



Communicative-pragmatic disorders in traumatic brain injury: The role of theory of mind and executive functions



Francesca M. Bosco^{a,b}, Alberto Parola^{a,*}, Katuscia Sacco^{a,b}, Marina Zettin^c, Romina Angeleri^d

^a Center for Cognitive Science, Department of Psychology, University of Turin, Italy

^b Institute of Neurosciences of Turin, Italy

^c Centro Puzzle, Turin Italy

^d Department of Psychology, University of New Mexico, NM, United States

ARTICLE INFO

Article history:

Received 29 June 2016

Revised 19 October 2016

Accepted 23 January 2017

Available online 3 February 2017

Keywords:

Communication

Pragmatics

Irony

Deceit

Non-verbal

Theory of mind

Executive functions

Cognitive flexibility

Working memory

Planning

ABSTRACT

Previous research has shown that communicative-pragmatic ability, as well as executive functions (EF) and Theory of Mind (ToM), may be impaired in individuals with traumatic brain injury (TBI). However, the role of such cognitive deficits in explaining communicative-pragmatic difficulty in TBI has still not been fully investigated. The study examined the relationship between EF (working memory, planning and flexibility) and ToM and communicative-pragmatic impairment in patients with TBI. 30 individuals with TBI and 30 healthy controls were assessed using the Assessment Battery of Communication (ABaCo), and a set of cognitive, EF and ToM, tasks. The results showed that TBI participants performed poorly in comprehension and production tasks in the ABaCo, using both linguistic and extralinguistic means of expression, and that they were impaired in EF and ToM abilities. Cognitive difficulties were able to predict the pragmatic performance of TBI individuals, with both executive functions and ToM contributing to explaining patients' scores on the ABaCo.

© 2017 Elsevier Inc. All rights reserved.

1. Introduction

A number of studies have confirmed that traumatic brain injury (TBI) is associated with communicative-pragmatic impairments (Angeleri et al., 2008; Bara, Tirassa, & Zettin, 1997; Bosco, Angeleri, Sacco, & Bara, 2015; Johnson & Turkstra, 2012). The aim of this paper is to investigate the relationship between this well-established communication disorder and the underlying cognitive components that might be responsible for such impairment. In particular, we focused our attention on two domains of cognitive functioning, usually found to be impaired after TBI, i.e. Theory of Mind (ToM) and executive functions (EF), (e.g., Ashman, Gordon, Cantor, & Hibbard, 2006; Dikmen et al., 2009). The role of these cognitive abilities in pragmatic performance after TBI is still unclear and difficult to disentangle (Honan, McDonald, Gowland, Fisher, & Randall, 2015; Martin & McDonald, 2003; McDonald, 2013; McDonald et al., 2014). This paper will contribute to improving the understanding of this issue.

A wide number of definitions exist to explain the notion of pragmatics (see Levinson, 1983). They include the study of meaning in relation to the use of language, as the relationship between signs and their users; the ability to use language and other means of expression, such as gestures and paralinguistic indicators, to convey communicative meaning; the ability to manage conversations and discourse analysis (Bara, 2010; Cummings, 2005). In the present investigation we focus on linguistic and extralinguistic (non-verbal) abilities to convey meaning in a social context.

Communicative-pragmatic abilities of individuals with TBI may be impaired, making it difficult for them to manage communicative interactions at various levels: their understanding of the non-literal meaning of utterances is often incorrect or incomplete (e.g., Winner & Gardner, 1977), they often have difficulty grasping the pragmatic implications of sentences, as in the case of understanding sarcasm (Channon et al., 2007; McDonald, 1992; McDonald & Pearce, 1996), humor (Braun, Lissier, Baribeau, & Ethier, 1989; Docking, Murdoch, & Jordan, 2000), or commercial messages involving inferential reasoning (Pearce, McDonald, & Coltheart, 1998). Pragmatic impairment is not limited to linguistic comprehension, but also extends to the production of

* Corresponding author at: Dipartimento di Psicologia, Via Po 14, 10123 Torino, Italy.

E-mail address: alparola@unito.it (A. Parola).

communicative acts. For example, individuals with TBI are reportedly poor at negotiating efficient requests (McDonald & Van Sommers, 1993), and at giving the right amount of information to their interlocutor (McDonald, 1993).

Interestingly, difficulties have also been documented for the extralinguistic modality, which represents the ability to communicate through gestures, facial expressions, and body posture (Bara, Cutica, & Tirassa, 2001; Rousseaux, Vérigneaux, & Kozlowski, 2010). Individuals with TBI often suffer from a general difficulty in managing social interactions in their everyday life (e.g., Struchen, Pappadis, Sander, Burrows, & Myszka, 2011), also characterized by conversational problems, such as managing turn taking (Murphy, Huang, Montgomery, & Turkstra, 2015), and narrative disorders (Dardier et al., 2011; Marini, Zettin, & Galetto, 2014; Marini et al., 2011).

