Cognitive Pragmatics

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Abstract

Cognitive pragmatics is concerned with the mental processes involved in intentional communication. A theory in this domain aims to explain what mental processes a person actually engages in during a communicative interaction.

From a cognitive perspective, it is interesting to keep into consideration the development of a mental process, along with its possible decays in brain damaged persons, in order to provide a more complete comprehension of human ability to communicate.

Key words

Communication, cognitive processes, inferential ability, direct and indirect speech acts, irony, deceit, development, brain damage, executive functions.

Introduction

Cognitive pragmatics is concerned with the mental processes involved in intentional communication. Typically, studies within this area focus on the cognitive processes underlying the comprehension of a linguistic speech act, often overlooking linguistic production or extralinguistic communication.

By cognitive processes, authors in this field refer both to the inferential chains necessary to understand a communicator's intentions, starting from the utterance he proffered, and the different mental representations underlying the comprehension of various communicative phenomena. Thus, a theory in cognitive pragmatics aims to explain what mental processes a person actually engages in during a communicative interaction (see Shared Knowledge).

Relevance theory (Sperber & Wilson 1986/1995) is usually identified as the principal theoretical framework in the area of cognitive pragmatics (see Relevance theory). Nonetheless, in the last decade other theories have been developed: a broad-stretching theory of the cognitive processes underlying human communication, the Cognitive Pragmatics theory (Airenti, Bara & Colombetti 1993a; 1993b; Bara 2005) and a theory more focused on the mental inferences underlying the comprehension of literal vs. figurative language, the Graded Salience hypothesis (Giora 2003) (see relevant definition about Giora).

The possibility of describing the cognitive processes involved in a communicative interaction is interesting not only when such processes are studied as fixed states - an approach which takes into consideration exclusively the final stage in healthy adult subjects - but also to when the development of such processes is studied from the infant through childhood to the adult and when its decay in certain types of brain damage (Bara 1995). In this way, it is possible to comprehend better, from a cognitive perspective, how the pragmatic competence develops and what are the neurocognitive structures that, if damaged, might cause deficits in people's performance.

A strictly related topic is the identification of the cognitive components allowing the realization of a complete pragmatic competence. From this perspective it is important to keep into consideration the role played by a person's Theory of Mind (see Pragmatics and Theory of Mind) and by the executive functions during a communicative interaction.

Cognitive Pragmatics theory

Airenti et al. (1993a; 1993b) present a theory of the cognitive processes underlying human communication that provides a unified theoretical framework able to explain communicative phenomena of different sort (see also Bara 2005). The authors claim that their theoretical analysis holds for both linguistic and extra-linguistic communication and thus introduce, when referring to

the interlocutors, the terms actor and partner instead of the classical speaker and hearer. The theory assumes that the literal meaning of an utterance is necessary, but not sufficient for the partner to reconstruct the meaning conveyed by the actor and that, in order to understand the interlocutor's communicative intention, the partner has to recognize the *behavior game* the actor is proposing him to play. The behavior game is a social structure mutually shared by the participants of the communicative interaction. Suppose for example that, while you are working in your office, a colleague walks in and says: [1] "It's cold outside". Although the literal meaning of the utterance would be completely clear, you should be extremely perplexed. Only if [1] was taken as an invitation not to go out or a request to close the window or a proposal to take together a hot cup of tea or in some way the reasons for uttering the expression were evident, you should be able to make the necessary inferences and answer appropriately. The utterance pure and simple, without a game to which to refer, has in itself no communicative significance whatsoever. Thus, an utterance extrapolated from its context of reference has no communicative meaning and can not reach any communicative effect on the partner.

Starting from the assumption that the communicative meaning of an utterance is intrinsically linked to the context within which it is proffered, Bosco, Bucciarelli and Bara (2004), define a taxonomy of six different categories of context - Access, Space, Time, Discourse, Behavioral Move and Status - which helps the partner to identify the behavior game bid by the speaker, allowing him to fully comprehend the speaker's communicative intention.

