human cognition, Relevance Theory aims at explaining every possible meaning phenomenon in communication (Sperber & Wilson, 1986/1995). In this framework, "pragmatics is a capacity of the mind, a kind of information-processing system, a system for interpreting a particular phenomenon in the word, namely human communicative behavior. It is a proper object of study itself, no longer to be seen as simply an adjunct to natural language semantics. The components of the theory are quite different from those of Gricean and other philosophical descriptions; they include on-line cognitive processes, input and output representation, processing effort and cognitive effects" (Carston, 2002).

Despite Relevance Theory considers pragmatics as a process and not as a set of abstract and formal relationships (Wilson & Sperber, 2012) and is concerned with real time processes (Wilson & Sperber, 2004), for a long time it remained exclusively theoretical, and the same holds true for other pragmatic hypotheses and research traditions. Theories were tested by using as evidence a mixture of intuitions about interpretation and observations of behaviors. In this sense, an experimental approach can strongly help in disentangling alternative theoretical accounts and their implications regarding underlying cognitive mechanisms. Psycholinguistics has developed sophisticated experimental methods in the study of language processing. These were applied to pragmatic phenomena, but not systematically used to test pragmatic theories. In the last decade, the publication of the book "Experimental Pragmatics" (Noveck & Sperber, 2004) marked what became known as the "experimental turn" in pragmatics (Noveck & Reboul, 2008). Experimental

[1] Another model of pragmatic interpretation is Bara's Cognitive Pragmatics, which accounts for communicative processes, both linguistic and extralinguistic (i.e., gestural), by positing special emphasis on the description of the communicative agents' mental states (Bara, 2010).

pragmatics presents itself as a new field that "draws on pragmatics, psycholinguistics and also on the psychology of reasoning" (Noveck & Sperber, 2004) and opens new scenarios in the formulation of testable predictions derived by theory. More specifically, experimental pragmatics aims at furthering linguistic and pragmatic theoretical assumptions by better describing the cognitive factors and mechanisms playing a role in communicative exchanges and by testing the validity of pragmatic theoretical proposals for a number of specific phenomena (Noveck & Reboul, 2008). Developing the experimental side of pragmatics entails deriving testable pragmatic hypotheses from theoretical assumptions – based on intuitions and observations – and thus leading theory to refine itself in the light of experimental evidence.

The experimental side of pragmatics is explored also within the field of neuropragmatics (Bambini, 2010; Bambini & Bara, 2012), aimed at describing the neural underpinnings of pragmatic processes by applying, for example, functional neuroimage. Even though the identification of the aspects of the pragmatic theory to be addressed in brain's terms is not definite yet (Bertuccelli, 2010), most neuropragmatic studies "go neuro" by using neuroscientific techniques to validate cognitive models and hypotheses. The importance of this research direction is undeniable, because models are able to support investigations that otherwise will be only be mere empiricism (Van Berkum, 2010). However, it should be noticed that the levels of analysis proposed in the linguistic field may be not always suitable to reflect brain functioning due to incommensurable units between the linguistic and the neural level (Poeppel & Embick, 2005; Grimaldi, 2012). Thus, for "going neuro" it would be desirable also starting from "neuro" hypotheses and reconsidering research issues with special attention to brain mechanisms and functioning Van Berkum (2010), which holds for pragmatics as well.

Overall, the experimental turn puts forward a two-way relation between theory and empirical confirmation. On the one hand, theoretical issues ask for more detailed experimental evidence and, on the other hand, experimental evidence puts pressure on theorizing, which in turn leads to refinements and expansions of theoretical models. As regards the objects under the lens of experimental pragmatics, several phenomena fit into the paradigm. Some of them, as for example scalar inference and reference resolution have received systematic attention (Noveck & Reboul, 2008), whereas for others, as for example metaphor, experimental evidence is still fragmentary and needs to be

gathered more systematically. In the present work, we will focus precisely on metaphor, assuming its definition as a "paradigmatically pragmatic phenomenon" "involving a gap between the conventional meaning of words and their occasion-specific use", able to motivate the distinction between pragmatics and semantics (Camp, 2009), and to approach the psychological reality of pragmatics as well. We will discuss two research questions that concern fundamental unit of construction in a pragmatic model such as Relevance Theory. The first one concerns the comprehension process and, more precisely, whether there is a mandatory literary step while accessing metaphorical meanings. The second issue concerns the mental architecture and how of the pragmatic system operates in the case of metaphor comprehension cognitive components.

1. Issue 1: Metaphor comprehension: a direct or indirect process?

The assumption that metaphor is a deviation from literal meaning dates back to Aristotle's *Poetics*, where metaphor was considered as a departure from the "literal norm". This position has been widely developed within the so-called standard pragmatic model, associated primarily with philosophers Grice (1975, 1978) and Searle (1979). Grice assumed metaphor to violate one of the cooperative principles that govern communication, namely the first Maxim of Quality, i.e., "Do not say what you believe to be false", and thus to be defective in communicative terms compared to literal language. In order to success in metaphor comprehension, the hearer relies on a set of inferential rules and pragmatically works out speaker's meaning, which is separated from the linguistic meaning. Therefore, part of the conveyed meaning is explicitly communicated, while another part needs to be inferred ("implicature"). Moreover, whereas literal meaning is accessed directly, metaphor interpretation requires subsequent different stages: first, literal meaning is accessed; second, literal interpretation is detected as defective; and third, the search for another interpretation is pursued. Accessing literal meaning is thus a mandatory stage, and metaphor interpretation occurs indirectly. A similar position is held by Searle (1979), who argued that in understanding a metaphor the hearer first determines whether seeking for a metaphorical interpretation or not, then uses a particular set of strategies for computing the values of the intended metaphorical meaning and, finally, uses a particular strategy for restricting these values. Interestingly, also the psychologist George

Miller (1979) argued that metaphor generates a "recognition problem", i.e., a discrepancy against the previous context, which is the first step, followed by reconstruction and interpretation towards metaphor comprehension. Note that the standard pragmatic model provides a rationalization of the processes used in deriving figurative meanings but it is in no ways a psychological or cognitive model. No speculation about the nature or the temporal development of cognitive processes behind metaphor is provided.

In more recent times, Relevance Theory (Sperber & Wilson, 1986/1995), within a broad framework for explaining human cognition and communication, challenged the standard pragmatic model arguing that the same inferential processes determining implicatures may contribute also to the explicit level of communication. Metaphorical meaning is claimed to belong to this explicit level, namely to "what is said", rather than to "what is implicated" as postulated by Grice. What guides inferential comprehension is the expectation of relevance raised by an utterance against the provided context (Sperber & Wilson, 2008). Inferential processes allow us to automatically "adjust" lexical concepts and construct *ad hoc* concepts during online interpretation without any conscious effort. The concept inferentially derived may have a "broader" or "narrower" denotation compared to lexically encoded concept. Contrary to the standard pragmatic model, the relevance-theoretic approach does not recognize a mandatory literal step in metaphor interpretation. The lexical encoded meaning is a mere point of access to an array of encyclopedic information from which the hearer selects in order to achieve a satisfactory interpretation. Interpretative hypotheses are tested in order of accessibility and are driven by the achievement of optimal relevance (Wilson & Sperber, 2004).

Turning into the experimental field, these different accounts of the comprehension process allow for a wide margin for empirical translation of theoretical hypotheses into time-sensitive predictions. Predictions have been derived mainly from the standard pragmatic model and were based on the assumption that literal meanings have absolute priority, and that literal intended meanings should be easier and faster to understand than figurative meanings (the so-called "literal first hypothesis"). Longer reaction times for metaphors were assumed as an indirect support for this hypothesis, assuming that the process of accessing literal meaning, rejecting it, and searching for a figurative interpretation requires longer times than directly accessing literal meaning. In a few words: more stages require more time. This assumption seemed to be confirmed by behavioral measurements showing that reading

metaphors is more time consuming than reading literal utterances (Janus & Bever, 1985). Similar findings, however, were soon challenged by evidence showing that, when contextually supported, metaphors are comprehended as quickly as literal counterparts (Gibbs & Gerrig, 1989; Inhoff, Lima, & Carroll, 1984), opening the way to the formulation of an alternative model, known as "direct access view".

The dichotomy indirect *versus* direct access to metaphorical meaning is mitigated by the Graded Salience Hypothesis (Giora, 2003), a general view of language comprehension that postulates the activation of salient meaning (i.e., the most prominent and faster retrievable from the mental lexicon) in the first stage of language processing without additional pragmatic interferences and regardless of context. When literal and non-literal utterances converge in the degree of salience, the initial process is the same and a direct access occurs. On the contrary, in the case of novel – non salient – metaphors, the access to metaphorical meaning is not direct. Gibbs (2001) defined the Graded Salience Hypothesis as a "hybrid theory of figurative language" because it combines both a direct access view (for salient meanings) and an indirect access view (for non salient meanings). The Graded Salience Hypothesis seems to be confirmed by reading times that showed equal reading times for both salient literal and metaphorical meanings (Giora, 2003).

Equal reading times, however, are not sufficient *per se* neither to support nor to discredit the standard pragmatic model, because several elements may induce an "incorrect illusion" of equivalence (Gibbs & Gerrig, 1989). Importantly, McElree and Nordlie (1999) showed that even if the process of understanding literal and figurative language might be equal in time, differences in accessibility might be significant. A number of techniques are able to offer online, more fine-grained data on metaphor understanding process than those provided by reading times. Among these, the recording of brain activity through Event-Related Potential (ERP) technique seems especially promising in disentangling the direct *versus* indirect dichotomy as it is able to give millisecond precise temporal pattern of comprehension process time-locked to the word of interest.

Up to now, about fifteen ERP studies on metaphor have been published and among them a great variability of metaphorical structures, languages, experimental protocols, and observed ERP components is visible (among others, Arzouan, Goldstein, & Faust, 2007; De Grauwe, Swain, Holcomb, Ditman & Kuperberg, 2010; Lai, Curran, & Menn, 2009; Pynte, Besson,

Robichon, & Poli, 1996; Tartter, Gomes, & Dubrovsky, 2002). It is beyond the purpose of the present paper to review all available ERP contributions on metaphor. What falls within our aims is to overview how the literal-first question has been addressed in this domain. The dichotomy direct *versus* indirect access models seems indeed to be a compulsory step for introducing ERP studies on figurative language but, actually, only in a few cases precise experimental predictions are provided and discussed. Among the available amount of ERP studies on metaphor, we selected two studies that clearly transposed the theoretical assumptions of the standard pragmatic model into ERP predictions, in terms of modulation of components: Pynte et al. (1996) and De Grauwe et al. (2010).

The first one (Pynte et al., 1996) investigated the difference between familiar and unfamiliar metaphorical sentences both with and without contextual support. The second one (De Grauwe et al., 2010) investigated the difference between conventional metaphorical sentences and literal or anomalous sentences. Both studies predicted a modulation of two components as neural evidence for the literal first hypothesis. Namely, the N400 – a negative-going component that peaks at approximately 400 ms after the onset of the target stimulus – taken as an index of the difficulty in semantic processing, and the Late Positive Component (LPC) – a positive going potential following the N400 – taken as a marker of additional processing or meaning reanalysis. However, due to the variability in adopted protocols, conclusions proved highly different.

More specifically, Pynte et al. (1996) ran four ERP experiments comparing familiar metaphors ("Those fighters are lions"), unfamiliar metaphors ("Those apprentices are lions") and literal sentences ("Those animals are lions"). The authors predicted that if the literal-first hypothesis holds, metaphors should elicit an N400 effect (i.e., a different amplitude compared to literal controls) indexing the access to literal meaning, followed by an LPC effect indexing the access to the metaphorical meaning. Otherwise, if the parallel hypothesis (or direct access) holds, the access to literal and metaphorical meaning should occur in the same latency band and the N400 should be modulated by factors that usually influence metaphor comprehension, such as familiarity. Finally, they introduced a third hypothesis, namely the context dependent-hypothesis arguing that metaphorical meaning is accessed directly when relevant to the preceding context. If this last hypothesis is valid, the N400 to metaphor should be reduced in presence of a supportive context. Results showed that, when

compared to literal sentences, familiar metaphor elicited a more enhanced N400, consistently with the literal-first hypothesis (experiment 1). But when familiar metaphors were compared to unfamiliar metaphor, no N400 was visible (experiment 2). In this case, N400 proved not sensitive to familiarity modulation thus disconfirming, according to the predictions, a parallel hypothesis. When context was added and again familiar and unfamiliar metaphors were compared, results run as follows. When context was supportive in the case of familiar metaphors ("They are not talkative: these counselors are carps") and unsupportive in the case of unfamiliar metaphors ("They are not obedient: these engineers are carps"), unfamiliar metaphors elicited both N400 and LPC effects (experiment 3). The authors claimed that this result could be explained both in terms of the literal-first hypothesis because of the biphasic pattern N400-LPC reflecting different stages, and in terms of the context-dependent hypothesis, because context increased the difference between familiar and unfamiliar metaphors, not visible in the out of context condition. But, when context was unsupportive for familiar metaphors ("They are not naive: Those fighters are lions") and supportive for unfamiliar metaphors ("They are not cowardly: this apprentices are lions"), surprisingly an N400 effect was elicited by familiar metaphors, while an LPC effect was observed for unfamiliar metaphors. The authors concluded that the crucial effect of context visible in N400 modulation definitely supports the context-dependent hypothesis.

De Grauwe et al. (2010) compared conventional nominal metaphors ("Unemployment is a plague"), literal ("Cholera is a plague") and semantically anomalous sentences ("Metal is a plague"). Like in Pynte et al. (1996), here the authors suggested that if the literal-first hypothesis is valid, an N400 effect to metaphors should be elicited – indexing a preliminary difficulty in semantic mapping – followed by an LPC effect reflecting an additional effort in accessing metaphorical meaning or integrating it in context. Moreover, they took into account the Graded Salience Hypothesis (Giora, 2003) and predicted that if it holds no difference in the N400 amplitude should be recorded between conventional metaphors and literal sentences, as in both cases the critical word is salient in the context and should be activated immediately. The authors claimed that an LPC effect might be consistent with the Graded Salience Hypothesis, as well, because also in familiar metaphors the literal meaning could be accessed in addition to the metaphorical meaning until considered in conflict with a plausible interpretation thus eliciting a reanalysis indexed by the

LPC. Results showed that semantically anomalous phrases elicited a greater N400 effect than the other two experimental conditions, while the difference between metaphors and literal counterparts was only transient. The N400, indexing the access to literal meaning, was followed by an LPC effect triggered by the conflict between the correct metaphorical meaning and the still retained literal meaning, in other words by a kind of alignment process. To confirm these results, the authors designed a second experiment where the critical word was in mid-sentence position and thus wrap-up effects due to final-sentence positions were avoided. Importantly, also when presented in mid-sentence position, metaphorical critical words elicited an N400 (even if localized) followed by an LPC effect. Overall, the authors found thus support for the literal-first hypothesis, while the Graded Salience Hypothesis seemed to be not supported.

In sum, both reviewed ERP studies confirmed that metaphor evoked a biphasic pattern (N400-LPC), like other pragmatic phenomena (e.g. metonymy, Schumacher, 2011) but they differed in interpreting the results with respect to the direct *versus* indirect dichotomy: while Pynte et al. (1996) interpreted their results in terms of a context-dependent, i.e., direct hypothesis, De Grauwe et al. (2010) claimed to offer support in favor of serial, i.e., indirect access. Again, the literal-first hypothesis is neither confirmed nor disconfirmed definitely, as it is not possible to determine whether there is a mandatory initial stage.

Therefore, the question is whether available predictions and adopted experimental paradigms are actually suited to ascertain the presence of a literal step with sufficient accuracy. While an initial step with a fully accessed literal meaning seems implausible, it is possible that core aspects of the literal meaning are automatically activated even in metaphorical-biased contexts. Remarkable evidence in this direction comes from a cross modal priming study (Rubio Fernandez, 2007). This study showed that core features of word meaning (i.e., literal meaning) are always activated even in context biased towards metaphorical interpretation and remain activated beyond the recovering of the metaphorical meaning. On the contrary, irrelevant features were deactivated between 400 and 1000 ms through a suppression process that involves high-level cognitive processes similar to those involved in ambiguity resolutions. In its turn, also theory is moving towards a convergence with experimental data by incorporating the idea of a "lingering" of literal meaning throughout the metaphor comprehension process (Carston, 2010) in

perfect accordance with experimental pragmatics' aims. In this scenario, the question about whether the access to metaphor passes through a mandatory literal step seems to be rather interpreted as "what is the role of literal meaning". Some promising suggestions rely on new paradigms – as for example the combination of masked priming and ERP recording (Schumacher, Bambini, Weiland *in press*) – that are able to tap the very early phases of processing and could be profitable used for investigating also the construction of metaphorical meanings.

2. Issue 2: Cognitive components in metaphor comprehension

The second issue we would like to consider is related to the cognitive architecture of the metaphor comprehension process, i.e., the description of the cognitive systems that participate in metaphor understanding and of their neural underpinning. Here the experimental pragmatics perspective blends with clinical pragmatics and neuropragmatics, as it enters matters and adopts methodologies belonging to neuropsychology and cognitive neuroscience. To our view, here too it is possible yet profitable to stick with the guideline of a strict dialogue between theoretical hypotheses and empirical data.

Going back to Grice, he was certainly far away from approaching the neurocognitive description of metaphor. However, the assimilation of metaphor to implicature and the description of how implicatures are derived, namely through the recognition of intentions, makes it plausible to assume that, in a Gricean inspired cognitive model, metaphor comprehension – as all cases of implicated meaning – would require mind-reading operations, i.e., what has become known as Theory of Mind, defined as the ability of attributing mental states to others. The Gricean view is that pragmatic interpretation is ultimately an exercise in metapsychology, in which the hearer infers the speaker's intended meaning from evidence she has provided for this purpose (Sperber & Wilson, 2002).

In maintaining the inferential nature of pragmatic processes at the implicit level and extending it to the explicit level of communication, Relevance Theory too assumes the involvement of mind-reading mechanisms. More specifically, Relevance Theory considers mind-reading as a dedicated inferential module, and pragmatics as a sub-module of the mind-reading module, with its own special-purpose principles and mechanisms, especially dedicated to verbal communication (Wilson, 2005). The relevance-theoretic comprehension

procedure automatically constructs hypotheses about the speaker's meaning on the basis of a description of the utterance plus available contextual information. In the case of metaphor, the hypotheses about the speaker's meaning cannot be based on the default rules of literalness, being metaphorical expressions alternative routes to reach optimal relevance, determining additional efforts in terms of intention recognition (Happé, 1993).

This aspect of the relevance-theoretic perspective found an empirical test bed in the autistic condition: autistic patients lacking mind-reading abilities should be impaired in deriving metaphorical meanings as compared to literal interpretation. The data collected by Happé (1993) supported this view, by showing that autistic children who do not pass the first-order theory of mind test are impaired in metaphor comprehension but not in simile comprehension, as the latter condition can be interpreted literally. Several studies confirmed this piece of evidence, although it has been showed that Theory of Mind is necessary but not sufficient to understand metaphor (Norbury, 2005), the specificity of pragmatic disorders in autism is a matter of current debate (Giora, 2012). Recently, Wearing (2010) highlighted the apparent conflict between the idea of metaphor as loose use, based on *ad hoc* concepts and not involving special mechanisms, and the special mind-reading effort assumed to be necessary for metaphor interpretation. The conflict is solved by clarifying that the mind-reading effort in metaphor processing lies in the type of source the hearer must rely upon to derive the *ad hoc* concept and solve the interpretive process successfully: not only the world at large, as typically in the literal case, but the beliefs that the speaker is likely to hold and not to hold. The relevance of a metaphor is guaranteed by the speaker's mental states, rather than by the world, which is what autistic individuals are unable to process.

Importantly, as evident from the description of the relevance-theoretic comprehension procedure, mind-reading mechanisms operate against a wider cognitive background which includes other systems. As already mentioned, the comprehension procedure follows a path of least effort in formulating hypotheses about the speaker's meaning, aiming at the maximization of relevance and "using whatever contextual information is most highly activated by the automatic workings of the cognitive system at the time" (Wilson, 2005). The maximization of relevance is guaranteed by three notably characteristics of the human cognition: the constant monitoring of the environmental features, the permanent availability of a huge amount of memorized data, and the

attentional resources, which are able to handle only a limited amount of information at any given time. The efficiency of the process is a matter of being able to select, from the environment and from memory, the most relevant information for attentional processing (Sperber & Wilson, 2002).

On this basis, if we could take a global picture of the cognitive systems at work in pragmatic interpretation, one should expect not only mind-reading mechanisms, but also the attentional system to be involved, possibly with a higher effort for metaphor as compared to literal interpretation, related to higher costs in selecting the relevant information from context and possibly also the appropriate meaning among competing ones. Moreover, the construction of the *ad hoc* concepts – accessing concepts and modulating their denotations through broadening and narrowing – implies operations that should be reflected in the conceptual system.

In a similar scenario, functional neuroimaging techniques appear as the methodology of choice for exploring the cognitive architecture of metaphor comprehension, being able to provide information concerning "where" the processes take place, and allowing for anatomo-functional correlations between brain structures and cognitive systems. The neuroimaging of metaphor comprehension is relatively vast, including around twenty studies published in the last decade. Metaphor nicely suits into the requirements of standard neuroimaging paradigms, i.e., subtractive: while for structural aspects of language we need to device sound experimental designs, for instance introducing anomalies (Moro, 2008), metaphor can be easily compared to its literal equivalent, offering a window on what systems are recruited to adjust meaning pragmatically. However, most of the existing literature has not paid attention on describing the architecture of the process, being interested instead in assessing hemispheric involvement, following the classic hypothesis that pragmatic aspects of language are processed in the right hemisphere (Joanette, Goulet, & Hannequin, 1990; Tompkins, 1995). In contrast with the classic view, most studies on metaphor interpretation report bilateral patterns of activations, where frontal and temporal areas stand out in particular, as shown in recent comparative analyses (Bohrn, Altmann, & Jakobs, 2012; Rapp, Mutschler, & Erb, 2012). The involvement of the right hemisphere seems to be especially modulated by the conventionality vs. novelty of the metaphorical expressions, with greater right activations involvement for novel and unfamiliar expressions (Schmidt et al., 2010). This is in line with the theoretical tenets of Graded Salience Hypothesis, which specifically aims at

accounting for the difference between familiar and unfamiliar expressions, assuming two different processing styles (Bohrn et al., 2012). The cognitive architecture of the comprehension process, however, is not the main topic in the neuroimaging of metaphor.

In a recent fMRI study, we tried to overcome the right versus left debate to focus on the neurofunctional description of metaphor comprehension, based on the cognitive architecture put forward in the cognitive pragmatics literature (Bambini et al., 2011). The building blocks of the metaphor comprehension process assumed were the following:

a) To start with, we hypothesized the crucial involvement of *the conceptual component*, reflecting conceptual access and the construction of *ad hoc* concepts through context-based inferences.

b) Second, we hypothesized the involvement of the *attentional component*, in charge of selecting the information worth bring together, filtering contextual features and competing meanings.

c) Finally, the *mind-reading component* is assumed to participate in supporting the recognition of the speaker's communicative intentions, and specifically, along Wearing (2010), the recognition of the speaker's belief on which *ad hoc* concepts are based.

We constructed an experimental paradigm where participants were presented with paired passages including literal and metaphorical expressions (e.g., "Do you know what that insect is? A dragonfly" vs. "Do you know what that dancer is? A dragonfly"), intermixed with fillers, in order to reduce the proportion of figurative language. Participants were instructed to read the passages, and then perform an adjective matching task, making metaphor comprehension an implicit task. The analysis showed that metaphor as compared to literal comprehension produced greater activations in a number of regions, distributed bilaterally and involving especially the frontal and temporal lobes: the bilateral inferior frontal gyrus (extending over left and right BA 45 and left BA 47) and other prefrontal regions (right BA 9 and left BA 8), the left angular gyrus (BA 39), the cingulated cortex bilaterally (BA 24 and BA 32) and the right posterior superior temporal gyrus (BA 22).

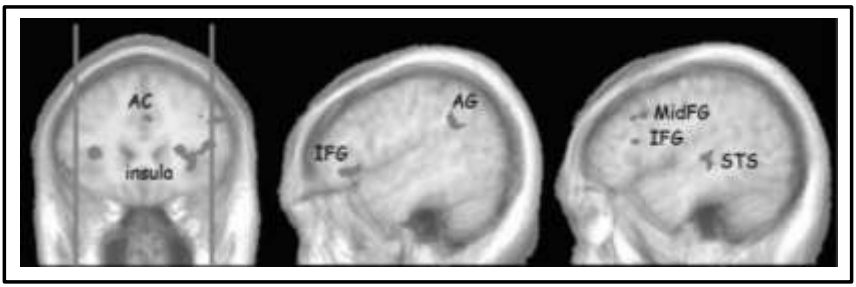

Figure 1. Brain areas activated for metaphor comprehension as compared to literal sentences. Coronal (on the left) and sagittal view of the left hemisphere (center) and of the right hemisphere (right); the lines in the coronal image correspond to the location of the sagittal slices. AC: anterior cingulate; IFG: inferior frontal gyrus; MidFG: middle frontal gyrus; STS: superior temporal sulcus; AG: angular gyrus Adapted from Bambini et al. (2011).

The anatomo-functional correlations seemed to confirm our predictions:

a) Activity at the level of the inferior frontal gyrus bilaterally is likely to reflect the activation of the *conceptual system*. The activation of bi-frontal areas is probably the most robust results across the literature on metaphor, and in discourse processing as well, i.e., when word meaning needs to be integrated with world knowledge and the wider context. The same function seems to be supported by the angular gyrus (BA 39), which too is greater activated in metaphor as compared to literal process, and which is considered as an area supporting high-level conceptual processing.

b) The activity observed in the cingulate cortex, as well as activity in prefrontal areas, is likely to reflect *attentional mechanisms*. These regions are implicated in cognitively demanding tasks involving stimulus-response selection in the face of competing streams of information, including Color Stroop and Stroop-like tasks and many working memory tasks.

c) Finally, the posterior part of the right superior temporal gyrus might reflect *mind-reading mechanisms*, as this area has been implicated in monitoring the protagonists' perspective and attributing intentions to agents. Interestingly, in our study the regions along the superior temporal sulcus show greater activity in response to unfamiliar than familiar metaphor, extending to the left hemisphere for unfamiliar items, pointing to a strong relation between novelty and mind-reading efforts.

Two important considerations should be added here. First, this decomposition is highly compatible with the clinical literature on metaphor deficit, which is not limited to the autistic population. Deficit in metaphor

comprehension are indeed vulnerable to several neurological and psychiatric conditions (Thoma & Daum, 2006; Rapp & Wild, 2011), which suggests that a complex cognitive architecture is involved: the underlying cause of deficits in pragmatic interpretation, far from being unitary, might find different explanations in different populations (Stemmer, 2008). For instance, difficulties in demented patients might be related to attentional deficits in the case of demented population (Amanzio et al., 2008). Second, this decomposition shares similarities with the findings reported for other cases of figurative language interpretation, for instance idiom processing (Papagno & Romero Lauro, 2010) which suggests common mechanisms and is in line with the Relevance Theory's idea that metaphor doesn't require specific operations to be processed.

Overall, the main achievement of our study is the neutrally-plausible decomposition of the metaphor comprehension process in a network of functional components, which are candidate to represent basic blocks in a full-fledged neurocognitive model of metaphor processing. Cognitive pragmatics provided the foundation for the study, by helping formulating predictions and interpreting results. To this respect, Relevance Theory seems to offer a comprehensive framework for understanding figurative language comprehension, by sketching a model which is grounded in general cognition and takes into account different aspects of the process. Besides, Relevance Theory might hopefully bear on neuroimaging evidence to further detail the architecture of the system. Similar considerations, however, are not limited to the Relevance Theory framework, but extend to other cognitive models of metaphor comprehension: we will go back to this point in the final remarks. One can expect that major future achievement could come from the attempt to go beyond the decomposition toward a proper neurocognitive model: much promises lie in the study of connectivity between brain areas, in order to explore the delicate interplay of the components, the order of activation, and their specific roles.

Conclusion

In this contribution, we attempted to show how theoretical assumptions in pragmatics can be translated into experimental paradigms, and indeed can profitably guide empirical investigations in formulating predictions and interpreting results. As emerged in the discussion, the process is far from

being complete. Rather, the experimental turn in metaphor research is in the phase of sharpening research questions and experimental paradigms for closer addressing key theoretical points.

One of these central questions regards the description of the time course of metaphor interpretation, bearing in mind the standard pragmatic view and the hypothesis of a mandatory initial literal step. Through the consideration of behavioral data and ERP results collected over the last three decades, we argued that available experimental data are still not able to give a decisive answer to this question. Promising hints seem to come from a refinement of the theory, incorporating the notion of lingering of the literal meaning, and from the employment of new paradigms able to tap the very early stages of processing (e.g., masked priming combined with ERP).

Another case is represented by the cognitive architecture of the metaphor comprehension process. The involvement of mind-reading mechanisms, since long assumed in the pragmatic tradition, is confirmed by clinical evidence on autistic patients. Moreover, functional neuroimaging helped decomposing the process of metaphor interpretation in a number of cognitive components which include also the conceptual and the attentional system. Guided by theoretical modeling, we are stepping forward in describing the neurofunctional architecture of metaphor interpretation.

A framework such as Relevance Theory – explicitly modeled on online processes of utterance interpretation and the nature of the systems behind (Wilson & Sperber, 2004) – offers many more aspects to be addressed experimentally. We would like to mention just two of them, which are of special interest to our view and on which our group is working within an experimental (neuro)pragmatics perspective.

First, recent developments in the relevance-theoretic account of metaphor suggest that the comprehension of creative and extended metaphors might imply a meta-representative process of extracting the intended meaning from both literal meaning and the evoked imagery rather than a process of *ad hoc* concept construction (Carston & Wearing, 2011). To now, very little experimental evidence has been collected on literary metaphor, which might represent a case very high processing costs are compensated by high cognitive benefits, possibly in terms of aesthetic appreciation. Early results showed that literary metaphor is a complex, multidimensional phenomenon whose comprehension is influenced and mediated by a number of psycholinguistic variables (Resta, Bambini, & Grimaldi, *submitted*). This domain appears to us

as a good candidate for a rich dialogue between experimental evidence and theory, pragmatics and possibly also cognitive poetics.

Second, figurative language has been used in pragmatics as a label for several different phenomena, and only recently theory is starting to clarify the differences across phenomena, by developing a finely-grained lexical pragmatics account. Although we assume that all figurative instances require pragmatic inferences, there might be different underlying processes linked to different operations at conceptual level. For example, there is early evidence supporting a distinction between metaphor, metonymy, and approximation – which are claimed to vary in the degree of underlying adjustment – in terms of the interpretation availability and costs (Bambini, Ghio, & Schumacher, *submitted*). We believe that along this line a psychologically grounded taxonomy of figurative language might be reached, which might account for the alternative routes speakers might choice to communicate meaning.

Besides Relevance Theory, interesting suggestions might come from other theoretical proposals which move in different fields than pragmatics. Above all, Cognitive Linguistics – grown out from the work of Lakoff and colleagues – suggested that metaphor is not a specific linguistic device, but a conceptual phenomenon deriving from bodily grounded mapping operations (Lakoff & Johnson, 1980). Interesting experimental predictions about the involvement of the sensory motor system in the processing of metaphor meaning might be derived in this scenario, which are being elaborated but still require further exploration. Furthermore, the mechanisms of mapping might play a role in understanding some types of metaphor, although the theory is still underdetermined in terms of comprehension procedure. Importantly, Cognitive Linguistics appears to be not incompatible with Relevance Theory's main claims and the possibility of a combination of the two to contribute to a comprehensive theory of metaphor has been already explored, as they might target different aspects and thus be complementary (Tendahl & Gibbs, 2008; Wilson, 2011). In this light, experimental pragmatics might be at the forefront in solving theoretical disputes within the wider perspective of sharpening theory to account for experimental evidence and allowing experimental evidence to sharpen theory in its turn.

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Automated Translation between Lexicon and Corpora

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ABSTRACT

In this work we will show the role of lexical resources in machine translation processes, giving several examples after a brief overview of Machine Translation studies. Then we will advocate the need for a richer lexicon in MT processes and sketch a methodology to obtain it through a mix of corpus-based and machine learning approaches.

Keywords: Translation, Corpus linguistics, Natural Language Processing, Machine Learning, Lexical Knowledge.

Introduction

Machine Translation (MT) is one of the most challenging issues for Artificial Intelligence (AI) applied to language, which we here refer to as Natural Language Processing (NLP). The history of MT shows, indeed, that a

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translation process presupposes a good understanding of the text to be translated.

In this paper, we will argue for the relevance of the lexicon in the translation process and the need to dispose of wide coverage and high quality lexical resources. The access to a rich lexical knowledge is in fact a fundamental requirement for a computational system to correctly analyze a text and generate its translation.

To this purpose, we will present an Italian lexicon that meets the requirements of MT systems, and we will show how its lexical information can be used in a translation process.

It must, however, be emphasized that building a large coverage lexicon is a very costly and time consuming process. That is the reason why Computational Lexicography is today mostly oriented toward the development of methodologies and strategies that make the creation of lexicons easier and faster with the automatic acquisition of data from corpora, from the Web, or by induction from existing resources. In this paper, we will show a bootstrapping method, based on a machine learning technique, that allows us to build at the same time a corpus-based lexicon and a tagged corpus, that grow incrementally together in a semi-automated way.

1. Machine Translation: historical overview and state of the art

Since the beginning of Artificial Intelligence (AI) and Natural Language Processing (NLP) , studies and research were devoted to realizing the dream of Machine Translation.

