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Recognition of emotional and nonemotional facial expressions: A comparison between Williams syndrome and autism

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ABSTRACT

The aim of our study was to compare two neurodevelopmental disorders (Williams syndrome and autism) in terms of the ability to recognize emotional and nonemotional facial expressions. The comparison of these two disorders is particularly relevant to the investigation of face processing and should contribute to a better understanding of social behaviour and social cognition. Twelve participants with WS (from 6;1 to 15 years) and twelve participants with autism (from 4;9 to 8 years) were matched on verbal mental age. Their performances were compared with those of twelve typically developing controls matched on verbal mental age (from 3;1 to 9;2). A set of five tasks assessing different dimensions of emotional and nonemotional facial recognition were administered. Results indicated that recognition of emotional facial expressions is more impaired in Williams syndrome than in autism. Our study comparing Williams syndrome and autism over a small age range highlighted two distinct profiles which call into question the relationships between social behaviour/cognition and emotion perception.

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This study investigated the ability of children with Williams syndrome and children with autism to identify emotions on the basis of facial expressions. Emotions play a significant role in behaviour and, more generally, in social cognition. “Social cognition” can be defined as the processing of any information that is relevant to guiding social behaviour. As pointed out by Adolphs et al. (1999), social cognition “concerns the perception, attention to, memory for, and thinking about other people, and in a way that involves emotional and/or motivational processing”. As far as emotion processing is concerned, after perceiving the face, we draw inferences about the social meaning of the facial information. As emotions play an important role in social relationships and social behaviour, it is interesting to study Williams syndrome (WS) and autism (AUT), as these two neurodevelopmental disorders exhibit contrasting social behaviours. WS subjects are socially engaged and interested in others, even unfamiliar persons, and are particularly attracted to human faces, while individuals with AUT exhibit deficits in social interaction and prefer inanimate objects to human faces. Because of their distinct social phenotypes, the comparison between these two neurodevelopmental disorders is particularly relevant when investigating facial emotion processing and should contribute to a better understanding of social behaviour and social cognition.

Williams syndrome (WS) is a rare genetic disorder (1 in 20,000–25,000 live births) resulting from the deletion of a section of chromosome 7. People with WS are unusually social, friendly and empathic, and exhibit considerable sociability (Dykens & Rosner, 1999; Gosh & Pankau, 1997; Martens, Wilson, & Reutens, 2008; Porter, Coltheart, & Langdon, 2007; Sarimski, 1997; Tager-Flusberg & Sullivan, 1999). WS individuals extend their overtly friendly behaviour to unfamiliar people by engaging them. This positive social bias is thought to affect their perception of facial expressions of emotions, leading to more positive interpretations of facial expressions than would be made by other participants. Studies on the identification of emotions (Bellugi, Wang, & Jernigan, 1994; Gagliardi et al., 2003; Wang, Doherty, Rourke, & Bellugi, 1995) indicated that participants with WS perform better than typical children with the same mental age (MA) and similarly to typical children with the same chronological age (CA) and typical adults. More recently, Plesa-Skwerer, Faja, Schofield, Verbalis, and Tager-Flusberg (2006) looked at the sensitivity of WS participants to positive or negative emotions. Adolescents and adults with WS scored similarly to language- and IQ-matched individuals with mental retardation, and both groups performed more poorly than typical controls on negative emotions, though at the same level on happiness. Plesa-Skwerer, Verbalis, Schofield, Faja, and Tager-Flusberg (2006) used the revised “eyes” task, which requires participants to distinguish between positively and negatively valenced mental states (e.g. friendly/unfriendly). People with WS performed significantly more poorly than the typical group and the learning/intellectual disabilities group. Unlike facial identity recognition, facial emotion recognition is not a spared ability in WS. More recently, Porter et al. (2007) studied the recognition of facial emotion expressions in individuals with WS and results indicated that WS performances were similar to those of the MA group and better than those of the DS group, but poorer than those of the CA group. Negative emotions were often identified as positive ones. The authors attributed this result to the positive social bias arising from a sociable personality.

In terms of autism (AUT), a pervasive neurodevelopmental spectrum disorder of varying degrees of severity, with onset prior to age three, the interpretation of the results is still controversial, depending on the method used and the heterogeneity of the autistic samples. In general, autism is characterised by a core deficit in social interaction, communication and imagination (American Psychiatric Association, 1994) and more specifically by impairments in the processing of social and emotional information (Baron-Cohen, Tager-Flusberg, & Cohen, 1993; Dawson, Meltzoff, Osterling, Rinaldi, & Brown, 1998; Teunisse & de Gelder, 1994), responses to the emotional displays of others (Sigman, Kasari, Kwon, & Yirmiya, 1992) and face recognition (Dawson, Carver, Meltzoff, Panagiotides, McPartland, & Webb, 2002; Klin et al., 1999). More specifically, children with AUT perform better when they have to recognize simple emotions related to external situations (happiness and sadness) than when they have to recognize those related to internal cognition, such as surprise and embarrassment (Baron-Cohen, Spitz, & Cross, 1993; Capps, Yirmiya, & Sigman, 1992; Yirmiya, Sigman, Kasari, & Mundy, 1992). Moreover, they are less sensitive to negative emotions, such as distress, fear and discomfort (Sigman et al., 1992). People with AUT have difficulty recognizing, identifying and understanding the significance of emotions (Celani, Battacchi, & Arcidiacono, 1999; Hobson, Ouston, & Lee, 1989; Loveland et al., 1995). Recently, Castelli (2005) indicated that children with AUT are just as

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