Following the tenets of the Cognitive Pragmatics theory, Bucciarelli et al. (2003) propose that two cognitive factors affect the difference in the difficulty of comprehension of various kind of pragmatic phenomena: (i) *the inferential load* and (ii) the *complexity of the mental representations* underlying the comprehension of a communicative act.

Inferential load: simple and complex speech acts
Searle (1975) claims that in speech acts comprehension the literal interpretation of an utterance always has priority with respect to any other interpretations that can be derived from it. According to Searle the understanding of an indirect speech act, e.g. [2] "Do you mind to pass me the salt", is harder to understand than the corresponding direct speech act, i.e. [3] "Please pass me the salt", because it requires a longer inferential process (see <u>relevant definition</u>).

Bara and Bucciarelli (1998) provide empirical evidence that, starting from 2;6 years of age children find direct speech acts, as for example [4] 'Please sit down', and conventional indirects, as for example [5] 'Do you mind to close the door?', equally easy to comprehend. In a further study Bucciarelli et al. (2003) find that children of the same age find it easier to understand both direct

and conventional indirect speech acts rather than non conventional indirect speech acts, as for example the utterance [6] "Excuse me, I'm studying" meant as a request not to make noise when proffered to a partner who is hammering.

Following the tenets of the Cognitive Pragmatics theory, it is possible to abandon the distinction between direct and indirect speech acts and to adopt a new one, based on different inferential processes underlying their comprehension between simple and complex communicative acts (Bara & Bucciarelli 1998). According to this theory, the comprehension of any kind of speech act depends on the comprehension of the behavioral game bid by the actor: each agent interprets the utterances of the interlocutor on the grounds he takes as shared between them. According to this perspective, the partner's difficulty in understanding a communicative act depends on the inferential chain necessary to refer the utterance to the game meant by the actor. Direct and conventional indirect speech acts do immediately make reference to the game and thus they are defined as *simple speech acts*. On the contrary, non conventional indirect speech acts can be referred to as *complex speech acts* because they require a chain of inferential steps, because the specific behavior game of which they are a move is not immediately identifiable. For example, in order to understand [4] and [5] it is sufficient for the partner to refer to the game [ASK FOR SOMETHING]. In order to understand [6], a more complex inferential process is necessary: the partner needs to share with the actor the belief that when a person is studying she needs silence and that hammering is noisy and thus [6] is a request to stop making noise. Only then, the partner can attribute to the utterance the value of a move of the game [ASK FOR SOMETHING]. Thus, if the problem is how to access the game, the distinction between direct and indirect speech acts is not relevant. It is the complexity of the inferential steps necessary to refer the utterance to the game bid by the actor that accounts for the difficulty of speech acts comprehension.

Such distinction applies not only to standard communicative acts, namely direct, conventional indirect and non-conventional indirect speech acts, but also to non standard ones, like ironies and deceits (Bara & al. 1999a). The same distinction between simple and complex standard, ironic and deceitful communicative acts holds also for extralinguistic communicative acts, that is, those acts that are realized only through gestures (Bosco & al. 2004).

The inferential load underlying a communicative act allows to explain the different difficulty that might occur in the comprehension of different communicative acts pertaining to the same pragmatic category, for instance between simple and complex standard communicative acts. To explain the different difficulty that might occur among communicative acts pertaining to different pragmatic categories, for instance between a direct communicative act and a deceitful one, it is necessary to

consider the complexity of the mental representations involved in their respective comprehension and production.

Complexity of mental representations

Still within the framework of the Cognitive Pragmatics theory, Bucciarelli et al. (2003) describe an increasing trend of difficulty in the comprehension of simple communicative acts of different sorts: simple standard, simple deceitful and simple ironic communicative acts.