During the first decades of MT research, an articulated panorama of methodologies and strategies started shaping. Classifying all the approaches is almost impossible, given that perspectives change along with the adopted parameters.

> There is now a variety of MT systems which almost defies any neat classification. It is still often legitimate to apply the labels of the 1960s: practical vs. theoretical, empirical vs. perfectionist, direct vs. indirect, interlingual and transfer. But now there are new labels and new perspectives: interactive vs. fully automatic, 'try-anything' systems vs. 'restricted language' systems, mainframe systems vs. microcomputer or word-processor systems, AI-based systems vs. linguistics-oriented systems (Hutchins, 1986, p. 19).

To our purposes, we will focus on the distinction between direct and indirect strategies that belong respectively to first and second generation MT systems.

Until the sixties, MT systems, called first generation systems, followed a so-called direct strategy, in which a direct correspondence was established between Source Language and Target Language (henceforth, SL and TL). In this strategy, the SL was only analyzed from a morphological point of view. The output of the morphological analysis constituted the access point to the bilingual lexicon. In this way, a text could only be translated word-by-word. This strategy failed therefore to cope with the translation of ambiguous sentences or sentences with different SL and TL syntactic structures, such as the Italian sentence Questo ragazzo piace a Maria (lit. this boy likes to Maria), whose English structure: Maria likes this boy is quite different.

During the sixties, the second generation systems adopted an indirect strategy, in which two approaches were followed. Firstly, a two-phase process defined as the Interlingua approach and, secondly, a three-phase process defined as the Transfer approach.

In the Interlingua approach, a formal, abstract and language-independent representation interfaces source and target languages: a SL text is analyzed into an interlingual representation which is then synthesized into a TL text. In this view, a conceptual lexicon is required, the building of which is an extremely complex and controversial task.

For this reason, more realistic strategies, based on Transfer, are adopted. In this case, the translation steps are the following:

- analysis of a SL text into a SL formal representation;
- transfer of the SL formal representation into a TL formal representation;
- generation of a TL text from the TL formal representation.

In the Transfer approach, the structural analysis of the SL text is performed in different steps and leads to the building of a formal representation of the SL structures that, in the transfer phase, is mapped onto a formal representation of the TL structures. As to the lexical transfer, the SL lexical units are translated into TL lexical units, using an electronic bilingual dictionary. During the

synthesis phase, the TL formal representation is turned, following different steps, into a TL text. In this perspective, cultural aspects of different languages are taken into account.

In spite of this innovation, disappointment with the feasibility of MT was growing, due to the "semantic barriers" that researchers encountered and that proved difficult to overcome.

Furthermore, in 1964, the US government sponsors asked the National Science Foundation to constitute a committee in order to evaluate the progress made in NLP in general and in the MT state-of-the-art in particular. The commission produced in 1966 a "(in)famous report", as John Hutchings (1996) defined it, the ALPAC report (from the name of the committee: Automatic Language Processing Advisory Committee). The ALPAC report stated that MT systems were slower, less precise and more expensive than human translators. The verdict then was: "there is no immediate or predictable prospect of useful machine translation" (ALPAC, 1966).

It should be noticed, though, that the ALPAC committee, in its report, took into consideration only direct strategy systems, evaluating them negatively. For the next ten years, this assessment caused the U.S. Government to reduce its funding in this area dramatically. As a direct consequence, research in this field stopped in the US for over a decade, while it carried on in Canada, Germany and France.

It is only in the middle of the Seventies that we find a renewed interest for automated translation, with the emergence of third generation systems based on Artificial Intelligence.

Starting from the 1990s, a new methodological approach emerges, that makes use of large bodies of text (corpora) (Hunston, 2002). Among the corpus-based systems, the most common approaches are statistics-based systems (SBMT) and example-based systems (EBMT).

SBMT follows strategies in which SL and TL sentences are tentatively aligned on the basis of the probability that each word in the SL sentence corresponds to one or more words in the TL sentence. On the contrary, the example-based methodology, suggested by Nagao in 1984 but implemented only in the 1990s, gives a translation by analogy, comparing the input sentence with a bilingual dictionary that includes examples and matching those that are more similar to the input (Nagao, 1984; Brown, 1999, Turcato et al., 1999).

In the same years, the rule-based systems move away from syntax-based representations to more 'lexicalist' approaches. At its extreme, the essence of

the lexicalist approach in MT system design is to reduce transfer rules to simple bilingual lexical equivalences. Such a drastic reduction was first put forward in the CRITTER project (Isabelle et al., 1988). The approach has been explored in the ACQUILEX project devoted primarily to the construction of multilingual lexicons for transfer-based MT (Sanfilippo et al., 1992), and is probably best known as the ′shake-and-bake′ method described by Whitelock (1992). The requirement for structural representations - common to both transfer and interlingua approaches - is abandoned in favour of sets of semantic and syntactic constraints on lexical items. Translation involves the identification of TL lexical items which satisfy the semantic constraints attached to the SL lexical equivalents.

The ′bag′ of target lexical items is then ′shaken′ to generate an output text consistent with the syntax and semantics of the target language (Hutchins, 1993).

This 'lexicalist' turn led the MT community to an increasing interest for computational lexicons.

Today, Machine Translation systems usually follow either a corpus-based or a rule-based approach. In the first trend, we find statistical approaches and example-based approaches. In the second one, emphasis is given to lexical resources. In the following section of the paper, we will propose an integration of these two approaches.

2. Relevance of the lexicon in MT

In order to produce a good translation it is necessary to understand correctly the input text. It is precisely for this reason that Machine Translation is deemed one of the most difficult tasks in the field of AI language applications. Any translation process implies, in fact, the resolution of a whole range of problems regarding both the analysis and the generation of texts. In this context, the lexicon plays a crucial role. A robust translation system should be able to cope with a wide range of issues inherent to the complexity of natural language, such as the various types of ambiguity, non literal uses, polysemy and so on. A poor lexicon fails to support these challenging tasks.

3. Lexicon and lexical problems in MT

Table 1 illustrates some of the most typical and frequent lexical problems that are encountered during a translation process and that a lexicon tailored for an MT system should be able to deal with.

The lexicons used in MT systems must have wide coverage and provide, for each lexical entry, a large range of rich and various information spanning all levels of linguistic description.

Direct strategy MT systems used a unique, very complex bilingual lexicon containing all grammatical information concerning both the SL and the TL lexical units, as well as the conditions for selecting the appropriate translation in case there are different alternatives possible.

Transfer-based MT systems, by contrast, use different monolingual lexicons (morphological, syntactic and semantic) containing all relevant information for each level of linguistic description for both the analysis and generation phases. In the transfer phase a bilingual lexicon is used. The transfer bilingual lexicon consists of lexical rules setting i) the correspondences between the lexical units described in the SL and TL monolingual semantic lexicons and ii) the conditions imposed on those equivalences. For example, in case of a SL word translatable by different TL words, the lexical transfer rule selects the appropriate TL equivalent, on the basis of the information provided by the two translational equivalents in their respective monolingual description.

In the domain of computational lexicography, a significant number of electronic lexical resources are now available, even though not all languages are equally represented. Most lexicons deal with a single level of linguistic description; some describe a unique part of speech or are strictly theory-dependent. Some are created in order to describe the vocabulary of a particular domain; others in order to meet the requirements of a specific application.

Level	Phenomenon	Example
Phonology	Homography	▪ it. *pésca* = en. *fishing* ▪ it. *pèsca* = en. *peach*
Morphology	Homonymy	▪ it. *legge, porta, sbarra*: N & V ▪ it. *appunto*: N. & ADV
Syntax	Syntagmatic realization	▪ en. *know* + NP = it. *conoscere* ▪ en. *know* + WH-clause = *sapere*
Semantics	Homonymy	▪ fr. *louer* = en. *to praise* ▪ fr. *louer* = en. *to rent*
	Polysemy	▪ en. *set up* = it. *piantare, erigere, mettere su, causare, installare, allestire, formare, etc.*
	Conceptual division	▪ en. *corner* = sp. *rincón* (internal), *esquina* (external)
	Lexical gaps	▪ it. *fuoricorso, consuocero*: not lexicalized in English and in French

Table 1.

Very few lexical resources, however, have the required features to be used in an MT system. As a matter of fact, besides providing a rich and various amount of information, a lexicon must guarantee completeness and coherence of the encoded lexical data. Moreover, it must be conceived as a dynamic resource, and not as a static and crystallized repertory of lexical information. Such a resource should be simple to update and expand not only manually but essentially through the automatic acquisition of information from textual resources, so as to reflect the continuous evolution of languages and to meet the new needs and answer the problematic issues which might emerge from the translation process. In this perspective, a generic lexical model and a modular architecture are essential for an electronic lexicon to be profitably exploitable.

A large computational lexical resource for the Italian language was developed at the *Istituto di Linguistica Computazionale* of the National

Research Council in Pisa from 1996 to 2003, which presents these characteristics.

4. The Lexical Resource

The computational lexicon PAROLE-SIMPLE-CLIPS (Ruimy *et al.*, 1998; 2002; 2003), elaborated in the framework of three different projects[1], provides a wide-coverage, four-level description of the Italian language. This lexical resource was built according to a multifunctional and multilingual perspective and in compliance with the international standards set out in the PAROLE-SIMPLE lexical model (Ruimy et al., 1998; Lenci et al., 2000).

This model, based on the EAGLES recommendations (San Filippo et al., 1998) and on an extended version of the GENELEX model (Antoni-Lay et al., 1994), is at the forefront of the field of Computational Lexicography for some outstanding and innovative features. The flexible architecture of the model as well as the building methodology allow the coherent encoding of a wide range of highly structured information, at the desired granularity level. Consensually adopted at a European level for the building of twelve harmonized monolingual electronic lexicons, the PAROLE-SIMPLE lexical model became a *de facto* standard and subsequently strongly inspired the ISO standard for NLP lexicons, the metamodel *Lexical Markup Framework*[2].

The PAROLE-SIMPLE-CLIPS lexicon offers, therefore, the outstanding advantage of being compatible with eleven other lexicons developed for European languages, with which it shares the theoretical and representational model, the working methodology as well as a kernel of entries.

The lexicon is articulated in four independent but interrelated modules, which correspond respectively to the phonological, morphological, syntactic and semantic levels of linguistic representation. The complete description of a lexical unit consists therefore in a minimum of four interconnected entries, each one providing a structured set of information relevant to the description level that hosts it.

A phonological entry accounts for the phonetic and phonological features of a lexical unit while a morphological entry informs on its grammatical category and inflectional paradigm. A syntactic entry describes both the

[1] The European projects LE-PAROLE and LE-SIMPLE and the Italian project *Corpora e Lessici dell'italiano Parlato e Scritto* (CLIPS)
[2] ISO-24613:2008

intrinsic and contextual properties of a lexical unit in *one* specific syntactic structure. The subcategorization frame is modelled in terms of syntactic category, grammatical function, optionality and morphosyntactic, syntactic and lexical restrictions of the governed elements. Systematic frame alternations, such as the causative-inchoative variation, are represented in a complex entry whereby the correspondence between the constituents of the two structures is specified.

The adopted theoretical framework for the representation of semantic information is based on the fundamental principles of the Generative Lexicon theory (Pustejovsky, 1995). In a generative lexicon, a semantic unit is modelled through four different levels of representation[3] that account for the componential aspect of meaning, define the type of event denoted, describe its semantic context and set its hierarchical position with respect to other lexicon units.

The semantic lexicon is structured in terms of an ontology of semantic types (the SIMPLE ontology). In a semantic entry, which encodes a single meaning of a lexeme, the membership in an ontological type represents the primary and most relevant information. Besides the ontological classification, the semantic unit is endowed with information concerning its domain of use; the type of event it denotes, where relevant; some distinctive semantic features; its links with other lexical units - among which synonymy and morphological derivation links - and membership in a class of regular polysemy. The semantic frame of predicative units is also described in terms of semantic role and selectional restrictions of the arguments.

To express the links holding among sense units, the SIMPLE lexicographers benefited from a remarkably efficient expressive means, the *Extended Qualia Structure*. This representational tool was derived from the *Qualia Structure*, a four-role[4] structure which is considered a mainstay in the Generative Lexicon theory for representing the multidimensionality of a word's meaning. The extended structure was created by defining, for each of the four Qualia roles, a subset of semantic relations. Such relations obviously allowed a much sharper expression of both the multidimensional aspect of a word sense and the nature of its syntagmatic and paradigmatic links to other lexical units. To give but one example, considering the telic role that informs

[3] Namely Qualia structure, Event Structure Argument Structure and Lexical Typing Structure.
[4] Formal, constitutive, agentive and telic.

about the function or purpose of an entity, the most appropriate relation may be selected among the following ones: 'used_for', 'used_by', 'used_as', 'used_against', 'is_the_activity_of', 'object_of_the_activity' and so on.

Moreover, in a new and revised version of the lexical-semantic database, called *Simple_PLUS*, the semantic representation has been enriched with significant information concerning the relationships holding between events and their participants and among co-participants in events (Ruimy, 2010).

This lexicon offers, therefore, a wide range of very rich and interesting information, especially at the semantic level. It is our deep conviction that an MT system could greatly benefit from such a wealth of lexical data, for both the granularity of the information provided and its explicit formulation.

5. Lexical Semantics for the resolution of some MT problems

A translation process presupposes the understanding of the many and various aspects that characterize the input text. Besides the morphological and syntactic aspects, it is necessary to disambiguate the logical form of the sentence, checking the coherence among semantic restrictions and preferences of words. To establish an equivalence between a source and a target text a translator should also understand other semantic and pragmatic aspects (for example conversational implicatures, metaphors, ironic contexts, etc.), that are not easily detectable. In the following, we will briefly show how Lexical Semantics plays a central role in the resolution of problems that typically emerge in Machine Translation.

Word sense ambiguity is a pervasive characteristic of natural language. It is one of the main reasons for poor performance of Information Retrieval systems. In MT, lexical ambiguity may occur both in the analysis and the transfer phases. Its resolution, which is therefore considered a major problem, requires a large amount of rich lexical knowledge.

5.1.1. Polysemy / homonymy and domain knowledge

A SL polysemic word or two SL homonyms may translate in two different ways according to their usage domain (see Table 2). Matching the information concerning the topic of the source text and the indication, in the monolingual lexicon, of the different domains of use of the ambiguous word enables the selection, in the bilingual lexicon, of the appropriate translation.

en.	*mouse*	➔	it.	(gen.) (inform.)	*topo* *mouse*
it.	*borsa*	➔	en.	(gen.) (econ.)	*bag* *stock exchange*
it.	*calcolo*	➔	en.	(gen.) (med.)	*calculation* *gallstone*

Table 2.

5.1.2. Polysemy / homonymy and ontological classification

The semantic classification of a word sense is generally sufficient to discriminate among its different meanings or among homonyms and therefore to enable the selection of the relevant one from its different possible translational equivalents, as shown in Table 3 for Italian-English and Italian-French translations.

Italian	➔	English	French
ala: [PART]	➔	*wing*	*aile*
ala: [BODY_PART]	➔	*wing*	*aile*
ala: [ROLE]	➔	*winger*	*ailier*
espresso [ARTIFACT_DRINK]	➔	*espresso*	*express*
espresso [VEHICLE]	➔	*express (train)*	*express*
espresso [SEMIOTIC_ARTIFACT]	➔	*express (letter)*	*exprès*

Table 3.

5.1.3. Polysemy / homonymy and contextual links

More complex situations emerge when two readings of a lemma cannot be disambiguated through their semantic classification or other paradigmatic information. In this case, syntagmatic and therefore contextual links may be used. In the following example reported in Table 4, means for selecting the appropriate translation are provided by the domain of use, but also by semantic relations linking each ambiguous term to the predicate denoting its function.

	Italian	➔	English
ferri_1	[INSTRUMENT] used_for *sferruzzare* (to knit)	➔	*knitting needles*
ferri_2	[INSTRUMENT] used_for *operare* (to operate)	➔	*surgical instruments*

Table 4.

5.1.4. Polysemy / homonymy and semantic frame

The semantic frame description may also provide clues for solving lexical ambiguities. Two homonym predicates may be distinguished by a different argument structure, either by the number of arguments they require (Table 5, first example) or by the semantic restrictions imposed on those arguments (Table 5, second example).

Italian	➔	English
avvertire1: arg0, arg1, arg2	➔	*to inform, to warn*
avvertire2: arg0, arg1	➔	*to feel, to notice*

Italian	➔	English
camminare1: arg0 = + animate	➔	*walk*
camminare2: arg0 = - animate	➔	*work*

Table 5.

It is worth noting that the whole range of lexical semantic information used for solving the above cases of ambiguity is encoded in the lexicon presented in the previous section.

6. The Corpus-based Approach

In order to briefly illustrate how a corpus-based approach may work, we have decided to focus our attention on one specific example, the translation of the English phrasal verb 'set up' into Italian, gathering our samples from electronic texts on the Web and analyzing them with a KeyWord in Context (KWIC) tool.

The experiment outlined here was carried out using the following procedure. A lexical item was selected, for the purposes of this analysis the

English phrasal verb 'set up' (Wade & Federici, 2006), since this item is problematic from a semantic point of view. It provides an interesting example of the highly polysemic nature of the English language, characterised by "remarkable range, flexibility and adaptability" (Crystal, 1988, p. 39). In this case the translator, for example, is required to consider the context specific nature of the lexical item (Eco, 2003, p. 29) and where areas of "inherent fuzziness" (Bell, 1991, p. 102) are found in establishing equivalence between one language and another. Indeed, 'set' alone has about 120 different meanings (cf. Collins Cobuild English Dictionary, 1995). With regard to 'set up', it was decided to first examine its meanings using a traditional bi-lingual dictionary Ragazzini-Zanichelli (2009). Secondly, a small sample of examples was collected from the web with a specifically designed search tool, followed by the manual examination and analysis of the gathered data and comparison with the information provided in the dictionary. The analysis was then extended through the analogical comparison of the initial manual analysis, allowing the further extraction of a wider sample of data.

To perform the kind of analysis described above, a tool was developed to acquire word-concordances directly from the web. The tool is a combination of several web/linguistic tools:

- a web spider that acquires a predefined number of web pages;
- a segmenter that splits acquired web pages;
- a rule-based lemmatiser;
- a KWIC (*KeyWord In Context*) tool;
- a self-learning analogy-based engine.

The web spider (cf. Federici, Wade, 2007) extracts web pages starting from a given web address, thus providing "a random snapshot of the current state of the Internet in a given language" (Sharoff, 2006, p. 437). The spider filters out all unneeded web overstructure (see Figure 1).

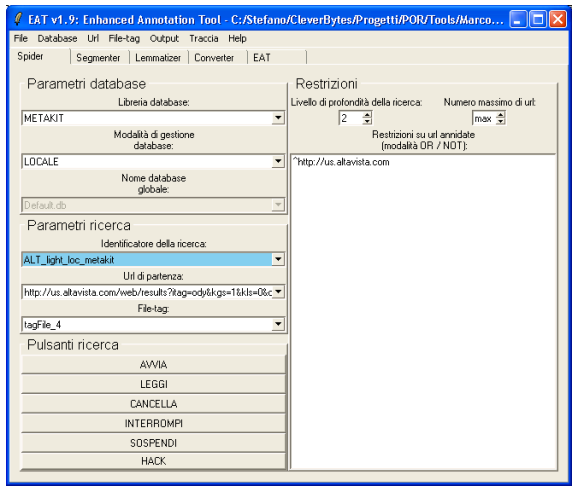

Figure 1

Then the lemmatiser associates each word form contained in the extracted web pages to the corresponding lemma. After the corpus has been cleaned and lemmatised, the KWIC will read the corpus by indexing all the lemmas. This is illustrated in Figure 2, where the word forms or lemmas are in the keyword area on the left (2a), and clicking on the keyword which is the focus of our interest the concordances are created (2b).

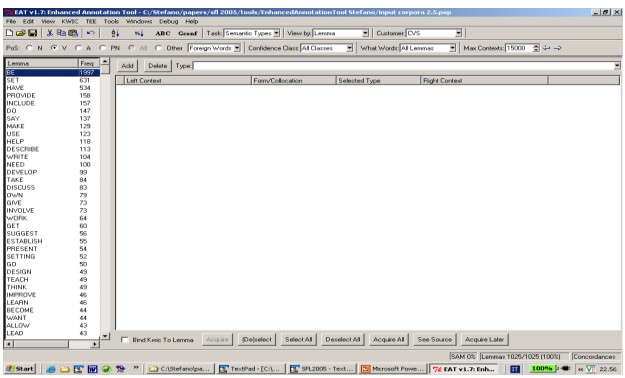

Figure 2a

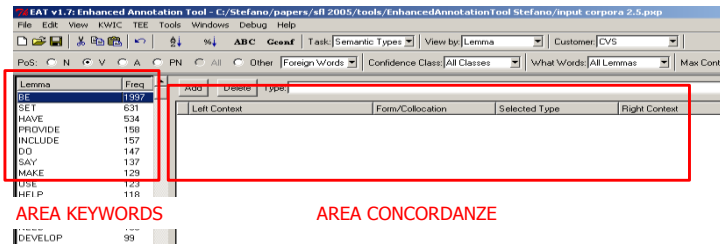

Figure 2b

While this approach is certainly useful as it enables the linguist to capture the real usage of a given word, it also suffers from a number of limitations:

- the manual analysis of data is extremely time-consuming;
- it is often not practicable to analyse all the examples, especially in large corpora, so only a selected number of examples are chosen as representative;
- there is the risk of human error and inconsistency in manual analysis.

7. Corpus vs. Dictionary

Our starting point was an analysis of the word senses provided in bi-lingual English-Italian dictionary Ragazzini-Zanichelli (2009). The result is illustrated in Figure 3.

to set up (verbo transitivo)

1. mettere su; alzare; erigere; piantare; montare; installare; allestire

2. mettere su; montare; installare; allestire

3. mettere su; mettere in piedi; istituire; fondare; costituire; formare; aprire (un ufficio); avviare (un'azienda)

4. sistemare; mettere (q.) in affari (o politica ecc.); aiutare (q.) finanziariamente (politicamente ecc.)

5. lanciare (un grido)

6. causare; provocare; dare l'avvio (o il via) a

7. stabilire (sport)

8. comporre (tipog.)

9. tesare, arridare (naut.)

10. (fam.) rimettere in salute (o in forze; in sesto); tirare su

11. (fam.) montare un'accusa contro (q.); incastrare; mettere contro; mettersi a fare; fornire; essere forte; essere ben fornito

Figure 3

It is to be noted that only a restricted number of entries provide contextualised examples of usage.

An initial analysis of the corpus created with the tools described above, on the other hand, reveals significantly richer contextualised source. In fact, it becomes immediately apparent that there are cases which are not included in the dictionary, such as the meaning 'creare', which is the appropriate translation of 'set up' in the case illustrated below:

> [...] useful information on the British Council's website, which was *set up* specifically for assistants to use in their placement countries. *("Foreign assistance"* by Katie Phipps, «Education Guardian online», August 23th 2005)

In an experiment that analysed 600 contexts of 'set up', only 8 out of 17 translations were attested in the dictionary. While it may be argued that the entries in the dictionary could be the most frequent usages of 'set up', it does not seem to be the case if we consider that the dictionary covers only about 47% of the translations of 'set up' occurring in our corpus (see Figure 4).

Translations present in the dictionary	Translations not present in the dictionary
ALLESTIRE	APPRONTARE
AVVIARE	ATTUARE
COSTITUIRE	CREARE
FONDARE	DEFINIRE
FORMARE	DIPINGERE
INSTALLARE	IMPOSTARE
ISTITUIRE	ORGANIZZARE
STABILIRE	PREPARARE
	REALIZZARE

Figure 4

From these analyses it emerges that examples extracted from real texts may be useful (i) to extend coverage of the lexicon and (ii) to refine semantic entries.

8. Extending the study: the 'bootstrapping' process

In order to extend the study and refine the data gathered, we need to use some type of Artificial Intelligence engine that (semi-)automatically carries out the annotation task. The procedure applied for the purposes of this study is called 'bootstrapping'.

In the first step a small portion of the corpus was annotated manually, assigning a translation to each sample (see Figure 5):

Manually annotated concordances:

1. [...] websites have also been *set up/CREARE* by the LSC [...]
2. [...] Websites have also been *set up/CREARE* and open days organised [...]
3. [...] an appeal panel has been *set up/COSTITUIRE* by the Dept. [...]
4. [...] a panel, task force, *set up/COSTITUIRE* by Harvard [...]

Figure 5

In the second step, the annotation is extended automatically to the remaining concordances for 'set up' in the corpus. At this stage it is found that not all of the translations assigned are correct (see Figure 6).

Manually annotated concordances:

1. [...] websites have also been *set up/CREARE* by the LSC [...]
2. [...] Websites have also been *set up/CREARE* and open days organised [...]
3. [...] an appeal panel has been *set up/COSTITUIRE* by the Dept. [...]
4. [...] a panel, task force, *set up/COSTITUIRE* by Harvard [...]

New concordances (Automatic annotation)

1. There are [...] much more useful information on the British Council's website, which was *set up/CREARE* [...] for assistants [...] (CORRECT)
2. [...] a committee was *set up/ISTITUIRE* to arrange [...] (WRONG)

Figure 6

During this automatic annotation step the first occurrence of 'set up' is automatically annotated as 'CREARE', which is correct, while the second is automatically annotated as 'ISTITUIRE', which is incorrect. This is because the algorithm in this case failed to provide the appropriate translation for lack of evidence.

In the third step, therefore, further manual revision is necessary. During this last phase the correct interpretation is manually assigned to those keywords that have been wrongly annotated.

9. Practical application of the procedure

We tested this procedure by setting up an experiment in which 600 contexts from a 1.5 million word corpus were manually annotated by assigning a translation to each concordance with 'set up', 400 new contexts were then automatically annotated and finally revised manually.

The results were encouraging, since the correctness of the automatically assigned translations was about 49%. That is, almost half of the time the

procedure assigns the correct translation, even starting from a relatively small set of training samples. This is acceptable when compared to the high number of possible translations (17) and less thorough baselines, such as the ones that could be obtained by assigning a random interpretation (1/17=6%) or just the most frequent one (that is "avviare", that accounts for only 12% of the cases).

Conclusions

In our hypothesis, the corpus-based process outlined above might prove to be very useful in enhancing lexical resources. This study aimed to create a dynamic cyclical process, in which the lexicon, in the case of our web-based experiment, is enhanced by a corpus-based analysis, and the corpus-based analysis can then be automatized thanks to the availability of richer and more precise lexical knowledge. This would appear to be necessary when dealing with a dynamic process as opposing a static lexicon which fails to provide a complete descriptive picture of current language use. With the application of automated methods, a wide set of new lexical data and knowledge can be collected and analyzed.

There is the need, therefore, for the implementation of systems which are able to dynamically extend/enhance/update lexicons with information acquired from large corpora and from the web. Our objective should be to set up a new generation of large-size, dynamic lexical resources that fully capture current language usage (how language is materially manifested) and use (the way in which language forms are used as a means of communication) (Widdowson, 1978, pp. 18-19).

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Affective Twist in Irony Processing

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ABSTRACT

Traditionally irony has been researched as a verbal mode of communicating non-literal meaning. Yet, the extant literal/non-literal meaning oriented research provided conflicting evidence and failed to explain how irony vs. non-irony is processed. The dominant literal/non-literal meaning approach hasn't accounted for the role of attitudinal non-propositional contents so crucially involved in irony communication and comprehension. Employed to communicate indirectly, on top of non-literal meaning, irony serves to convey implicit attitudes: emotional load non-propositionally attached to the propositional contents. The role of emotional contents implicitly communicated by irony has not been acknowledged in irony research so far. This paper reviews irony and attitude research, focusing on the non-propositional, emotional contents, aiming to bridge the propositional-non-propositional meaning gap in irony research. Neuroimaging and behavioral evidence showing that emotional load profoundly influences communicative contents processing, priming its computation and determining its processing patterns, is presented, and its role for irony processing is highlighted.

Keywords: attitude; non-propositional meaning; emotional contents; affective load; valence.

Introduction

It seems obvious that everyday human communication is imbued with emotions. On top of what we say, we smuggle how we feel, what are our attitudes, preferences, biases. There are numerous ways to convey emotional

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contents. Most effective and efficient are the nonverbal means: facial mimicry, smile-to-frown range of (micro)expressions, emotional prosody, rich repertoire of gestures, and body postures. These 'tell' more than words. Emotion-wise that is. They communicate feelings and attitudes. Emotional contours always tinge verbal interactions, yet remain as pervasive as unexplored. Accumulative experimental evidence shows that emotional contents attached to a message, beyond verbal code (smiling-frowning range of facial work, affective prosody) plays a significant key role in message comprehension, facilitating or delaying the intended meaning grasp. Though deeply interrelated with communication, nonverbal emotional contents, and its impact on verbal contents processing, remains largely unexplored. Language researchers have not developed effective methods to capture the pervasive, yet elusive (nonverbal) affective "matter" attached to the verbal "matter". Even the language repertoire for communicating attitude and affect by a spectrum of explicit and implicit means, is not well understood. It seems highly commendable to change this inauspicious state of affairs. Language-emotion interface offers to elucidate a range of communicative phenomena. Irony is but one of the intriguing phenomena that might benefit from being explored in language-emotion interdisciplinary framework. How does irony, so far explored by linguistic methods as a linguistic phenomenon, belong to emotion research? This paper attempts at showing that irony is a verbal, though implicit means of conveying attitude. Attitude conveyed by ironic comments, has been recognized as substantial for irony comprehension (e.g. Sperber & Wilson, 1981; 1986; 1991; Wilson & Sperber, 1992; Clark & Gerrig, 1984; Kreuz & Glucksberg, 1989; Barbe, 1995; Kumon-Nakamura et al., 1995; Kotthoff, 2003; Partington, 2007). Yet, despite this recognition, implicit affective evaluation communicated by irony, has not been explicitly explored. Factoring attitude in the experimental research, favors a recognition that emotions are on board. They are on board anyway, however their presence remains unaccounted for. Recognizing emotional contents in irony, might only be beneficial for irony research. It might also help in explaining the inconclusive results obtained so far in the extant irony processing studies.

1. What does language research tell us about irony processing?

Philosophers have attempted to grasp and explain the nature of irony for the last two thousand years(Socrates, Plato, Arystoteles, Sophocles, Quintilian

Grice). With limited success. The predominant rhetorical account centered around indirect criticism function of irony (Cutler, 1974; Muecke, 1970; Booth, 1974; Grice, 1989). Irony was seen as a power tool, affording one with the liberty to criticize publicly, without being committed to the literal value of the words. Precious deniability, on the one hand. A verbal means legitimizing polite impoliteness, on the other hand. Ascribing to this tradition, language oriented philosophers (e.g. Grice, 1975; Searle, 1979) pictured irony, as an anomalous, deviant use of code, convenient to smuggle in (implicitly) unwelcome messages, veiled meanings. Irony was 'explained' by substitution where the explicit (polite) needs to be substituted with the implicit (impolite), the literal with the non-literal. What the speaker literally says should be taken to mean 'something else', conveniently assumed to be the exact, or relative opposite of what is said. Yet, except for few conventionalized cases, irony communicates no readymade, one-to-one substitutable meaning. Irony, does not work on one-to-one basis: says 'x' hence means '~x'. Rational as it seemed, substitution approach put paid to 'explaining' irony and unmasking the inferential infrastructure involved in its comprehension.

Processing oriented irony research chose not to abandon the literal/non-literal meaning substitution as the overarching distinction, and aimed at finding out whether irony comprehension takes longer, shorter, or as long as non-irony comprehension. Crucially, the goal was to test if irony is comprehended in two stages, as opposed to literal meaning, which is a one-stage attempt. Two major accounts to irony processing took the experimental stage: (i) two-stage account (e.g. Grice, 1975, 1989; Giora, 1997, 2002, 2003), (ii) one-stage account (e.g. Gibbs, 1986, 1994; Sperber & Wilson, 1986/1995). Both chose different ways and employed different mechanisms to explain irony. These accounts differ significantly in how they assess the role of literal (salient or coded) meaning and the role of context in irony processing. Both supply empirical data to corroborate their claims. The experimental results are as incompatible as the theoretical claims.

Two-stage account assumes that literal (salient or coded) meaning is interpreted in the first stage. If the interpretation makes no sense in the current context, it is rejected. Contextually congruent interpretation is pursued in the second stage. This account, strongly anchored in rhetorical tradition, pictures figurative meaning (as in the case of irony) as a derivative of literal meaning, considered as the default standard meaning. Non-literal meaning is pictured as a deviation from the norm, an "anomaly" that can only

be grasped and explained by some special mechanism (i.e. implicature) (Grice, 1975). The two-stage account argues that irony processing always takes longer than literal meaning processing. The comprehender arrives at the figurative, context-fit reading only after processing and rejecting the literal meaning as out-of synch. Extra time involved in irony processing-rejecting and re-processing is not needed for literal/coded meaning comprehension. Hence, irony takes longer to grasp when compared to the code-based, literal interpretation. Standard Pragmatic Model (Grice, 1975; Searle, 1979), and Graded Salience Hypothesis (Giora, 1995, 1997, 1999; 2003) are the two main models advocating the privileged status of code-based (literal, salient) meaning interpretation. A number of experimental irony studies support two-stage processing assumptions and demonstrate that irony processing takes longer than non-irony processing does (e.g. Giora et al., 1998; Giora & Fein, 1999, Giora, et al. 1998; Dews & Winner, 1999; Schwoebel et al., 2000).

