

# Who Cares? Revisiting Empathy in Asperger Syndrome

Kimberley Rogers · Isabel Dziobek ·  
Jason Hassenstab · Oliver T. Wolf · Antonio Convit

Published online: 12 August 2006  
© Springer Science+Business Media, Inc. 2006

**Abstract** A deficit in empathy has consistently been cited as a central characteristic of Asperger syndrome (AS), but previous research on adults has predominantly focused on cognitive empathy, effectively ignoring the role of affective empathy. We administered the Interpersonal Reactivity Index (IRI), a multi-dimensional measure of empathy, and the Strange Stories test to 21 adults with AS and 21 matched controls. Our data show that while the AS group scored lower on the measures of cognitive empathy and theory of mind, they were no different from controls on one affective empathy scale of the IRI (empathic concern), and scored higher than controls on the other (personal distress). Therefore, we propose that the issue of empathy in AS should be revisited.

**Keywords** Empathy · Asperger syndrome · Autism · Theory of mind · Social cognition

## Introduction

The capacity to empathize with others is undeniably a revered characteristic in our society. Empathy is

thought to be a motivating factor for unselfish, prosocial behavior (Eisenberg & Miller, 1987). Conversely, a lack of empathy is related to antisocial behavior (Bjorkqvist, Osterman, & Kaukiainen, 2000; Geer, Estupinan, & Manguno-Mire, 2000).

Empathy broadly refers to our reaction to the observed experiences of others (Davis, 1980). Previous investigators and theorists have taken two main approaches to the study of empathy. The first approach emphasizes “cognitive empathy” (Kohler, 1929; Mead 1934; Piaget, 1932), which can be defined as the process of understanding another person’s perspective (Davis, 1983). The second approach emphasizes “affective empathy” (Eisenberg & Miller, 1987; Hoffman, 1984; Mehrabian & Epstein, 1972), defined as an observer’s emotional response to the affective state of others (Davis, 1983). Recently, researchers have adopted a more multi-dimensional approach, acknowledging that both components are an integral part of empathy. This approach views the cognitive and affective components of empathy as two separate, but related constructs (Davis, 1980, 1983).

Impairments in empathy have often been cited as a characteristic of Asperger syndrome (AS) (e.g., Baron-Cohen & Wheelwright, 2004; Blacher, Kraemer, & Schalow, 2003; Gillberg, 1992; Wing, 1981). AS is listed among the pervasive developmental disorders in the DSM-IV (American Psychiatric Association 1994). It is characterized by impairments in social interactions and by the presence of restricted interests and behaviors (Asperger, 1944). AS is differentiated from high-functioning autism (HFA) by the absence of any significant delay in language or cognitive development (American Psychiatric Association, 1994).

---

K. Rogers · I. Dziobek · J. Hassenstab · A. Convit (✉)  
Millhauser Laboratories (MHL-400), Center for Brain  
Health, New York University School of Medicine, 550 First  
Avenue, New York, NY 10016, USA  
e-mail: antonio.convit@med.nyu.edu

O. T. Wolf  
Institute of Experimental Psychology, University of  
Dusseldorf, Dusseldorf, Germany

A. Convit  
Nathan Kline Institute, Orangeburg, NY, USA

It has been proposed that AS, as well as HFA and pervasive developmental disorder—not otherwise specified, belong to a broader group of “disorders of empathy” (Gillberg, 1992). However, relatively few studies have attempted to assess the empathic capabilities of individuals with AS.

Yirmiya, Sigman, Kasari, and Mundy (1992) assessed empathy in high-functioning children with autism and unaffected controls using videotaped vignettes that showed children experiencing different emotions. After viewing each vignette, the children were asked what emotion was being displayed in the video and to report what emotion he or she felt on watching it. Matching responses were scored as being more empathic. Although the children with autism scored significantly lower than the controls, the authors still felt the autistic children demonstrated some empathic skills and state in the discussion that the children with autism performed “surprisingly well” and “showed considerable ability...to respond empathetically to the feelings of others.”