According to Airenti et al. (1993), in standard communication default rules of inference are used to understand each other's mental states; default rules are always valid unless their consequences are explicitly denied. Indeed, in standard communication what the actor says is in line with his private beliefs: directs, conventional indirect speech acts and non-conventional indirect speech acts are all examples of standard communication. In terms of mental representations, in order to comprehend a standard communicative act, the partner simply has to refer the utterance proffered by the actor to the behavior game he bids.

On the contrary, non-standard communication, as for instance ironies and deceits, involves the comprehension of communicative acts *via* the block of default rules and the occurrence of more complex inferential processes, involving conflicts between the beliefs that the actor takes as shared with the partner and the latter's actual private beliefs. In the comprehension of irony and deceit the mental representations involved produce a difference between what the actor communicates and what he privately entertains. It follows that standard communicative acts are easier to deal with than non-standard pragmatic phenomena.

According to Bucciarelli et al. (2003) in the case of the comprehension of deceit, the partner has to recognize the difference between the mental states that are expressed and those that the actor privately entertains. Consider for instance the following example: Mark and Ann share that the lecture they have just attended was an absolute boredom. Mark is annoyed with John because John had not come to the lecture and he wishes not to let him know that he lost the whole morning for nothing. After the lecture Mark and Ann meet John who asks them: "How was the lecture?". Mark answers: [7] "It was really interesting!". Ann is able to understand that Mark is deceiving John because she recognizes the difference between the mental states he is expressing and those that he actually and privately entertains.

Furthemore, a statement becomes ironic when, along with this difference, the partner also recognizes the contrast of the expressed mental states with the scenario provided by the knowledge the actor shares with the partner. In our example Ann might also interpret [7] as ironic because she shares with Mark the knowledge that the lecture was not interesting at all. For an observer, the

simultaneous activation of the representation of the actor's utterance *(It was really interesting*) and of the contrasting shared belief (*The conference was boring*) makes an ironic communicative act more difficult to comprehend than a deceitful one.

Bucciarelli et al. (2003) show the existence of a trend of difficulty in the comprehension of simple standard communicative acts, simple deceits and simple ironies with an experiment carried out on children from 2;6 to 7 year-olds. The authors also show that the same children show asimilar predicted degree of difficulty in understanding the same pragmatic phenomena both when its are expressed via linguistic speech acts and when its are expressed via communicative gestures. Independently of the communicative channel, linguistic or extralinguistic, used by the actor, children find it easier to comprehend simple standard speech acts rather than simple deceits, which are, in turn, easier to comprehend than simple ironic communicative acts.

Finally, globally considering the mentioned results it is possible to remark that all the theoretical predictions derived from the Cognitive Pragmatics theory and grounded on a person's cognitive processes underlying the communicative comprehension, hold for the same pragmatic phenomena both expressed via linguistic speech acts and via gestures. Thus, such results seem to indicate that linguistic and extralinguistic communicative acts share the most relevant mental processes in each specific pragmatic phenomena investigated. This suggests that pragmatic competence is one and the same cognitive faculty, independent of the input processed, be it linguistic or extralinguistic. Thus, it is possible to interpret such empirical evidence as being in favor of a unified theoretical framework of human communication in which linguistic and extralinguistic communication develop in parallel as different aspects of a unique communicative competence (see Bara & Tirassa 1999; Bara 2005).

Cognitive pragmatics and development

In this paragraph we shall examine the empirical evidence in favor of the existence of cognitive processes of increasing complexity underlying different pragmatic phenomena. The developmental domain is particularly interesting to this aim because it makes it possible to observe errors in the comprehension of different kinds of pragmatic tasks and thus to falsify empirical hypotheses. On the contrary, healthy adult subjects possess a fully developed cognitive system and communicative competence, and thus they usually do not show any interesting errors in comprehending or producing different kinds of communicative acts: it is only possible to analyze their time of reaction in solving such kind of tasks.