One-stage account advocates context-dependent interpretation in the first and only stage. It holds that comprehenders are not bogged by the literality or the non-literality of message meaning. They care about the intended, context-embedded meaning. This attempt makes no processing distinctions for the literal or non-literal meaning. No special, privileged status is ascribed to the literal meaning. Literal meaning is a constituent of pragmatic meaning, next to other contextually cued meaning constituents. No special or extra mechanism is postulated to govern non-literal meaning processing (Sperber & Wilson, 1986). Both literal and non-literal meanings are processed in parallel manner (Gibbs, 1986; 1994). What matters in this account is the (degree of) context supportiveness. Supportive context facilitates the intended ironic interpretation. Unsupportive (or non-supportive enough) context slows the comprehension down. Irony processing takes no longer than the literal equivalents processing does, provided irony-supportive context (e.g. Gibbs, 1986, 1994, 2001, 2002; Sperber & Wilson, 1986/1995). These claims have been empirically supported by a number of empirical studies showing that irony comprehension is not more time consuming than literal meaning comprehension (e.g. Gibbs, 1986; 1994; Colston, 2002; Colston & O'Brien, 2000; Gerrig & Goldvarg, 2000; Ivanko & Pexman, 2003).

These two accounts providing conflicting results on irony processing, legitimize questions about the nature of irony and the essence of ironicity. If it is not the literal/non-literal meaning that generates the processing time difference, then literality/non-literality does not constitute the essence of

ironicity, as it has been stipulated. What then makes the essence of ironicity? What cues, features, properties make irony up and influence its processing speed? Across a range of domains, irony communicates more than it says, apparently by exploiting one feature: dichotomy. Barbe (1995) singles out dichotomy as "the" constitutive feature of irony. Irony is used to serve various communicative functions (e.g. funniness, implicit emotion display, exaggeration, politeness, etc.) and may employ various verbal and non-verbal means to do the "doublespeak": communicate two dichotomous levels of meaning. Barbe (1995) distinguishes three potential levels of dichotomy in irony: (i) semantic and pragmatic incongruity – literal and intended meaning dichotomy (cf. Colston, 2002; Coston & O'Brien, 2000; Gerrig & Goldvarg, 2000; Ivanko & Pexman, 2003); (ii) linguistic meaning and behavior incongruity (cf. Gibbs, 1986; Jorgensen et al., 1984; Kreuz & Glucksberg, 1989; Kumon-Nakamura et al., 1995; Sperber & Wilson, 1981, 1986/1995); (iii) linguistic meaning and affective evaluative incongruity (cf. Sperber & Wilson, 1981, Kreuz & Glucksberg, 1989). Literal meaning vs. affective meaning dichotomy, sounds a worthwhile line of investigation, especially that irony markers, all of them, conspire to manifest affective load, to boost ironic reading.

A range of irony markers may be employed to signal literal meaning/affective meaning dichotomy (e.g. range of facial expressions, affective prosody). These markers signal affective dichotomy by extra-linguistic affective cues. They are not irony specific. Rather, they might be employed to manifest contrasts and mark incongruity between meaning levels in all forms of communication (e.g. Bryant & FoxTree, 2002; Bryant & FoxTree, 2005; Attardo et al., 2003). Markers facilitate irony recognition and comprehension. Yet, irony calls for subtle marking. Over-marking ironic intent is detrimental to the funniness, or poignancy of ironic message. Over-marked, irony loses its expressive impact (cf. Cutler, 1974, p. 117). Ironic markers of affective dichotomy such as non-anatomic, non-propositional structures, vary and depend on a range of subtly manifested extra-linguistic properties. These subtle, non-linguistic effects call for communicative granularity and finesse in ostensive manifestness on the one hand, and inferential granularity, on the other hand. Their elusive, non-propositional nature escaped propositional-meaning driven research so far.

Exclusive focus on the linguistic input, to the exclusion of extra-linguistic cues, co-manifested in ironic messages, failed to account for irony vs. non-

irony differential speed processing patterns. Visibly, there is more to irony than the literal/non-literal distinction. To account for this "more" and improve the limited, deficient picture of irony comprehension, a closer look at context and extra-linguistic cues manifesting ironic contents, might help. Irony cannot be grasped without context. Ironic non-propositional cues are contextually manifested. Yet, what makes irony context is not obvious. It seems beneficial to examine how the linguistic context: what is said, the socio-situational context: who-to-who, where, when, in what manner, blend with mental context, i.e. what the speakers/hearers assume, anticipate, feel about what they say/hear. The mental set up, and especially the feelings, attitudes implicitly manifested, may turn out as relevant a context for irony, as the linguistic context. This possibility though, has not been much tested.

In communicative interactions in general, people care a lot about emotional contents: feelings and attitudes they share. In irony people care about implicit modal contents: the critical or praising attitudinal load they communicate on top of what they explicitly say. Leggitt, Gibbs (2000) emphasize that empirical research has not so far accounted for the implicit emotional layer in irony, despite its crucial significance. This affective, modal, non-propositional communicative content that evidences how we feel about what we say, constitutes the backbone of human interpersonal interaction (e.g. Tomasello et al., 2005; Tomasello, 2008). Affective load in interpersonal communication is the core ingredient of social interaction. While one can easily imagine complex affective communication without words, it is difficult to image human-to-human communication devoid of affective load. Damasio (1994) observes that we are never (unless in a comma) devoid of affect (background affect constitutes the most basic affective milieu that prompts feelings and emotions). It underpins human action and thought. It permeates communication. Affective code is more ancient than language code. That might be the reason why the ever present affective load has so far escaped linguists' attention (cf. Zajonc 1980). It has been taken for granted. If pragmatics is to account for the gap between what people say and what they mean, it needs to account for how they manifest their attitudes and how these shape communicative comprehension. According to Sperber & Wilson (1986/1995) we manifest meanings, rather than merely provide propositions, which trigger metarepresentational contents. When we communicate we embed the propositional meaning (linguistic evidence) within the non-propositional,

affective cover. These two combined, propositional and non-propositional contents, make the pragmatic meaning (cf. Moeschler, 2009).

2. What does attitude processing research tell and how is it relevant for irony?

Attitude is tightly intertwined with communication and language in ways not well understood. Attitude construct is central to social psychology (e.g. Eagly & Chaiken, 1993) due to its prime and crucial impact on social interactions. Interest in how attitude affects communication has not generated much research in language studies (with a notable exception of Hunston, Thompson, 2000; Martin & White 2005). Yet, language/attitude relations, and especially how attitude enters linguistic contents, and whether it preempts verbal contents processing (e.g. Zajonc, 1980, 1984; LeDoux, 1996) seems crucial for pragmatics.

Since Thurston's definition (1931, p. 261) of attitude as "affect for or against a psychological object", attitudes have been researched as favorable/unfavorable feelings about, evaluative characterizations of, and action predispositions toward stimuli. This approach reflects empirical evidence showing that attitudes are reducible to the net difference between the positive and negative value they convey (cf. Allport, 1935; Lewin, 1935; Ito et al.,1998; Ito, Cacioppo, 2000; Ito, Cacioppo, 2001; Ito, Cacioppo, 2005). Eagly & Chaiken (1993, p. 1) notice that evaluative tendency triggered by attitude stimuli is "expressed by evaluating a particular entity with some degree of favor or disfavor." Evaluation is a basic, core ingredient of any attitudinal disposition and refers to overt, covert, cognitive, or affective response to evaluative contents. Evaluative dispositions are "a type of bias that predisposes the individual toward evaluative responses that are positive or negative." (Eagly & Chaiken, 1993, p. 2). Attitudinal responses are evaluative, and evaluation is connected with the imputation of some degree of goodness or badness to an entity (e.g. Lewin, 1935; Osgood et al., 1957; Thompson & Hunston, 2000).

Cacioppo and Gardner (1999) emphasize that environmental stimuli are diverse, complex, multidimensional, and seemingly incomparable. Yet, perceptual systems evolved to be tuned to the most significant (survival oriented) environmental features that might be represented on a common metric: good vs. bad. Recent studies of the conceptual organization of emotion support the view that people's knowledge about emotions is hierarchically

organized to respect a super-ordinate division between positivity and negativity (e.g. Ortony et al., 1988; Lang et al., 1990; Cacioppo & Gardner, 1999). Cacioppo and Berntson (1994) add that attitudes as positive/negative affect towards stimuli, generate two basic dispositions: attraction and aversion (cf. Shizgal, 1999; Davidson et al., 1990). Attitudinal dispositions are underpinned by biological mechanisms, physiological biases and predispositions triggered by emotionally competent stimuli. Attitudes cannot be fully understood without considering their biological and neural substrates. The biological, biochemical, and neural substrates of emotion, as well as neuropsychological aspects of emotional expressions should constitute a constant point of reference for attitude research, and should be recognized as viable meaning components in irony processing research.

Processing oriented attitude research recognizes valence as a basic form of valuation: assessing whether something is good or bad, helpful or harmful, rewarding or threatening at a given instant in time (Barrett, 2006, p. 36). Valence is considered an elemental property of emotions (Barrett et al., 2007, p. 183), a semantic primitive (Osgood et al., 1957), a special semantic feature, accessed before activation of other semantic features (Zajonc, 1980, 1984), and a core ingredient of meaning (e.g. Barrett, 2006; Barrett, Bar, 2009). Valence refers to intrinsic attractiveness (positive valence) and aversiveness (negative valence) of an event, situation, object, or stimulus (cf. Lewin, 1935; Damasio, 1994). Van Berkum et al. (2009) notice that language researchers disregard valence as a semantic primitive and a core ingredient of meaning. Yet, if valence of a concept is encoded as part of its meaning (cf. Barrett, Bar, 2009), the affective valuation corresponding to goodness and badness, needs to be viewed as an integral part of meaning. All individuals "read" the environment in terms of valence, and sense it as a basic feature of their experience (Lewin, 1935; Barrett, 2006). These readings concerning goodness/badness of stimuli or events, shape the perception and interpretation of the incoming stimuli (communicative as well). The growing body of evidence demonstrates that valence is an invariant property of emotionally competent stimuli (e.g. Bargh, Chartrand, 1999; Bargh, Ferguson, 2000; Bargh, 2007). People continually and automatically evaluate situations and objects for their relevance and value, assessing whether or not they signify something relevant to well-being (e.g. Bargh, Ferguson, 2000; Ferguson, 2007; Brendl, Higgins, 1996; Tesser, Martin, 1996; Duckworth et al., 2002). Lang and colleagues (1990) propose that emotional valence is a

general information-processing category that permeates brain/mind organization and activity. If this is so, it seems only commendable to find out how attitudinal valence impacts irony processing.

3. Attitude priming: congruence/incongruence processing

Numerous attitude priming studies show that attitudes (affective valence) are processed rapidly and pre-consciously. The main finding of attitude priming paradigm is that attitude congruence facilitates evaluative processing, while attitude incongruence hinders it. The extant studies corroborate this robust finding in conscious processing condition, when subjects are asked to evaluate target stimulus as "good" or "bad", as well as in unconscious processing condition, when affective stimuli are subliminally presented, or the task is to name/pronounce the target (e.g. Fazio et al., 1986; Bargh et al., 1992; Bargh et al., 1996; Chaiken & Bargh 1993). Bargh and colleagues demonstrated that all environmental stimuli are subject to a constant and automatic evaluation. The constant pressure to rapidly tell apart the threatening from the nonthreatening and respond immediately and appropriately, produced automaticity in evaluative processing (e.g. Bargh, 2007; Barrett, Bar, 2009). Attitude priming automaticity has been found for lexical stimuli (Bargh et al., 1992; Bargh et al.,1996; Fazio et al., 1986; Chaiken & Bargh, 1993; Hermans et al., 1994), pictures (Giner-Sorolla et al., 1999; Fazio et al., 1995; Hermans et al., 1994), odors (Hermans et al., 1998), faces (Murphy & Zajonc, 1993). The effect of affective priming has been found for explicit and implicit evaluative tasks (Bargh et al., 1996; Duckworth et al., 2002), and motor responses (Chen & Bargh, 1999; Duckworth et al., 2002; Wentura, 2000). The priming effect has also been obtained for subliminal priming (Greenwald et al., 1989; Greenwald et al., 1996; Murphy & Zajonc 1993; Ferguson et al., 2004). These results show that affect competent stimuli are processed rapidly. Attitude-congruity generates faster response times than does attitude-incongruity.

4. Positivity offset, negativity bias

The consistency of experimental results obtained in attitude priming paradigm evidences but one aspect of valence processing the facilitated processing of valence-congruent stimuli, and inhibited processing of valence-incongruent stimuli. The observed facilitated valence congruence and impeded valence

incongruence processing does not exhaust affective valence processing mechanics. Quite distinct valence processing effects have been observed for positive versus negative valence processing paradigm, researched as positivity offset and negativity bias (e.g. Cacioppo & Berntson,1994; Cacioppo et al., 1997). Positivity offset refers to enhanced positive valence processing. Negativity bias indexes inhibited negative valence processing (Ito et al., 1998; Ito & Cacioppo, 2000; Ito & Cacioppo, 2005). Positivity offset/negativity bias paradigm attests to the working of default affective infrastructure responsible for the differential processing of positive and negative valence (Lang et al., 1990; Cacioppo & Berntson, 1994; Cacioppo et al., 1997; Cacioppo et al., 1999; Cacioppo, 2004; Berntson & Cacioppo, 2008). Positivity offset and negativity bias effects have been evidenced in differential chronometry, physiology and neuroarchitecture of evaluative processing. Valence chronometry is impressive. Within the range of mere 100-150 milliseconds, the brain already knows whether the activated stimulus "translates" into benefit or harm (e.g. Kawasaki et al., 2001; Pizzagalli et al., 2002; Schupp et al., 2004; Smith et al. 2003; Grandjean & Scherer, 2008). This astoundingly swift discrimination between affect competent and affect neutral stimuli is reflected in further processing stages. Positive and negative valence are processed by separate, or non-overlapping neural systems (Davidson, 1994, Cacioppo et al., 1999; Barrett, Bar, 2009) with varied speed (Smith et al., 2003; Kawasaki et al., 2001; Ito et al., 1998) and intensity (Ito & Cacioppo, 2000, 2005; Kawasaki et al., 2001). Positivity offset and negativity bias effects have been observed at the biological (Cacioppo et al., 1997; Davidson, 1994), structural (Damasio, 2010), functional (LeDoux, 1996; Panksepp, 1998), physiological (Davidson, 1992) and neural level (Cacioppo, Gardner 1999; LeDoux 1995; Damasio 1994; Cacioppo & Berntson 1994).These effects seem to wield too strong an impact on brain/mind dynamics to be ignored in irony communication and comprehension research.

4.1. Why positivity is faster?

Positively valenced stimuli are processed swiftly and smoothly. Why so? First of all, positive valence translates into benefit. No threat – no need to respond, and mobilize to action. Disposition to approach elicits leisurely response (e.g. Shizgal, 1999; Davidson,1994). Peeters et al. (1971, 1989, 1990) notice

that positively valenced stimuli are processed swiftly and less intensely than the negative ones because of sheer frequency. Positive stimuli predominate. They are more ubiquitous. To account for the privileged processing of positive information, Unkelbach et al. (2008) proposed the density hypothesis. According to the density hypothesis, positive information is processed faster due to its high associative density in memory network. Positive information is more alike in general, and therefore intensely interconnected. Negative information, on the other hand, is not even relatively alike. Therefore, much less interconnected. Lack of highly interconnected associative network elongates processing, and demands higher processing cost. The density hypothesis holds that the more dense the associative network the faster and smoother the processing. Negative information associative density is lower than positive, hence slower processing. Ashby et al. (1999) proposed to explain the enhanced processing of positively valenced stimuli by dopamine hypothesis, positing that positive affect is connected with increased brain level of dopamine. Increased dopamine level (in the anterior cingulate cortex) has been found to impact increased speed and efficiency of processing. Positive affect induced by positive valence augments dopamine level, which impacts directly the processing fluency and creativity (e.g. Estrada et al., 1994; Isen et al., 1985), and facilitates access to positive information network (Isen et al., 1978). This systematically enhances the speed and quality of decision making (Isen et al., 1988; Isen et al., 1991). The insights this neurophysiological theory offers show the importance of positive affect (boosted dopamine level) in facilitated verbal contents processing, hence the mechanisms it captures and evidence it offers, seem directly relevant for theories dedicated to explaining the role of attitudinal contents in contextualized meaning comprehension.

4.2. Why negativity is longer?

Negatively valenced stimuli generate asymmetric processing patterns (negativity bias) reflected in longer and more intense processing. This effect is manifested in behavioral, psychological and physiological patterns. The high processing intensity is connected with the physiological mobilization to rapid and concentrated response to adverse stimuli. It pays to attend to and rapidly respond to potential threats (Baumeister et al., 2001; Rozin & Royzman, 2001; Taylor, 1991; Pratto & John 1991). Negative, threatening stimuli claim more intense processing than positive, non-threatening stimuli, because

negative stimuli signify immediacy of responding. Threat works as an alarm that activates physiological know-how to respond (e.g. Taylor, 1991). This ancient mechanism has evolved to secure survival and wellbeing, by focusing processing resources on salient stimuli (LeDoux, 1996; Damasio, 1994). From the evolutionary perspective negatively valenced input, irrespective of modality (audio, visual, olfactory, tactile), constitutes the highest priority. The mechanism at work has been perfected for millennia of evolution to manage adversity and support decision making, and to do it with flawless automaticity (LeDoux, 1996; Panksepp, 1998; Damasio, 2010; Shizgal, 1999). The alarm is activated by all sorts of emotionally competent stimuli, perceptual, cognitive and linguistic (Baumeister et al., 2001; Barrett & Bar, 2009). Ito and Cacioppo (2000) emphasize that negative stimuli processing is more intense because the immediacy and necessity to respond absorbs more processing resources (e.g. Cacioppo et al., 1994; Ito et al., 1998; Ito et al., 2000). A range of physiological, all body involving responses get activated. Kawasaki and colleagues (2001) observed a characteristic for aversive stimuli neural pattern: a short-latency, transient inhibition followed by a prolonged excitation. Neutral and pleasant stimuli exhibit a strikingly different processing pattern. Baumeister and colleagues (2001) emphasize that negative valence plays a fundamental role in calibrating emotional system. Its main purpose is to mobilize one to the challenges of the environment. Positive valence, to the contrary, serves to stay the course and to explore the environment. These positive and negative valence processing patterns have been observed for explicit and implicit attitudinal meaning processing in studies on irony processing (Bromberek-Dyzman, 2010; Bromberek-Dyzman forthcoming; Ivanko & Pexman 2003). Therefore, valence processing mechanism and patterns so widely evidenced in attitude research, deserve a more thorough investigation and recognition in irony research.

5. Anticipatory processing

Recent neuroimaging research points to proactive anticipatory processing of the brain infrastructure as an explanation of speed and efficiency of even cognitively complex pieces of information processing. Recent accumulating evidence shows that the brain specializes in generating context-tailored predictions cued by the incoming even most rudimentary, gist evidence (Bar, 2007, 2009, 2011; Bar & Neta, 2008). This evidence seems relevant for

irony research as it provides insight into how linguistic and extra-linguistic cues interact in affect-loaded meaning processing. Research has demonstrated that we routinely, if unconsciously use the predictive skills to predict what other people might do (Frith & Frith, 2003, 2010) or say (Sperber & Wilson, 2002). There is a growing support for the realization that brain is proactive, and evolved to predict and respond to the environment (Bar, 2007; 2009; Van Berkum, 2010). Communication processing in general and irony comprehension in specific, seem to thrive on this evolutionarily evolved prediction mechanics. Any bit of manifested evidence, i.e. a word, tone of voice, facial expression, posture displayed while speaking, contributes to contextualized meaning making. This default predictive mode of verbal input processing, alters significantly irony processing picture. If the affect driven anticipatory default network plays a significant, if implicit, role in verbal irony processing, determining the speed and intensity of its processing, it should enjoy more explicit research interest. For one, it would mean moving beyond the literal/non-literal meaning dictum to more explicit focus on extra-linguistic cues.

Recently Regel and colleagues (2010) set to test when/how listeners integrate extra-linguistic and linguistic information to compute the intended meaning. They wanted to find out whether/how the implicit knowledge about the speaker's communicative style (ironic vs. non-ironic communicative style) activates predictions and, how these reverberate in brainwave patterns. In two sessions they manipulated the speakers' use of irony (70% vs. 30% irony frequency) to see how irony frequency implicitly cues anticipation for irony. The study showed that unexpected irony produced by the non-ironic speaker, resulted in an increased P600, and both ironic and literal statements made by the ironic speaker, elicited similar P600 amplitudes. Session two, conducted one day later, featured balanced irony use, yet the ERPs showed an irony-related P600 for the ironic speaker (thwarted anticipation), but not for the non-ironic speaker. This finding indicates that implicit knowledge about speaker's preference for explicit/implicit attitude communication, does affect language comprehension in early processing (200 ms after the onset of a critical word), as well as in the later stages of comprehension (500-900 ms post-onset). Bits of pragmatic, extra-linguistic information about the speaker's communicative style preferences (attitude display), have a direct bearing on the neurophysiology (brainwaves) of inferential processing. The study shows that predictive processing triggered by the style of attitude communication,

determines brainwaves patterns in anticipated vs. unanticipated communicative contents processing. The implicit, extra-linguistic cue manifested by the frequency of ironic/non-ironic comments, shows to play a significant role in modulating brainwaves and processing patterns. This finding attests to the predictive default brain activity. Implicit cues about a speaker's communicative style modulate expectations and alter brainwaves patterns. Regel and colleagues' findings show that ironic and literal meanings were processed differently, depending on whether anticipation for irony or literal comment was implicitly triggered. Electric activity brain patterns differed as a function of implicit anticipation, and not literality/non-literality.

The impact of extra-linguistic cues on communicative contents processing has also been posited by Higgins (1998). According to Higgins individuals by default rely on feelings, experiences, memory, or any non-specific bit of information that gets evoked while specific contents is being processed. Higgins emphasized that the influence of incidental, extra-linguistic, experiential information, reflects the operation of a tacit aboutness principle. Accordingly, while we process a cue, all the memory deposited contents associated with the cue (about the cue) gets activated and is co-processed. Research seems to belittle the role and impact of non-propositional, extra-linguistic cues on the propositional contents processing. There is a widespread assumption that the mental contents: thoughts and feelings that appear while we process messages, get evoked by the propositional contents. The extra-linguistic cues are subtle, vague and usually taken for granted. So much so that they remain "invisible" to conscious experience, and experimental research. Yet, their impact on message processing is as much inestimable as unexplored.

Winkielman and colleagues (2002, 2003) put forward hedonic fluency hypothesis to account for a wide range of preference phenomena in terms of their processing dynamics. They propose that a range of non-specific features (e.g. extra-linguistic cues), next to the traditionally researched propositional contents of the message, impact fluency of processing. According to hedonic fluency hypothesis, perceptual and cognitive input processing depends as much on the specific, target related, as the nonspecific cues, which often influence processing dynamics before the specific features are extracted from the stimulus. Winkielman and colleagues emphasize that evaluative contents processing, hinges on two basic sources of information: (i) declarative information, such as features of the target, and (ii) non-feature based experiential information, such as the interpreter' affective state, accompanying

feelings, biological, physiological markers consciously or subconsciously experienced at the moment of processing, and a wide range of situational non-specific factors. Traditionally, only the declarative (propositional) information about the target has been explored as relevant for the target processing. According to Winkielman and colleagues, current research is in no position to decide how the propositional (stimulus specific) and the non-propositional (stimulus non-specific) merge to influence the processing patterns. Extra-linguistic, "incidental" cues might render the target specific cues more salient, more accessible, and hence might directly impact the processing dynamics. Various biological markers, such as neurotransmitter levels, electrical brain activity, body posture or facial expressions underpin affective states expression as non-specific cues, and "invisibly" affect the propositional contents processing. These non-feature-based cues are routinely evoked by affect competent stimuli to be indiscriminately interpreted as "about" the target (cf. Higgins, 1998). Winkielman and colleagues (2003) provide evidence that affective, non-specific cues are accessed before individuals fully process stimuli features (cf. Zajonc, 1980, 1984; Murphy & Zajonc, 1993), and hence impact further target processing (cf. Bar & Neta, 2008; Bar & Barret, 2009). Winkielman & Huber (2009) emphasize that processing fluency concerns not only perceptual fluency reflected in the ease of low-level, perceptual operations driven primarily by stimuli surface features. Parallel effects have been observed in conceptual fluency, reflected in high level stages of processing, concerned with identifying the meaning of the stimulus. Hedonic fluency hypothesis emphasizing equal significance of non-specific (non-propositional) and stimulus feature specific (propositional) cues, might be taken to promote the balance between propositional and non-propositional contents in irony processing research.

Recent neuroimaging research shows that affective load is recognized very early on in the comprehension process (e.g. Kawasaki et al., 2001; Smith et al., 2003; Barrett & Bar, 2009). There is evidence showing that affective contents of verbal input is processed pre-consciously, unlike the semantic contents, which requires conscious access to stimulus information (e.g. Zajonc, 1980; Murphy & Zajonc, 1993; Bargh et al., 1996; Greenwald et al., 1989; Greenwald et al., 1996). Murphy and Zajonc (1993), testing the affective primacy hypothesis (Zajonc, 1980, 1984), found that positive and negative affective reactions can be evoked with minimal stimulus input and virtually no cognitive processing involved. Barrett and Bar (2009) proposed

the affective prediction hypothesis, in which they demonstrate that recognition of affective valence of a stimulus is not a separate, subsequent processing stage, initiated only after the stimulus has been recognized, but runs parallel to its identification and significance recognition. Barrett and Bar (2009) provide empirical data showing that the brain routinely anticipates the affective value of the incoming stimuli, and affective load (stimuli positivity or negativity) influences the processing style (speed, intensity), and chronometry. Affective load of perceptual and cognitive stimuli has been found to impact directly perception, identification, recognition and valuation in a top-down manner. Affect-dedicated neural circuitry has evolved to handle valence in the brain. It comprises a network that includes primarily (stimuli and task depending) amygdala, prefrontal cortex, insula, cingulate cortex, hypothalamus, nucleus accumbens, and the brainstem (cf. Cacioppo et al., 2004; Dalgleish, 2004; Damasio, 1994; Davidson & Irwin, 1999; Dolan, 2002; Ledoux, 2000). This affect network is central to attitudinal contents processing, and evaluation-embedded decision making (Damasio, 1994). Language sciences cannot ignore accumulating evidence showing that valence network recognizes affective contents within a mere 100-150 ms (e.g. Grandjean & Scherer 2008; Pizzagalli et al., 2002; Schupp et al., 2004; Smith et al., 2003; Kawasaki et al., 2001). If affective load is so preferentially accessed and processed, valenced cues need to be acknowledged as basic ingredients of meaning whenever affective meaning is communicated.

Recent irony neuroimaging research shows that affective valence circuit overlaps in some critical areas with theory of mind (ToM) circuit which handles irony comprehension. How affective valence network cooperates with theory of mind circuit in handling irony, needs to be further researched. Yet, recent neuroimaging and lesion irony processing studies show that irony comprehension is impossible when ToM is deficient. Fully fledged theory of mind faculty allows to comprehend others: their attitudes, intentions, affective (what they feel) and cognitive (what they think) states. It also enables irony comprehension (Frith & Frith, 2003, 2010; Wang et al.,2006; Wakusawa et al., 2007; Uchiyama et al., 2006; Shamay-Tsoory et al., 2005a, 2005b; Shibata et al., 2010). Shamay-Tsoory et al., (2005a) emphasize that emotions and affective states are as crucial for irony communication-comprehension as the cognitive states are. In a series of studies Shamay-Tsoory et al. (2005a, 2005b), Uchiyama et al. (2006), Wakusawa et al. (2007) examined how ToM circuit navigates irony comprehension, and how cognitive and affective systems

are involved. These studies confirm the role of theory of mind in irony comprehension and point to the role of affective ToM, to be as crucial for irony comprehension as cognitive ToM (Shamay-Tsoory et al., 2005 a,b).

6. What does attitude (valence) research tell us about irony?

Rhetoric tradition pictured irony as a figurative, non-literal meaning, a substitute to literal meaning. This paradigm harnessed to empirical testing produced inconclusive, conflicting results showing that irony can be processed slower, as fast as, or faster than literal equivalents. The contradictory results might be a side effect of not tapping the essence of ironicity and unaccounting for it in research designs. Approaches striving to account for irony comprehension, by relying exclusively on the traditional philosophical and linguistic (language autonomy approach) methods, no longer suffice to explain the emerging intricacies of mental and neural infrastructure employed for pragmatic inferential tasks. New mounting evidence challenges the traditional language-autonomy based accounts, and sets new research agendas striving to master interdisciplinary goals by means of experimental methods in multidimensional perspectives. Recent accumulative research shows that on top of propositional meaning so far exclusively researched, irony communicates non-propositional, implicit, attitude contents. This implicit, evaluative load appears of key significance, processing-wise. Communication serves to exchange the contents of our minds: what matters most. On top of what we say, we piggyback attitudes, feelings, moods. Affective contents seems to be the engine of human interaction. The linguistic meaning does not exhaust the communicative potential of non-propositional contents. The propositional contents of the "said" is but one level of the ironic message. What we say matters, but how we say it, manifested by extra-linguistic cues, is at least equally important.

Research needs to find out more specifically what extra-linguistic cues manifested non-propositionally in communicative context, impact irony comprehension and how this happens. Experimental pragmatics, with its processing, variable-oriented experimental design, seems fit to tap the propositional and non-propositional processing mechanics involved. It needs to pin down the extra-linguistic, affective factors and mechanisms underpinning irony communication and comprehension. Neuropragmatics inspired by new research methods on mind and brain dynamics, offers quite

new insights into the mental and neural infrastructure of communicative comprehension. Irony research has already been slightly redefined by the insights offered by recent neuroimaging research (Shamay-Tsoory et al., 2005a,b; Uchiyama et al., 2006;Wakusawa et al., 2007; Shibata et al., 2010; Regel et al., 2010). Intriguing results observed for evaluative valence processing seem to have a direct bearing on how irony is handled mind/brain-wise. The significance of valence circuit and ToM circuit overlapping, needs to be explored at length. Language research cannot afford to ignore affective valence, which boasts as rapid an activation time window as 100-150 ms. Hence, traditional models on irony comprehension need to be revised to accommodate for the attitudinal contents. Attitude is onboard. Specific predictions as to the role of implicit attitude in irony processing, need to be worked out and tested explicitly.

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Puns for Contextualists

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ABSTRACT

In this paper, I will first try to provide a new argument in favour of the contextualist position on the semantics/pragmatics divide. I will argue that many puns, notably multi-stable ones, cannot be dealt with in the non-contextualist way, i.e., as displaying a phenomenon that effectively involves wide context, the concrete situation of discourse, yet only in a pre-, or at least inter-, semantic sense. For, insofar as they involve ambiguous *utterances* rather than ambiguous *sentences*, these puns show that the wide context affecting them has a *semantic* role: it provides many truth-conditions for a single utterance. Moreover, I will try to show that the contextualist can provide a unitary account of the *general* phenomenon of puns. On the one hand, this account explains multi-stable puns as well as those puns the non-contextualist claims to deal with successfully, i.e., the ones involving a speaker-induced removal of a well-grounded misunderstanding. On the other hand, it also explains zeugmatic puns, i.e., those involving an 'impossible' meaning.

Keywords: Contextualism, non-contextualism, wide context, puns, multi-stability.

Introduction

In this paper, I will first try to provide a new argument in favour of the contextualist position on the semantics/pragmatics divide. The argument is based on an evaluation of the phenomenon of ambiguity as it occurs in puns. I will argue that many puns, notably multi-stable ones, cannot be dealt with in the non-contextualist way, i.e., as displaying a phenomenon that effectively

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involves wide context, the concrete situation of discourse, yet only in a pre-, or at least inter-, semantic sense. For, insofar as they involve ambiguous *utterances* rather than ambiguous *sentences*, these puns show that the wide context affecting them has a *semantic* role: it provides many truth-conditions for a single utterance. Moreover, I will try to show not only that non-contextualist replies to the contextualist account of this phenomenon of ambiguous utterances do not work, but also that the contextualist can provide a unitary account of the *general* phenomenon of puns. On the one hand, this account explains multi-stable puns as well as those puns the non-contextualist claims to deal with successfully, i.e., the ones involving a speaker-induced removal of a well-grounded misunderstanding. On the other hand, it also explains zeugmatic puns, i.e., those involving an 'impossible' meaning.

1. The contextualist/non-contextualist opposition and the role of ambiguity

As regards the divide between semantics and pragmatics, nowadays two main options confront each other: *non-contextualism* and *contextualism*. In point of fact, contextualism varies in type.[1] Yet the opposite position lacks even a common label.[2] Nevertheless, there is a clear-cut way to cash out the main distinction affecting these two positions *à propos* of the above divide. This distinction concerns the different conceptions those options have with respect to the so-called *wide context*, i.e., the concrete situation of discourse. To put it in Perry's (1997) terms, according to non-contextualists, wide context never has a *semantic* role, that is, it never fixes the truth-conditions a sentence has in

[1] Not only *truth-conditional pragmatics à la* Recanati (2004a) - according to which primary pragmatic processes determining contextual truth-conditional contributions of sub-sentential expressions may even bypass the linguistic meaning of such expressions – but also *broad indexicalism* à la Stanley (2007) - according to which linguistic meaning merely underdetermines contextual truth-conditions – turn out to be forms of contextualism, a radical and a moderate one respectively. For in broad indexicalism, linguistic meaning plus narrow context may well be unable to determine the truth-conditions of an utterance, i.e., of a sentence in wide context (for the notions of narrow and wide context see later).