In recent decades the cognitive aspects underlying pragmatic impairment have also been the subject of growing interest (e.g., Bambini et al., 2016; Cummings, 2009, 2014; Perkins, 2000; Stemmer, 1999). Even if the specific pattern of deficits resulting from traumatic brain injuries may differ widely depending on the lesion site, the type of damage, and the time after injury, individuals with TBI usually suffer from damage to the frontal lobes, resulting in deficits in executive functions, the construct used to describe the ability to manage goal-directed behavior (e.g., Miyake et al., 2000). Executive functions include abilities crucial to the efficient use of communication, such as self-regulation, organization, and planning; some authors have proposed that executive dysfunction is the main cause of pragmatic impairment in TBI (Channon & Watts, 2003; Douglas, 2010; McDonald & Pearce, 1998). Channon and Watts (2003) found TBI individuals to be impaired in the comprehension of indirect speech acts, as well as in executive tasks indexing working memory, inhibition and multitasking. The authors found that only inhibitory processes provided a significant contribution for explaining pragmatic performance in patients with TBI, while no association was found between working memory, multitasking and pragmatic tasks. Douglas (2010) evaluated pragmatic-communication difficulties in TBI individuals using the *La Trobe Communication Questionnaire* (LCQ; Douglas, O'Flaherty, & Snow, 2000), and she also provided different measures of executive skills, i.e. verbal fluency, the ability to maintain and manipulate information, and the speed of verbal processing. The author found that executive skills, in particular verbal fluency, were able to explain approximately a third of the variance in pragmatic performance of TBI individuals.

Communicative-pragmatic impairment in individuals with TBI has also been linked to a deficit in ToM, i.e. the ability to infer others' mental states, such as beliefs and intentions (Premack & Woodruff, 1978). Some authors have argued that ToM plays a critical role in human communication: understanding another person's mental state is essential in order to modify it and to achieve a specific communicative effect, i.e. to induce the partner to believe or to do something (Bosco, Bono, & Bara, 2012; Cummings, 2015; Happé & Loth, 2002; Tirassa, Bosco, & Colle, 2006a, 2006b). Several studies have reported poor comprehension of ToM tasks in individuals with TBI (Bibby & McDonald, 2005; Geraci, Surian, Ferraro, & Cantagallo, 2010; Martín-Rodríguez & León-Carrión, 2010; Milders, Ietswaart, Crawford, & Currie, 2006; Muller et al., 2010; Spikman, Timmerman, Milders, Veenstra, & van der Naalt, 2012), and some authors have suggested that this difficulty may be crucial to understanding their pragmatic impairment (Happé, Brownell, & Winner, 1999; Havet-Thomassin, Allain, Etcharry-Bouyx, & Le Gall, 2006; Martin & McDonald, 2003).

McDonald and Flanagan (2004) assessed a group of individuals with TBI using the Awareness of Social Inference Test (TASIT, McDonald, Flanagan, Rollins, & Kinch, 2003). The authors found

that the ability to understand conversational meaning was closely related to the ability to interpret speakers' intentions, when measured by second-order ToM tasks (but not by first-order ones). First-order ToM tasks investigate a person's ability to infer the mental state of another person (Wimmer & Perner, 1983); second-order ToM tasks investigate the ability to comprehend what a person thinks, knows and or believes about another person's mental state, and they require a greater cognitive load in order to be understood (Perner & Wimmer, 1985). In line with these results, Channon, Pellijeff, and Rule (2005) reported that individuals with closed head injury performed poorly in understanding sarcasm, and that their difficulties were related to their mentalizing abilities, in particular to the incorrect or inadequate appreciation of the mental states of the characters involved in their tasks. Byom and Turkstra (2012) also showed that individuals with TBI used a reduced pattern of mental-state term types, compared to their peers, when conversing with friends about intimate topics.

Very few studies have examined the relationship between ToM and EF in individuals with TBI and tried to disentangle the unique contribution of ToM or executive functions to their communicative-pragmatic performance. Martin and McDonald (2005), for example, found that ToM deficits were not able to predict impaired irony comprehension, while physical inferential reasoning, i.e. the ability to comprehend complex non-mental inferences applying the principles of physical causation to a sequence of events, was a strong predictor. They also measured other cognitive components (including conceptual reasoning, cognitive flexibility and working memory). However, none of them was able to predict participants' ability to comprehend irony.

In a recent study, McDonald et al. (2014) investigated the contribution of executive functions (cognitive flexibility and inhibition) and ToM in TBI individuals, by administering a speech production task in which the patients were presented with different sets of photographs that they had to describe to a partner. The authors found that both executive functions and ToM had a unique effect on the speech production task, but also that cognitive flexibility was the best predictor of pragmatic performance. Moreover, ToM difficulties were able to predict poor performance by patients in language production tasks but only when the tasks implied strong inhibition, such as when participants were asked to think about a specific event from their own perspective, and then inhibit that perspective and switch to someone else's perspective. This result suggests a critical role of inhibition abilities in ToM reasoning (see also Leslie, Friedman, & German, 2004). These findings seem to indicate that theory of mind does play a role in communication, but also that this role tends to decrease when the contribution of executive functions is controlled; the idea of a domain-specific contribution of ToM in predicting pragmatic deficits in individuals with TBI is thus not well supported. In a more recent study, Honan et al. (2015) studied individuals with severe TBI, comparing their performance in everyday conversation with that of healthy controls. In particular, the study, using everyday conversation tasks, investigated whether impaired executive functions could predict ToM deficits. Participants with TBI were compared with controls in tasks demanding low or high ToM in four different experimental conditions: (i) high working memory (WM) (ii) high flexibility (iii) high inhibition and (vi) low cognitive load. The results showed that TBI individuals only performed less well than the control group in high-ToM tasks in the high WM condition. The authors suggested that ToM impairments in everyday communication in individuals with TBI may be attributable to higher demands on WM.

To conclude, there is still a lack of conclusive evidence regarding the nature of the relationship among ToM, executive functions, and pragmatic abilities, and more empirical work is needed.

Download English Version:

<https://daneshyari.com/en/article/5041352>

Download Persian Version:

<https://daneshyari.com/article/5041352>

[Daneshyari.com](https://daneshyari.com)