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Social cognition after head injury: Sarcasm and theory of mind

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Abstract

Closed head injury (CHI) is associated with communication difficulties in everyday social interactions. Previous work has reported impaired comprehension of sarcasm, using sarcastic remarks where the intended meaning is the opposite of the sincere or literal meaning. Participants with CHI in the present study were assessed using two types of sarcastic items, those with a directly opposite meaning and those with an indirect, non-literal but not directly opposite meaning. The CHI group was differentially poorer at comprehending sarcastic versus sincere remarks, although type of sarcastic materials did not influence performance. Errors involved not only literal interpretations, but also incorrect non-literal interpretations. Theory of mind (mentalising) was also assessed by comparing comprehension of human actions with control physical events. The CHI group was selectively impaired on the mentalising component of this task, and mentalising scores correlated with sarcasm comprehension. The implications of the findings for our understanding of impaired sarcastic comprehension after acquired brain injury are discussed.

Keywords: Social cognition; Frontal lobes; Theory of mind; Mentalising; Pragmatic; Sarcasm

1. Introduction

The interpretation of much of what people say and do is affected by the social context in which it takes place, i.e., the setting, the people present, the relationship between them, and their beliefs and intentions. Research to date has shown that processing pragmatic communications involving non-literal meanings such as indirect requests, humour, deception and sarcasm may pose particular difficulties after brain injury, despite intact ability to process syntactic and semantic aspects of language. Ability to interpret pragmatic language appropriately in social interactions is fundamental to successful functioning in many aspects of everyday life, and is commonly disrupted by brain damage. Impairment in processing pragmatic materials including the interpretation of ambiguous advertisements, story vignettes including lies, sarcasm, humour and so on has been reported in adults with right hemisphere lesions (e.g., Brownell, Simpson, Bihrle, Potter, & Gardner, 1990; Winner, Brownell, Happé, Blum, & Pincus, 1998), and more recently in those with frontal lobe lesions and closed head injury (CHI) (e.g., Channon & Crawford, 2000; Pearce, McDonald, & Coltheart, 1998; Shamay, Tomer, & Aharon-Peretz, 2002). In addition to the above studies, which have concentrated on impaired pragmatic language processing in clinical populations where language development was normal until adulthood, pragmatic difficulties have also been described in children after CHI (e.g., Dennis, Purvis, Barnes, Wilkinson, & Winner, 2001) and in neurodevelopmental disorders, particularly autism (e.g., Dennis, Lazenby, & Lockyer, 2001; Ozonoff & Miller, 1996) and schizophrenia (e.g., Corcoran et al., 1995; Mitchley, Barber, Gray, Brooks, & Livingston, 1998). Other neurodevelopmental disorders such as Williams syndrome and Prader–Willi syndrome have also been associated with difficulties in pragmatic language processing (e.g., Sullivan, Winner, & Tager-Flusberg, 2003).

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CHI is of particular interest from the point of view of adult-acquired deficits in social cognition, since it is associated with marked difficulties in social communication, with impaired processing of pragmatic materials despite intact primary language abilities (e.g., Brooks, Campsie, Symington, Beattie, & McKinlay, 1986; McDonald, 2000). Impairment in processing pragmatic meaning appropriately according to the social context has been reported after CHI in adults using a range of materials (e.g., Bara, Tirassa, & Zettin, 1997; McDonald & Pearce, 1996). Studying CHI thus provides an opportunity to examine processes underpinning pragmatic language deficits.

