



Theory of mind understanding and empathic behavior in children with autism spectrum disorders



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ARTICLE INFO

Article history:

Received 12 March 2014

Received in revised form 14 May 2014

Accepted 14 May 2014

Keywords:

ASD (autism spectrum disorder)

Theory of mind

Empathy

False belief test

Emotional contagion

ABSTRACT

This paper begins with a review of past research on theory of mind and empathy in children with ASD. Using varied operational definitions of empathy ranging from physiological heart rate through story vignettes to reports by privileged observers (e.g., teachers) of children's empathic behavior, results of previous studies are limited and contradictory. Thus new evidence is needed to answer two key questions: Are children with ASD less empathic than typically developing children? Do individual differences in theory of mind (ToM) understanding among children with ASD predict differences in their behavioral empathy? An original empirical study of 76 children aged 3–12 years (37 with ASD; 39 with typical development) addressed these. Results showed that children with ASD were significantly less empathic, according to their teachers, than typically developing children. However, this was not because of their slower ToM development. Findings showed equally clearly that ToM understanding was unrelated to empathy in children with ASD. The same was true for typically developing children once age and verbal maturity were controlled. Indeed, even the subgroup of older children with ASD in the sample who passed false belief tests were significantly less empathic than younger preschoolers who failed them.

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1. Introduction

Theory of mind (ToM) is the understanding of how subjective mental states, including thoughts and feelings that are at odds with objective reality, shape human behavior. ToM develops early in children without disabilities but is slow to emerge in children and adolescents with autism spectrum disorder (ASD). Using standard false belief tests requiring inferences about how people with wrong information will behave, few 3-year-olds understand ToM but by age 5 success is so widespread in typically developing groups as to suggest that “understanding of belief and, relatedly, understanding of mind exhibit genuine conceptual change in the preschool years” (Wellman et al., 2001, p. 655). By contrast, most high-functioning children with autism continue to fail false belief tests not only throughout early and middle childhood but into the teens. For example one comprehensive review (Happé, 1995) suggested that a chronological age of 13 years and/or a verbal mental age (VMA) of 9 are needed for a majority of those with ASD to pass.

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In theory, these ASD-specific delays in cognitive understanding of the human mind might be echoed at the behavioral level by difficulties with interpersonal relationships, including conversation (de Rosnay et al., 2014; Peterson et al., 2009; Frith et al., 1994), peer interaction (Dissanayake and Macintosh, 2003) and empathic responsiveness (Charman et al., 1997; Yirmiya et al., 1992). Indeed some theorists have equated ToM conceptually with “cognitive empathy” (e.g., Baron-Cohen and Wheelwright, 2004), arguing that “empathy involves understanding the other's feelings” (p. 164). Yet, surprisingly, the empirical evidence seeking correlations between scores on tests of ToM understanding and measures of empathic behavior in children with and without ASD is limited and uncertain, at best, as will be reviewed below.

One key issue relates to the operational definition of empathy. Unlike ToM, which has a well-accepted operational definition as success on standard false belief tests (e.g., Wellman et al., 2001) or on equivalent laboratory ToM measures (e.g., Peterson et al., 2012), operational definitions of empathy are highly variable from study to study, perhaps helping to explain the many inconsistencies across studies in empirical answers to very fundamental questions. Despite general agreement, in theory, with Hoffman's (1987) classic conceptual definition of empathy as emotional contagion or the empathic experience of “an affective response more appropriate to someone else's situation than one's own” (p. 48), the research

paradigms used to measure empathy have varied widely from study to study. As a result, even such basic questions as whether or not individuals with ASD are less empathic than control groups have not yet been convincingly empirically answered. A persuasive empirical answer is even less evident to a related question that is central to the empirical section of this paper. This is whether or not achieving a false-belief-based understanding of ToM is linked with greater empathy in children with ASD.

In studies of children and adolescents with ASD, the following seven operational meanings, (or types of empathy assessment), have commonly been employed: (a) direct behavioral observation in structured settings (e.g., by watching how the child being tested reacts when an experimenter feigns an injury—say by hitting herself with a hammer: e.g., Charman et al., 1997; Sigman et al., 1992), (b) physiological reactivity (e.g., changes in heart rate as a function of exposure to a film of someone being hurt: Sigman et al., 2003), (c) affect matching to hypothetical story vignettes (e.g., Yirmiya et al., 1992), (d) guessing the unexpressed thoughts and feelings of real-life conversational partners (e.g., Ponnet et al., 2005), (e) self-reports of emotional reactions to watching (or being responsible for) others' distress (e.g., Jones et al., 2010), (f) reports by third-parties (teachers, parents or peers) of the child's general disposition to behave empathically (e.g., Astington and Jenkins, 1995; Strayer and Roberts, 2004), and (g) frequency tallies, reported by parents or teachers, of how often specifically targeted empathic behaviors occur (e.g., Dadds et al., 2008).

