Journal of Neurolinguistics 39 (2016) 10–25

Contents lists available at ScienceDirect

Journal of Neurolinguistics

journal homepage: www.elsevier.com/locate/jneuroling

Research paper

Assessment of pragmatic impairment in right hemisphere damage

Alberto Parola [a], Ilaria Gabbatore [a, f, *], Francesca M. Bosco [a, b], Bruno G. Bara [a, b], Federico M. Cossa [c], Patrizia Gindri [d], Katiuscia Sacco [a, b, e]

[a] Center for Cognitive Science, Department of Psychology, University of Turin, Italy
[b] Neuroscience Institute of Turin, Italy
[c] Dipartimento di Riabilitazione Neurologica, Fondazione Salvatore Maugeri, Turin, Italy
[d] Presidio Sanitario San Camillo, Turin, Italy
[e] Brain Imaging Group (BIG), Turin, Italy
[f] Faculty of Humanities, Child Language Research Center, University of Oulu, Oulu, Finland

ARTICLE INFO

Article history:
Received 25 March 2015
Received in revised form 15 December 2015
Accepted 18 December 2015
Available online 4 January 2016

Keywords:
Communication
Assessment
Right hemisphere damage
Non-verbal
ABaCo
Pragmatic

ABSTRACT

Aim of the present study is to provide a multifocal assessment of pragmatic abilities in patients with right hemisphere damage (RHD). Pragmatics refers to the ability to use language and non-verbal expressive means (e.g., gestures) to convey meaning in a given context, and it also involves the appropriate use of connotative elements such as rhythm and prosody. Patients with RHD frequently report a wide range of pragmatic disorders: despite the heterogeneity of their clinical profiles, these difficulties can seriously undermine their ability to effectively communicate in everyday situations. We analysed the performance of 17 patients with RHD and 17 healthy controls using the Assessment Battery for Communication, a clinical tool for assessing a wide range of pragmatic phenomena - both in comprehension and production - and considering different expressive means. The results suggest patients have difficulties both in comprehending and producing pragmatic phenomena of differing complexity; in particular, patients seem to be significantly impaired when dealing with non-verbal modality, i.e., gestures and facial expressions. Moreover a hierarchical cluster analysis revealed the presence of a number of clusters corresponding to different outcomes of pragmatic performance, in line with the heterogeneity of communicative profiles following RHD frequently reported in the literature.

1. Introduction

Patients with right hemisphere damage (RHD) frequently report a wide range of communicative disorders that can seriously undermine their ability to effectively communicate in everyday contexts (Mackenzie, Brady, Begg, & Lees, 2001; Cummings, 2014). RHD individuals rarely exhibit deficits that affect the microlinguistic aspects of language, such as phonological, morphological and syntactical aspects (e.g., Brownell, Carroll, Rehak, & WingWeld, 1992; Marini, 2012; Marini, Carlomagno, Caltagirone, & Nocentini, 2005; Tompkins, Fassbinder, Lehman-Blake, & Baumgaertner, 2002), which are generally associated with lesion at the left hemisphere (LHD).

* Corresponding author. Faculty of Humanities, Child Language Research Center, University of Oulu, P.O. Box 1000, 90014 Oulu, Finland.
E-mail addresses: ilaria.gabbatore@oulu.fi, ilariagabbatore@gmail.com (I. Gabbatore).

http://dx.doi.org/10.1016/j.jneuroling.2015.12.003
0911-6044/

By contrast, one of communicative aspects that is most seriously impaired after RHD is the pragmatic one. Pragmatics can be defined as the ability to communicatively act in an appropriate way in a given context (Levinson, 1983), and it involves the appropriate use of a wide range of expressive means, such as language, gestures, proxemics, body movements, facial expressions. Pragmatic ability is thus not limited to the use of linguistic elements (i.e., phonological, morphological and syntactical aspects), but it also requires contextual information and inferential ability, which allow people to fill the gap between the literal and the speaker's meaning of utterances, as for example in the case of indirect speech acts, i.e., "Do you mind opening the door?" and of figurative expressions. It is now established that RHD can compromise the pragmatic domain, undermining patients' ability to understand indirect speech acts (Weylman, Brownell, Roman, & Gardner, 1989), non-literal and figurative expressions such as idioms and proverbs (Brundage, 1996; Papagno, Curti, Rizzo, Crippa, & Colombo, 2006), humour (Cheang & Pell, 2006), lies and jokes (Winner, Brownell, Happe, Blum, & Pincus, 1998), and irony and sarcasm (McDonald, 2000). These studies showed that RHD patients are able to comprehend the meaning of literal sentences whereas they fail to grasp the meaning of non-literal and figurative expressions such as metaphor and irony. The characterization of communicative deficits in RHD patients suggests that the origin of these difficulties can be referred to high-level of language processing: what is compromised is the ability to correctly draw contextual inferences, in order to appreciate the speaker's intention and accomplish the demands of the surrounding communicative context (Gardner, Brownell, Wapner, & Michelow, 1983; Kaplan, Brownell, Jacobs, & Gardner, 1990; Sabbagh, 1999).