[2] To outline this position, some use the label *semantic minimalism* (cf. Cappellen & Lepore 2005) – or the similar one *minimal semantics* (cf. Borg 2004). Predelli speaks of the "traditional approach" (2005, p. 13). By following a proposal put forward by Recanati (2004a), one might name this position *literalism*. Yet as Recanati himself admits, since according to this position what is semantically evaluated are sentences in context, one might well be justified in taking this position as a form of *narrow indexicalism*, according to which linguistic meaning automatically determines truth-conditions given a *narrow* kind of context (see immediately later in the text).

narrow context, or *index*, i.e., a set of a limited series of parameters – typically, agent, space, time, and world.[3] Typically, for non-contextualists wide context has the *post-semantic*, genuinely pragmatic, role of determining whatever extra-truthconditional factor of significance is conveyed by means of such a sentence in context. By a first approximation, for non-contextualists the proper objects of semantic evaluation are therefore *sentence - narrow context pairs*, theoretical representations of *utterances*, the concrete wide-contextual tokenings of sentences on the speakers' part.[4] Whereas according to contextualists, wide context *may* well have the semantic role in question. Properly speaking, in fact, in order for the contextualist to win the battle against her enemy, it is enough for her to show that contextualism is correct with respect to the purportedly semantic role of wide context in at least one case.[5] As a result, for contextualists the proper objects of semantic evaluation are utterances themselves, *qua* (roughly) sentences in wide context.[6]

Here is why the contextualist/non-contextualist distinction must be drawn this way. On the non-contextualist side, since wide context never has a semantic role, truth-conditions are assigned to sentences in narrow context by computing the truth-conditional contributions (in narrow context) of the sub-sentential components of such sentences, together with certain syntactic and compositional principles. Since such a computation turns out to be an utterly automatic process, even a semantic mechanism, something that is programmed to make that computation, may perform a truth-conditional assignment.

In this respect, the fact that what is semantically evaluated is a sentence in narrow context raises no problem. For the relevant truth-conditional computation remains entirely automatic. This is paradigmatically shown by indexical sentences, for which narrow context effectively is truth-conditionally relevant. Granted, without a narrow context an indexical sentence has no truth-

[3] For this distinction between wide and narrow context cf. Perry (1997, p. 595). Predelli (1998, 2005) has shown that narrow context has to be considered a context of interpretation rather than a context of utterance. For the narrow context's parameters can well differ from the parameters of a context of utterance. For a general reason as to why this must be the case, cf. Voltolini (2006).

[4] More precisely, for non-contextualists the objects of semantic evaluations have to be clause (a linguistic representation of a natural language sentence) – index (narrow context) pairs. See slightly later in the text.

[5] As Recanati (2004a, p.116) claims.

[6] Kaplan (1989b, pp. 584-585) argues that sentence – (narrow) context pairs are the right objects of semantic evaluation, for sometimes there are non-uttered sentences yet true in a context. However, contextualists simply put this argument aside. For according to them language *use*, hence utterances, is the starting point of semantic evaluation. Cf. e.g. Recanati (2004a).

conditions. Yet once one such context is provided, that sentence again obtains a certain truth-condition automatically. For that sentence also has a *linguistic meaning*, or better a *character*, which is completely determined by the linguistic meanings, or better the characters, of its sub-sentential elements. Character is a function mapping narrow contexts onto truth-conditional contributions. When one such sub-sentential element is indexical, its character specifies which parameter in narrow context has to be mobilized in order to give that indexical a certain truth-conditional contribution in a given narrow context. Thus, that parameter automatically determines the truth-conditional contribution that sub-sentential element gives in that context to the indexical sentence in which it figures.[7]

Consider e.g.:

1. I am American.

Given its linguistic meaning, (1) conveys that whoever is the (contextual) agent is American. Yet since (1) is an indexical sentence for it contains the indexical "I", not the sentence itself, but that sentence in a certain narrow context, has truth-conditions. Now, the character of "I" constituting the sentence's linguistic meaning is a function mapping narrow contexts onto referents, i.e., the truth-conditional contributions of "I" in those contexts. As is shown by its linguistic description, roughly "the agent in context", such a character specifies the 'agent'-parameter in narrow context so as to automatically obtain the agent in one such context as the referent of "I" in that context, i.e., as its truth-conditional contribution in that context. As a result, once (1) is taken along with a narrow context whose agent is Barack Obama, then (1) is *eo ipso* true in that context iff Obama is American. Something that even a mechanism may compute.

Now, contextualists reject this whole picture by appealing to the idea that language functioning is a matter of intentional use, not a matter of automatic applications of semantic operations. For them, therefore, there is no need to represent utterances by means of linguistic representations of any kind. Since utterances are the speakers' concrete productions, they can be semantically

[7] For this whole picture on indexicals, cf. Kaplan (1989a,b). Recanati (2004b, p. 1) claims that the character of an indexical is given by a token-reflexive rule. Since for each indexical its own token-reflexive rule specifies the narrow context parameter that has to be mobilized in order to provide the relevant indexical sentence its truth-conditions in a given narrow context, truth-conditional assignments for such sentences remain automatic.

evaluated in the concrete situations where they are uttered, i.e., in their wide contexts.

As is well known, it is rather controversial nowadays whether by means of the above account the non-contextualist manages to deal with all cases of context-sensitivity, especially those involving so-called *hidden* context-sensitivity, i.e., the contextuality that is not sententially articulated by means of the occurrence in a sentence of a context-sensitive expression.[8] Yet I want to stress here that even if the non-contextualist managed to deal with hidden context-sensitivity,[9] the contextualist should not worry, since there may turn out to be a very basic semantic phenomenon that preliminarily hinders any non-contextualist account.

Ambiguity seems to be one such phenomenon, according to which one and the same sentence of a natural language has different meanings, either because at least one of its terms has different meanings – *lexical* ambiguity – or because the sentence has different syntactic structures – *structural* ambiguity. At first glance, ambiguity indeed brings grist to the contextualist's mill. For the contextualist may well point out that disambiguation is a matter of wide context: a factor in the concrete situation of discourse helps one to settle whether the ambiguous sentence is used with one or another meaning. Yet the fact that a sentence is ambiguous is none other but the fact that it has different truth-conditions. Thus, proceeds the contextualist's argument, assigning to an utterance of that sentence certain truth-conditions rather than other ones is a matter of wide context. But this shows that in the case of ambiguity, it is precisely wide context that has a semantic role. More formally:

1. That a sentence is ambiguous is wide-contextually dependent
2. That a sentence is ambiguous = that a sentence has many truth-conditions
3. That a sentence has many truth-conditions is wide-contextually dependent [from 1,2]
4. Hence, wide context has a semantic role.

Yet the non-contextualist will immediately reply to the contextualist, you have run too fast. One may well accept the wide-contextual dependence of ambiguity. Yet this wide-contextual dependence merely shows that neither

[8] For this label cf. Borg (2004). Sentence (9) below presents a case of hidden context-sensitivity.

[9] I myself, for one, do not believe this: cf. Voltolini (2009). Yet for many attempts at non-contextually dealing with overall context-sensitivity, cf. e.g. the afore-mentioned Borg (2004), Cappellen-Lepore (2005), Predelli (2005).

natural language sentences nor their utterances are the objects of semantics. For wide context is certainly appealed to in disambiguation, but only in a *pre-semantic* role (to get back again to Perry's 1997 terminology). Wide context indeed serves just in order to select the *real* object of semantic evaluation, namely an underlying linguistic representation – e.g., a Mentalese sentence[10] – that automatically has its own truth-conditions, as the non-contextualist holds. Such a representation will represent an utterance of a certain natural language sentence. Theoretically speaking, one and the same natural language ambiguous sentence can be paired with different underlying linguistic representations, each endowed with its own truth-conditions.[11] Yet once one considers the wide context in which such a sentence is uttered, this context simply settles *which* underlying linguistic representation with its own truth-conditions has to be selected by the semantic mechanism as representing the relevant utterance of that sentence, i.e., the utterance of that sentence which is uttered in that wide context.

To be sure, for a more precise picture that accounts for indexicality as well, the non-contextualist must reintroduce narrow context and say that the real objects of semantic evaluations are those underlying linguistic representations plus narrow context. On behalf of the non-contextualist, Predelli (2005) has formulated this idea in the most articulated way. First of all, for him one and the same natural language sentence is to be associated, in accordance with its being uttered in different wide contexts, with different syntactically transparent[12] linguistic representations. He calls one such representation a *clause*. Moreover, he says, in order to account for indexicality, too, what really has to be associated with one such sentence are different clause-*index* pairs, namely, couples made by a linguistic representation plus a certain narrow context. From a theoretical point of view, one such pair indeed represents an utterance of that sentence, i.e., (roughly) such a sentence in a certain wide context. Now, for Predelli that pair is the real object of semantic evaluation. For that pair is automatically assigned certain truth-conditions, in conformity with non-contextualist *desiderata* about truth-conditional computation.

[10] For this idea, cf. e.g. Pinker (1994, p. 79).

[11] Since ambiguity is both lexical and structural, this formulation must be taken with a grain of salt. It would be more precise to say that what is paired with different underlying linguistic representations each one endowed with its own truth-conditions is a sentence *as syntactically opaque*. On their turn, such representations are instead *syntactically transparent* for their primary task is precisely that of presenting the different syntactic structures that sentence possesses.

[12] See the previous footnote.

As a result of this picture, ambiguity amounts to the fact that *different* clause-index pairs respectively representing different utterances of one and the same natural language sentence – i.e., respectively representing that sentence as taken in different wide contexts – respectively have *different* truth-conditions (automatically as it were). Thus, wide context plays a mere pre-semantic role. For it merely points out *which* pair has to be mobilized in order to represent the relevant utterance of that sentence.[13]

Consider e.g. the following both indexical and ambiguous sentence:

2. I am taking a babe to the bank.

This sentence is indexical for it contains the indexical "I" and is ambiguous because it contains the ambiguous term "bank". Given such an ambiguity, in accordance with its being uttered in different wide contexts, (2) is respectively associated with two clauses, clause *c* containing a term such as "$bank_1$" and clause *c'* containing a different term "$bank_2$". Consider now a narrow context, an index *i* whose agent is the former Italian Prime Minister Berlusconi. In accordance with its being uttered in different wide contexts, (2) is properly associated with two different clause-index pairs, namely *C* (*c*-*i*) and *C'* (*c'*-*i*). Now, *C* and *C'* are the proper objects of semantic evaluation: *C* is true iff Berlusconi takes the babe in question to a certain financial institution, while *C'* is true iff Berlusconi takes that babe to a certain river edge. In this perspective, wide context simply selects whether (2) should really associated with *C* or with *C'*, respectively having different truth-conditions. The selected pair will thus represent a certain utterance of (2), i.e., (roughly) (2) in that wide context. As a result, *pace* contextualists wide context has no semantic role.

More formally, a non-contextualist following Predelli rejects the previous contextualist argument, for she denies premise 2) of that argument. Instead, she puts forward this different argument:

1) That a sentence is ambiguous is wide-contextually dependent

2*) That a sentence is ambiguous = that a sentence is associated with different clause-index pairs respectively representing different utterances of that sentence and endowed with its own truth-conditions

[13] In point of fact, since for Predelli an utterance is roughly a sentence in wide context, it would be more precise to say that by selecting the right clause-index pair with its own truth-conditions, wide context makes it clear *which* utterance of the sentence has been really uttered. Yet for my present purposes I can leave this aside.

3*) That a sentence is associated with different clause-index pairs respectively representing different utterances of that sentence and endowed with its own truth-conditions is wide-contextually dependent [from 1), 2*)]
4*) Hence, wide context has no semantic, but simply a pre-semantic, role.

To be sure, a non-contextualist acknowledges that the situation at stake may be more complicated. Consider an utterance of an ambiguous sentence. It may be the case that, in order to fix the relevant clause-index pair representing that utterance, wide context operates not at a pre-semantic level, but so to speak within the semantic level itself. In other terms, it may be the case that only once that sentence is uttered, does it become wide-contextually clear which clause-index pair represents the relevant utterance. Thus, the semantic mechanism must be able to store all the pairs that may theoretically speaking be associated with that sentence. Yet once the relevant pair is selected, wide context still plays no semantic role. For that pair is automatically assigned certain truth-conditions. That pair wears those truth-conditions on its sleeve, as one might put it.[14]

2. Why puns really bring grist to the contextualist's mill

In his perspective, puns seem to cause no particular trouble to the non-contextualist. Granted, in order for a pun to work, it must exploit natural language ambiguity in some way or other. Yet the way it works is simply a *speaker-induced* removal of misunderstanding that is *well-grounded*, for it depends on the fact that the relevant natural language sentence is ambiguous. In an ordinary well-grounded misunderstanding, an interlocutor erroneously believes that a given utterance of an ambiguous sentence has a certain truth-conditional interpretation. Such a belief is mistaken, for that utterance actually has a different truth-conditional interpretation. In this respect, wide context makes it clear that the truth-conditional interpretation of a certain utterance is different from the expected one. In the theoretical terms Predelli provides for the non-contextualist, wide context makes it clear that the utterance corresponding to that sentence in such a context has to be represented by a certain clause-index pair endowed with its own truth-conditions rather than by another clause-index pair with its own truth-conditional interpretation. Once

[14] For these complications cf. Borg (2004, p.140-146).

the interlocutor realizes that, she may well remove her erroneous conviction and represent that utterance by the right clause-index pair with its own truth-conditional interpretation. Now, the only difference between an ordinary well-grounded misunderstanding and one prompted by a pun is that the latter misunderstanding is due to *intentional* factors. A pun's creator *wants* her interlocutor, first, to be led astray by a certain possible yet incorrect truth-conditional interpretation for an utterance of an ambiguous sentence, and second, to be led back to the correct truth-conditional interpretation of that utterance, just in order to have fun thanks to the clash of her semantic expectations.[15]

In order to see these cases, take first an ordinary case of well-grounded misunderstanding. Suppose Wim utters:

3. Paris is beautiful.

Typically, her interlocutor will believe that by (3) Wim is talking about the capital of France. Yet once Wim continues by saying:

4. I like the desert surrounding it

then wide context, specifically the wide-contextual factors of co-text and background knowledge (a noun such as "desert" and the background knowledge that the capital of France has no desert), will induce such an interlocutor to revise her interpretation and suppose that Wim, as he was indeed doing, was talking instead of Paris, Texas. In Predelli's terms, this means that the above utterance of (3) has to be represented by a certain clause-index pair containing the name "Paris_2", which is true iff the city in Texas so named is beautiful, rather than by another clause-index pair containing the name "Paris_1", which is true iff the capital of France so named is beautiful, as the interlocutor erroneously believed.[16] Second, consider one of the most famous puns by Oscar Wilde:

[15] In such a case, the comical effect will therefore conform to the so-called 'incongruity theory' of humor. On it cf. Morreal (2009:chap.1).

[16] For the purpose of this example, I take the name "Paris", hence any sentence containing it, to be ambiguous. In point of fact, along with some others I believe that proper names are indexicals (cf. Voltolini 1995). But if I assumed indexicality for proper names, it would make no big difference. For in Predelli's terms, a non-contextualist might then account for the misunderstanding by saying that the utterance of (3) should be represented by *another* clause-index pair. This pair differs from the pair the interlocutor erroneously took that utterance to be represented by because its *index*, not its clause, is different.

5. To lose one parent, Mr. Worthing, may be regarded as a misfortune; to lose both looks like carelessness. (*The Importance of Being Earnest*, 1895)

In order for such a pun to work, an interlocutor is first erroneously induced by the presence in (5) of the noun "misfortune", to think that in the relevant utterance of (5) the ambiguous "to lose" means *to suffer deprivation*, so as to assign that utterance a certain truth-conditional interpretation. Yet as the utterance proceeds, a better look at the wide context in which (5) is actually uttered, more specifically at the fact that the wide-contextual factor of "to lose"'s cotext in (5) contains not only the noun "misfortune", but also the noun "carelessness", makes it clear that "to lose" here means *to misplace*, so that its correct truth-conditional interpretation is another. In this predicament, moreover, the interlocutor realizes that, by so construing (5), it was Wilde's intention to lead his interlocutor into such a misunderstanding. For he wanted to obtain a comical effect by means of his interlocutor's removal of the misunderstanding. In Predelli's terms, instead of being erroneously represented by the clause-index pair containing the term "to lose_1", which is true iff to suffer deprivation from one parent's death may be regarded as a misfortune and to suffer deprivation from both parents' looks like carelessness, the relevant utterance of (5) has to be correctly represented by another clause-index pair containing the term "to lose_2", which is true iff to misplace one parent may be regarded as a misfortune and to misplace both parents looks like carelessness.[17]

[17] For another example of a pun mobilizing a speaker-induced well-grounded misunderstanding yet involving structural rather than lexical ambiguity, take the famous Groucho Marx pun "I shot an elephant in my pyjamas. How he got into my pyjamas I don't know!" (cf. on this Borg 2004, p. 143fn.91). A similar explanation may be given for puns involving: i) indexicality rather than ambiguity; ii) sameness of meaning rather than difference of meaning contrary to previous expectations. Consider the joke Pinker (1994, p.80) presents: "First guy: I didn't sleep with my wife before we were married, did you? Second guy: I don't know. What was her maiden name?" Given the first sentence, an interlocutor would expect the second guy's utterance of his second sentence to be represented by a clause-index pair in which the theoretical counterpart of the pronoun "her" referred to a certain individual, the *second* guy's wife. This individual obviously differs from the individual, the *first* guy's wife, the theoretical counterpart of the description "my wife" denotes in the representation of the first guy's utterance. What's punny is that, contrary to previous expectations, the clause-index pair that really represents the second guy's utterance of his second sentence contains a theoretical counterpart of "her" yet referring to the *very same individual* the theoretical counterpart of "my wife" denotes in the representation of the first guy's utterance.

Yet, one may now immediately wonder, is this always the case with puns? As we have just seen, from the cognitive point of view, the non-contextualist considers puns as speaker-induced well-grounded misunderstandings, hence as things falling into the general category of aware misrecognitions. This is to say, for non-contextualists puns are cognitively on a par with cases of illusory perceptions in which one discovers that what one illusorily took in her perception to be a certain thing is in point of fact another. In the most famous example, Carneades discovered that what he illusorily took in his perception to be a snake was in point of fact a rope. If this is the case, puns have to be characterized by non-reversibility of interpretation. As a matter of fact, once we discover that what we illusorily took in our perception to be a certain thing is another thing, we can no longer even seem to see that thing as being the previous one. Once Carneades made the above discovery, the rope no longer appeared to him to be a snake. By parity of reasoning, in the case of puns once we discover the truth-conditional interpretation a certain sentence in wide context, hence a certain utterance, has to be assigned, we can no longer take that sentence in context, hence that utterance, as having the truth-conditional interpretation we previously and erroneously gave to it. The utterance remains linked with what we have discovered to be its correct truth-conditional interpretation. In Predelli's terms, we discover once for all that such an utterance is represented by a certain clause-index pair having a certain truth-conditional interpretation rather than by another clause-index pair having another truth-conditional interpretation, as we erroneously thought.

Yet cognitively speaking this does not always happen with puns. On the contrary, for many puns reversibility obtains. In such cases, an utterance first receives a certain interpretation, then another one, yet once it receives the latter interpretation the former is still at play. Once we realize that we have to do with one such pun, we continue going back and forth between the different interpretations for that utterance, precisely because neither prevails. From the cognitive point of view, this reversibility is easily accounted for once we find the right explanation for such puns. As Wittgenstein (1953, 1980, 1982, 1992) originally grasped, the general cognitive category under which such puns fall is not that of aware misrecognition, but that of *seeing-as*, at least the kind of seeing-as characterized by *Gestalt* switches. In our case, such puns are indeed characterized by the fact that certain linguistic configurations are endowed with multi-, or at least bi-, stability of interpretation. Unlike cases of aware misrecognition, in seeing-as of this kind reversibility indeed occurs. For

instance, one can pass from seeing a certain array of dots as being a two-dimensional cross to seeing them as being a rhombus and *vice versa*. Likewise, one can pass from seeing a certain configuration as being (a picture of) a duck to seeing it as being (a picture of) a rabbit and *vice versa*, right up to passing from seeing an Arcimboldo painting as being (a picture of) a face to seeing it as being (a picture of) a cluster of fruit and vegetables and *vice versa*. In this respect, the cognitive upshot of facing an ambiguous figure is a mixture of astonishment and disorientation. For although in one sense, or better at a certain experiential level, that of direct visual perception, we are experiencing one and the same thing, i.e., the item we actually have before us, yet in another sense or better at another experiential level, that of seeing-as, we have an alternate visual experience as of different things. Now, in many cases the inventor of a pun wants to get her audience to be involved in precisely the same predicament. That is to say, someone who understands one such pun is in a certain sense, or better at a certain experiential level, that of direct auditory/visual perception, still hearing/seeing the very same utterance she has before her, yet in another sense or better another experiential level, that of hearing/seeing as, she is having an alternate experience of hearing/seeing that utterance as having now one meaning, now another one. This alternation of meaning experiences, or more radically this ambiguity of the sentence's *utterance* rather than of the sentence itself, is what the inventor of a pun intends her interlocutor to have.

Consider for instance the following cases:

6. Condoms should be used on every conceivable occasion
7. Without geometry, life is pointless
8. Santa's helpers are subordinate Clauses.[18]

In all these cases, a sentence is ideally uttered in complete isolation. This may help the interlocutor not to be led astray by other possible factors of the specific wide context involved (co-text, gestures, salience effects, etc.) so as to focus just on the relevant wide-contextual factor, i.e., the utterer's intention to convey different meanings by means of *the very same utterance*. Thus, by

[18] Wittgenstein (1980, I§77) gives another such example. In this example, a singer playing Wagner's *The Rhine-gold* on stage addresses another singer who had just whispered to him something about egg-cooking by singing "Weiche, Wotan, weiche!". By that utterance, does the first singer mean the same as "Go away, Wotan, Go away!" or the same as "Soft, Wotan, soft"? Both, Wittgenstein would urge.

exploiting the ambiguity of the adjective "conceivable", the relevant utterance of (6) is meant to convey two different interpretations, namely not only that condoms should be used whenever there is a risk of pregnancy, but also that they should be used in any logically thinkable situation. By exploiting the ambiguity of the adjective "pointless", the relevant utterance of (7) is meant to convey two different interpretations, namely not only that a non-geometrical life is devoid of geometric points, but also that such a life is meaningless. By exploiting the ambiguity of the very same plural form, "clauses", of both the noun "clause" and the name "Claus", the relevant utterance of (8) is meant to convey two different interpretations, namely not only that those who help Santa are subordinate to him, but also that they are linguistic constructions.[19]

Now, the contextualist may well rely on such examples of puns in order to reply to her non-contextualist opponent as follows. Suppose we buy the non-contextualist account of ambiguity. As we have seen, in order to deny wide context a semantic role when ambiguity obtains, the non-contextualist claims that *one and the same natural language sentence* in different wide contexts has to be associated with *different* clause-index pairs that respectively represent the relevant *different* utterances of that sentence and automatically have *different* truth-conditions. So each utterance of the sentence, via its representing pair, has just one truth-conditional interpretation. In such a predicament, wide context simply selects which clause-index pair with its own truth-conditions represents the relevant utterance. Yet in the present cases of puns, we have *one and the same utterance* of a sentence having *different* interpretations, not just *one* interpretation. As the non-contextualist is instead supposed to claim, by making one such interpretation the truth-conditional interpretation of just *one* clause-index pair representing that utterance. On the contrary, for the contextualist those different interpretations amount to *different* truth-conditions for that very utterance – e.g. the relevant utterance of (7) for instance is true both iff a non-geometrical life has no geometrical point and iff that life is meaningless. But these different truth-conditional

[19] In advertisement, many puns work this way. Cf. Tanaka (1992). Here I have chosen cases of puns in which one can say that just one utterance of *one and the same natural language sentence* is involved, for the ambiguity on which the multi-stability of the utterance is involved is merely lexical. If the ambiguity involved were both lexical and structural, as in "My girl criticized my apartment, so I knocked her flat", we should more properly speak of a multi-stable utterance of one and the same *syntactically opaque* sentence, if not merely of one and the same string of uttered *words*. Whereas in case of a pun involving mere homophony, as in "Seven days without laughter makes one weak", we should rather speak of a multi-stable utterance of one and the same string of uttered *sounds*.

interpretations for that utterance depend on wide context; notably, on the fact that the utterer's intention is precisely to convey two meanings at one and the same time by means of the same utterance of a certain sentence. Thus, contextualism is vindicated. For in the case of our puns, wide context has a *semantic* role. More formally, the contextualist first rejects:

> 2*) That a sentence is ambiguous = that a sentence is associated with different clause-index pairs respectively representing different utterances of that sentence and endowed with their own truth-conditions

of the previous Predelli-inspired non-contextualist argument. Then, she puts forward this new argument:

> 1') That an utterance, i.e., (roughly) a sentence in wide context, is ambiguous is wide-contextually dependent
> 2') That an utterance, i.e., (roughly) a sentence in wide context, is ambiguous = that an utterance, i.e., (roughly) a sentence in wide context, has many truth-conditions
> 3') That an utterance, i.e., (roughly) a sentence in wide context, has many truth-conditions is wide-contextually dependent [from 1', 2']
> 4) Hence, wide context has a semantic role.[20]

Now, the claim that a contextualist account fits multi-stable puns nicely can be further corroborated. Consider that in the case of multi-stable puns, as in all cases in which a contextualist account suggests itself, not only is it wide-contextual for an utterance to have certain truth-conditions, but it is also wide-contextual which factor of the concrete situation of use is relevant for that truth-conditional assignment. Contextualism involves *meta-contextualism*, as some put it (cf. Bianchi 1999).

In this respect, take an utterance of:

9. Bill cuts the grass.

[20] Let me just stress once more that what the contextualist advocates here is that *one and the same utterance* has *more than one* truth-conditional interpretation, not that it is indeterminate whether one and the same utterance has a truth-conditional interpretation. Borg (2004, pp. 221-5) claims that Travis' version of contextualism, as it emerges e.g. from Travis (1997), amounts to the latter form of meaning eliminativism. Whether or not Borg's interpretation of Travis is correct, this form of eliminativism is not what I am defending here. The point is not that there is no such thing as a truth-conditional meaning for a punny utterance, as Borg might claim in reconstructing Travis' contextualism. The point is rather that there are as many truth-conditional meanings for that utterance as its utterer intends it to have in her multi-stable pun.

which presents a typical case for which a contextualist account seems to work. For a contextualist, that utterance has no truth-conditions in isolation; a certain wide context, i.e., the concrete situation in which (9) is uttered, fixes for it a truth-conditional interpretation. Yet according to a contextualist, this means not only that in order for that utterance to have truth-conditions one has to appeal to the concrete situation in which (9) is uttered, but also that it depends on that situation *which* of its factors is relevant in order to settle *which* truth-condition that utterance has. In a certain wide-contextual situation, one has to appeal to the fact that (9) is uttered within a story one is telling about the endings of a soccer match, hence to the *co-textual* factor of that wide context of (9), in order to settle that that very utterance is true iff Bill rips the grass to pieces. If instead (9) had been uttered in the course of garden care practice, one would have had to appeal to *this* factor of the new wide-contextual situation in order to settle that this utterance of (9) is true iff Bill trims the grass with a lawnmower.

Now, the same holds with our multi-stable puns. If somebody uttered (6) within some anti-AIDS campaign, that utterance would not be punny at all, for in such an utterance "conceivable" would merely mean *logically thinkable*. So, that utterance would be true merely iff condoms should be used in any logically thinkable situation. Yet if a comedian utters (6), in this new wide-contextual situation the prevailing wide-contextual factor is the comedian's intention that the new utterance of (6) be taken as a multi-stable pun. So, this utterance is true both iff condoms have to be used in every logically thinkable situation and iff condoms have to be used just in a pregnancy-inducing situation. Thus, it is not only wide-contextual for that utterance of (6) to receive a truth-conditional interpretation, but it is also wide-contextual which factor of the wide context provides the punny, bi-stable, interpretation: the utterer's intention.

3. Objections and replies

Up to now, I have first of all presented what I take to be a new interesting datum: a multi-stable pun counts as an utterance having different interpretations. Moreover, I have put forward a contextualist account of that datum: such interpretations for one and the same utterance are different *truth-conditional* interpretations for that utterance prompted by wide context, which thereby has a *semantic* role. Yet to say that the datum *may* be accounted for in contextualist terms does not yet obviously prove that it *must* be so accounted for. Perhaps the non-contextualist can still shoot some arrows from his bow.

What I will try to show in this Section is that the non-contextualist's arrows are blunt.

To begin with, a non-contextualist might try to deny the datum altogether. That is, she may suggest that in the case of a multi-stable pun *different* utterances are involved for one and the same sentence. Perhaps these are not physical utterances, but mental ones – typically, one in the speaker's, the other in the interlocutor's, mind. Moreover, such utterances are respectively represented by different clause-index pairs with their own truth-conditions. Thus, the case raises no particular problem.[21]

To be sure, such a strategy is appealing when we want to draw a distinction between a physical token of a sentence and its different interpretations due to different (mental) readings, hence different (mental) utterances, of it. For instance, this may happen with the case of a road sign such as:

10. (You) drive slowly.

In this case one and the same physical token – the road sign itself – of a certain sentence is matched by different (mental) utterances that are differently interpreted by each of the different drivers that pass in front of that sign. I interpret my reading of (10) as meaning that *I* have to drive slowly, you interpret your reading as (10) as meaning that *you* have to drive slowly, and so on.

Yet no such account is legitimately involved in the case of a multi-stable pun. Let me set well aside the single outer utterance that is involved in such a case, the concrete uttering of the relevant sentence on the speaker's part. Yet if we stick to *inner* utterances, here again we have, first of all, just one and the same mental utterance on the speaker's part. Yet this inner utterance has again *different* interpretations, as well as the speaker's outer utterance. Simply, we have just moved one step back – from outer to inner utterances – so as to focus on the speaker's mental utterance as our relevant datum. Moreover, if over and above that mental utterance that has different interpretations there is another mental utterance on an interlocutor's part that has just *one* interpretation, this is just an irrelevant utterance in the situation at stake. If in such a situation we have to choose between the interlocutor and the utterer, clearly it is the utterer who counts.[22] For as I said before, by uttering certain sentences in mere

[21] I owe this suggestion to Genoveva Marti.

[22] At least in normal cases. Sometimes, a punny effect is created in the interlocutor's mind completely regardless of the utterer's intentions. Everyone remembers John Fitzgerald Kennedy's saying in

isolation, pun creators often mean the relevant utterances as having different meanings and thereby want their interlocutors to understand those utterances as having such different meanings. So, taking one step back, from the outer to the inner, is really no advantage for the non-contextualist.

Incidentally, one similar ambiguity of the *utterance* does not take place with puns only. Sometimes speakers want to be interpreted as if they had uttered something that has different meanings even if there is nothing punny about it.[23] Consider Mozart's saying to Salieri *à propòs* of his compositions (according to the movie *Amadeus*):

11. I never thought that such a music were possible.[24]

Or take a lover saying to her lover who has finally chosen someone else:

12. I wish you what you really deserve.

In both cases, two interpretations are intended to be available for one and the same utterance: in the case of (11), both that Salieri's music is excellent and that it is very bad, in the case of (12), both that the errant lover has a happy life and that s/he has an unhappy one. All in all, therefore, it seems better for the non-contextualist to accept the datum as it occurs at the level of a physical utterance. For it presents itself again at the level of a mental utterance.

At this point, the non-contextualist may agree to put 2*) of her original argument aside in its overall scope – 2*), remember, states the following identity: that a sentence is ambiguous = that a sentence is associated with different clause-index pairs respectively representing different utterances of that sentence and endowed with their own truth-conditions. For she may modify 2*) in the light of the claim that *one and the same* clause-index pair, as a linguistic representation of an utterance, *may* have *different* truth-conditions.

Berlin "Ich bin ein Berliner" in order to say that he was to be taken as a real inhabitant of the city. Although his German interlocutors well grasped JFK's intention, they could not stop laughing when thinking of the other possible interpretation of the utterance as meaning that JFK is a pastry of a particular sort. (I thank Dan Zeman for having attracted my attention to this point).

[23] This is as it should be. For multi-stability is one thing, humor is another. If one wanted to stick to the 'incongruity theory' (cf. fn.15) to also account for the comical effect of multi-stable puns, one might say that humor here again depends on the reciprocal incongruity of the different interpretations involved.

[24] For the present moral of this example see also Sperber and Wilson (1987, p. 751). For Sperber and Wilson, this example indeed presents no problem for their relevance theory, as Morgan and Green instead claim (1987, p.727).

By so doing, the pair remains the real truth-conditional bearer; simply, in certain cases it has *more* than one truth-condition.

To begin with, this move seems to betray the spirit of non-contextualism. As we have seen, non-contextualists have put forward *clause*-index pairs wearing their own truth-conditions on their sleeves in order to satisfactorily deal with sentence ambiguity. Yet if some of such pairs have *different* truth-conditions, doesn't ambiguity come back in through the rear door? In any case, this move does not seem promising. Once one and the same clause-index pair is assigned *many* truth-conditions, the pair becomes not only a wheel that turns idly, but also something on which a semantic mechanism cannot operate. It is a wheel that turns idly, because there is no reason to assign different truth-conditions to one and the same pair rather than straightforwardly to one and the same utterance. But it is also something a semantic mechanism can no longer operate on. For how can a semantic *mechanism* not only computationally assign *many* truth-conditions to a pair, but also settle *to which pair* many such conditions are to be assigned? In order to do both things, the mechanism should be able to compute not only complex meanings out of simple ones (given a syntax) but also the utterer's intention, which as I said before is in this respect the decisive factor. Yet to begin with, it is not clear how a semantic *mechanism* can manage to compute that intention. As I said before, the fact that in a multi-stable pun a sentence is uttered in isolation *may* help the interlocutor to grasp the intention of that pun's utterer, hence its multi-stability; such a grasp does not seem to be an automatic matter. To be sure, there may be a mechanism for mindreading that allows one to compute the utterer's intentions, as some claim.[25] Yet this is no *semantic* mechanism. As any other mechanism, a semantic mechanism is *domain-specific*: it purportedly delivers the meanings (in narrow context) of complex expressions out of the meanings of their constituent expressions given a certain syntactical structure.

