

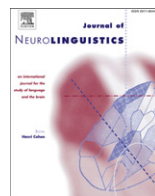


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Theory of mind and language comprehension in schizophrenia: Poor mindreading affects figurative language comprehension beyond intelligence deficits

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ABSTRACT

Patients suffering from schizophrenia have been found to be impaired in their pragmatic abilities in the comprehension of figurative language (e.g., metaphors, ironies, proverbs). Impairments in theory of mind (ToM; that is, the ability to attribute/infer mental states) have been proposed to be underlying high level language understanding. Even though ToM has been shown to be defective in schizophrenia, there is little information about the pattern of relations between ToM and language comprehension (LC) abilities. Our aim in this study is to explore how deficits in ToM concern the LC capacity in schizophrenia when general intelligence is controlled for. A total of 22 Spanish-speaking inpatients and 22 healthy controls matched in age, sex, education and language dominance were assessed using 3 ToM tasks and 6 LC tasks (covering lexical, syntactic, and semantic–pragmatic language processing levels) in order to establish to what extent ToM gets associated with LC abilities. Correlational analysis showed a connection between impairments in ToM and difficulties in LC. A discriminant function analysis showed that the variables that best discriminate between patients and controls are those corresponding to ToM-critical items and figurative LC tasks. Impairments in ToM seem to be mainly associated to LC in the semantic–pragmatic processing level and this association appears to be genuine, non dependent on IQ. In schizophrenia, mindreading impairments contribute negatively to the process of understanding figurative meanings beyond the presence of an impoverished intelligence.

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1. Introduction

Verbal communication usually relies on the transmission of non-literal messages rather than on a direct transmission of literal information. Any deficit in the processing of such pragmatic aspects of language could play an important role in the social isolation and other symptoms experienced by schizophrenic patients. Many studies show that although schizophrenics are able to understand literal language, they have problems understanding non-literal language (see Champagne-Lavau & Stip, 2010). On the other hand, some authors propose that basic structural components of language (Martin & McDonald, 2003) and basic language comprehension (Cutting, 1985; Frith & Allen, 1988) are rather intact in this disorder, suggesting that only high level language processing is affected in schizophrenia. That is, the level whereby numerous cognitive systems interact in order to succeed in communicative acts.

Theory of Mind (ToM) is one of those cognitive systems, defined as the natural capacity to attribute mental states to oneself and others in order to explain and predict behaviour in social interaction (Baron-Cohen, Tager-Flusberg, & Cohen, 1993). It is the ability that allows our minds to entertain what we and other people are thinking in regard to beliefs and intentions. ToM ability has been found impaired in schizophrenia in studies with different languages and tasks (Brüne, 2003, 2005a; Corcoran, Mercer, & Frith, 1995; Gavilán & García-Albea, 2007, 2008; Langdon et al., 1997; López-Herrero, Lara, López, López, & García, 2007; Mazza, DeRisio, Surian, Roncone, & Casacchia, 2001; Pousa et al., 2008; Sarfati, Hardy-Baylé, Nadel, Chevalier, & Widlöcher, 1997), even if its dysfunction seems to be overlapped with other deficient processes such as executive functions, cognitive flexibility (Champagne-Lavau & Stip, 2010), or general intelligence (Brüne, 2003; Pickup & Frith, 2001).

Figurative language requires the pragmatic skills to process more than the literal meaning conveyed by an utterance in order to grasp the speaker's intention in a given context, and to decide whether a sentence means what is said or more than what is said (Champagne-Lavau & Joannette, 2009). Very recently, a number of researchers have paid attention to the relationship between ToM ability and the ability to understand figurative language in schizophrenia with the discovery that both capacities show a significant correlation (Brüne & Bodenstein, 2005; Herold, Tenyi, Lenard, & Trixler, 2002; Langdon, Coltheart, Ward & Catts, 2002; Langdon, Davis & Coltheart, 2002; Mo, Su, Chan, & Liu, 2008). More specifically, Langdon, Coltheart et al. (2002) found that the understanding of metaphors and the understanding of irony made significant and independent contributions when it comes to distinguishing between schizophrenics and controls, suggesting that metaphor and irony exert distinct pragmatic demands. On the other hand, Herold et al. (2002) found that remitted patients who had earlier suffered from acute paranoid schizophrenia showed a significant impairment in irony tasks performance, but not so in metaphor tasks when compared to control groups. These results suggest that the impairment of irony comprehension persists longer in the course of the illness when symptoms remit. By contrast, Mo et al. (2008) recently found a correlation between the performance in second-order ToM tasks and the interpretation of metaphors in remitted schizophrenic patients, even if they didn't find any correlation with the interpretation of ironies. This finding sounds paradoxical, given that not all types of non-literal language have the same communicative function and comprehension demands, as Champagne-Lavau and Stip (2010) point out. In order to understand a metaphor, the listener doesn't have to take into account the speaker intentions per se (at least not to the same extent as in the understanding of ironies), but it will be sufficient to recognize similarities and differences between source and target conceptual domains (Winner & Gardner, 1993).

With regard to proverbs, two recent studies found correlations between ToM deficits and impaired proverb interpretation. Greig, Bryson, and Bell (2004) found a significant negative correlation between ToM performance and thought disorder as measured by the proverbs tasks (Gorham Proverb Test; Gorham, 1951). Likewise, Brüne and Bodenstein (2005) found a strong correlation between ToM ability and the ability to adequately interpret figurative language conveyed by proverbs.

Taken together, the above-mentioned studies relate impaired ToM to a deficit in the comprehension of metaphoric, ironic and proverbial statements in schizophrenia, even though the results are not conclusive when it comes to connecting the type of functional relationship between ToM and

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