On the other hand, if inferential processes and mental representations of increasing complexity underlie the comprehension of various kind of pragmatic phenomena, then it is possible

to explain why, during the development of children's communicative competence, some types of communicative acts are typically understood and produced at an earlier age than others. For example, at the beginning children communicate by comprehending sincere communicative acts and only later on in their development they start comprehending, deceit and irony. Children's ability to deal with mental representations and inferential chains of increasing complexity develops with age. This contributes to explain the development of their pragmatic competence.

From such perspective, the increasing capacity to construct and manipulate complex mental representations is involved in the emergence of the preschoolers' and kindergartens' capacity to deceive. A deceptive task could be made easier to comprehend by reducing the number of characters, episodes and scenes, and by including a deceptive context (Sullivan et al. 1994).

Also the ability to comprehend and produce different form of ironies involves an increasing and sophisticated inferential ability. Lucariello and Mindolovich (1995) carry out a study on the ability of 6 and 8-year-olds children to provide ironic endings to unfinished stories. The authors claim that the recognition and the construction of (situational) ironic events involve the ability to manipulate the representations of events. These representations have to be transcended, critically viewed and disassembled in order to create new, different and ironic event structures. According to these authors proposal, it is possible to make a distinction between different forms of ironies: their results show that older children construct more complex ironic derivations from the representational base than younger children do.

In the same way that is possible to better understand the development of pragmatic competence by keeping into consideration the mental processes involved in a specific communicative act, it is also possible to explain deficits in performance when a brain damage to the development of the cognitive system occurs. The ability of children with closed head injury to solve pragmatic tasks is strictly connected to their (damaged) inferential capacity, that is their ability to link ideas between sentences (for a review see Bara & al. 1999b). These subjects perform worse than normal peers in specific pragmatic tasks, such as bridging the inferential gap between events in stereotyped social situations and comprehending idiomatic and figurative language (Dennis & Barnes 1990).

Cognitive pragmatics and brain damage

Different neuropyschological diseases affect communicative performance in different ways, depending on what relevant cognitive subsystem is damaged. Such information provide the opportunity to better understand the architecture of the brain/mind and its relation with pragmatic competence (Tirassa 1999; Bara & Tirassa 2000). Acquired brain damage impairs certain cognitive

processes while leaving others functioning; there is well-known evidence in the literature that aphasic patients with a left-brain damaged have residual pragmatic competence despite their language impairment (see Brain and lateralization of language).

On the other hand, different cerebral injuries have in common the damage of the capacity to deal with phenomena requiring complex mental processes to be understood. In particular if the analyzed tasks require more complex inferences, then they seem to be more damaged. These researches, which will be examined in this paragraph, seem to confirm that different pragmatic phenomena require the realization of different cognitive processes.

McDonald & Pearce (1996) find that traumatic brain injured patients do not have difficulty in the comprehension of written sincere exchange as, for example, [8] Mark: "*What a great football game,* Wayne: "*So you are glad I asked you come*"; whereas they have several problems, compared to the normal control subjects, in comprehending ironic exchange as [9] Mark: "*What a great football game*, Wayne: "*Sorry I made you come*". The authors give to the subjects the same experimental material in an auditory form, but they find that patient's performance did not improve. They conclude that traumatic brain injured patients have difficulties in comprehending irony and that, even if the intonational contour usually facilitates the comprehension of ironic remarks, it is not sufficient on its own.

Furthermore, McDonald (1999) finds that, surprisingly, traumatic brain injured patients have no problems in understanding written ironic utterances as [10] Tom: "*That's a big dog"*, Monica: "*Yes, it's a miniature poodle*". The author suggests that [10] might require a shorter inferential chain compared with [9] in order to be understood. Indeed, in comprehending [10] it is sufficient to understand that Monica answers as if the premise meant the opposite of what is said. Instead, in [9] Wayne's response is not only a refusal of the original comment, but also refers to Mark's reaction to that state of affairs and thus there were at least two necessary inferential steps in the comprehension process. Such findings are in line with the proposal that different kinds of irony may vary in difficulty according to the complexity of the inferential load necessary to their comprehension (Bara & al. 1999a).