The non-contextualist may now be tempted by the opposite move. Why not stick to 2*) while representing *one and the same* utterance by *many* clause-index pairs, each with its own truth-conditions?

There may be an immediate justification for this move. For a non-contextualist may say that in a clause-index pair one may increase the index parameters. For instance, one may add a 'language'- parameter to an index. In such a case, the pair would be made by a linguistic representation obviously no

[25] Cf e.g. Leslie (1997).

longer of a natural language sentence, but of a string of words (or of sounds), plus an enriched index that pairs that representation not only with agent, space, time, and world, but also with a language. This new parameter fixes which language the above string belongs to.[26] As a result, one and the same utterance – or at least one and the same string of uttered words, or better of uttered sounds – may be represented by different pairs whose indexes' parameters are differently saturated; those pairs wear different truth-conditions on their sleeves, as it were. So, why not saying that something along these lines happens in the case of an utterance of a multi-stable pun? Take the sentence:

13. Humpty Dumpty sat on a wall.

If you focus on the sound of it, (13) is like the French sentence:

14. Un petit d'un petit s'étonné aux Halles.[27]

Now, a non-contextualist may say that the same string of uttered sounds involved both by (13) and by (14) may be represented not only by a pair *C* whose index *i* contains English at its 'language'-parameter, which is true iff there is someone identical with Humpty Dumpty who sat on a wall, but also by a pair *C'* whose index *i'* differs from *i* for it contains French as its 'language'-parameter, which is true iff a child's child was astonished at les Halles.[28]

Conceived as an appeal to enriched indexes, perhaps this move accounts for the first of the two problems afflicting the previous non-contextualist move, *superfluity* (why not assign the different truth-conditions directly to the *utterance* rather than to a pair representing it?). Yet it does not account for the second of the two problems afflicting the previous non-contextualist move, *arbitrariness* (how can the semantic mechanism not only computationally assign many pairs to an utterance, but also settle when an utterance is multiply represented in this way?).

Granted, by appealing to the idea of enriched indexes, hence enriched pairs, the non-contextualist may say that this move raises no issue of arbitrariness. First, *any* utterance of the relevant sounds/words is represented

[26] Such an idea is envisaged by Recanati (2000).

[27] This pun can be found in a collection of English yet homophonically French nursery rhymes by van Rooten (1967).

[28] For an example involving the same string of uttered *words*, consider "I vitelli dei romani sono belli" which in Italian is true iff Romans' calves are beautiful while in Latin is true iff Vitellius goes to the call of war of the Roman god.

by *all* the pairs that one may obtain by giving different values to the new extra-parameter in the index. Second, the semantic mechanism searches for the extra-parameter in the index in order to compute truth-conditions for each of those pairs; in the case presented by (13), we have at least two pairs for one and the same utterance of sounds.

Yet the contextualist may reply that the idea of enriched indexes is rather *ad hoc*, or at least is *ad hoc* if one wants to apply it to the case of multi-stable puns. Theoretically speaking, one can always take a factor of wide context and put it in a suitable index. Yet one has to provide an independent reason as to why such a move should be performed.[29] To be sure, a non-contextualist might find a justification as to why one should add a 'language'-parameter to an index of a clause to be assigned to an utterance. The idea would be, an utterance of sounds or even of words cannot be semantically evaluated until it is established which language that utterance belongs to.[30] However, all the previous cases of multi-stable puns are precisely cases of puns in which it has already been settled *which* language a certain utterance of sounds/words belongs to; nevertheless, the utterance of the resulting sentence of *that* language counts as ambiguous. So, let us assume for argument's sake that by adding a 'language'-parameter the non-contextualist move accounts for bilingual multi-stable puns. Yet in order to account for all *monolingual* multi-stable puns, which are the overwhelming majority of such puns, the non-contextualist should find another parameter over and above the 'language'- parameter to be added to the relevant index. Yet what parameter could it be?

Yet the non-contextualist may reply, appealing to enriched indexes is not the right way for this move to be understood. In order to have different pairs for one and the same utterance, one should not enrich indexes, but rather duplicate clauses. So, one has to pair the same ambiguous utterance with pairs that differ with respect to their different clauses, which make those pairs possess different truth-conditional interpretations.

Yet this non-contextualist way of understanding the present move is rather artificial. It treats *utterance* ambiguity in the same way as the non-contextualist

[29] For an analogous criticism of the idea that when demonstratives are involved in a truth-conditional assignment the typical wide-contextual factors that are *prima facie* relevant for such an assignment, namely either demonstrations or *demonstrata*, have to be put in the relevant index, cf. Recanati (2004a, p.57).

[30] As Borg (2004, p. 140) accurately claims, by pointing to an original example by Davidson: does one string of uttered sounds/words count as an utterance of the English sentence "Empedocles leapt" or of the German sentence "Empedocles liebt"?

treated *sentence* ambiguity. An ambiguous sentence is such that it must be paired with different clauses, hence with difference clause-index pairs, that respectively have a different truth-conditional interpretation. Likewise for an ambiguous utterance. Yet in the case of an ambiguous *sentence*, the two different clauses hence the two different pairs respectively represent different *utterances* of such a sentence. But in the case of an ambiguous utterance, what are the different things that the two different clauses hence the two different pairs respectively represent? *Mental* utterances? Yet as we have seen before, in the case of a multistable pun an inner utterance is as ambiguous as an outer utterance. So, there are no different mental utterances the underlying clauses hence the pairs respectively represent. Or perhaps different meaning experiences, i.e., the experiences of hearing/reading an utterance as having a certain meaning rather than another one? Definitely, in the case of a multistable pun we have different such experiences. Yet a meaning experience is *not* what an underlying clause, hence a pair, should represent. What should be represented should be something that, unlike a meaning experience, has no meaning by itself, for it should receive its meaning precisely from the underlying clause, hence a pair, endowed with its own truth-conditional interpretation. So, the analogy between ambiguous sentences and ambiguous utterances the non-contextualist appeals to breaks down. In uttering an ambiguous sentence, its utterer means it in a particular way insofar her utterance is represented by an underlying clause – possibly, a Mentalese sentence – having its own truth-conditions and lending them to the utterance itself. But in thinking one and the same ambiguous utterance, its thinker means in a particular way insofar as her clause with its own truth-conditions represent *what*?

At this point, the non-contextualist may put forward another, perhaps more obvious, move. True enough, the datum that in the case of multi-stable puns one and the same utterance has different significances is undeniable. Yet, the non-contextualist may go on saying, since such different significances are precisely a matter of the utterer's intentions, as the contextualist has pointed out, they have to be taken as *implicatures* in Grice's (1975) classical sense rather than as *explicatures* (to put in Carston's (2002) terms); namely, as far as a sentence in (narrow) context is concerned, such different significances affect the level of what is *implicated* rather than the level of what is said, hence an extra-truthconditional level rather than the truth-conditional level. If this is the case, wide context is certainly involved, but in its typical *post*-semantic role. In

this case, wide context helps in assigning an utterance, which already has (via the proper clause-index pair representing it) just certain truth-conditions, different implicatures at one and the same time. In this respect, a non-contextualist may say, the comparison between the utterances of multi-stable puns such as (6)-(7)-(8) and the utterances of insidious sentences such as (11)-(12) is welcome. For, she would continue, each of the latter utterances is insidious. For by means of each such utterance its utterer intends to convey a plurivocal significance over and above the unambiguous truth-conditional meaning it already has. *Mutatis mutandis*, the same holds of each of the punny utterances of (6)-(7)-(8).

Yet this move again seems *ad hoc*. For the non-contextualist has claimed that in the case of puns involving a speaker-induced well-grounded misunderstanding to be removed, like the one presented by (5) before, meaning interpretation has to be accounted for at the *semantic* level. As a result, the non-contextualist has insisted that in such cases wide context operates at the *pre*-semantic level. Given the utterer's intentions, the relevant utterance has just one truth-conditional interpretation. Simply, as wide context enables one to discover, that interpretation is not the one originally supposed by the interlocutor. Yet why then in the case of multi-stable puns should wide context be appealed to at the *post*-semantic level? In other terms, it seems arbitrary to account for one and the same phenomenon of signification now at the pre-, now at the post-, semantic level.

In this respect, the contextualist account is more elegant. For it appeals to a *unitary* explanation enabling her to account for *all* kinds of puns – not only the two previously mentioned, but also a third case of puns involving *zeugmas* – precisely at the *semantic* level. The idea is, wherever there is a punny content for an utterance, this content has to be accounted for at the truth-conditional level: it is what the utterance *says*. Hence, the role wide context plays in the relevant pun depends on how to ensure that the punny content is what the utterance says. Let me describe things more in detail.

To begin with, the contextualist may even acknowledge that in the case of puns involving a speaker-induced well-grounded misunderstanding, wide context has a merely pre-semantic role. For she agrees that in such a case the relevant *utterance* of the sentence in question is not ambiguous. Yet for her what really counts in this move is that it saves the point of the pun, which is to let the interlocutor realize that the utterance *says* a certain thing (rather than another). For that utterance has certain truth-conditions, the punny ones. Yet

the contextualist will add that if we also want to save the point of the pun in the case of multi-stable puns, we have to claim that wide context should play a semantic role in such a case. For this time the point of the pun is to let the utterance *say* different things. The contextualist accounts for this utterance ambiguity by saying that in such a case wide context makes one and the same utterance have many truth-conditions. According to the contextualist, moreover, also in a third kind of case, namely the case of zeugmatic puns, wide context must play a semantic role. For this time the point of the pun is to let the utterance *say* an 'impossible' thing. On the one hand, the relevant sentence contains an anaphoric link syntactically suggesting that in the relevant utterance of that sentence, a certain sub-sentential token of a term yields the same truth-conditional contribution as another token of that term to which that token is anaphorically linked. Yet on the other hand, the anaphora notwithstanding, in that utterance the relevant token yields a truth-conditional contribution (possibly radically) different from the one provided by the token it is anaphorically linked to. As wide context, notably the utterer's intentions, again causes the utterance to say, thereby again playing a semantic role. Consider:

15. After two unsuccessful marriages, I find myself keeping my guard up, along with my underpants
16. I called her a whore and myself a cab
17. John and his driving licence expired yesterday.

In all the punny utterances of those sentences, a meaning shift occurs. Sometimes this shift is less radical, involving only different yet somehow related polysemical senses, sometimes it is more radical, involving ambiguity. Now, the anaphorical link subsisting in all these sentences does not prevent that shift from occurring. In the relevant utterance of (15), an implicit token of "keeping" refers back to a previous explicit token of the same word, yet the implicit token has a 'physical' reading while the explicit one has a metaphorical reading: underpants, not guard, are physically kept up. In the utterance of (16), an implicit token of "called" refers back to a previous explicit token of the same word, yet the implicit token means *retrieved someone's attention* while the explicit one means *labelled*. In the utterance of (17), an explicit token of "expired" refers back to a previous implicit token of the same word, yet the

explicit token means *came to an end* while the implicit one means *died*.[31] In all these cases, the anaphorical link would prompt one to interpret the second token exactly like the first one. Yet such a syntactically driven interpretation is rejected. For one realizes that the utterer's purpose was precisely to create a punny effect in which the meaning of the second token is shifted, the anaphoric link notwithstanding. This is precisely why the interpretation of the whole utterance is 'impossible'. For the contextualist, this interpretation is again a truth-conditional interpretation of such utterances: they say something 'impossible'.

Incidentally, once again this phenomenon – anaphorical link plus meaning shift in one and the same utterance – does not obtain in punny cases only.[32] Consider two utterances of:

18. Norman Mailer likes to read himself
19. He drank the whole bottle and smashed it to the floor.[33]

Contextualists would again say that also in these cases, the anaphoric link respectively tying "himself" to "Norman Mailer" and "it" to "the (whole) bottle" notwithstanding, those utterances of (18) and (19) are respectively true iff Norman Mailer likes to read some *work or other of his* and iff the demonstrated person drank *the whole content of a bottle* and smashed *that bottle* to the floor. Unlike the zeugmatic cases presented by (15)-(16)-(17), however, that the relevant utterances of (18)-(19) have such 'impossible' truth-conditions depends not on the utterer's intentions, but rather on other wide-contextual factors. These factors are i) *co-text* – the fact that the pronoun "himself" follows the verb "to read" in (18) and the fact that in (19) the first token of "bottle" is linked with the verb "to drink" and the adjective "whole", while the second token is linked with the verb "to smash" – and ii) *pragmatic relations* linking the ordinary referents with the extended referents of the relevant expressions in those utterances, namely a pragmatic relation linking

[31] Of course, in order to fully vindicate the anaphora, one may postulate an *ad hoc* concept that would be the disjunctive referent of both the first and the second token of the relevant subsentential term. Yet, as Carston and Wilson implicitly admit in putting forward such a proposal - cf. (1996, p. 427), (1997) - this move would annihilate the punny effect of the utterance. See also Lascarides, Copestake and Briscoe (1996, p. 47).

[32] Once again, one thing is the meaning shift, another is the comical effect. On behalf of the 'incongruity' theory of humor (cf. fn.15), one may again say that even here the meaning shift is comical for the 'impossible' interpretation is incongruous.

[33] For those examples, cf. Fauconnier (1985, p. 7) and Sainsbury (2010, p.139) respectively.

an author with his work in the case of (18) and another pragmatic relation linking a container to its content in the case of (19).[34]

Clearly enough, in such cases of meaning shift meta-contextualism is again at work. For it is wide-contextual which wide-contextual factor is relevant to determine the utterance's truth-conditions: utterer's intentions in the case of the above utterances of (15)-(16)-(17), factors i) and ii) in the case of the above utterances of (18)-(19). Such a meta-contextualism is even more evident if we consider different utterances of one and the same sentence, a punny and a non-punny one. Consider a punny utterance of:

20. I'm reading a book about anti-gravity. I can't put it down.

In this utterance, the meaning shift from *literary work* to *physical copy of a work* involving the first token and the second (implicit) token of "book" respectively leads that utterance to have 'impossible' truth-conditions. These truth-conditions are induced by the utterer's comical intention to generate a zeugmatic effect. Yet if (20) were uttered without such an intention, the resulting utterance would not have such truth-conditions. Rather, it would just have the normal truth-conditions according which that utterance would be true iff the agent of the context were reading a work on anti-gravity and that reading could not be interrupted.

Conclusions

In this paper I have not only provided an interesting datum concerning multistable puns, according to which punny utterances of certain sentences have multiple readings, but I have also claimed that those readings affect the truth-conditional level of what is said by such utterances. As such different readings are prompted by a wide-contextual factor, namely the speaker's intentions, with respect to such utterances wide context plays a semantic role. Moreover, I have claimed, this account is grounded by the idea that punny interpretations affect the truth-conditional level of what is said also when puns of other kinds are at stake, namely both the puns involving a speaker-induced removal of a well-grounded misunderstanding and the zeugmatic puns. Simply, while in the former case wide context plays a pre-semantic role – it selects a given interpretation for an utterance of a sentence by choosing which meaning that sentence actually mobilizes – in the latter case it again plays a semantic

[34] For this way of putting the referential distinction in question cf. Nunberg (1979).

role, by making the utterance funnily say something 'impossible' in virtue of the speaker's intentions. Now, experimental pragmatics may further corroborate this latter idea, if it will experimentally turn out that, as I believe, language users straightforwardly interpret a punny utterance according to one of the three possibilities just sketched: a) by proving an interpretation that removes a previous interpretation; b) by providing a multistable interpretation; c) by providing an 'impossible' interpretation.

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The Text as a Context: Blurring the Boundaries between Sentence and Discourse

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ABSTRACT

A central and influential idea among researchers of language is that the sentence, by virtue of its direct relationship with syntactic parsing, represents the heart of language itself. Even in the field of pragmatics, models rooted in classical theories tend to put sentence prominence forward again. Here, we present results from recordings of event-related brain potentials that brings into question even the distinction between sentence and discourse. During natural communicative exchanges, the human brain continuously and immediately relates incoming words to the previous discourse, whether it is constituted of a word, a sentence or complex speech. Moreover, focusing on discourse instead of sentence represents a viable strategy to better understand the relationship between language and other cognitive systems.

Keywords: Discourse; text; context; experimental pragmatics; ERPs recordings.

Introduction

The theme of this paper is the pragmatics of discourse. The aim is to highlight the impact of discourse-level factors on language processing in order to demonstrate that the classic separation between sentence and discourse may be misleading if we want to investigate the processes that extract meaning from language. Moreover, moving the attention from sentence as an abstract and formal entity to discourse as a concrete and shaping context is a good way to release language from isolation and consider it on the basis of its relationship with other cognitive processes, in an interdisciplinary framework.

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Communicative activity, generally, does not rely on the exchange of isolated information but on the construction and transmission of meaningful and coherent sequences of sentences. In spite of the evidence, in cognitive science, for a long time, the study of discourse has received very little attention. Why? According to most of the interpretative models developed in the field of cognitive science, the proposition represents the essence of language. Since proposition belongs to the domain of syntactic analysis, assuming that proposition is the essence of language is equivalent to sustain that sintax represents the core of linguistic processing.

In pragmatics there is a widespread agreement on the idea that syntactic and semantic processing constitute just one side of the coin. The other side is represented by additional 'contextual' factors that help to fix the final interpretation of a sentence. In fact, in order to comprehend the speaker's meaning, listeners are required to perform two basic tasks: decoding what is said (semantic meaning) and understanding what is meant (pragmatic meaning). In other terms, "pragmatic theories agree in considering meaning as comprising a semantic component (the meaning of what is said) and a pragmatic component (the meaning derived by what is intended by the speaker). Both the processes involved in the unification of the two components and the time-course of these processes are, however, still under debate" (Balconi, 2010, p. 96). The debate, in particular, is between supporters of a "two step model" and supporters of a "one step model," borrowing Hagoort's expressions (Hagoort, 2007). The first group argues that these two processes are accomplished in a serial fashion – with semantic meaning processed first and pragmatic meaning processed in a delayed time – while the second group predicts an earlier interaction of linguistic and contextual information in order to obtain a complete representation of what is meant by the speaker.

The two step model originates from Grice's distinction between "what is said" (literal meaning) and "what is implicitly meant" (pragmatic meaning) (e.g. Grice, 1975, 1989). To grasp the speaker's communicative intentions, listeners are required to pass first through the comprehension of literal meaning. If their expectations are not attended (i.e. if the conversational maxims are not respected) at the explicit level, then inferential processes intervene to adjust literal meaning on the basis of linguistic and extra-linguistic context. Cognitive versions of the Gricean model predict that comprehension process occurs in multiple stages: (a) language module elaborates semantic meaning (b) the output of language module is related to contextual

information, (c1) if there is agreement between the two outputs, the process stops while (c2) if there is no agreement, a mechanism of contextual adjustment is activated. In the last case the processing time of language comprehension increases (Bambini, 2003, p. 137).

Agreeing with the two step model implies accepting the idea that sentence processing occurs always before discourse processing because, in this view, the contextual constraints conveyed by the text are considered only after that the literal meaning of the utterance is computed. Cutler and Clifton (1999), for example, state that, based on syntactic analysis and thematic processing, utterance interpretation takes place first and integration into a discourse model follows. In line with these considerations, Lattner and Friederici (2003) claim that mismatches between spoken message and speaker's intentions are detected relatively late, in slow pragmatic computations, that are different from rapid semantic computations in which word meanings are combined. According to Hagoort (2007), a model such this still embraces a "syntactocentric perspective" which perceives sintax as the central aspect of language (e.g. Chomsky, 1980). It is possible to sum up this perspective in two assumptions: (1) The truly relevant aspects of language are coded in syntax, (2) The semantic interpretation of an expression is derived from its syntactic structure (Hagoort, 2007, p. 801). The heaviest consequence of this inheritance is that language analysis continues to focus on the sentence first, leaving the discourse behind.

The theoretical background of the one step model, instead, lies in the *immediacy assumption,* formulated by Just and Carpenter in 1980, that states that linguistic information relative to the single words together with the linguistic and extralinguistic contextual information, concur, from the beginning, to determine the meaning of the incoming words. At a cognitive level, having immediately access to all information at one's disposal means, in concrete terms, to bypass the stage of the literal processing. The focus of attention is, in fact, on the effects of the context and the way it interacts with the rest of the linguistic information. In line with this idea, a first extension of the role of pragmatic processes has been made by relevance theorists (Sperber & Wilson, 1986): pragmatic processes concern the determination of both what is said and what is meant. According to the relevance theory, the main aim of inferential pragmatics is to detect speakers' communicative intentions since the processing of the literal meaning of an utterance is not sufficient to

determine what the speakers desire to communicate (*under-determinacy thesis*).

In the next paragraph we will see how experimental techniques can contribute positively to the debate, showing that the one step model is more appropriate than the two step model to suit the evidence provided by the study of the working brain.

1. Evidence from N400

A good deal of experimental data in favor of the one step model is offered by Gibbs' various work on reading times (Gibbs, 1989, 2002, 2004). Gibbs' reading times data showed that linguistic and contextual information interact early on to ensure the construction of contextually appropriate meanings and the inhibition of contextually inappropriate ones. In other words, when given enough contextual information, as in the ecological setting, listeners are able to directly access the correct interpretation of what is said, without elaborating conventional (but not appropriate) sentence meaning.

If reading-time experiments tend to concentrate on the processing of figurative language, electrophysiological studies face the question of discourse processing in a more direct way. Electrophysiological studies, for more than twenty years, have focused only on the processing of sentences rather than on discourse. According to Van Berkum, the reasons for this radical choice lie in historical, social and concrete motives:

> One reason is that psycholinguistic ERP research is for historical reasons strongly rooted in the sentence processing community. This means that most of the people with EEG expertise and easy access to EEG labs have sentence processing issues in mind, whereas those most interested in discourse and conversation are short of expertise and labs. Furthermore combining EEG with single sentences is already difficult enough as it is. Because at least 30–40 trials are needed per condition to obtain a relatively clean ERP, factorial sentence-level EEG experiments require the presentation on many lengthy trials, as well as sometimes months of work to create the materials. Another problem is that within each of these lengthy trials, people are not supposed to move their eyes, head or body. With a longer fragment of text or conversation in each trial, all this is only going to get worse (Van Berkum, in press)

In recent years, the fall of most of the ideological and practical obstacles has finally allowed electrophysiology to approach the discourse with fruitful results. For instance, the study of N400 component of the event-related

potentials (ERP)[1] that, at first, was very useful to throw light on sentence processing, in a second moment found a large application even in the field of discourse. Kutas and Hillyard (1980) were the first to observe this negative-going potential, comparing ERPs recordings to the last word of sentences that either ended congruously (1) or incongruously (2):

1. I take my coffee with cream and sugar
2. I take my coffee with cream and dog

The authors found negativity in the brainwaves that was much larger for incongruous sentence completions than for the congruous ones. Because it peaked about 400 milliseconds after the onset of the presentation of the word, this negativity was called the N400. Since its original discovery, much has been learned about the processing nature of the N400. In particular, as Hagoort and Brown (1994) observed, the N400 effect does not rely on semantic violation. For example, subtle differences in semantic expectancy, as between *mouth* and *pocket* in the sentence context "Jenny put the sweet in her *mouth/pocket* after the lesson", can also modulate the N400 amplitude (Hagoort & Brown, 1994). Specifically, as the degree of semantic fit between a word and its context increases, the amplitude of the N400 goes down. Owing to such subtle modulations, the word-elicited N400 is generally viewed as reflecting the process that integrate the meaning of a word into the overall meaning representation constructed by the preceding language input (Hagoort, 2007).

Among the pioneer works that applied the study of N400 component to discourse processing figures the one of St George, Mannes and Hoffman (1994), aimed to investigate whether the N400 is sensitive to global, as well as local, semantic expectancy. Global coherence refers to the ease with which subjects can relate the current proposition they are reading with theme-related ideas. In this study, the effect of global coherence on event-related brain potentials was tested using four titled and untitled paragraphs, presented one word at a time. These paragraphs are non-coherent and are made coherent only through the presentation of a title. The EEG was recorded in response to every word in all four paragraphs. An example:

The procedure is actually quite simple. First you arrange things into different

[1] The N400 components is a negative-going wave that peaks approximately 400 ms after the onset of the stimulus and has a centro-parietal distribution (evident over the back of the head) which is slighty larger over the right hemisphere (Kutas, Van Petten & Besson, 1988).

> groups depending on their makeup. Of course, one pile may be sufficient depending on how much there is to do. If you have to go somewhere else due to lack of facilities that is the next step, otherwise you are pretty well set. It is important not to overdo any particular endeavor. That is, it is better to do too few things at once than too many. In the shorter run this may not seem important, but complications from doing too many can easily arise. A mistake can be expensive as well. The manipulation of the appropriate mechanisms should be self-explanatory, and we need not dwell on it here. At first the whole procedure will seem complicated. Soon, however, it will become just another facet of life. It is difficult to foresee any end to the necessity of this task in the immediate future, but then one can never tell (St, George, Mannes & Hoffman, 1994 cited in Van Berkum, in press).

Whereas the story appears locally coherent in that its individual sentences are interconnected and related to a single topic, it is rather difficult to understand what it is about. When the story is provided with a title, however, the subject becomes immediately clear (in this case, the title was "Procedure for washing clothes"). The ERP recordings, in fact, showed an increase in N400 amplitude in response to the words in the Untitled paragraphs relative to the Titled paragraphs, indicating that global coherence does affect the N400.

Building on this initial exploration, Van Berkum and colleagues (1999, 2003, 2008, 2009) performed Kutas and Hillyard' experiment (1980) on a large scale (micro-discourses compounded by two or more sentences). In particular, they examined the brain's response to words that were equally acceptable in their local carrier sentence (i.e., 1a and 1b) but differed radically in how well they fit the wider discourse (i.e., 2a and 2b) as in:

1. Jane told her brother that he was exceptionally...

   a) Quick

   b) Slow

2. By five in the morning, Jane's brother had already showered and had even gotted dressed. Jane told her brother that he was exceptionally...

   a) Quick

   b) Slow

Van Berkum and colleagues found that words which elicit N400s of approximately equal amplitude in an isolated sentence (i.e., 1) do not elicit equivalent N400s when they occur in a context that makes one version more plausible that the other (i.e., 2). Specifically, relative to the discourse-coherent counterpart (i.e. *quick*), the discourse-anomalous words (i.e. *slow*) elicited a larger N400 effect. Furthermore it is worthy to note that the discourse-dependent N400 effect emerged for clause-final words as well as for clause-medial words. This means that every incoming word is immediately related to the wider discourse. Furthermore, with spoken words (Van Berkum et al., 2003), the effect of discourse-level fit emerged as early as 150 ms after acoustic word onset, (i.e., only some 2-3 phonemes into the word). This suggests that spoken words are actually related to the wider discourse extremely rapidly, well before they have been fully pronounced, and possibly even before they have become acoustically unique. Finally, the timing, shape and scalp distribution of the N400 effect elicited by discourse-dependent anomalies did not differ from that of the 'classic' sentence-dependent N400 effect. This indicates that discourse and sentence-dependent semantic constraints are brought to bear on comprehension as part of the same unified interpretation process (Van Berkum, in press).

The relevance of identical sentence- and discourse-dependent anomaly effects would of course be somewhat limited if the commonality simply reflected some common error detection process, activated by two otherwise very different comprehension processes. However, it has long been know that the word-elicited N400 effect is not a simple anomaly detector, but a reliable index of the ease with which lexical meaning is integrated into the wider sentential context (Kutas & Van Petten, 1994). In line with this, Otten and Van Berkum (2005) showed that in a sentence such as:

3. The brave knight saw that the dragon threatened the benevolent sorcerer. He quickly reached for a:

   a) Sword

   b) Lance

relative to highly expected words in discourse (e.g., "sword"), words that are merely somewhat less expected (e.g., "lance") also elicit a N400 effect.

Until now, none evidence has been found in support of the standard model according to which new words are related to the discourse model only after they have been evaluated in terms of their contribution to local sentence semantics. On the contrary, evidence from the N400 consistently indicates that words are related immediately to the wider discourse and in a way that is no different from how they are related to local sentence-level context. This accords well with the models of language comprehension that do not make a distinction between the computation of sentence- and discourse-level meaning. Considerations such as these bring into question the traditional and well accepted idea that discourse-related information is not instantly available and must be retrieved from memory when needed (Ericsson & Kintsch, 1995). The relevant discourse information can sometimes be brought to bear on local processing within a mere 150 ms after spoken word onset. This indication appears to be at odds with estimates of how long it would take to retrieve information about prior discourse from long-term memory, i.e., 300-400 ms at least (Hagoort, 2007).

Fancy stories constitute a clear evidence of the power of discourse to determine meaning because when knowledge of the real world is not useful to make sense of the incoming words, the alternative way is to call upon the rest of the story to find out what it is going on. Indeed, in cases such as these, the immediate integration of lexical-semantic information into a discourse model is particularly clear. Evidence regarding this has efficiently been provided by Nieuwland & Van Berkum (2006). They had subjects listening to short stories in which the inanimate protagonist was attributed with different animacy characteristics.[2] For instance, one of these stories was about a peanut in love:

> A woman saw a dancing peanut who had a big smile on his face. The peanut was singing about a girl he had just met. And judging from the song, the peanut was totally crazy about her. The woman thought it was really cute to see the peanut singing and dancing like that. The peanut was *salted/in love*, and by the sound of it, this was definitively mutual. He was seeing a little almond.

The canonical inanimate predicate (i.e., salted) for this inanimate object (i.e, peanut) elicited a larger N400 than the locally anomalous, but contextually appropriate predicate (i.e., in love). These results show that

[2] Animacy is the classification of nouns, and the things these words refer, based on the degree to which they are "alive" or animate.

discourse context can completely overrule constraints provided by animacy, a feature claimed to be part of the evolutionary hardwired aspects of conceptual knowledge (Caramazza & Shelton, 1998) and often mentioned as a prime example of the semantic primitives involved in the computation of context-free sentence meaning. Therefore we agree with Van Berkum when he says that what primarily seems to matter is how things fit what is being talked about right now, be in the real world or in a fancy world of happy peanuts (Van Berkum, 2008, p. 377).

Conclusion

The observed identity of discourse- and sentence-level N400 effects can be accounted for in terms of a processing model that abandons the distinction between sentence and discourse. One viable way to do this, according to Hagoort (2007), is by invoking the notion of 'common ground' (see Clark, 1992 for a discussion about the definition of common ground). Linguistic analyses have demonstrated that the meaning of utterances cannot be determined without taking into account the knowledge that speaker and listener share and mutually believe they share such as information that comes from the bases of community membership, physical co-presence, and linguistic co-presence. For example, conversational participants would be able to infer that they share various types of knowledge on the basis of both being in a particular city, or by looking at a particular object at the same time.

Now we know, from electrophysiological evidences, that in the notion of common ground we should also include a model of discourse which is continually updated as the discourse unfolds. With a single sentence, the relevant common ground only includes whatever discourse and world knowledge has just been activated by the sentence fragment presented so far. With a sentence embedded in a discourse context, the relevant common ground will be somewhat richer, now also including information elicited by the specific earlier discourse. But the unification process that integrates incoming words with the relevant common ground should not really care about where the interpretative constraints came from (Hagoort, 2007, p. 803).

According to an impressive analogy coined by McCarthy (1994), processing the discourse is like watching an impressionist painting. When you stop looking for strokes and brushworks, you can grasp the global meaning of what is represented. What are the advantages from taking the landscape of the

text as our starting point rather than focusing on its constituent forms? First of all, we are compelled to recognize that such a landscape is not just an assemblage of linguistic strokes but a coherent entity purposefully constructed. Moreover, "the moment one starts to think of language as discourse the entire landscape changes, usually forever"(McCarthy, 1994, p. 201). Admiring the beauty of the composition, instead of focusing on the single strokes of the brush, obviously, is not a strategy to reduce the importance of the components but merely a way of seeing how each of them contributes to the entire project of the painting.

In the same vein, focusing on the deeper rather than on the shallow level of comprehension is not a way of diminishing the relevance of lexical processing or syntactic parsing at a surface plane. Blurring the boundaries between sentence and discourse is not intended to deny the relevance of the sentential structure for semantic interpretation. On the contrary, sentence-level syntactic devices (such as word order, case marking, local phrase structure or agreement) and thematic roles constrain the structure of discourse. However, this is fully compatible with the claim that contextual information conveyed by discourse are processed in parallel with local sentence meaning.

The scientific study of language has been shaped by the assumption that the human language faculty evolved for thinking rather than for communicating (e.g., Chomsky, 1980). This "language-as-product" tradition takes language itself as the object of study, focusing on grammatical knowledge and the core processes for recovering linguistic structure from sentences. As Brennan states:

> "This common focus has given generations of psycholinguists and other cognitive scientists license to concentrate on the study of the linguistic representation and processing in the mind and brain of a lone (and largely generic) native speaker, independent of context. As a result, a great deal is known about how individuals store, organize, and access knowledge in the mental lexicon; how individuals parse sentences and resolve syntactic ambiguity; and how individuals plan and articulate utterances. But there is more to language processing than these (seemingly) autonomous processes" (Brennan, 2010, p. 302).

What remains to investigate is what happens in the brain during communicative processes. This implies, first of all, overcoming the Chomskyan distinction between competence and performance, "one of the heaviest burdens for a truly comprehensive approach to language" (Baggio, in press). In

my view, studying performance using experimental tools seems to be the best way to enlighten the nature of language processing and "if experimental research provides evidence which does not align with the introspective judgments of the linguist or other native speakers, then, following common practice in science, there is no other choice than to accept the results of the former and reject the latter" (*ibidem*).