Furthermore, impairment in terms of conversational and discursive skills was often detectable in RHD patients, resulting in egocentric and irrelevant responses, tangential comments, digressions from the topic, lack of coherence in discourse and difficulties in respecting turn-taking (Bartels-Tobin & Hinckley, 2005; Chantraine, Joanette, & Ska, 1998; Hird & Kirsner, 2003; Lehman-Blake, 2006; Marini et al., 2005; Myers, 1999; Sherratt & Bryan, 2012).

Moreover, RHD can also lead to a reduction in the ability to understand and produce those paralinguistic elements, such as tone, intonation, rhythm and prosody, which contribute to generate the pragmatic meaning of a communication act (Krauss, 1998; Krauss, Morrel-Samuels & Colasante, 1991; Vaissière, 2005).

Indeed, RHD patients exhibit difficulties in recognizing both linguistic and emotional prosody: difficulties in recognizing emotions from tone of voice and facial expressions (Kucharska-Pietura, Phillips, Gernand, & David, 2003; Shamay-Tsoory, Tomer, Berger, Goldsher, & Aharon-Peretz, 2005), in using prosody to distinguish between different basic speech acts, such as to distinguish between declarative and interrogative sentences (Pell, 1998, 2006), and in recognizing paralinguistic contradictions, namely the inconsistency between the semantic message and the intonational meaning conveyed through an utterance (Tompkins & Mateer, 1985). They also do not adequately modulate prosodic elements to comply with the requests set by the communicative context, producing monotonous or atypical prosodic contours (Lehman-Blake, 2007; Pell, 1999).

Another significant area of impairment in RHD communicative competence seems to be represented by difficulties in the use of non-verbal communicative modality. Most of the studies in the relevant literature evaluated communicative abilities in RHD patients focusingon the linguistic aspects of the pragmatic ability (e.g., Cheang & Pell, 2006; Joanette, Goulet, & Hannequin, 1990; McDonald, 2000), while few researchers have attempted to analyse the role of non-verbal modality, i.e. gesture and facial expressions, in generating communication disorders in RHD patients. Cocks, Hird, and Kirsner (2007) observed a reduction in gesture production during spontaneous conversation in RHD patients, compared to healthy controls, especially when the examiner elicited discourses with an emotional content. Cutica, Bucciarelli, and Bara (2006) analysed the comprehension of gesture during communicative interaction comparing the performance of LHD and RHD patients. The RHD patients exhibited greater impairment in gestural modality compared to the LHD patients: the RHD patients also failed to appreciate the simplest communicative acts (i.e., direct communicative acts) when expressed through gesture. Overall, these studies seem to suggest that RHD can undermine the ability to comprehend and produce the pragmatic aspects of communication when also expressed through non-verbal modality. However, the limited number of studies evaluating non-verbal expressive meaning given RHD do not allow us to draw firm conclusions on the relationship between gestures and language, and further investigations into this aspect are required.

The researches described above highlight that communicative-pragmatic impairments represent a typical outcome following RHD; this supports the hypothesis that communicative competence can be ascribed to the conjoint activity of both hemispheres and overcoming the traditional view which associates it with the linguistic areas of the left hemisphere (e.g., Goodglass & Kaplan, 1983; Tompkins, 1995; Zaidel, Kasher, Soroker, & Batori, 2002). Several recent neuroimaging studies have confirmed that processes are distributed across several brain areas, involving an extended bilateral cerebral network (e.g., Bambini, Gentili, Ricciardi, Bertinetto, & Pietrini, 2011; Mason & Just, 2006).

1.1. Communicative assessment of RHD patients

Some theoretical and methodological issues affect the assessment procedures of communicative-pragmatic abilities in RHD patients.

As previously reported, few pragmatic approaches for assessing acquired communicative deficits have combined the assessment of linguistic abilities with a systematic evaluation of both the comprehension and production of communicative gestures and facial expressions: the assessment tools developed to diagnose communication impairments following RHD, such as the "Right Hemisphere Communication Battery" (RHCB, Gardner & Brownell, 1986), the "Right Hemisphere Language Battery" (RHLB; Bryan, 1995) and the "Batteria sul Linguaggio dell'Emisfero Destro" (Rinaldi, Marangolo, & Lauriola, 2004) have focused on some aspects of communication (i.e., the linguistic and prosodic components) without providing a detailed