Particularly interesting for our perspective are some studies showing that the decay of pragmatic competence in closed-head-injured subjects (CHI) reflect the same trend of development that is observed in the development of normal children, i.e. the capacities acquired later in the development of the pragmatic ability are the most damaged. Bara et al. (1997) test a group of CHI with a linguistic experimental protocol subjects and find out that specific pragmatic tasks, like the comprehension of non-standard communication, i.e. deceit and irony, are more difficult to comprehend than tasks requiring simpler mental representations, like the comprehension of standard

communication, i.e direct, conventional and non conventional indirect speech acts. Furthermore, the authors find no differences in the patient's comprehension of direct and conventional indirect speech acts. The same results are observed in the performance of children aged from 2 to 6 -year-olds tested by the same experimental protocol (Bara & Bucciarelli 1998). It has also to be noted that Bara et al. (1997) presented to CHI patients two classical tests on false belief to measure their theory of mind, but they did not find any significant difference with the non brain damaged control group. Thus, the patient's poor performance at the pragmatic tasks can not be ascribed to a deficit of the Theory of Mind, that is, the ability to understand other persons' mental states.

In addition Bara et al. (2000) realize a similar extralinguistic version of the same pragmatic experimental protocol, evaluating the comprehension of standard communication, i.e. simple and complex communicative acts, and non-standard communication, i.e. deceit and irony. This protocol is composed of videotaped scenes where the mentioned pragmatic phenomena are realized with extralinguistic means, like pointing or clapping. The authors test children aged from 2 to 6-year-olds and a group of Alzheimer's disease patients and find that children show the same trend of development of extralinguistc competence observed by Bara and Bucciarelli (1998) in the linguistic domain. The authors also observe a similar trend of decay in the Alzheimer's patient's extralinguistic competence: the non-standard extalinguistic tasks are understood more poorly than standard communicative tasks. Finally, the same decay of pragmatic competence is observed in CHI patients tested with the same protocol (Bara et al. 2001). The CHI subjects are also given several neuropsychological tests, but no statistical correlation between the subjects' performance on the pragmatic protocol and that on these collateral neuropsychological tests is found. Thus the patient's poor performance can not be ascribed to a deficit in their executive functioning.

As already observed for the development of pragmatic linguistic and extralinguistic competence, such empirical data concerning brain damaged subjects seem to be in favor of a unified pragmatic competence independent from the input, be it either linguistic or extralinguistc. The comprehension of speech acts and extralinguistic communicative acts share the most relevant mental processes in different pragmatic phenomena and pragmatic competence seems to be independent from the expressive means used to realize it.

Cognitive pragmatics and the executive functions

As we have seen, several researches in the literature provide empirical evidence in favor of the existence of different mental processes underlying different pragmatic tasks. Anyway, in order to have a full comprehension of pragmatic competence from a cognitive perspective it is necessary to keep into consideration two other elements that affect human ability to communicate: the Theory

of Mind and the executive functions. We shall examine here only the latter (see Pragmatics and Theory of Mind).

Executive Function is a theoretical construct used to describe the goal-directed behaviors mediated by the frontal lobes. The Executive Function system guides a person's actions enabling him to have an adaptive and flexible behavior; it includes cognitive capacities like: planning, inhibition of prepotent responses, flexibility and working memory.