We have claimed that the brain does not seem to honor the classical division between sentence and discourse. Indeed, electrophysiological data indicate that there is no qualitative difference between processing a word in a sentence or processing it in a discursive frame. In both cases, the brain adopts the biggest frame at its disposal to interpret the word's meaning:

> To the language user, discourse-level processing is simply language-driven conceptual processing, regardless of whether it occurs in a single sentence or a longer discourse. And intuitively, this makes sense. Does it really matter, for example, whether the targeted entity of a free referential pronoun like "he" has been introduced in the previous sentence or in the current one? (Van Berkum, in press, p. 16).

Two-step models, following Gricean tradition, assume that comprehension processes take place in a two-step fashion. First, the context-free meaning of a sentence is computed by combining fixed word meanings in ways specified by the syntax. Second, the sentence meaning is integrated with information from prior discourses, world knowledge, information about the speaker and semantic information from extra-linguistic domains such as co-speech gestures or the visual world. Such ideas are not supported by electrophysiological evidence and consequently are not adequate in light of our understanding of the principles of brain function. One-step models, instead, represent the "neuro-friendly" alternative to two-step models. At the heart of these models there is the idea that comprehension processes are based on the parallel use of multiple clues of both a linguistic (phonology, syntax, semantics) and pragmatic nature (knowledge about the context, the speaker, states of affairs in the world and the rest of discourse) that operate under unification principles in order to address the interpretation processes.

In every communicative situation, the brain selects from among the information at its disposal that which is more suitable to the context and less expensive from a cognitive point of view. The contextual information has a double function: on the one hand it is necessary to interpret what has been said in an appropriate way, on the other hand it allows to anticipate what is going to

be said. Looking forward positively affects the speed and efficiency of the comprehension processes. As Van Berkum states "what we see is an opportunistic proactive brain at work" (Van Berkum, 2008, p. 379), a brain that seeks, from the first moment, to pick up the communicative intentions of the speaker without necessarily passing through a literal phase that is often little informative from a pragmatic point of view.

Establishing the weight to be assigned to the discourse is not a question of little importance. It determines, for example, which is the place of pragmatics in relation to other levels of language analysis. The discussion has two major opponents; complementary theory and perspective theory. While the first considers pragmatics as an additional linguistic component, the second concerns pragmatic competence as a fundamental aspect of a more general communicative competence (Balconi, 2010). According to complementary theory, it is possible to represent linguistic components in a hierarchical fashion. Along imaginary stairs, discourse, as the "biggest chunk" (Van Berkum, in press), has to be positioned on the top. Underneath we can find all the others units, from sentences to phonemes, going through words and morphemes. This kind of approach tends to crumble the research object in separate units to better understand it. The result is a puzzle of pieces waiting to be connected to each other. If this strategy is fruitful from an analytic point of view, it is not really useful to understand how communicative processes really works. On the other side, perspective theory states that pragmatics is not just a level of analysis among others, but it is a way to interpret language as a communicative phenomenon immersed into the contexts at all levels. As we have seen, electrophysiological data go exactly in this direction, attesting perspective view as the best way to describe linguistic processes as they really happen in the brain.

In line with the perspective theory, discourse, intended as the widest linguistic context at disposal, becomes the unit of reference of every linguistic exchange. Given the binding action that discourse exercises on interpretative processes, it is endowed with cognitive priority, metaphorically representing the dam of the spoken flux that constantly guides production and comprehension processes. Interestingly, the distinguishing mark of discourse is coherence intended as the thematic and conceptual unit of a text. It is possible to conceive of coherence as the glue thanks to which words and sentences are stuck together and connected to each other. It is not a coincidence that the word "text" (from latin, "textus") alludes to the fact that

the sentences that form the "biggest chunk" are interwoven with each other in a specific, i.e. in a coherent, way (Simone, 2002, p. 406). In spite of its importance, coherence has always been considered by linguists out of the Pillars of Hercules (*ivi*, p. 449) because it is not just a linguistic phenomenon but it is situated in a border zone where language interfaces other cognitive processes such as memory and executive functions (e.g. Ferretti & Adornetti, 2012).

In general terms, studying language as a context-dependent phenomenon means cutting the distances between language and other cognitive processes:

> In its infinite variation, context permeates information processing: regularities in the way the brain integrates and exploits context might bypass the distinctions among cognitive modules, while maintaining the distinctiveness of each faculty. Indeed, we might be facing a point here where language and other systems share mechanisms that developed evolutionarily in response to environmental demands. So, in order to get a full account of processing pragmatic fact in the brain, one cannot exclude that neuropragmatics should dialogue with other context-sensitive 'neuro'disciplines and become even more interdisciplinary (Bambini, 2010, p. 15).

In the future, the pragmatics of discourse could surely gain important successes if it will choose to follow the interdisciplinary route. Now that we are moving away from the "modular era" and we are approaching a new "network era", the idea that language shares some mechanisms with other cognitive processes is becoming so evident that it is not acceptable anymore to consider language as an isolated system. Indeed, more and more studies, using fMRI or PET, have proved the existence of a common network shared by discourse processing and other cognitive processes such as social cognition or spatial and temporal navigation (e.g, Ferstl, 2008, Spreng, 2008, Ferstl, 2010). "Now that we can look under the hood of the car" , as Van Berkum states, (Van Berkum, 2008, p. 379), what remains to do is to go into the conceptual implications of the experimental data to see what the interaction between language, cognition and perception can tell us about the nature of language itself.

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Why Philosophical Pragmatics Needs Clinical Pragmatics

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ABSTRACT

This paper aims to show how clinical pragmatics (the study of pragmatic deficits) can fruitfully inform the classical theoretical models proposed by philosophical pragmatics. In the first part of the paper I argue that theories proposed in the domain of philosophical pragmatics, as those elaborated by Austin and Grice, are not plausible from a cognitive point of view and that for this reason they cannot be useful to understand pragmatic deficits. In the second part, I show that Relevance Theory overcomes this limitation (being consistent with the data about actual mind's functioning), but I also argue that it offers a restricted view of human communication which has to be integrated with a model of language use that takes into account a central pragmatic property: coherence of discourse.

Keywords: cognitive plausibility, discourse coherence, executive functions, pragmatic impairments, relevance theory.

1. The domain of pragmatics

Pragmatics, since its dawn as a branch of the sciences of language, has been the subject of numerous debates about the nature and definition of its object of study. While scholars of syntax and semantics agree, at least on a general level, on what should be their field of study, among scholars of pragmatics there is no general consensus on what constitutes the domain of study of their discipline. The absence of such a consensus is evident, for example, in the various definitions of pragmatics that it can be find among the authors who deal with it.

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For example, Sperber and Wilson (2005, p. 468), assuming language centrality, define pragmatics in general terms as "the study of the use of language", and more specifically as "the study of how contextual factors interact with linguistic meaning in the interpretation of utterances". Other authors, instead, focusing their attention on non-linguistic features (gaze, gestures, postures, etc), describe pragmatic behavior as not dependent on the use of language (Dronkers, Ludy, & Redfern, 1998). In some others cases, scholars distinguish, at least implicitly, between linguistic and non-linguistic pragmatics by using terms such as 'pragmatic language impairment' (Bishop, 2000) or 'pragmatic language disorders' (Martin & MacDonald, 2003).

In recent decades, the definition of pragmatics has been strongly influenced by the results from the field of clinical pragmatics: the study of clinical cases has offered valuable new sources of data with respect to traditional issues in philosophical and linguistic pragmatics (e.g. Cummings, 2009; Perkins, 2007). At the basis of this kind of methodological approach there is the idea that through the study of deficits it is possible to identify capacities and processes that underlie pragmatic behavior: here the maximum is that we become aware of the nature of a mechanism or process by examining what happens when it goes wrong. From this perspective, therefore, it is possible to propose a model of pragmatics that respects the cognitive plausibility (the interpretive model should be compatible with the knowledge about the functioning of our mind). In this paper I assume as working definition of clinical pragmatics the following proposed by Cummings (2009, p. 6):

> Clinical pragmatics is the study of the various ways in which an individual's use of language to achieve communicative purposes can be disrupted. The cerebral injury, pathology or other anomaly that causes this disruption has its onset in the developmental period or during adolescence or adulthood. Developmental and acquired pragmatic disorders have diverse aetiologies and may be the consequence of, related to or perpetuated by a range of cognitive and linguistic factors.

My aim is to show that our understanding of pragmatics can be informed and extended by the study of pragmatic impairments. In the next section I aim to discuss the advantages of such an approach compared to some theories proposed in the area of philosophical pragmatics.

2. Pragmatic theories and pragmatic impairments

Although classical pragmatic theories, as those proposed by philosophers such as Austin (1962) and Grice (1975), have had a remarkable impact on the study of pragmatic impairments, understanding of communication deficits has not always been particularly well served by these theories. This is due to a large extent to the fact that these theories provide a means of describing pragmatics and pragmatic impairments that is rarely adequate for clinicians (for a discussion, see Perkins, 2007). Austin's Speech Act Theory, for example, although used to test communication in several clinical populations, including adult with aphasia (Wilcox & Davis, 1977) and children with Asperger's syndrome (Ziatas, Durkin, & Pratt, 2003) and autism (Loveland et al., 1988), shows some limitations (Allan, 1998) that can be problematic for clinicians. As an example, consider the following transcript, spoken by a man with traumatic brain injury (TBI).

> I have got faults and. my biggest fault is. I do enjoy sport . it's something that I've always done. I've done it all my life. I've nothing but respect for my mother and father and. my sister. and basically sir. I've only come to this conclusion this last two months. and. as far as I'm concerned. my sister doesn't exist. (from Perkins, Body & Parker, 1995, p. 305).

As you can see, each single utterance is well formed and has the illocutionary form of a statement. However, considered as a whole, this piece of language appears inappropriate from a pragmatic point of view. Indeed, it lacks coherence: it is characterized by sudden and irrelevant topic shifts. So, according to Speech Act Theory, utterances produced by TBI subject are not problematic, although they are ineffective from a more general communicative perspective. Here the problem is that Speech Act Theory has tended to focus on single isolated sentences independent from discourse context (Geiss, 1995), but (as I will discuss more specifically in the last paragraph) a central property of pragmatics is coherence that pertains to the level of the discourse rather than of the single sentence.

Like Austin's Speech Act Theory, Grice's Theory has served as a conceptual framework for understanding pragmatic impairment and has been used for studying communicative problems of some clinical populations, including adults with aphasia and right hemisphere damage (Ahlsén, 1993; Bloom et al, 1999; Stemmer, Giroux & Joannatte, 1994) or children with autism (Surian et al., 1996). However, the application of theory of

Conversational Implicature proved problematic to study pragmatic deficits, and its application is not always easy and straightforward. The main problem of this failure is that Gricean Theory (but the same is true, at a general level, for philosophical pragmatics) doesn't explain the underlying causes of pragmatic behavior and pragmatic deficit. However, the need to distinguish between such levels, that of *description* and that of *explanation*, seems particularly outstanding. As an illustration of this, consider the following transcripts discussed by Perkins (2007, p. 31).

a.

Prompt: the man who sits on the bench next to the oak tree is our mayor

Gary: amen

b.

Adult: can you think of anymore?

Matthew: a remote-controlled cactus

Transcripts *a* is the response of Gary, an 8 year old boy, to a task where the subject is required to repeat the sentence heard. Transcripts *b* shows a piece of conversation between Matthew, aged 8, and an adult who has been asking names for pets. Gary's and Matthew's response may be apparently described in a similar way: they are examples of pragmatically anomalous behavior as they appear to violate the Gricean maxim of relevance. However, only Matthew's response is a genuine case of pragmatic impairment. Indeed, as Perkins (2007) shows, the underlying causes in each case are quite different. Gary's irrelevant response is due to his problems with verbal memory and syntactic comprehension: the sentence "the man who sits on the bench next to the oak tree is our mayor" is both too long and too syntactically complex for him. On the other hand, Matthew has normal syntax and verbal memory, but has a diagnosis of autistic spectrum disorder: his problems in social cognition are responsible for his incapacity to take proper account of prior and surrounding context during conversation.[1]

[1] Here the distinction is between primary and secondary pragmatic disorders. Clinicians and theorists use the term 'secondary' to describe an individual's pragmatic disorder that is not related to any impairment of pragmatic competence as such – the disorder is secondary to an impairment of structural language. Instead, an individual with a primary pragmatic disorder has intact structural

The arguments discussed lead us to highlight an important issue: the idea that the development of a theoretical model about the nature of communication cannot be separated from the reference to empirical data. In our case, the idea is that the elaboration of a pragmatic theory should be constrained by clinical data. The analysis of the deficits permits building theoretical models (founded in human cognition) that can explain the actual communication processes rather than describe them in the abstract. Now, although the existence of a deficit does not constitute in itself evidence to support that a certain processing system is involved in a given function, in my opinion the study of the deficit, and therefore the reference to the functioning of cognition, remains an indispensable tool (while not sufficient alone) to test the empirical plausibility of a theoretical model. The issue of pragmatic impairments opens the way to question the relationship between pragmatic theory and the theory of cognition. In the next section I discuss such a question using Relevance Theory (Sperber & Wilson, 1986/95).

3. Pragmatics and cognition: Relevance Theory

Relevance Theory (RT) is a perspective on the nature of communication strongly related to theories on the architecture of the mind. Unlike Speech Act theory and Conversational Implicature, RT characterizes pragmatics referring to cognitive processing rather than contextualized action or usage principle. RT, in fact, tries to give an account of the processing systems at the base of human communication: the scholars who work within this perspective of research explicitly seek to respect cognitive plausibility to explain communication processes. In such a perspective assumptions about the nature of communication are subject to confirmation or refutation and reformulation in the light of experimental work concerning the nature of cognition (Noveck, Sperber, 2004). The methods adopted are, in fact, those of cognitive psychology: in addition to purely philosophical or linguistic arguments, the appeal of cognitive plausibility binds authors to construct models of communication processes in line with the evidence produced by experimental

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language skills, but may fail to understand the significance of context features for his choice of linguistic utterance (Cummings, 2009).

studies on the deficit or with interpretations that come from evolutionary psychology.[2]

Following Grice's intuition, according to which an essential feature of most human communication, both verbal and non-verbal, is the expression and recognition of intentions (Grice, 1957), Relevance Theory sees communication as an inferential pragmatic process in which the generation and the detection of communicators' intentions is central. More in detail, Sperber and Wilson propose an ostensive-inferential model of human communication according to which the speaker provides just an evidence (e.g., an utterance) of his intention to convey a certain meaning and the listener comprehends speaker's meaning by producing a series of inferences that are governed by that evidence. In this communicative process two intentions are involved:

1. the *informative intention*, by which the speaker informs the listener of something (the ostensive stimulus has to attract the attention of the recipients);
2. the *communicative intention* by which the speaker intends to inform the listener of his own communicative intention (the ostensive stimulus has to lead the attention of the recipients on the speaker's intention).

Communication has a positive outcome when the recipient explicitly recognizes the communicative intention of the speaker (therefore his communicative behavior). To this end, the ostensive stimulus (behavior, verbal utterance, etc.) must capture the attention of the recipient and direct the attention on speaker's intentions. But, what does it make an ostensive stimulus worth attending to? Sperber and Wilson have argued that the answer to this question is based on a theoretical notion of relevance. They wrote:

> Relevance, as we see it, is a potential property of external stimuli (e.g. utterances, actions) or internal representations (e.g. thoughts, memories) which provide input to cognitive processes. The relevance of an input for an individual at a given time is a positive function of the cognitive benefits that he would gain from processing it, and a negative function of the processing effort needed to achieve these benefits (Sperber & Wilson, 2002, p. 14).

[2] The reference to evolutionary psychology is due to the fact that according Wilson and Sperber (2004, p. 610) «humans do have an automatic tendency to maximise relevance, not because we have a choice in the matter [...] but because of the way our cognitive systems have evolved».

Relevance is a guiding principle of communication. From this perspective, the basic assumption of each conversational interaction is that speakers and listeners have tried to make their contributions as relevant as possible and that each one is interpreting the contributions of others taking relevance in mind. However, the principle of relevance is also intended to apply to the domain of cognition in general. The idea of Sperber and Wilson is that relevance is a feature of human cognition: human mind is geared toward the maximization of relevance:

> the human cognitive system has developed in such a way that our perceptual mechanisms tend automatically to pick out potentially relevant stimuli, our memory retrieval mechanisms tend automatically to activate potentially relevant assumptions, and our inferential mechanisms tend spontaneously to process them in the most productive way (Wilson & Sperber, 2004 p. 610).

Since we have said that RT is a model of pragmatics that adheres to how the mind works, it is important to analyze connections between RT and theory of human cognition. At a general level, identification of the others' intentions is made possible by a specific cognitive system, Theory of Mind (ToM) module. This term is used to describe the ability to attribute mental states such as beliefs, intentions, and feelings to others and to explain and to predict the actions that derive from them (Baron-Cohen, 1995). Relevance theorists see pragmatics as a specific component - a "relevance-based comprehension module" – of the ToM module with its own proprietary concepts and procedures distinct from general ToM module (Carston, Guttenplan & Wilson, 2002; Sperber & Wilson, 2002). From this point of view, communication, and more specifically verbal comprehension, is a form of mindreading. Happé (1993) identifies different levels of mindreading capacity that could be conceived as a continuum ranging from a basic capacity to represent others' mental state (i.e. representational ability) to the potentially infinite representation of mental states about other mental states (i.e. metarepresentational ability). According to Happé, representational ability appears to be sufficient to understand metaphor, while metarepresentational ability is needed to appreciate irony.

The condition most commonly associated with mindreading deficit is autism (Baron-Cohen, 1995; 2001). Since RT sees communication as an exercise of mindreading, it has been a useful framework to analyze communicative deficits of autistic people (e.g., Dennis, Lazenby & Lockyer 2001; Frith 1989; Happé 1995; Wearing, 2010). For example, a

mindreading deficit may be responsible for the incapacity of autistic subjects to understand indirect requests. Consider the following transcripts:

T: can you turn the page over?

C: yes (*non sign of continuing*) (from Perkins, 2007, p. 67).

This is a piece of an interaction between C, a 4-year-old child with autistic spectrum disorder, and T, a speech and language therapist. C seems unable to infer that T's utterance is intended as a request and is not just a question. Another example of this kind of pragmatic impairment in autism is offered by figure 1 that shows the response of a child with autism who was given a paper with seven rectangles drawn on it and given the request to "write the days of the week in these seven boxes" (Perkins & Firth, 1991). It is evident that the child's response could be ascribed to a misreading of the speaker's intention.

The	Days	of	the	Week		

Fig. 1. The response of a child with autism to the request 'write the days of the week in these seven boxes'.

As we have seen so far, Sperber and Wilson (2002) characterize pragmatics as "inferential comprehension" oriented to relevance detection. This means that the "relevance principle" characterizes, from a pragmatic point of view, the essence of language. My opinion is that such a conception represents a too limited view of human communication (a view that is heavily focused on the aspects of language comprehension and therefore on the role of the hearer). More specifically, I believe that it is opportune to put together with Relevance Theory an interpretative model that takes into account another fundamental pragmatic property, coherence, which has a key role in discourse processing (clinical data show that it is a property that pertains, primarily, to the dimension of language production). In next section I aim to show why coherence is a central property of human communication and what kind of devices make it possible.

4. Beyond Relevance: how to build coherent discourses

Relevance is not the only principle that governs human communication. As highlighted, for example by Giora (1997, 1998), «speakers and hearers are not constrained only by the search for relevance. In addition, coherence considerations constrain communication and play a major role in discourse structuring and understanding» (Giora, 1997, p. 31). As I have said in a previous sections, my idea is that coherence pertains especially to the building of discourse – to the production - and, for this reason, it is an effort principally made by the speaker. To specify this point, I discuss briefly the case of TBI subjects. This example allows us to emphasize the importance of production dimension and the fundamental involvement of others cognitive systems, specifically the executive functions of planning and monitoring, beyond ToM, in pragmatic communication. Before addressing this topic, I need to specify more in detail the notion of coherence.

Coherence is a term that refers to conceptual organizational aspects of discourse at the suprasentential level. The coherence of a text or discourse depends, at least in part, on the speaker's ability to maintain thematic unity (Agar & Hobbs, 1982). When is a discourse coherent? The dominant idea, especially among linguists, is that the coherence of discourse (spoken or written) depends on the linear relations between adjacent sentences, that is to say on cohesion between pairs of consecutive statements (Bellert, 1970; Bublitz, 2011; Daneš, 1974; Halliday & Hasan, 1976; Tanskanen, 2006). The most influential work from this perspective is Halliday and Hasan's *Cohesion in English* published in 1976. Their concept of cohesion is semantic one. Indeed, in their opinion cohesion refers «to relations of meaning that exist within the text» (Halliday & Hasan, 1976, p. 4) and «enable one part of the text to function as the context for another» (Halliday & Hasan, 1989, p. 489). In a text, the relations of cohesion are realized through grammatical and lexical devices. Grammatical cohesion includes elements such as reference, substitution, ellipsis and conjunctions, while lexical cohesion is based on reiteration (repetition, synonymy, etc.) and collocation (co-occurrence of lexical item). Consider the following text:

> After the forming of the *sun* and the *solar system*, our *star* began its long existence as a so-called *dwarf star*. In the *dwarf phase* of its life, the energy that the *sun* gives off is generated in its core through the fusion of hydrogen into helium (from Berzlánovich 2008, p. 2).

As we can see, in this text the sentences are connected through lexical cohesion: the lexical cohesive relations hold among the lexical items *sun*, *solar system*, *star*, *dwarf star* and *dwarf phase* in the text.

What is important to note for the purposes of my argument is that in this perspective cohesion is a necessary condition for discourse coherence (for a discussion see Giora, in press). Now, although the cohesive relations (grammatical and lexical) have an important role in the expression and recognition of coherence relations, my idea is that cohesion between consecutive sentences is not a necessary and sufficient condition for the coherence of utterances in the flow of speech. With reference to this a crucial distinction is that between global and local coherence. Global coherence refers to the relationship between the content of a verbalization with that of the general topic of conversation; local coherence concerns the conceptual links between individual sentences or propositions that maintain meaning in a text or discourse (Glosser & Deser, 1990). While local coherence is made possible by cohesion relationships, my hypothesis is that global coherence is independent from linguistic mechanisms (it is independent from cohesion). Consider the following sentences:

> I bought a Ford. The car in which President Wilson rode down the Champs Élysées was black. Black English has been widely discussed. The discussions between the presidents ended last week. A week has seven days. Every days I feed my cat. Cats have four legs. The cat is on the mat. Mat has three letters (Enqvist, 1978, pp. 110-111).

In this text the sentences are connected through the mechanism of repetition. However, the set of sentences, despite the abundance of cohesive ties, is not perceived as a coherent whole. In this text the sentences do not "hang together" in a reasonable way: the text lacks of global coherence.

The example and the arguments discussed so far show that global coherence is a pragmatic property independent from linguistic devices. Indeed, my hypothesis is that coherence relies on more general cognitive processes such as the executive functions of action planning and monitoring. The processes of planning and monitoring play (even intuitively) an important role in building the flow of discourse. As speech is composed of linear sequences of words and expressions, the speaker must constantly form a plan of verbal expressions in order to decide what to say and how to organize what he says, if he wants to express himself in a coherent manner. Moreover, during the execution of a plan, that is, during the stage of discourse production, it is

necessary to continue estimation of the task in order to make sure that the elements introduced accord with the general topic of conversation. Empirical evidence confirms the effective role of these executive processes in processing discourse coherence.

The most interesting data in this regard comes from studies of patients with TBI with executive dysfunctions. These subjects have deficits in action planning and monitoring: they are unable to complete a goal-oriented behavior through a series of simple actions (e.g., Eslinger et al., 2011; Shallice 1982; Zalla et al., 2001). Because of this, TBI patients cannot organize and maintain global discourse coherence (while they have no problems at the level of local coherence). As an illustration of this, consider the following transcript discussed by Perkins (2007, p. 86) in which C, a man with TBI, is talking with T, a speech and language therapist, about trade unions.

C: I admit this government we've got is not doing a good job but the unions are trying to make them sound worse than what they are
T: mm
C: they . they . cos I'm a Tory actually but I I do vote . if there's a . er . a communist bloke there I will vote communist but . it all depends what his principles are but I don't agree . with the Chinese communism . and the Russian communism
T: right
C: but I believe every . should be equal but . I'm not knocking the royal family because y . you need them
T: mm
C: and they they they bring people in to see take photos

Despite the local sequential links between trade unions–government, government–Tory, Tory–communist, communism–Chinese/Russian communism, communism– equality, equality–Royal Family, Royal Family–tourist attraction, C shows a form of 'topic drift': he is unable to monitor what has already been talked about or to relate each individual utterance to some overall coherent plan or goal. In fact, neurolinguistic experimental data show that TBI subjects connect sentences correctly by using cohesion ties (grammatical devices), but they are unable to construct and maintain the global coherence of their verbal productions (they cannot relate the individual sentences to a plan or to a more general purpose) and often introduce material that is irrelevant to the current context in their verbal productions (Biddle et al., 1996; Glosser &Deser, 1990; Hough & Barrow, 2003; Marini et al.,

2011). Because of their inability to formulate and to pursue a communicative goal, their discourses appear pragmatically inappropriate.

Conclusion

In order to elaborate an interpretative model of the nature of language, the analysis and the study of clinical data appear very important: they allow us to propose a theoretical model that respects the constraint of cognitive plausibility. I have showed that philosophical pragmatics does not respect this constraint and, because of this, it is not at all adequate for the study of pragmatic deficits. A cognitive plausible model of pragmatics is offered by Relevance Theory. However, the clinical data discussed here have pointed out the necessity to go beyond relevance: although pragmatic theory based on relevance detection explains many aspects of human communication, such a theory should be integrated with a theoretical model that takes into account discourse coherence.

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Book Review

Cognitive Pragmatics. The Mental Processes of Communication

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In *Cognitive Pragmatics. The Mental Processes of Communication*, published by the MIT Press in 2010 and translated from Italian into English by John Douthwaite, Bruno Bara takes a cognitive perspective, investigating communication through different viewpoints (neuroscience, anthropology, pragmatics, psychology, philosophy, theory of games) in the six chapters constituting the book. In his preface, Bara defines communication as a conscious, deliberate and cooperative activity, in which two or more agents together construct meaning. Every communicative encounter is an activity and an enterprise: successes and failures are equally distributed among the participants.

In the first chapter, *Not Just Language: A Taxonomy of Communication*, Bara translates Paul Grice's philosophy (Grice, 1989) into his own theory: As Grice wrote, "if A wishes to say something by means of a given behaviour, A must have the intention of bringing about a given effect in her interlocutor, an effect that is realized at least in part thanks to the fact that the hearer recognises that the speaker intends to convey something to him" (p. 16). He concludes that we can speak of communication when there is mutual wilfulness. Communication is a process (not a product) and communicating involves two different ways of processing data: the same input may be analyzed from a linguistic and from an extralinguistic standpoint. Specifically, linguistic communication is *compositional* and *systematic*: it enables an infinite productivity of lexical meanings and the possibility of spatial-temporal displacement thanks to particular indicators of reference. On the contrary,

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extralinguistic communication is *associative* and *non-compositional*: every extralinguistic signal is independent, like a molecular block that cannot be decomposed any further, productivity and spatial-temporal displacement are limited.

Extralinguistic communication, more related to the emotional dimension, is an attempt to change others' mental states. Specific rules of extralinguistic communication are innate (recognition of basic emotions) or refer to channels of perception (recognition of danger), whilst other specific rules of linguistic communication are genetically and culturally determined. These rely on syntax, semantics and pragmatics levels: they allow an effective comprehension and production of language. In particular, *cognitive pragmatics* investigates the correlations between the mental processes involved in communication and those areas of the brain that are responsible for those processes. The key concept at the roots of pragmatics is the *speech act*. John Austin (1962) notes that in precisely given situations, certain utterances modify the world in the same way as the actions do. If performatives modify the world in the desired direction, they may be successful ("felicity conditions"), otherwise they will fail. Considering speech acts as actions, Austin affirms that a speech act could be: a) *locutionary act*: what is said b) *illocutionary act*: what is done in saying something; c) *perlocutionary act*: what one wants to achieve saying something. Success of one of these steps does not mean that the next stage will necessarily have the same outcome.

Communication is based on general principles, available for each type of communicative production: a) *common attention*: a partner must understand as expressive the actions of the actor that tries to establish a communication with him; b) *communicative intentionality*: communication is always conscious and intentional; c) *communication is symbolic*: we build together the meaning of an action, which becomes communicative act when we assign a meaning; d) *shared beliefs*: the effectiveness of communication is based on knowledge progressively shared by the actors; e) *conversation*: priority, turns and coherence must be adequately respected; f) *cultural dependency*: communicative acts must be compatible with culture; g) *linguistic and extralinguistic functional systems*: there are two ways to achieve communication, not competitive but joined together, with common purposes; h) *cooperation*: the significance of the interaction is agreed between the agents.

Communication is a cooperative activity and it is interesting to think language as a game: Bara analyzes this concept in depth in the second chapter of the book, *Tools for Communicating*. Ludwig Wittgenstein (1953, part I, remark 7) was the first to define "the entire process of using words" as a linguistic game. The aim of using the word "game" is to remark the fact that speaking a language is part of an asset, a "way of life". The revolutionary idea is that one should focus on language use instead of language form. Indeed, communication takes place at two levels: the *informational content* and the *relational message* (the non-verbal part: attitude, tone of voice, gestures) (cf. Bateson, 1979). The relationship between players is the primary element taken into consideration before accepting or not a proposal of game. In addition, the game is played if the actors are really interested to play (and to comply with the rules that specify what is appropriate to ask or to answer). An objective game (G) does not exist, but each agent has her own subjective vision of the game. Therefore: G (A, B) represents game G viewed from A's standpoint, while G (B,A) represents the same game G, viewed from B's standpoint. The response of B to perform or not the action that A requests him, can be: *linguistic or not* (for example, B does not answer), *acceptance*, or *rejection* (for example, B refuses to play the game that A expects).

In the third chapter, *Behavior Games and Conversation Games*, Bara introduces two different types of games. *Behavior Games* are the structure coordinates actors use to select the actual meaning of a sentence among many possible meanings. As argued in Airenti, Bara, and Colombetti (1993), a behavior game between X and Y is an action plan that is shared by X and Y. The shared knowledge required for two agents to be able to interact in the same game may be a combination of tacit and explicit knowledge. A behavior game must respect three conditions of validity: 1) *Time*: behavior games cannot be activated at any moment. In some cases, temporal conditions are not rigid, for example asking a road information does not require a temporal bond. 2) *Place*: behavior games provide a place of activation where various moves are possible. For instance, behavior games in a professional context often have very strict constraints of time and place. Of course, there are exceptions: some professionals such as doctors must work at any time. 3) *Other conditions* (related to the mental states of the participants, for example manner, sequence, effect): some behavior games require particular conditions related to the specific aspects of the games themselves. For instance, a person wishing to hire a car must have a driver's license and a credit card (validity conditions).

Conversation games are sets of tasks and moves that each participant involved in a conversation must perform in a specific context. Conversation games manage the dialogue, a sequence of speech acts performed by two or more. What is the structure of a dialogue? Each speech can be divided into four phases: inventio, dispositio, elocutio and actio. *Inventio* is the orator's inventive research of all the arguments and persuasion tools related to the theme of her speech. *Dispositio* is the internal organization of speech (its scheme) which follows the order given to the topics. *Elocutio* is the structure of the speech, linguistically organized on the base of inventio and dispositio. In this phase non-literal language (ex. metaphor and irony) appear. *Actio* is the actual recitation of the speech, vocal, mimic and gestural effects included.

As discussed in the fourth chapter, *Generation and Comprehension of Communication Acts*, another relevant aspect in a conversation is the *communicative effect*, a set of all the states of mind acquired and modified as a result of communicative intentions expressed by the actor. The actor A should attempt the best method – depending on the personality of B – to reach the desired effect, satisfying B. What "expedients" does the actor use? In the model of communicative effect introduced by Airenti, Bara, and Colombetti (1993), six concepts are particularly important: correctness, motivation, having a plan, and sincerity are involved in attributing intention and (specifically, the fourth one) beliefs; ability and informedness are involved in the process of adjustment.

So far, Bara discussed standard communication, but in the fifth chapter, *Nonstandard Communication*, he points out that there are also interesting cases of non-standard communication, which can be classified under four headings: 1) *non-expressive interaction*: emission of a statement without there being any intention to express the mental state associated; 2) *failure*: unsuccessful attempt to achieve the desired communicative effect; 3) *deception*: the attempt to communicate a mental state that is not really possessed, in other words, a conscious violation of a shared behavior game; 4) *exploitation*: the special use of a particular communication rule to achieve a communicative effect that is different from the normal effect associated with that rule.

The most frequent cases of exploitation are as-if situations, metaphor, understatement, hyperbole, and irony. For instance, in irony the speaker implicity or explicity echoes an antecedent situation or an expectance by reporting what that other person said (Sperber & Wilson, 1986). The echoic

nature of an ironic utterance reminds the listener of a failed expectation or violated social norm. A final aspect which is often unnoticed – but its importance is, on the contrary, absolute and considerable – is silence. For instance, Western culture tends to obsessively fill the silences, while for Native Americans the norm is to remain quiet unless one has something essential to say. We have become accustomed to permanent background noise, so that we are surprised when we no more hear it. However, silence is our natural background, not words. Against a background of silence, words acquire value without needing to be repeated. There would not be communication without silence.