Sarcasm is a common and relatively complex form of pragmatic communication. Varying definitions of sarcasm and irony appear in the literature, beyond the scope of the present discussion; some refer to sarcasm and irony interchangeably, some treat sarcasm as one form of irony, and others separate the two, for instance with the distinction that sarcasm is targeted at a particular victim, whereas irony is not (see, e.g., Gibbs, 2000; Jorgensen, 1996; Katz, 2000; Kreutz & Glucksberg, 1989; McDonald, 1999). In our use of the term 'sarcasm' here, we refer to remarks made with negative or critical intent, where there is an indirect meaning, i.e., a discrepancy between the literal meaning of the words and the social context. Early models of pragmatic language comprehension postulated that literal meanings were automatically processed before indirect meanings could be accessed (e.g., Grice, 1975), based on detecting contradiction between the social context of the remark and the literal meaning. Others have disputed whether literal meanings are necessarily processed and interpreted before non-literal meanings. For instance, Giora (1999) argued that the most salient meaning in the relevant context was processed, whether or not this was the literal meaning. Dews and Winner (1995) suggested that the literal meaning was processed, but not replaced; rather, this literal meaning contributed to the interpretation of the indirect meaning in the social context, for instance by colouring negative meanings so that they are perceived to be less critical. It has also been argued that comprehension is driven by the social context, such that neither the literal nor salient meaning is necessarily processed if a sufficiently rich context cues interpretation of the correct indirect meaning (see, e.g., Gibbs, 2002; for a discussion).

Developmental models of pragmatic comprehension have postulated stages of processing that depend upon the complexity of the materials. The most commonly used form of sarcasm involves reversal of the direct meaning. This type of sarcasm is referred to here as 'direct sarcasm,' and has been labelled differently by different authors; Grice (1989) referred to it as "antiphrastic irony," Dews et al. (1996) as "direct irony," and Bucciarelli, Colle, and Bara (2003) as "simple irony." Sarcastic remarks are also made with more indirect meanings (i.e., different from, but not directly opposite to, the literal meaning), referred to here as "indirect sarcasm"; this type of sarcasm has been labelled "indirect irony" (Dews et al., 1996) or "complex irony" (Bucciarelli et al., 2003). For example, Bosco et al. (2004) gave the following example: "Alex takes out from a toaster two completely burned pieces of toast. Mary arrives and Alex asks with a puzzled expression: 'Am I a good cook?' Mary answers... " 'The best cook in the world!' ("simple irony," referred to here as direct sarcasm) or 'I'll hire you in my restaurant' ("complex irony," referred to here as indirect sarcasm). There is some evidence of developmental stages in the comprehension of these two types of sarcastic remark. For instance, Dews et al. (1996) reported that young children (aged 6–7) did not appreciate the perceived funniness of the more subtle type of indirect sarcasm in the same way as older children (8–9) and adults. Children aged 6–10 have been found to show better comprehension of simpler speech acts including direct versus indirect sarcasm (Bosco and Bucciarelli, reported in Bosco et al., 2004), and a similar pattern was found for children aged 6–8 for direct versus indirect sarcasm where facial and body gestures rather than words were used to indicate sarcasm (Bosco et al., 2004). It is not clear whether the distinction between direct and indirect forms of sarcasm reported in children at different developmental stages applies to adults with acquired brain injury, since comprehension of indirect sarcasm has not been explored with the latter group. There is evidence of impairment in adults with traumatic brain injury in the comprehension of direct sarcastic remarks, compared to sincere, non-sarcastic remarks (McDonald & Pearce, 1996). The present study was designed to compare comprehension of both direct and indirect sarcastic remarks in adults with acquired brain injury after CHI.

Previous work assessing comprehension of direct sarcasm found that CHI was associated with literal errors, and interpreted this as support for the view that the literal meanings of the sarcastic remarks were processed before non-literal meanings (McDonald & Pearce, 1996). If CHI leads to literal errors in interpreting sarcasm, this indicates failure to appreciate the non-literal nature of the communication. However, Gibbs (2002) argued that literal errors in this study were a function of the particular materials used. The sarcastic stimuli consisted of two statements, such as 'Mark: "What a great football game," followed by Wayne: "Sorry I made you come." Yes/no answers were used to assess comprehension. Gibbs pointed out that there was no particular reason to make an inference other than the obvious literal one in relation to the first statement, and that a failure to re-evaluate this when followed by a contradictory statement such as the example above would therefore lead to an erro-