Barnes and Dennis (2001) show that, in addition to the inferential ability, working memory and metacognitive skill contribute to explain closed-head injured children's problems in comprehending stories. Working memory support the inferential processes during ongoing text comprehension and the metacognitive skill checks and suggests when to make an inference. The authors investigate the ability of children with severe and mild-head injury to comprehend brief written stories. The authors find that children with severe, but not with mild-head injury, show inferential deficits: they have problems in drawing links between general knowledge and the explicit text. Anyway, when in the task the role of metacognitive demands and working memory is reduced, children with severe head-injuries do not demonstrate an inferential deficit in comprehension with respect to the normally developed or mild head-injured peers. Working memory plays a role also in explaining children with hydrocephalus poor ability in comprehending written stories. Hydrocephalus a neurodevelopmental disorder accompanied by an increase in the pressure of the cerebrospinal fluid on the brain tissue. Children with hydrocephalus, compared to the control group, have increasing difficulties in integrating information from a previously read sentence in order to understand a new one as the textual distance between the two propositions increases. Thus, these children seem to have no fundamental problems in making an inference, while their poor performance in solving the task is principally explained by a working memory deficit (Barnes & al. 2004).

Researches in the literature also highlight the role of other executive functions. Channon and Watts (2003) examine the ability of CHI patients to comprehend brief vignettes involving pragmatic judgement and the relationship between this and some executive functions: working memory, inhibition and the ability to organize and plan appropriate response in a given context. The authors find that only the ability to solve the inhibition task, requiring the subjects to inhibit prepotent words and to generate words that complete sentences with non-sensical endings, correlates with the pragmatic comprehension task. No association is found with the other executive skills.

From a neuropsychological perspective, the frontal lobes are crucial to intact executive functioning and since traumatic brain injuries often result in damage to such area, pragmatic deficit showed by these patients can be mainly explained by an Executive Function impairment. From such

a perspective, deficits in the planning and monitoring of behavior usually observed in such patients seem to explain their difficulty to adhere to the conventional discourse structure (McDoanld & Pearce 1998).

To conclude, theoretical and empirical studies in the literature seem to suggest that, in order to explain people's pragmatic competence, it is necessary to keep into account the role played by at least three elements: the mental processes, namely the inferential load and the complexity of the mental representations, the Theory of Mind and the executive functions underlying the realization of such competence. Furthermore, the majority of the empirical studies focus on the linguistic realization of different pragmatic tasks. It is important to methodically compare such ability with the corresponding extralinguistic one in order to establish whether the same cognitive components underlie the two different means of communication. Finally, a complete theory in the cognitive pragmatics domain should be able to explain not only the adult normal subjects' ability to communicate, but also the development and the decay of such capacity in brain damaged patients.

Bibliography

Airenti, G., Bara, B.G. & Colombetti, M. (1993a). Conversation and behavior games in the pragmatics of dialogue. *Cognitive Science*, 17, 197-256.

Airenti, G., Bara, B.G. & Colombetti, M. (1993b). Failures, exploitations and deceits in communication. *Journal of Pragmatics,* 20, 303-326.

Bara, B.G. (1995). *Cognitive Science: A developmental approach to the simulation of the mind*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Bara, B.G. (2005). *Cognitive Pragmatics*. Cambridge, MA: MIT Press.

Bara, B.G., Bosco F.M., & Bucciarelli M. (1999a). Simple and complex speech acts: What makes the difference within a developmental perspective. M. Hahn & S.C. Stone**s** (eds.). *Proceedings of the XXI Annual Conference of the Cognitive Science Society*. Mahwah, NJ: Lawrence Erlbaum Associates, 55-60.

Bara, B.G., Bosco F.M. & Bucciarelli, M. (1999b). Developmental Pragmatics in normal and abnormal children. *Brain and Language*, 68, 507-528.

Bara, B.G. & Bucciarelli, M. (1998). Language in context: The emergence of pragmatic competence. In Quelhas, A. C. & Pereira, F. (eds.), *Cognition and Context*. Lisbon: Istituto Superior de Psicologia Aplicada, 317-345.

Bara, B.G., Bucciarelli, M. & Geminiani, G. (2000). Development and decay of extra-linguistic communication. *Brain and Cognition*, 43, 21-27.

Bara, B.G., Cutica, I. & Tirassa, M. (2001). Neuropragmatics: Extralinguistic communication after closed head injury. *Brain and Language*, 77, 72-94.