In the sixth chapter, *Communication Competence*, Bara argues that communication, from a cognitive point of view, is a mental act: the mental states, emotional, cognitive, conscious or unconscious and the psychic processes are produced by the brain. The theory of cognitive pragmatics is then structured on three levels: 1) Darwinian-oriented arguments about the evolution of communication from animals to humans (phylogeny); 2) experimental reflection concerning both the emergence of communicative competence in children and its physiological, pathological or traumatic decay (ontogeny); 3) the correlation between mental processes of communication and brain functions.

The basic idea of evolutionary psychology is that mind is a product of the evolutionary process and thus every component has been shaped by natural selection. Humans use an open system of communication: the basic units of human language are the letters of the alphabet and the signs of ideograms, then the possibilities of composition are infinite. The invention of writing makes the stabilization of external cognition possible, starting up, in this way, the cultural transgenerational development. External cognition permits the use of markers present in the environment to support the cognitive activity, easing the mental processes from cognitive load. Cognition is also *embodied*, i.e. our intellectual abilities are also connected a specific body, with its particular features. Only hominids have the brain (*internal cognition*), the appropriate environment (*external cognition*), and the physical characteristics (*embodied cognition*), allowing to develop their communicative competences.

Human specificity is not a general communicative ability, but the specific linguistic communicative ability. Linguistic competence is concrete, not abstract and theoretical. Language is normally located in the contralateral hemisphere to the dominant hand, although in both hemispheres there are

areas subject to its operation. Since the birth there exists a communicative competence subdivided into linguistic and extralinguistic structures, which are located in different areas of the brain, with non-simultaneous maturation, although both areas can use common cognitive resources and interact continuously. The extralinguistic channel matures and is used first (relationship maternal attachment-caregiver, emotional and cognitive relations with others). Linguistic communication requires more resources and emerges around the first year. Once the linguistic competence is finally revealed (after 2-3 years), it is dominant when compared to the extralinguistic competence, except for certain types of communication (emotions). Two different pragmatic competences could be hypothesized: a purely linguistic one, typically analytical, which allows to manage the basic speech acts (statements, questions and orders), and a central one, typically synthetic, represented by rules relating to "things that are done with the words," needed to conduct complex speech acts (indirect, deception and sarcasm). These two types of pragmatic competences are respectively localized in the left hemisphere and in the right hemisphere. The central ability is described as the more interesting for cognitive pragmatics.

In this book, Bara examines and describes both standard and non-standard communication, communicative competence, language as a linguistic game, conversation games, the general principles of communication, proposing an attractive framework not only to cognitive scientists, but also to linguists, anthropologists and psychologists. In a reader-friendly way, the author grounded is theory on the intuitions of major philosophers of language, such as Wittgenstein, Austin and Grice. At the same time, he presents a well-argued proposal, combining both a strong evolutionary-theoretical perspective and a good discussion of experimental data.

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Book Review

The Routledge Handbook of Corpus Linguistics

Anne O′Keeffe & Michael McCarthy (Eds.)

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The Routledge Handbook of Corpus Linguistics is edited by Anne O′Keeffe (University of Limerick, Ireland) and Michael McCarthy (University of Nottingham, UK and Pennsylvania State University, USA). The main authors aim at providing a comprehensive and timely overview of studies on Corpus Linguistics and Applied Linguistics (cf. previous collected works by Facchinetti, 2007 and McCarthy & Sampson, 2004). In recent years, especially thanks to the development of technologies for the analysis of large bodies of texts, this field has proved to be very dynamic and with a broad range of application fields, such as computational linguistics, discourse analysis, forensic linguistics, pragmatics, language pedagogy and translation studies (Biber, Conrad, & Reppen, 1998). The *Routledge Handbook of Corpus Linguistics* includes forty-five contributions (each of them enriched by suggested readings and an updated bibliographies) by experts coming from the key-areas of the discipline. The chapters are organized in eight sections. In the first section, the editors provide an introduction to corpora from an historical perspective and a theoretical overview of the evolution of corpus linguistics.

In the second section, *Building and designing a corpus: what are the key considerations?*, Reppen introduces the basic questions underlying the construction of corpora, such as problems related to the corpus size, how to collect texts, and how much mark-up is needed. Adolphs and Knight discuss the basics of developing a spoken corpus and the strategies for analysing and transcribing spoken data. In the following chapter, Nelson introduces the problem of building a written corpus and analyses the required steps: planning,

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sampling, balancing and making the corpus representative, gathering, computerising and organising texts. Then, Koester provides an introduction to the development of small specialised corpora and analyses several questions involved in this process. Clancy considers the problem of building corpus with the aim of representing a variety of a language, starting from an analysis of variety of language meaning and continuing with issues like size, diversity, representativeness and balance. Interestingly, Thompson focuses his attention on the building of specialised audio-visual corpus and on collecting data, the preparation of transcriptions and annotations.

The third section, *Analysing a corpus: what are the basics?*, begins with a contribution by Lee who offers a general survey of currently available corpora (the chapter is divided into several paragraphs related to major English language corpora, lingua franca corpora, and non-English corpora and multilingual corpora). Evison introduces problems concerning the analysis of a corpus, such as exploring word frequency, key-word lists, concordance lines. In the following chapter, Scott introduces the use of software, showing what computers do really well, what they cannot do at all, what they can do with difficulty, and finally things that computers are expected or believed to be able to do in corpus linguistics. Hunston is interested in the strategies to find patterns in concordance lines and issues related to the assessment of their frequency. The nature and the use of concordances are discussed by Tribble in his contribution, by distinguishing two main phases (before the computer age and after the introduction of computer applications in this field). Lu is instead interested in language development and the use of corpus software in this application scenario.

The fourth Section, *Using a corpus for language research: what can a corpus tell us about language?*, begins with a contribution by Moon on the intersection between corpus and lexis. The author faces problems in lexical linguistics, such as the number of words comprised in the main vocabulary of a language or what we can learn about a word from looking at its co-occurrences, and the relationships between the meaning of words and their context. Greaves and Warren focus their attention on corpora and the study of multi-word units, based on the idea that we best know the meaning of a word, not by considering it as an isolated entity, but as a more holistic unit. Conrad considers what a corpus can tell us about grammar, by means of patterns in contexts and investigating multiple features and/or conditions simultaneously. Biber covers the theme of the use of corpora for analysing registers and genres,

distinguishing between these different perspectives. In the following chapter, Handford, after a brief introduction on genres in corpora, proposes a discussion of the methodological advantages of specialised corpora in analysing genres. Moreover, he focuses his attention on the use of corpora to analyse academic, professional, and non-institutional genres. The study proposed by Thornbury introduces the use of corpora to analyse discourse, also taking into account the limits of using a corpus in such a subject. Interestingly, Rühlemann investigates the relationship between pragmatics and corpus linguistics. In particular, he focuses his attention on the following areas of pragmatic phenomena: conversational encounters, discourse marking and speech act expressions. Anh Vo and Carter develop this perspective by studying creativity through the use of corpora and considering both spoken and written aspects of creativity.

The fifth section, *Using a corpus for language pedagogy and methodology*, starts with a work by Cheng on what a corpus can tell us about language teaching. The chapter argues that corpora, corpus-analytic tools and corpus evidence have been increasingly used in English language teaching and learning for the last two decades (cf. Sinclair, 2004). The contribution by Walsh analyses in depth the topic of the creation of language teaching materials. The following chapter, written by Chambers, is devoted to data-driven learning. This approach does not limit the use of corpora to the development of language-learning materials, but also gives learners access to substantial amounts of corpus data that can be found, for instance, in a dictionary or in a course book. The pedagogical functions of data-driven learning are discussed by Gilquin and Granger, who firstly introduce the operationalization of data-driven learning and then face the problem of assessing its effectiveness. At the end of the section, the contribution by Sripicharn is devoted to the preparation of learners for using language corpora, covering issues like assessment, learning objectives and available tools.

The sixth Section, *Designing corpus-based materials for the language classroom*, starts with the chapter written by Jones and Durrant on what a corpus can tell us about vocabulary teaching materials. Moreover, the authors face the problem of identifying the types of corpora which are considered as more suitable for academic vocabulary learning, as well as of selecting the right approach to design teaching materials (cf. Knowles, Mcenery, Fligelstone, & Wichman, 1997). Hughes offers an analysis of the role of corpora in relation to grammar teaching materials, considering their benefits, limits and looking to

their future development. McCarten takes in account the use of corpora in order to write a course book and discusses the future of corpus-informed course books. The following chapter, written by Walter, is strictly related to the latter and concerns the application of corpora in writing dictionaries. He discusses the use of corpora by lexicographers (also considering current limits and future developments) and analysing tools that can be useful for lexicographers in this context. Flowerdew deals with the corpus-based and corpus-driven approaches to design writing materials, in relation to English for General Academic Purposes (EGAP) and English for Specific Academic Purposes (ESAP) instruction. Coxhead investigates the usage of corpora in relationship with the English for Academic Purposes (EAP), addressing several major questions related to this topic (what can corpora reveal about aspects of academic language in use; how can corpora influence EAP pedagogy; how can corpora be used in EAP materials; what can a corpus tell us about EAP learner language; and what might the future be for corpora in EAP). Vaughan, in his chapter, analyses the use of corpora by teachers for their own research. The author's work is aimed at practitioners who are interested in conducting their own professional or pedagogical research by exploiting corpora.

The seventh section, *Using corpora to study literature and translation*, starts with a chapter written by Kenning on parallel and comparable corpora (defined as collections of electronic texts that are closely related to each other) and the strategies for their usage. Then, Kübler and Aston examine applications of different types of corpora in the practice and pedagogy of translation (in particular, they are interested in pragmatic translation). In the following chapter, McIntyre and Walker outline different techniques for using corpora to study poetry and drama with the aim of demonstrating their value in stylistic analysis. This section is completed by Amador-Moreno who analyses the use of corpora to explore literary speech representation (introducing similarities and differences between real/fictional speech and presenting a case study of an Irish novel).

The last section, *Applying corpus linguistics to other areas of research*, is introduced by Andersen's work whose aim is to give an account of how corpora and corpus linguistic methods can be used by researcher who wants to pursue a sociolinguistic research question. O'Halloran examines how to use corpus linguistics in the study of media discourse, and focuses on Critical Discourse Analysis. In the following chapter, Cotterill explores the issues related to the use of corpus linguistics in forensic linguistic analysis, including both its

potential advantages and also some of the methodological challenges associated with its use. Ädel's chapter is related to the application of corpus linguistics in the study of political discourse (the focus is on linguistic analysis rather than on political comments). In the chapter written by Atkins and Harvey, the authors are interested in the usage of corpus linguistics in the study of health communication and illustrate how some of the corpus linguistic methodologies presented in this book can be usefully adopted in the field of healthcare communication studies. Farr analyses instead the use of corpora in teacher education (with major emphasis on Language Teacher Education) and introduces three types of relevant corpora: corpora of classroom language; learner corpora; and pedagogic corpora. Moreover, the author examines the use of specialized corpora, aiming at developing language awareness skills. The last contribution, written by Barker, is related to the use of corpora in language testing (a field concerned with the assessment of language proficiency and knowledge, performance or application of individuals in a variety of contexts and for a range of purposes).

The overall book is a complete and well-organised guide in corpus linguistics and offer to the reader a good overview of the field, in its relationships with the mains aspects of language, such as lexis, grammar and discourse. A well-argued discussion of the merits and the limits of computational tools in language analysis is provided, as well as a presentation of the future developments of the discipline. Unfortunately, most of the examples and materials come from English: a variety of examples coming from corpora in other languages would have been useful to better understand the power corpus linguistics can have in the analysis of (more complicated) language structures. In particular, the chapters dedicated to pragmatics are just a few when compared to other linguistic phenomena: for instance, it would have been interesting a more detailed discussion on the detection and analysis of (lexicalised/dead) metaphors, irony, and others figure of speech.

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Interview
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Rachel Giora is Professor of Linguistics at Tel Aviv University. Her work has been devoted to exploring the ways salient meanings of words shape how we think and speak. Giora analyzes meaning salience in both figurative and literal language. The main question around this general topic is the way in which, while words have multiple meanings, some meanings are more accessible than others. Given the notion of graded saliency, access of information stored in the mental lexicon is therefore ordered: more salient meanings are accessed before less salient meanings. Degree of salience is determined by factors such as frequency of use, experiential familiarity, conventionality, prototypicality, etc. Giora argues that both literal and non-literal meanings that are salient are cognitively prominent salient meanings and therefore they play a very important role in the comprehension and production of language. Her work focuses on the psycholinguistics of figurative language (irony, jokes, and metaphor), context effects, optimal innovations and aesthetic pleasure, discourse negation, context and degree of salience. One of her most popular books is "On Our Mind: Salience, Context, and Figurative Language", published by Oxford University Press in 2003.

1. In *On our mind* (Giora, 2003), you analyzed a variety of figurative language cases, such as metaphors, idioms, and jokes, paying attention also to the role of context. To what extent does context influence figurative language comprehension? Are there contexts which favor non-literal interpretation?

No theory dismisses the role of contextual information in utterance interpretation. The debate, however, revolves around the timing of its effects:

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Are context effects initial, relevant to early comprehension processes, or are they late, affecting only the products of early processing? On one view - the direct access and constraint-satisfaction models - if contextual information is strongly supportive, comprehenders can immediately and directly derive the appropriate interpretation (e.g., Campbell & Katz, 2012; Colston, 2000; Gibbs, 1986, 1994, 2002; Pexman, Ferretti & Katz, 2000; Katz & Pexman, 1997; Utsumi, 2000). On another, contextual information has no effect on initial processing. Instead, an obligatory literal stage is involved initially, even when contextually inappropriate (e.g., Grice, 1975; Searle, 1979). On the Graded Salience Hypothesis (Giora, 1997, 1999, 2003; Giora, et al. 2007), even a strong context cannot block salient meanings, and hence salience-based interpretations – interpretations based on the salient meanings of the utterance component - regardless of (non)literality.

But what is a strong context? Or, put in your words, is there a specific kind of context that favors non-literal interpretation? First, as you have said, there is no just one kind of non-literal language. It's not just the difference between metaphors, sarcastic ironies, proverbs, jokes, etc. that matters. According to the Graded Salience Hypothesis, the psychologically relevant distinction relates to degree of salience, regardless of degree of (non)literality. Given that salient (coded and prominent) meanings, whether literal or non-literal, will always be activated initially, regardless of contextual information, the question as to what context favors which interpretation is relevant only to meanings and interpretations low on salience. It is no wonder then that research focusing on contextual effects has dealt primarily with nonconventional expressions and utterances. Sarcasm or verbal irony has attracted most of the attention.

The question as to whether there is a specific type of context that invites a sarcastic interpretation has been treated by proponents of the direct access view and the constraints-satisfaction model. According to Katz and his colleagues, a context rich in sarcastic cues should facilitate sarcasm initially. Among these cues are speaker's occupations, failed expectation, pragmatic insincerity, negative tension, presence of a victim, to name a few. While none of them is necessary, a context employing multiple such cues will favor a sarcastic interpretation (Campbell & Katz, 2012). According to Gibbs (2002), it is a protagonist's failed expectation that induces an expectation for a sarcastic utterance and consequently - a sarcastic interpretation.

In a number of studies we tested the prediction that a context rich in multiple cues will facilitate sarcastic interpretation immediately and directly.

For instance, in Giora, Fein, Kaufman, Eisenberg, and Erez (2009) we showed that context involving a frustrated expectation on the part of a protagonist did not induce an expectation for a sarcastic utterance; nor did it facilitate sarcasm interpretation compared to a context featuring a realized expectation. Instead, the sarcastic utterances in both types of contexts took longer to process compared to a context featuring no expectation, in which the appropriate interpretation was salience-based.

But even when contexts were, in effect, *shown* to induce an expectation for a sarcastic utterance, sarcastic interpretation was not facilitated immediately. For instance, in Giora et al. (2007, Experiment 1), dialogic contexts were shown to induce an expectation for a sarcastic irony by involving a sarcastic speaker who uttered a sarcastic utterance twice: once in dialogue mid position and once in dialogue final position. Results replicated previous findings. Although a contextual expectation for a sarcastic utterance was induced, processing the anticipated sarcastic utterances was slowed down compared to their salience-based counterparts. Reinforcing such dialogues with explicit marking (*mockingly*) did not affect the patterns of results (Giora, Yeari & Fein, 2012).

Similarly, when contextual expectation was manipulated by repeatedly and exclusively exposing participants to contexts ending in a sarcastic utterance, results were not affected: only salience-based interpretations were facilitated, regardless of contextual misfit and length of processing time allowed (750, 1000 ms). In Giora, Yeari, and Fein (2012), this experimental design was strengthened by providing participants with the information that the experimenters were after sarcasm interpretation. Regardless, patterns of results remained constant (see also Giora 2011). Multiple cues, whether implicit or explicit, did not improve understanding of non-salient sarcastic interpretations. Instead, only salience-based (often literal) interpretations were activated initially, as predicted by the Graded Salience Hypothesis. Context, then, is ineffective in blocking access of salient meanings and hence salience-based interpretations early on.

2. In some of your papers, not only salience and context but also (indirect) negation plays a fundamental role in explaining irony. Recently you have also focused on explicit negation with regard to sarcastic irony. Would you elaborate on the differences between the two types of negation?

Whereas familiar verbal ironies have a coded sarcastic *meaning*, studying unfamiliar verbal irony in terms of indirect negation deals with affirmative utterances whose sarcastic *interpretation* is non-coded, but context dependent, and thus needs to be constructed. (On different processing of familiar and unfamiliar sarcastic ironies, see Filik, Leuthold, Wallington, & Page, 2012; Giora & Fein, 1999a). As a result, even in the presence of highly supportive contexts, processing unfamiliar ironies is taxing, compared to their salience-based (often) literal interpretation (as discussed above). Indeed, there is plenty of evidence demonstrating that unfamiliar utterances intended sarcastically are slower to interpret appropriately compared to deriving their salience-based albeit inappropriate interpretation. This evidence has been accumulated by means of a variety of methodologies, both behavioral (Akimoto, Miyazawa, & Muramoto, 2012 with regard to intentional irony; Colston & Gibbs, 2002; Filik et al. 2012; Filik & Moxey, 2010; Gibbs, 1986; Giora, Fein, Laadan et al., 2007; Ivanko & Pexman, 2003, Exp. 3; Pexman, Ferretti & Katz, 2000), including brain damage (Giora, Zaidel, Soroker, Batori, & Kasher, 2000), as well as automatic (Eviatar & Just, 2006; Filik et al., 2012; for a summary see Giora, 1995, 2003).

In contrast, explicit negation induces sarcasm by default, independently of contextual information. It allows comprehenders to activate sarcastic interpretations of unfamiliar utterances directly, without having to go through their salience-based (literal) interpretations first, which slows down derivation of affirmative sarcasm. As shown by our recent studies, some novel negative utterances of the form "X s/he is not" (*supportive she is not*), "X is not her/his forte" (*punctuality is not her forte*), or "X is not her/his strong point" (*Thoroughness is not her strong point*), involving no internal incongruity, were interpreted sarcastically and rated as more sarcastic than their affirmative counterparts, when presented in isolation. When embedded in strongly supportive contexts, their non-salient sarcastically biased interpretation was faster to activate than their salience-based literally biased interpretation (Giora, Drucker, Fein, & Mendelson 2012; Giora, Livnat, Fein, Barnea, Zeiman, & Berger in press; see also Giora, Fein, Ganzi, Alkeslassy Levi, & Sabah, 2005; on negation as inducing default metaphorical interpretations, see Giora, Fein, Metuki, & Stern, 2010).

These results are attributed to the role of negation as a low-salience marker, highlighting meanings and interpretations low on salience by rejecting them

(Giora, Fein, Metuki et al., 2010; Givoni, Giora, & Bergerbest, in press). No contemporary processing model, not least the Graded Salience Hypothesis, can account for the priority of non-salient interpretations over salience-based alternatives.

3. The Graded Salience Hypothesis you proposed explicitly avoids abstract distinctions such as the literal/non-literal divide, and replaces them with more fruitful concepts, such as salience, which is more fine-grained and experimentally verifiable. You have further discarded the distinction between literal and non-literal language with respect to aesthetic effects. Can degree of salience also account for pleasurability?

The literal and non-literal distinction is not entirely insignificant. However, it cannot explain a number of findings which fail to distinguish literal from non-literal language. For instance, it cannot account for the ease of processing of familiar metaphors which is comparable to that of their salient or salience-based, often literal interpretations (Giora & Fein, 1999b). Nor can it account for the ease of processing of familiar ironies which is comparable to that of their salience-based interpretations (Filik et al., 2012; Giora & Fein, 1999a). In addition it cannot explain the slower reading times of salience-based literal interpretations of highly familiar metaphors. Compared to their coded non-literal meanings, which are high on salience, the literal interpretations of such highly conventionalized metaphors are lower on salience and hence slower to construct (Giora, Fein, Kronrod, Elnatan, Shuval, & Zur, 2004).

In addition, it can neither account for aesthetic effects induced by optimal innovations which might be both literal and non-literal. According to Giora et al. (2004), an optimal innovation is an expression which is novel (*pinkwashing*; *curl up and dye*) but which also gives rise to a familiar meaning of a familiar expression (*whitewashing*; *curl up and die*), so that the similarities and dissimilarities between them may be considered. Although optimal innovations take longer to process compared to the familiar expressions they activate, they are rated as more aesthetic. In fact, they are rated more pleasing not just compared to these highly familiar expressions which they deautomatize, but also more pleasing than highly novel, or slightly altered counterparts, regardless of degree of (non)literality. What can account for these results, then, is not the literal non-literal distinction but degree of salience (see also

Giora, Fein, Kotler, & Shuval, in press; Shuval & Giora, 2009). The literal/non-literal distinction (or even continuum, see Coulson & Van Petten, 2002) is not general enough to account for these findings.

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Interview

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Bipin Indurkhya is a cognitive scientist and a philosopher. He studied Electronics Engineering in India and the Netherlands before getting his Ph.D. in Computer and Information Science from University of Massachusetts at Amherst, USA. He has been trained under a number of very bright and knowledgeable scholars from different fields. Besides his basic training as an electronics engineer and a computer scientist, he studied formal semantics and computational linguistics from Jan Landsbergen and Remko Scha at the Philips Research Labs in Eindhoven. During his Ph.D course, he studied brain theory and cybernetics with Michael Arbib and Nico Spinelli, formal semantics and linguistics with Barbara Partee, category theory and topos theory from Ernie Manes, and philosophy of language with Ed Gettier. All these experiences have resulted in a deeply interdisciplinary research work. After that he taught and carried out research in the USA, Asia and Europe. His main research interests are creative metaphors and analogies, and their formal and computational modeling. Indurkhya's best known book, *Metaphor and Cognition: An Interactionist Approach* (1992), sets out an original and comprehensive theory of metaphor in which the interaction between the cognitive agent and his physical and cultural environment stands as a key explanatory principle for a set of issues related to cognition, such as categorization, inductive inference, change of theoretical paradigm, analogical reasoning, creativity etc. The various aspects described within this theoretical framework are discussed, deepened and declined with regard to specific issues in a long series of articles. Currently he has been facing the issue of perceptual similarity related to imagery, setting out an account of the mechanisms involved in visual metaphor

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reading. Creativity is also being addressed in his recent work, which has resulted in some original theoretical proposal.
In this interview, while discussing some of the main topics concerning Bipin Indurkhya's theoretical contributions, we will bring some attention on the experimental aspect characterising his research approach.

1. Professor Indurkhya, giving a glimpse into your path as a scholar, it is quite clear that your theorising has been deeply influenced by empirical research: to what extent and how did it occur?

First of all, I should say that I am trained as an engineer, so I have a great respect for empirical research. I think theorizing without any empirical data is vacuous, and contemporary research in cognitive science has demonstrated this many times over.

Nonetheless, I started my research in cognitive science, and on metaphor in particular, from a purely theoretical standpoint. Of course, I considered various examples of metaphor that have been discussed in the literature, but I did not design any experiments to test out the implications of the framework I proposed in my Ph.D thesis (1984). But when I published a paper based on this in Cognitive Science (1987), a little later Richard Gerrig (1989) sent in a short commentary paper that critically examined the empirical consequences of this framework. In particular, he pointed out that the framework predicts an increased response time for understanding metaphorical utterances compared to the literal utterances, which is not supported by empirical data. This made me take a deep and thorough look at the experimental research on metaphor, which was incorporated in the framework I developed in my book (1992).
My own foray into the empirical research started with a collaboration with Marie-Dominique Gineste from the Department of Psychology, University of Paris 13, who visited me in 1990 when I was at Boston University. This was the beginning of almost 10 years of joint research and collaboration on demonstrating the phenomenon of emergent features in poetic metaphors. I learnt a lot about experimental design and data analysis techniques from Prof. Gineste through this collaboration.

2. How did you come to get interested in the issue of metaphor? Do you think the interest in metaphor could be completely dissociated from your interest in empirical research?

I entered the area of cognitive science and linguistics through formal semantics: I did my master's thesis on a computational version of Montague grammar at the Philips Research Lab in Eindhoven (1981). My thesis advisors Jan Landsbergen and Remko Scha were very generous with their time, and we had many stimulating discussions on various aspects of semantics. I was quite taken in by the problem of metaphor, as it poses a daunting challenge to theories of formal semantics.

In the summer of 1981, after finishing my thesis, I studied the works of Jean Piaget and Ernst Cassirer, which had a deep influence on my thinking and subsequent research on metaphor. After I joined University of Massachusetts, Amherst, as a doctoral student, my advisor Michael Arbib suggested metaphor as a research topic, and I immediately jumped on it. At UMass I studied category theory and topos theory with Ernie Manes, semantics with Barbara Partee and Philosophy of Language with Ed Gettier. I tried to apply topos theory to formalize metaphors, but without much success. For my Ph.D thesis, I used a logic-based formalisation. But already I was discovering that algebras are a more natural formalism to express generative characteristic of metaphor, and I used this approach later in my book (1992).

Since I started my collaboration with Marie-Dominique Gineste, I have been spending more and more effort on empirical studies concerning metaphors, but focused on emergent features. Now we are studying visual metaphors as well. In all this, experimental research is playing a central role.

3. Part of your work has been devoted to the theoretical improvement and the empirical foundation of the interactive view of metaphor. Some scholars, such as Robert Fogelin and Roger White, have argued that Max Black's interactive view, although interesting, was still a quite abstract outline, in need to be clearly articulated with reference to more diversified and realistic examples. How would you summarise the advances that have been made to turn the interactive view of metaphor into a comprehensive theory?

I quite agree that the interaction theory of metaphor, as spelled out by Max Black, is rather sketchy, and sometimes even contradictory. However, its key insight, as I see it, is that metaphors form a basic mode of experiencing the world. (This point is also poignantly made in Colin Turbayne's *Myth of metaphor.)* The roots of this idea can be traced back to the works of Ernst Cassirer and Jean Piaget, though they did not directly address the problem of

metaphor. Cassirer, for example, argued at great length that symbols *create* the experience or perception itself. He is often attributed with the cookie dough metaphor, according to which the flux of sense impressions is like cookie dough that is given form by symbols. Coming from an entirely different direction of developmental psychology, Piaget also championed a *constructivist* view of cognition, according to which the child constructs the world based on her or his actions.

A major problem with these interactionist accounts of cognition (and metaphor) is that they do not incorporate objectivity. For example, in the cookie dough metaphor, cookie dough can be shaped in any way by an appropriate cookie cutter. However, symbols, though they are formative and constructive, cannot structure the world arbitrarily. One can look at any engineering discipline – pre-history of flight, construction of bridges, electronic circuits, internal combustion engines, and so on – to find numerous examples that show that just to have an internally consistent theory that is carefully worked out, and the strong belief and commitment of the designer are not sufficient to ensure that it will actually work. For metaphors, this is evidenced by the fact that some metaphors appear more appropriate and more powerful than others, and this cannot be explained by the internal representations or coherence of the concepts alone.

This is the major problem I struggled with while working on my book *Metaphor and Cognition* (Kluwer: 1992). The key idea behind the solution proposed there is to make a distinction between ontology and structure. Ontology refers to the set of primitives in terms of which a structure can be specified; and structure refers to a particular configuration, or a particular description using those primitives. Thus, a structure always presupposes some ontology, but there can be multiple structures based on a given ontology. With this distinction in place, one can argue that the sensorimotor apparatus of a cognitive agent, and the cultural and social context in which it lives determines the ontology in terms of which it experiences the world. But then it is the autonomous world that structures this ontology. (Needless to say, this is a very simplified explanation, and I refer the reader to the book, and a later 2006 paper in *New Ideas in Psychology.)* In my view, this is the essence of the interaction view: the description or representation of the world that a cognitive agent has results from an *interaction* between the world and the agent. It is mind-and-body-dependent in that the physical body and the brain of the cognitive agent determine the ontology of the representation. But it is not

completely arbitrary, for the world places objective constraints on structures that are possible within that ontology (Indurkhya 1992; 2006).

In the last couple of decades there has been much more empirical research to demonstrate that what we experience in the world, and how we experience it, is not (largely) determined by the stimuli, but by our past experiences and expectations. I will mention here only the rubber hand illusion and cutaneous rabbit illusion as two prime examples of empirical evidence that supports the interaction view of cognition. For metaphor research, this has implications for the phenomenon of emergence of features and creation of similarity (Indurkhya 1998), which were the key aspects of the interaction theory of metaphor that distinguished it from the other theories.

4. Many philosophers, especially within the analytic tradition, while recognizing the usefulness of analogical reasoning in the context of philosophical and scientific thinking, are still reluctant to admit that metaphors can really contribute to the formulation of a rigorous discourse. In your perspective is it possible to speak of an epistemological irreducibility of metaphors within the theoretical discourse or is it necessary to relegate it to the so-called context of discovery, where, as Donald Davidson suggested on this subject, a "bump on the head" can as well help us to find out something new?

In the analytical tradition, one assumes that there is a description language available for expressing state of affairs in the world, which is mind-independent, or is at least shared across humans. This language then becomes the preferred medium for all serious scientific and philosophical discourse, and metaphors, though they can be psychologically persuasive and can occasionally lead to the discovery of new ideas, are relegated to a superfluous and ornamental role.

The interaction theory questions this view. The roots of the interaction theory can be traced back to the philosophy of Immanuel Kant, who argued that we do not have access to the objects as such (*Ding an sich*), but our experience and knowledge of objects results from the mind interacting with the object. Thus, all knowledge becomes mind-dependent. This is often summed up in the well-know aphorism: Conception without perception is empty, and perception without conception is blind. Kant proposed the notion of *schema* to facilitate this interaction between the concepts and percepts through imagination. Nonetheless, he argued that certain forms, such as space, time

and categories, are a priori and hence universal. Later on, Ernst Cassirer, who took into consideration the development of non-Euclidean geometries, theory of relativity, and anthropological research on diverse cultures, proposed his theory of symbolic forms, in which multiple worlds can be created through symbols. (One can almost substitute the term 'metaphor' here for 'symbol,' leading to the conclusion that multiple worlds can be created through metaphors. See also Nelson Goodman's *Ways of Worldmaking.)*

In recent years, more and more evidence has emerged to support the interactionist view. I mentioned above the rubber hand and cutaneous rabbit illusions. There have been several demonstrations of inattentional blindness and change blindness. (See also Hoffman's *Visual Intelligence*.) All these studies show that our perceptual system is not a passive receptor of sense data, but actively constructs the perceptual experience. Our perception of colour, motion and depth does not just depend on the stimulus, but reflects our past experiences of integrating similar stimuli into our actions, which is sometimes referred to as sensorimotor contingencies. (See, for instance, the work of Kevin O'Regan and Alva Noë.)

In this framework, metaphors play an irreducible epistemological role for they correspond to the gestalt or top-level template or schema that filters and organizes the sensory impressions. This, in my view, is the central tenet of the interaction theory.

5. Many influential studies on the epistemology of metaphor, such as those published by Mary Hesse, Richard Boyd, and others, used Black's interactive view to give an account of the heuristic effectiveness of metaphors in scientific reasoning. Their heuristic function has often been associated to that of models. According to your view, is there any kind of models sharing structural affinities with metaphors? If so, does the mechanism of interaction allow to account for them?

Well, Black himself was quite vehement about the close connection between models and metaphors: he considered every metaphor as the tip of an iceberg that is the model. There are many others scholars who have also likened metaphors to models. However, to see what role the interaction mechanism plays in all this, we need to take a closer look.

In the history and philosophy of science, different types of models are distinguished: pre-theoretic models, theoretical models, material models, and

so on. However, in most of these models, there is a preferred or intended interpretation: meaning that it is not a matter of arbitration as to what the terms (or parts) of the model correspond to. For example, in the scale model of a ship, it is decided as to what parts of the model correspond to what parts of the ship. This makes models more like conventional metaphors, and so they do not involve the interaction mechanism, unless one considers the genesis of such models.

However, when we consider pre-theoretic models, which are models that are in their formative stage and are still being articulated, the role of the interaction mechanism can be clearly evidenced. For example, Gruber (1978) analyzed Darwin's notebooks from the time when he was developing his theory of evolution, and found evidence to suggest that Darwin struggled to fit his image of a branching tree to the data he was gathering about the characteristics of the species. At this stage, the structure of model and what the terms of the model refer to are both fluid, and the scientist (or a group of scientists) work via the mechanisms of projection and accommodation to establish some sort of coherent connection between them. It is only after this that the model becomes conventionalized.

Thus, the interaction mechanism becomes a key player during the formation of models. Needless to say, not all the models go through this formative stage, for it is possible to design a model with a preconceived interpretation: as in the scale model of a ship, or the pattern for a dress at a tailor.