Given this wide variety of operational definitions and meanings, it is perhaps not surprising that research results are inconsistent and unclear. However, the upshot is that convincing empirical support for two commonly held assumptions about ASD and empathy has not yet been supplied. It is often taken for granted by clinicians, parents and individuals with ASD themselves that people with ASD are less empathic in everyday life than those without ASD. Existing empirical evidence on this issue, however, is surprisingly sparse and unclear, as will be reviewed next. A second question is even more vexed: Do individual differences among children with ASD in ToM understanding relate to how empathically these children behave in their everyday lives? After reviewing the existing evidence and finding it both limited and contradictory, an original empirical study of this question is reported in the second half of this paper.

1.1. Past research on autism-specific empathy deficits

Several studies have measured empathic behavior directly in children with ASD using structured observation. For example, in a study of 20-month-olds at high risk of developing ASD, Charman et al. (1997) measured the toddlers' reactions to an adult's feigned injury. They defined empathy operationally as looking at the experimenter while she grimaced and articulated her distress after, for example, whacking her finger with a toy hammer. (Lack of empathy was recorded, conversely, when the child failed to look either at the experimenter's face or at the offending toy). By this measure, the toddlers at risk of ASD showed less empathy than typically developing controls. The same was found in an earlier study of 42-month-old preschoolers (Yirmiya et al., 1992). However, if more than mere looking is required as evidence that the child is affectively sharing the adult's distress (in line with Hoffman's (1987) above definition of empathy) then results for children with ASD are very different. In the same adult-injury paradigm, Yirmiya et al. (1992) found that the preschoolers with ASD scored as at least as empathic as their typically developing peers on a more complex empathy index requiring some form of explicit comforting or expressing of concern. In fact, 21% of those with ASD actively comforted their "injured" mother and 7% comforted the "injured"

experimenter as compared with only 10% and 0% respectively in the typically developing control group.

Physiologically, too, there is little evidence to support the presumption that children with ASD lack empathy. Sigman et al. (2003) compared children with ASD to age-matched controls as they watched videotapes of either a crying baby or one who was playing happily. There were no group differences either physiologically (heart rate) or behaviorally. Furthermore, as compared with their own baseline control (the happy baby), the ASD group displayed clear physiological and behavioral evidence of empathy via cardiac deceleration and attentive visual fixation at the infant in distress.

Ponnet et al. (2003) videotaped adult participants with high-functioning ASD as they conversed spontaneously with a typically developing stranger. Later, privately, each conversational partner had to write down what their unexpressed thoughts and feelings had been during that conversational interaction. Using these true records as scoring criteria, the measure of empathy was how completely and accurately each participant performed when asked to guess the unexpressed thoughts and feelings of his or her dyadic interaction partner. The individuals with ASD were found to score just as highly in making these accurate inferences as the non-ASD participants. Furthermore, additional analyses revealed this was not because those with ASD had unusual thoughts that were difficult for a typically developing person to understand.

Using a parent-report methodology in place of behavioral observation, Hudry and Slaughter (2009) gave mothers of children with ASD, Down Syndrome or typical development a questionnaire describing a series of everyday situations where empathic behavior might occur (e.g., the mother was asked to imagine or remember how her child reacted when she herself was engaging an angry conversation with someone else over the telephone). In addition to empathy for the mother, the questionnaire assessed empathy toward peers (e.g., via an item describing another child falling down and crying out in pain) as well as empathy to strangers (e.g., one who felt ill). As in Sigman et al.'s (1992) direct behavioral observations, empathy was infrequent. Hudry and Slaughter found that even the mothers of typically developing control children believed it would be unusual for their child to engage in any explicitly empathic behavior such as becoming upset when the other person was, or actively comforting that person. In fact, across typical and atypical groups of children alike, only 35 percent of reports included mention of any explicit empathy or comforting at all. Nevertheless, the children with ASD were perceived to do so just as often as IQ-matched control children with Down's Syndrome. Hudry and Slaughter likewise found those with ASD equalled the young typically developing children with whom they were matched by verbal/intellectual maturity. However the chronologically matched older typical developers significantly outperformed each of these other three groups in one specific facet of empathy, namely their verbal expressions of concern.

In another parent-report study, Dadds et al. (2008) asked the parents of more than 2000 Australian children aged 4–16 years about the perceived frequency of their children's empathic behavior via responses to questionnaire items like "my child cries when seeing another child cry", "my child can't understand why other people get upset" and "my child doesn't seem to notice when I get sad (reverse scored)". Factor analysis revealed two distinct item clusters. The first factor labeled "cognitive empathy" included items about understanding others' feelings while the other "affective" factor had items like feeling sad when watching sad movies or sharing fear with someone screaming. There was no statistically significant correlation between the two factors ($r = .07$), indicating that affective empathy (meeting Hoffman's above definition) is factorially distinct, at least in typically developing children, from the emotion understanding known as "cognitive empathy" that

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