Bara, B.G., Tirassa, M. (1999) A mentalist framework for linguistic and extralinguistic communication. In Bagnara, S. (ed.), *Proceedings of the 3rd European Conference on Cognitive Science*. Roma: Istituto di Psicologia del Consiglio Nazionale delle Ricerche.

Bara, B.G. & Tirassa, M. (2000). Neuropragmatics: Brain and Communication. *Brain and Language*, 71, 10-14.

Bara, B.G., Tirassa, M. & Zettin, M. (1997). Neuropsichological constraint on formal theories of dialogue. *Brain and Language*, 59, 7-49.

Barnes, M.A., Dennis, M. (2001). Knowledge based inferencing after childhood head injury. Brain and Language, 76, 253-265.

Barnes, M.A, Faulkner H., Wilkinson M., & Dennis M. (2004). Meaning construction and integration in children with hydrocephalus. *Brain and Languag*e 89, 47-56.

Bosco, F.M., Bucciarelli, M., & Bara, B.G., (2004). The fundamental context categories in understanding communicative intentions. *Journal of Pragmatics*, 36(3), 467-488.

Bosco, F.M., Sacco, K., Colle, L., Angeleri, R., Enrici I., Bo, G. & Bara, B.G. (2004). Simple and Complex Extralinguistic Communicative Acts. In Forbus K., Gentner D. & Regier T. (eds.) *Proceedings of the Twenty-Sixth Annual Conference of the Cognitive Science Society*. Mahwah, New Jersey: Lawrence Erlbaum Associates, 44-49.

Bucciarelli, M., Colle L. & Bara B.G. (2003). How children comprehend speech acts and communicative gestures. *Journal of Pragmatics,* 35, 207-241.

Channon, S. & Watts, M. (2003). Pragmatic language interpretation after closed head injury: relationship to executive functioning. *Cognitive Neuropsychiatry*, 8, 243-260.

Dennis, M. & Barnes, M.A. (1990). Knowing the meaning, getting the point, bridging the gap, and carrying the message: Aspects of discourse following closed head injury in childhood and adolescence. *Brain and Language*, 39, 428-446.

Giora, R. (2003). *On our mind: Salience, context and figurative language*: New York: Oxford Univesrity Press.

Lucariello, J. & Mindolovich, C. (1995). The development of complex meta-representational reasoning: The case of situational irony. *Cognitive Development, 10*, 551-576.

McDonald S., & Pearce S. (1996). Clinical insights into Pragmatic Theory: Frontal Lobe deficits and Sarcasm. *Brain and Language*, 53, 81-104.

McDonald S., & Pearce, S. (1998). Requests that overcome listener reluctance: Impairment associated with executive dysfunction in brain injury. *Brain and Language*, 6, 88-104.

McDonald, S. (1999) Exploring the process on inference generation in sarcasm: A review of normal and clinical studies. *Brain and Language*, 68, 486-506.

Searle, J.R. (1975). Indirect speech acts. In: *Syntax and semantics*, vol, 3: *Speech acts*. P. Cole & J.L. Morgan (eds.). New York: Academic Press.

Sperber, D., Wilson, D., 1986/1995. *Relevance*. Oxford: Blackwell.

Sullivan, K., Zaitchik, D. & Tager-Flusberg, H. (1994). Preschoolers can attribute second-order beliefs. *Developmental Psychology, 30*, 395-402.

Tirassa, M. (1999). Communicative competence and the architectures of the Mind/Brain. *Brain and Language*, 68, 419-441.

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Biography

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Her main research interests lie in the area of cognitive pragmatics and theory of mind. Her studies on pragmatics are concerned with the mental processes underling normal development of linguistic and extra-linguistic competence, i.e. direct and indirect speech acts, irony, deceit and communicative failures, and its decay in brain damaged patients. She is also interested, from a theoretical and empirical perspective, in the early stages of the development of the theory of mind, as well as connections between theory of mind and pragmatic abilities.