Travis, Sigman, and Ruskin (2001) found similar results using puppets to enact the vignettes. Again, the autistic group scored significantly lower than the control group. In this case the authors qualified their findings by arguing that the puppet vignettes may have been too artificial to evoke true empathic responses. Furthermore, they state that while the children in the autistic group may have experienced empathic feelings, they may not have had enough self-awareness to report these feelings.

To date, the only report where both affective and cognitive empathy were examined in adults with AS is a case report of two individuals (Shamay-Tsoory, Tomer, Yaniv, & Aharon-Peretz, 2002). Although these particular individuals scored lower than controls on both self-report measures of cognitive and affective empathy, few conclusions can be drawn from a single case report and further research assessing both components of empathy is needed.

Recent research examining the empathic capabilities of adults with AS has not attempted to distinguish between cognitive and affective empathy. Baron-Cohen and Wheelwright (2004) reported lower scores on a self-report measure, the empathy-quotient (EQ), among individuals with AS/HFA relative to age-matched controls. However, it should be noted that the EQ does not differentiate between affective and cognitive empathy as the authors argue that the cognitive and affective components of empathy cannot be disentangled. In addition, as the authors point out, many of the items on the EQ tap what could be described as theory of mind (ToM).

Theory of mind can be defined as the ability to understand the feelings, intentions, and motivations of others (Premack & Woodruff, 1978). This definition of ToM is remarkably similar to the concept of cognitive empathy (understanding another person’s perspective or feelings) and for this reason, “cognitive empathy” and “ToM” are often used synonymously (e.g., Baron-Cohen & Wheelwright, 2004; Royeurs et al., 2001). Some researchers have also used the term “empathy” interchangeably with “ToM,” furthering confusion about the distinction between the two (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Gillberg, 1992; Kaland et al., 2002; Roeyers, Buysse, Ponnet, & Pichal, 2001).

The lack of a clear distinction between empathy and ToM may have led to an incomplete understanding of the empathic abilities of individuals with AS. Many reports on the empathic deficits of individuals with AS are actually based on impairments in ToM (Gillberg, 1992; Roeyers et al., 2001). However, to date, there have been no studies looking at the relationship between either cognitive or affective empathy and ToM, leaving unsettled whether these terms are equivalent or not. While ToM appears to be roughly equivalent to cognitive empathy, it does not appear to be related to affective empathy. It is possible that an individual could lack one component of empathy but maintain normal levels of the other component. Therefore, claims of impairments in empathy based solely on assessments of ToM may be misleading, as they likely portray an incomplete picture.

Given the current state of development of the field proposing that empathy is multi-dimensional in nature, more comprehensive research investigating both the cognitive and affective components of empathy is needed in individuals with AS. Moreover, to more fully understand the nature of empathy in AS, the relationship between empathy and ToM needs to be clarified.

The present study had two goals: (1) to investigate both cognitive and affective empathy in AS and (2) to attempt to clarify the relationship between ToM and empathy. We used the Interpersonal Reactivity Index (IRI) (Davis, 1983), which is the only measure of empathy that we are aware of that incorporates both cognitive and affective dimensions. We also administered a measure of ToM, the Strange Stories test (Happé, 1994) to allow the comparison between measures of ToM and empathy. We chose to examine a group of high-functioning adults with AS, a group with normal language development and intellectual functioning, which would allow us to more easily interpret the results of the testing.

**Methods**

**Participants**

Participants in this study were part of a larger study on social cognition in AS (Dziobek et al., 2006). All participants gave informed written consent and the research protocol was approved by the IRB of the New York University School of Medicine.