6. Speaking of the two representation-building mechanisms you just mentioned, namely accommodation (bottom-up process) and projection (top-down process), you state that they act simultaneously in most instances of conceptualization. The accommodation mechanism accounts for the fact that conceptualization is in part environment-driven, while the projection mechanism corresponds to the process of assimilation described by Piaget and is especially at work in the case of metaphors. The cooperation of these two mechanisms seems to imply a close, maybe indissoluble, interaction between ontology and structure in the process of representation-building. On one hand, the accommodation mechanism presupposes a fixed ontology, dependent on the nature of the cognitive agent's sensorimotor apparatus, while the structure is adapted in order to

> adequately represent the environment. On the other hand, in the projection mechanism the constraint comes from the ontology in the perceptual layer, which is subject-driven, so that the cognitive agent determines the ontology and chooses the structure as well (see for example "On Creation of Features and Change of Representation" (1998)). Does not this double mechanism have the consequence of weakening the constraints that the whole process should receive from the environment?

Well, when we have an interaction between two systems, it is always possible to look at the interaction from the point of view of one or the other system. I had discussed this point earlier in my book (Indurkhya 1992, Sec. 6.11), where I distinguish between projective and accommodating cognitive models. But in my later work, for example Indurkhya (1997) and the 1998 paper you mentioned, I focused on the situation from the point of view of the cognitive agent, for change of representation is an agent-driven process. So, as you accurately explained, the agent starts with an ontology and interacts with the environment. The environment reveals itself (with respect to that ontology) in some possible structures, and the agent chooses one of them. Portrayed in this way, the environment seems to be relegated to a secondary role.

But suppose we now reverse the perspective and look at the process from the environment's point of view, as if it were another independent agent. It sees many different structures with different ontologies being proposed to it by various cognitive agents. It accepts some or none of them according to how they cohere with it. One could even say that the environment does this on its whims: because the environment is autonomous, it does not have any obligation to the internal coherency of the structures, or even to its own past history of which structures it had accepted before. (This is related to Hume's problem of induction and Goodman's *grue* paradox, which I have addressed elsewhere (Indurkhya 1990). I must say that after the publication of this paper, I felt greatly honoured to get a complimentary letter from Nelson Goodman himself.) Now the account of interaction seems very much environment driven. Overall, I think it is a bit like the Darwinian principle of natural selection: the environment can be seen as passively accepting or rejecting random mutations; or as actively pruning the tree of life and fostering the growth of some of its branches. As for the interaction between projection and accommodation, it may be helpful to draw an analogy with Lakatos (1976), who discusses two

options to redress the situation when a counterexample to a proof is discovered. One is monster barring, where the concepts and the terms are redefined to exclude the counterexample. This is like projection, for the ontology is being changed. The other option is to weaken the theorem so that the counterexample is included, but with the weaker theorem it is no longer a counterexample. This is like accommodation, for it is the structure (a theorem reflects structure as it connects concepts and terms of the domain) that is being changed in response to the incoherency.

7. In some of your studies, such as "On Creation of Features and Change of Representation" (1998), you explain how metaphors "create" similarities among different objects or situations, rather than merely "express" already given similarities. May we appeal to the creation of new features even when we are considering the formulation of scientific theories? This idea has been initially suggested by Black, but attracted many criticisms. How did empirical method help you in justifying such a statement?

This may be best illustrated with an analogy proposed by Turbayne. A metaphor is like a pair of sunglasses that colour everything we see, as for the residents of the Emerald City in the Land of Oz. As noted by Kant, epistemologically speaking, we cannot take off the glasses and see the *Ding an sich* with the naked eyes. However, we may view the world through another pair of sunglasses, which can reveal some other features of the world. This process of changing sunglasses can be likened to Kuhnian revolution, where one paradigm is replaced by another paradigm. This, of course, is a great simplification, for the process of paradigm change is not as abrupt and swift as removing one pair of sunglasses and putting on another. A new paradigm may evolve gradually, or maybe transferred from another domain, and may only be adopted after considerable amount of debate and discussion. But the main point here is that in shifting from one metaphor to another – which is essentially a paradigm change – new features are created. (This is discussed at some length in my 2007 paper "Rationality and Reasoning with Metaphor.")

Let us consider some examples. When chemistry was developed and water turned out to have the composition H_2O, it seems appropriate to say that the scientists *discovered* that water has this composition, rather than saying that they *created* this feature in water. But now take an object such as a Vermeer painted in the 17th century. What features does it have now? What features did

it have in the year 1900? With the current technology, we can examine the paint pigment by X-ray crystallography, which results in certain features associated with the painting. (This, in fact, was used to distinguish fake Vermeers painted by van Meegeren in an infamous case. See Morris (2009) for details of van Meergeren's life and career as a forger). But this technology did not exist in 1990, so these features of the painting were not known in 1990. As with the previous example of water, it would seem reasonable to say that we *discovered* these features rather than *created* them. But then what are the features of the painting now? We cannot answer this question, because we do not know what future technologies might bring forth, and what new features might be discovered with them. And if we want the representation of an object to include all its features, then it is not possible because we do not know any of its features discoverable with future technologies.

Another way to consider the same situation is to limit the representation of an object to its known features at any point in time. Then when a new technology is applied to the object, the discovered features are added to the representation of the object. But these features are new in the representation, so in that sense they can be considered as *created* by the technological interaction. If we consider technology to be an extension of sensorimotor interactions, then this is similar to Piaget's account of how a child constructs a representation of her or his environment based on sensorimotor interactions. (Dual mechanisms of projection and accommodation further elaborate the nature of this interaction. This is spelled out in my paper "On Creation of Features and Change of Representation" that you mentioned above.)

As far as empirical methods are concerned, we can demonstrate that a metaphor can make one aware of certain features that she or he was not aware of before. This was one of the major results of my collaborative research with Marie-Dominique Gineste and Veronique Scart ("Emergence of Features in Metaphor Comprehension" 2000), and other researchers have shown this as well. However, one can argue that these featured were *not created but discovered,* so to say. But, as I noted above, this is more of a philosophical question that cannot be decided empirically, for there is no way to devise a test for features that are there but one is not aware of. (I should emphasize that this is not a question of conscious and subconscious awareness, for this can be tested. For example, there are tests that show that people with long-term memory impairment retain subconscious memory of previous experiences.)

From a cognitive science point of view, it seems more reasonable to take the position that the representation a cognitive agent has of an object at any point in time reflects the past sensorimotor interactions that the agent has had with the object. Then when a new mode of interaction becomes available (like x-ray crystallography), interacting with the object using this mode may generate new features that were not there in the earlier representation. From the point of view of the cognitive agent, these features are new, so can be considered as created, but it should be clear that they depend on the object itself, and also on the mode of interaction. (Of course, the representation of an object also includes information about the object that is communicated through language, so without direct sensorimotor interaction. The account presented here can be extended to this situation, but for the time being we will not consider this case.)

8. Conceptual metaphor scholars, such as Lakoff and Johnson, have classified a large set of metaphors working as conceptual mappings, from which a variety of metaphorical linguistic formulations can be drawn. The mechanism of interaction seems to be more basic than the mapping, because it might "create" certain features which only subsequently can be mapped. Indeed, a conceptual metaphor implies a certain degree of conventionality, which cannot be found in novel metaphors. In other words, the mechanism of interaction intervenes before a metaphor could be recognized as a conceptual mapping. In your opinion, are these two approaches (the interactive and the conceptual theory of metaphor) incompatible or is there a way to reassemble their insights and explanations in a systematic theoretical framework? Does empirical research show that these theories are not mutually exclusive?

What conceptual metaphor theory has done is to show that there are many metaphors underlying our conceptual structure, and linguistic metaphors derive from them. However, it does not explain how basic metaphoric structure comes about, except to say that it is there. Moreover, it presumes that just because some conceptual mapping can be shown to underlie a set of related linguistic metaphors, based on the linguistic analysis, speakers are actually aware of those mappings, or use them consciously or subconsciously. But for many conventional metaphors, speakers learn their meaning through usage, just like other non-metaphorical words. For instance, once when I used the

example "the chair of the meeting ploughed through the agenda" in my book to make a point – this example, incidentally, is taken from Black – one reviewer complained that to her this is not metaphorical at all. She explained that having grown up in the city, this was the primary meaning of 'plough' that she learnt. Conventional metaphors like "you are wasting my time" are much more so.

As you noted, interaction mechanism is more primitive in that it generates features that become constituents of the concept, which can subsequently be used for conceptual mapping. I will illustrate this with an interesting study recently presented by Maria Konnova from Kaliningrad at the Russian Cognitive Science Society Conference (2012). She looked at the historical evolution of different metaphors to represent time in the Russian language. She noted that the phrase "time is money" became conventionalized in Russian in the 19th century and that it coincided with the onset of industrial revolution. She pointed out that before the industrial revolution, people were generally not paid for their time, but for the product delivered. The model of wages according to the number of hours worked started with the factories, which became the basis of the "time is money" metaphor.

I think that the interaction theory and the conceptual metaphor theory are quite complementary, for they focus on different aspects of metaphor. Not realizing this sometimes results in unnecessary debate where people are talking past each other as they are using the same term but different meanings. I found some instances of this when I was doing research for my book *Metaphor and Cognition,* and I wrote them up in a paper "The Thesis 'All Knowledge is Metaphorical' and Meanings of 'Metaphor'" (1994). For instance, the thesis "All knowledge is metaphorical" is actually quite compatible with literal-metaphor dichotomy for each uses the term 'metaphor' in a different way. In literature, there are at least three different meanings of metaphor. The first meaning is to see one thing in terms of another, which is used by Lakoff, among others. In this sense, time-is-money gets classified as metaphor. The second meaning focuses on novelty, so conventional language is not considered metaphorical. Both these meanings give rise to a literal-metaphorical dichotomy, albeit with different boundaries. However, there is a third and I would say the most prevalent meaning of metaphor in English language, which is almost synonymous with the meaning of 'symbol'. It is this sense of metaphor that is used in the thesis "all knowledge is metaphorical." A deeper analysis reveals that the philosophical discussion around this thesis has

involved two related hypotheses. One is that there are no pre-conceptual or mind-independent boundaries in reality: any ontology, in terms of which a cognitive agent experiences the world, is created by the sensorimotor apparatus of the agent. As we have discussed above, this is one of the cornerstones of the interaction theory as well. A second hypothesis, which can be considered a corollary to the first, is that all concepts originate as metaphor.

9. Nowadays another influential paradigm is relevance theory. It is an inferential approach, which does not recognise the special role for our conceptual system metaphor has played in conceptual theory. In the relevance-theoretic approach, metaphor, as well as other forms of loose talk (approximation, understatement (litotes), overstatement (hyperbole), irony, etc.), is considered within a continuum, at one extreme of which there would be literal expressions. Attempts, such as Gibbs' and Tendhal's proposal (2008), are underway to coordinate the explanations based on relevance principles and those based on conceptual mapping. Do you think that the concept of interaction can promote a synthesis of these different theoretical frameworks, or does it represent an alternative to both?

I think the relevance theory is quite correct in noting that in any given context, the listener naturally gravitates towards an appropriate meaning of the utterance or the text, whether it is literal, or metaphorical (or any of its related tropes like hyperbole, irony, etc.) However, it does not really address the problem of how relevance itself is determined. Consider an example discussed in Sperber and Wilson (2008): Mary is angry with Peter and does not want to talk to him. So when he tries to engage her in conversation, she might open a newspaper and start reading it. Sperber and Wilson remark that this action is not based on a pre-established code but, nonetheless, suggests to Peter that Mary would rather not talk with him. But then we immediately ask: What is the basis of this suggestion? If Peter were to draw such an inference, it seems very likely that it reflects his past experiences when people in similar situations behaved like this. Let us elaborate a bit on how past experiences might bias Peter towards drawing this inference.

Perhaps last week, when Peter tried to talk with his boss at work about getting a raise, his boss had simply stared at the ceiling. This was followed, after a long pause, by a cold remark that she was deeply disappointed by Peter's performance, especially as his inept negotiation skills caused them to lose a

valuable client. There may be many differences in the two situations. Peter and Mary may be at home in a spousal relationship, whereas Peter's interaction with his boss was a workplace situation. Staring at the ceiling is not the same behaviour as picking up the newspaper and starting to read it. And so on. The point is simply that in applying this past experience to draw a relevant inference requires aligning parts of the current situation with parts of the past situation. I am not suggesting that Peter is explicitly retrieving some stored representation of the previous situation, and carrying out a mapping with parts of the current situation, but merely to emphasize that relevance may well be based on some underlying mappings. If we dig deeper, and ask how did these basic mappings came about, and, more importantly, how they are applied to a new situation – for a new situation is almost never exactly like the previously encountered situations, so a number of adjustments have to be made in order to apply them –then we get into the realm of the interaction theory.

This point can be further emphasized with an even simpler example. Suppose a child sees a dog for the first time, and the parents point to it, and say 'dog'. Then at a later time, the child sees another dog (or the same dog), and people say 'dog.' To connect these two instances, the child has to identify the relevant parts of the stimuli and connect them in some way (through mapping or otherwise). According to the interaction theory, this is exactly what goes on in a metaphor. I think it is in this sense that I. A. Richards, considered the originator of the interaction theory, claimed, "Thought is metaphoric and proceeds by comparison, and the metaphors of language derive therefrom" (Richards 1936, p. 94).

So, I think that relevance theory, conceptual metaphor theory and interaction theory all focus on different but overlapping aspects of cognition, and can be mutually compatible. However, considerations from the interaction theory point to some other research directions. For example, because the relevance theory claims that there is nothing special about metaphorical understanding as opposed to literal understanding, it seems to suggest that there is not much to be gained by studying metaphors separately. But when we focus on the novel-metaphorical end of the literal-metaphorical continuum, and study how different readers interpret the same text in very different ways, we can get some understanding of how relevance is based on one's past experiences and cultural background. (See, for instance, my 2007 paper "Creativity in Interpreting Poetic Metaphors".)

Another possible direction for empirical research suggested by the interaction theory is to study the effect of context on interpretation. Now, this may seem nothing new, for most scholars agree that the context plays a major role in determining the meaning of an utterance. However, most of the studies on the role of context in metaphor have focused on the communicative aspect of metaphor. To study creative aspect of metaphor, we need to design different kinds of experiments. For example, in a classic study by Pollio and Burns (1977), the participants were given mechanically generated "A is B" types of sentences, and were asked to come up with contexts (if possible), that would render them meaningful. They found that the participants generated novel and creative contexts to render meaningful many seemingly anomalous sentences. However, they did not analyze these contexts, and as far as I know, this phenomenon has not been properly studied. But I think it tells us a lot about the mechanisms of interaction by which relevance and meaningfulness is determined.

10. Your interactionist approach also aims at shedding some light on the mechanisms at play in creative cognition and problem solving. Could you tell us something about this topic?

The interactionist account of how new features are created illuminates a key facet of creative cognition. Though some may consider the emergence of features in poetic metaphors a frivolity, in the problem-solving arena such features may be the lifeblood of innovation, and metaphor an indispensable mechanism for generating them. Researchers who have studied real-world problem solving consistently point out that juxtaposition of *dissimilar* is a key technique for getting a *new* insight or perspective into a problematic situation. (See the works of Donald A Schön, W.J.J. Gordon, and Edward de Bono.) For example, Schön analyses in some depth the case of *paintbrush-as-a-pump* metaphor, which generated the key insight into why the synthetic-fibre paintbrushes were not performing as well as the natural-fibre paintbrushes. The insight came from a change of representation, a sort of Kuhnian revolution, which radically altered the role of brush fibres in the painting process.

The interaction theory provides an explanation of how this mechanism works. The first premise is that, as we had discussed above (in Q. 6), we experience objects and situations in terms of our concepts and categories. The second premise is that all conceptualization and categorization involves some

loss of information, for we select some of the potential attributes and relations that are relevant for the categorization, and a horde of others that might have been do not see the light of the day. While this conventional categorization is efficient for our existing priorities and tasks, at times the lost information becomes the key to solving a new problem. In such a situation, mechanisms like reasoning by analogy do not help because an analogue situation is analogous with respect to the existing conceptualization, so it only serves to reinforce it. What is needed is to break the existing conceptualization; or, to use Taurbayne's metaphor, to remove the current set of glasses and put on a new set. This mechanism has been identified under different labels by creativity researchers: making the familiar strange (Gordon), bisociation (Koestler), lateral thinking (de Bono), estrangement (Rodari), displacement of concepts (Schön), and so on. But this is essentially accomplished by metaphor. (See Indurkhya 2010, and Indurkhya 2013 for more detailed explanations).

11. Which are the most promising applications you expect from your theoretical findings?

Though interaction theory started as a philosophical approach to metaphor, a number of exciting application areas are emerging. One is cognitive robotics, where the goal is to design robots that build their concepts experientially through interactions with the environment (Florian 2002; 2010). Obviously, the process of integrating sensory data into existing concept networks, and then modifying the concept networks (if needed) as a result of this interaction process, plays a key role in this design.

Another promising application area is creativity-support systems. As explained above, metaphor is a key mechanism for stimulating creativity, which has been demonstrated empirically as well (Holstein 1970; Rodari 1996). An interesting aspect of these metaphor-based techniques is that they largely focus on getting people to think of two unrelated concepts together, for it is very difficult cognitively. Conceptual associations, which are an inseparable part of our concept networks and are very useful for our daily activities and commonsense reasoning, become a stumbling block when it comes to creativity. However, in this respect, computers can be very useful because they do not have such conceptual associations to begin with and are not hindered by them (Indurkhya 2013). We demonstrated this point in our earlier research (Ishii et al. 1998) by designing a story-writing system for children based on Gianni Rodari's principle of estrangement. (See also Indurkhya 1997 for an

interactionist approach to modeling creativity in legal reasoning.) Currently, we are examining the role of low-level perceptual similarities in the interpretation of visual metaphors and emergence of features therein; and exploring ways to exploit this to design computational systems that assist the user in generating novel and creative ideas (Indurkhya et al. 2008; Ojha & Indurkhya, to appear).

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Report
International Conference
Metaphor and Communication

Cagliari (Italy) – May 12-14, 2011

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The International Conference on Metaphor, entitled "Metaphor and Communication", was organised by the University of Cagliari (Italy) and the Italian Association for Metaphor Studies - Metaphor Club - and was held from the 12th to the 14th of May, 2011 at the Department of Pedagogical and Philosophical Sciences, Faculty of Education Sciences of the University of Cagliari.

The focus of the conference was on the role of metaphor in communication, analysed from different theoretical perspectives. In particular, it was divided into four sections, having as the subject of discussion some of the major issues in contemporary metaphor theories:

1. Metaphor and Linguistic Variability (Metaphor and (Machine) Translation, Metaphor and Explicit/Implicit Distinction, Metaphor and Intercultural Discourse, Metaphor in Sign Languages);
2. Metaphor and Cognition (Metaphor and Concepts, Metaphor and Cognitive Processes, History of Metaphor Theories, Metaphor and Artificial Intelligence);
3. Metaphor and Media (Metaphor and Fiction, Metaphor and Computer Mediated Global Communication, Metaphor and Political Communication), with a specific session dedicated to Metaphor and Art;
4. Metaphor in Science and Education (Metaphor in Scientific Explanation, Metaphor and Models, Metaphor in Games, Metaphor in E-learning).

Around these topics, questioned from different points of view, both interesting contributions that contextualized, refined and put to the test

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already known theories, and original proposals were presented. Each section was introduced by a plenary presentation followed by a thematic session with two speakers invited by Metaphor Club Committee and two speakers whose abstracts were selected by double-blind review process.

As concerns the section "Metaphor and Linguistic Variability", the keynote speaker was Robyn Carston (University College London and CSMN, Oslo) and the theme of her presentation was "Metaphor, Hyperbole and Simile: Two Routes to Metaphor Understanding". In line with Relevance Theory, she contended that metaphor is a case of the loose use of language and no special interpretative mechanisms are involved, because metaphor comprehension is based on the standard relevance-based inferential process of following the path of least effort in testing interpretation until expectation of relevance is satisfied. In particular, she proposed the idea that there are two modes of metaphor processing. One is a process of rapid on-line *ad hoc* concept formation that applies to the recovery of word meaning (literal and non-literal) in sentence comprehension. The other one requires a greater focus on the literal meaning of a sentence, which is metarepresented as a whole and is subjected to slower and more reflective pragmatic inferences. The questions whether metaphor conveys a propositional content and what is the role of imagery depend on the processing mode (Carston, 2010).

Gerard Steen (VU University Amsterdam), in his plenary presentation introducing the "Metaphor and Cognition" session, talked about "A Cognitive Model for Representing Metaphor in Language, Thought, and Communication". He started from the idea that when people process metaphors, they have to include them in their mental representation of the discourse. He used the suggestion that discourse representation involves the construction and maintenance of more types of mental model (McNamara & Magliano, 2009) and, starting from the theory by Van Dijk & Kintsch (1983), he developed a five-step approach to the analysis of the various cognitive representations of metaphor in discourse: metaphors figure in the surface text, text base, situation model and context model of a discourse (Steen, 2009). In his talk he presented the analytical approach, its theoretical motivation, and its application in discourse analysis to different types of metaphors.

The session "Metaphor and Media" was introduced by Roberto Muffoletto (Appalachian University, Boone, North Carolina) with a talk entitled "The Romance that Never Was". In his presentation he stated that words only mean what they mean and have connection just to the reality constructed by the

words. People make reality and reality makes people. Within this perspective, he analysed the concept of photograph, icon, and virtual reality, explaining the notion of image as a constructed concept formed by culture, technology, knowledge, and history.

Finally, Jeannette Littlemore (University of Birmingham) was the keynote speaker of the "Metaphor in Science and Education" section. She remarked that metaphor is both a cognitive process and a linguistic product and in this perspective she discussed the psychological processes involved in metaphor production and comprehension. In particular, in her talk entitled "Metaphor and the foreign language learner: Is it a problem? How is it used? Can it be taught?", she presented the work that has conducted into the following topics: the nature of metaphor and the problems that it presents to different types of language learners; the comprehension and production of metaphor by language learners; and the effectiveness of various approaches designed to raise learners' awareness of metaphor. The research she introduced confirms that the ability to use metaphor appropriately can contribute to a language learner's communicative competence.

Besides keynote speakers' presentations, which looked at metaphorical phenomenon from different and new perspectives, many other interesting topics were addressed during the Conference. Some contributions were purely theoretical, such as that by Gergő Somodi (Central European University, Budapest) on the perlocutionary effects of metaphor or that by Stefano Gensini and Stefano Di Pietro (University of Rome "La Sapienza"), who introduced a semiotic approach to the use of metaphor in political communication, through the notion of a syncretic type of "text" in which it is given attention to the nonverbal components, multimedia, etc. Rachel Sutton-Spence (University of Bristol) talked about embodied visual linguistic metaphors considering the interrelationship between iconicity and metaphor and the role of embodiment in sign languages. Lucia Morra (University of Turin) maintained a possible interaction between contextualistic and gricean approaches to metaphorical understanding. Adam Gargani (University of Salford, UK) developed the Relevance Theory account of figurative language to clarify the relationship between poetic metaphor and simile. Francesca Traina (University of Palermo) proposed an integration between Recanati's suggestion about the role performed by pragmatic processes and some essential assumption of lexical pragmatics. Sandra Handl (Ludwig-Maximilians-University, Munich) discussed a model of integration of Conceptual Metaphor Theory and Conceptual

Blending Theory to account for conventional and unconventional metaphors at the same time. John Barnden (School of Computer Science, University of Birmingham) suggested other dimensions, more important than comparison and categorization processes, that are used in understanding metaphor, such as the degree of disparity between how the source and target items in a metaphor make its meaning and the degree to which the meaning includes, rather than merely exploits, the connection established between the source and target items. He proposed also, following an artificial intelligence approach, the possibility of pretended identification of source and target items.

But reports were not just theoretical. Many of them gave a relevant contribution to growing *Experimental Pragmatics*. Pragmatics considers communication as a result of adjustment of the lexical level of messages to their context of use, and in this perspective it investigates processes involved in the integration of linguistic and contextual information. Even though pragmatics, having a philosophical origin, is specifically a theoretical paradigm and has had little interest in experimental psychology, in recent years a part of the scientific community has understood the importance of verifying the compatibility between theoretical models elaborated by pragmatics and how the human cognitive system actually works. What are the advantages of an interaction between these two fields of research?

> First, experimental evidence can be used, together with intuition and recordings, to confirm or disconfirm hypotheses. [...] Second, aiming at experimental testability puts valuable pressure on theorizing. Too often, armchair theories owe much of their appeal to their vagueness, which allows one to reinterpret them indefinitely so as to fit one's understanding of the data, but which also makes them untestable. Developing an experimental side to pragmatics involves requiring a higher degree of theoretical explicitness. Moreover, experimentally testing theories often leads one to revise and refine them in the light of new and precise evidence, and gives theoretical work an added momentum. (Noveck, & Sperber 2004, p. 9)

From these considerations, Experimental Pragmatics has sprung up.[1] It is a resarch field which builds a bridge between different disciplines such as pragmatics, psycholinguistics, cognitive science and developmental psychology.

[1] See Noveck & Sperber (2004) and Noveck & Reboul (2008).

One of the aims of this interdisciplinary approach is to use experimental methods of psycholinguistics, such as reading-times, reaction-times in lexical decision tasks and eye movement measures, to investigate the power of explanation and prediction of pragmatic theories. In particular, it is interested in testing pragmatic hypotheses on literal and figurative, implicit and explicit, to clarify the processes involved in the production and comprehension of non-literal (especially metaphorical) uses of language. More precisely, there are three main pragmatic models that explain cognitive mechanisms of figurative language processing. According to the *Standard Pragmatic Model* (Grice, Austin, Searle), metaphoric meaning is reached after having rejected literal meaning and the cognitive costs to understand them are different. *Direct Access Model* (Gibbs) refuses the idea there is a first phase of literal processing: in an appropriate context the speaker undertands figurative meaning as rapidly as literal meaning and the cognitive costs to understand them are the same. According to *Graded salience hypothesis* (Giora) there are two mechanisms: one (*bottom-up*) sensitive to linguistic information and the other (*top-down*) sensitive to contextual information. Differently to Standard Model, these mechanisms run in parallel. Experimental pragmatics is able to test these models through experimental techniques to verify their plausibility.

I would like to stress that the theoretical contributions to the conference mentioned before should be confirmed by experimental data and corpora analysis and there are a lot of work-in-progress researches aimed at testing these hypotheses. As a matter of fact, at the conference the need for interaction between the theoretical and experimental dimensions in order to better understand the role of metaphor in communication emerged. Let's see some cases.

The research on conceptual metaphors has largely focused on linguistic metaphors and has generally neglected visual ones, that are those metaphors where at least one of the concepts is rendered as an image. Amitash Ojha and Bipin Indurkhya (International Institute of Information Technology, India) examined visual metaphors and elaborated a perception-based model of visual metaphor processing in contrast with textual metaphor processing. In particular, they presented the results of three experiments done to verify the role of visual-perceptual features in visual metaphor comprehension. Research has shown that perceptual experiences are evoked during metaphorical processing and metaphors are considered more apt if concepts evoke

appropriate imagery in the reader. In fact, visual-perceptual features – like color, shape, texture, and orientation of concepts – play an important role in anchoring the interpretation of visual metaphors. Further, during perceptual processing, they evoke semantically distant concepts, which help in creating non-conventional associations between the source and target concepts. The authors presented results of their experiments explaining the different phases of visual metaphor processing that starts with the search for similarity at the low-level visual-perceptual features.

Irene Ronga (University of Turin) talked about synaesthesia which consists in extending, through an analogy, the meaning of a word from one sensory modality to another. In particular, she concentrated on taste synaesthesia and showed that, differently from other kinds of synaesthesia, it seems to originate from the semantic extension of taste-related heads from the taste sensory domain to the set of perceptions, which may happen in the mouth. Combining linguistics with a neurophysiological approach, she demonstrated that taste synaesthesia, compared to other metaphors, is more strongly connected with sensory experience and embodiment, since it results from the actual combination of different sensory phenomena that occurr at the same time.

Giorgio Cozzolino (University of Chieti "G. D'Annunzio") presented theoretical and experimental research about some errors frequently met in real discourse situations and media texts where regular and well known metaphors should be used. The analysis intended to understand if wrong metaphors are real mistakes or if they are due to particular cognitive, communicative, and social reasons, and to find the cognitive reasons for the wrong metaphors production and recognition. He also introduced experimental research, to be developed at the Department of Psychology in Chieti, where wrong metaphor recognition will be tested in connection with memory tasks and other cognitive tasks.

We said that, according to Experimental Pragmatics, experimental data are necessary to confirm theoretical hypotheses or to refine them in the light of solid evidence. Confirmation can come also through another kind of empirical data. A lot of contributions at the conference examined metaphorical phenomenon through analysis of corpora that is a helpful instrument to test theoretical paradigms looking directly at the real use of communicative interactions, and to understand how a linguistic system is organized, how it evolves in time and the differences between various languages. Let's see briefly the contents of the contributions.

Marianna Bolognesi (University of Turin) talked about the metaphorical use of motion verbs to express abstract concepts (e.g. fall in love, jump to a conclusion, run a risk). In particular, she analysed the cognitive salience and the frequency of usage of metaphorical senses of motion verbs in corpora from a bilingual perspective (Italian and English). The question was whether the salience of metaphorical senses of motion verbs applies both to native speakers and to foreign learners. Simone Müller (Justus-Liebig-Universität) discussed time metaphors across varieties of English, examining various sub-corpora of the International Corpus of English. The author presented the case of the conceptual metaphor TIME IS MONEY: analyses showed that there is no clear tendency in the use of this metaphor, at least not statistically, but there are some differences regarding frequency in certain registers as well as differences in collocations. Some non-Western countries took over the linguistic expressions for TIME IS MONEY along with the concept, but the concept has not yet been incorporated into the value set of their culture. Emiliano Ilardi (University of Cagliari) and Alessio Ceccherelli (University of Rome Tor Vergata) analysed the nineteenth century's major novels (mostly French ones) to verify the classical idea that the role of literary text is to create metaphorical systems of mediation between subject and new contexts. Julia Williams (Pompeu Fabra University, Barcelona) discussed the use of the WAR source domain in the conceptualisation of cancer in the English and Spanish press, proposing a quantitative analysis of the data. Further, the use of corpus techniques in the qualitative contextual analysis allowed identification of the full range of topics covered by the different metaphorical expressions in the corpus. Michela Giordano (University of Cagliari) addressed the ways in which the social impact of the media represents the world, by focusing on the metaphors of evils used to describe Hillary Clinton, collected from media texts in the last ten years. John Wilson and Martin Hay (University of Ulster, Northern Ireland) analysed conceptual metaphors found in internal press media produced by the minority of Ulster Scots. John Wade (University of Cagliari) examined the use of metaphorical reference in educational discourse, through the study based on corpora consisting of conference papers and newspaper articles regarding educational issues. Olga Denti and Luisanna Fodde (University of Cagliari) discussed how the metaphorical denseness of business discourse may be affected by emerging crisis phenomena, through both a quantitative and a qualitative analysis of a corpus of a series of EU financial stability reviews, published between 2004 and 2010. The research

aimed at achieving the identification of a type of genre through the analysis of the evolution of language during a period of deep economic changes. Stefania Manca (Institute for Educational Techology, CNR, Genova) presented the results of her research on the role of metaphors in virtual learning environments based on written discourse, demonstating in these contexts they may satisfy cognitive, emotional and affective needs of learning. Marianna Iodice and M. Beatrice Ligorio (University of Bari) analysed a corpus of metaphors produced by students in collaborative learning strategy.

The Conference showed also that areas of application of metaphorical studies could be different: Damele Giovanni (Philosophy of Language Institute, New University of Lisbon) explored the relevance of cognitive and persuasive aspects in political metaphors, using different examples of political discourses in the modern and contemporary eras. Elisabeth Wehling (University of California, Berkeley) investigated metaphorical framings used by Silvio Berlusconi in his speeches. Daniela Veronesi (Free University of Bozen) talked about metaphors in music. In particular she demonstrated how metaphors are a crucial means through which musicians conceptualise collective music making, and music teachers illustrate music qualities in educational activities. She analysed a collection of musicians' interviews and video-recorded music workshops, clarifying functions of metaphors in pedagogical interaction and showing how metaphors contribute to shape the process of music making itself. Ewa Schreiber (Adam Mickiewicz University, Poznań) discussed the influences of the Cognitive Theory of metaphor in musicology. In particular, she analysed the theoretical writings of selected twentieth-century composers who, with the use of metaphorical language, express their different attitudes to the phenomenon of sound, treating it as an object, part of an imaginary landscape or a living organism. José Vela Castillo (IE University, Segovia; Universidad Complutense Madrid) proposed a parallelism between metaphor and architecture, starting from the ways these two spheres operate. Maurizio Galluzzo (IUAV, Venezia) talked about the window metaphor, discussing different definitions of space. Fabio Tarzia (University of Rome "La Sapienza") questioned the relationship between metaphors, as a means of transport of the sense and the identity of a culture, and collective imagination, discussing the American case. Finally, Joan Elies Adell i Pitarch (Open University of Catalonia, Barcelona) talked about the Algherese Catalan language, a small geolinguistic island inside Sardinia that has survived throughout the centuries, despite being a harbour town, 530 km

away from Barcelona (Catalonia's capital). The author defined Alghero as «a metaphor about the linguistic variability».

In summary, the conference, which was always enhanced by a heated, extended and deepened discussion at the end of each session, was a revealing opportunity for experts and students to take stock of the situation on the current studies about the role of metaphor in communication. The congress served as an essential and relevant contribution to the flourishing research into metaphor, providing new devices in the contemporary research on figurative language especially thanks to the importance given to the interaction between the theoretical and experimental dimensions. The Conference finished but it opened new areas of thinking, questioning and researching on this complex topic.

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