Twenty-one adults with AS participated in the study. Participants were recruited from local support groups or were referred by specialized clinicians. All individuals met the DSM-IV diagnostic criteria for AS. The clinical diagnostic interview was videotaped and used to reach a consensus diagnosis when needed. The Autism Diagnostic Interview—Revised (Lord, Rutter, & Le Couteur, 1994), a semi-structured diagnostic interview, was also used in 16 AS participants who had available parental informants.

Individuals with AS were matched with 21 control participants on age, gender, education, and IQ. Participants in the control group were healthy volunteers participating in ongoing studies of normal aging at the NYU School of Medicine’s Center for Brain Health.

A measure of general intellectual functioning was obtained using the Shipley Institute of Living Scale, a test consisting of a vocabulary subtest and an abstraction subtest (Zachary, 1940). Scores from the Shipley can be used as an estimate of WAIS Full-Scale IQ scores (Zachary, Paulson, & Gorsuch, 1985).

The demographic characteristics of the participant groups are listed in Table 1. There were no significant differences between groups in age, education, gender, or estimated WAIS IQ.

**Measures**

To assess empathy multi-dimensionally, we administered the IRI (Davis, 1983). A modified version of the Strange Stories task (Happé, 1994) was used to assess ToM abilities.

**Table 1** Mean scores and standard deviations of the demographic characteristics of both groups

| Variable          | Group                      |                  |
|-------------------|----------------------------|------------------|
|                   | Asperger syndrome (n = 21) | Control (n = 21) |
| Age (years)       | 42.9 ± 10.6                | 41.9 ± 13.8      |
| Education (years) | 16.7 ± 1.6                 | 16.1 ± 1.7       |
| Percent female    | 18%                        | 18%              |
| Estimated WAIS IQ | 121.8 ± 6.8                | 120.6 ± 9.0      |

Values given as M ± SD

*The Interpersonal Reactivity Index*

The IRI (Davis, 1983) is a 28-item self-report questionnaire that measures both of the components of empathy. To date, it is the only published measure that allows for the multi-dimensional assessment of empathy. Participants respond to each item using a 5-point Likert-type scale ranging from (0) does not describe me well to (4) does describe me well. The questionnaire contains four 7-item scales (two cognitive scales and two affective scales). The two cognitive scales are the perspective taking scale (PT) and the fantasy scale (F). The PT scale assesses the tendency to spontaneously adopt the psychological point of view of others (e.g., I try to understand my friends better by imagining how things look from their perspective). The F scale measures the respondents’ tendency to identify with fictional characters, such as characters in books, movies, or plays (e.g., When I watch a good movie, I can very easily put myself in the place of a leading character). The two affective scales are the empathic concern scale (EC) and the personal distress scale (PD). The EC scale taps the respondents’ feelings of warmth, compassion, and concern for others (e.g., I often have tender, concerned feelings for people less fortunate than me). The PD scale assesses self-oriented feelings of anxiety and discomfort resulting from tense interpersonal settings (e.g., being in a tense emotional situation scares me). Individual scores are calculated for each subscale. Full-scale scores are not calculated as each scale has been shown to measure a discrete component of empathy (Davis, 1983).

The factor structure of the IRI was confirmed in a study of female dieticians (n = 217) and dietetic interns (n = 168) (Spraggins, Fox, & Carey, 1990). The IRI has good internal consistency, with alpha coefficients ranging from 0.68 to 0.79 (Christopher, Owens, & Stecker, 1993; Davis, 1980). Furthermore, the IRI has been shown to correlate with other measures of empathy, providing support for the construct validity of the measure (Davis, 1980).

*The Strange Stories Test*

We administered eight ToM stories and two control stories of Happé’s, (1994) original Strange Stories test. For each item, participants read short stories and were then asked to answer a question about the text. Each ToM item required the participant to infer a character’s thoughts, feelings, or intentions (e.g., “Why did X say that?”). The ToM stories contained two examples of each double bluff, persuasion, irony, and white lies. The control stories were about similar topic areas, but

asked questions about physical causation instead of about the mental states of others. Scoring procedures for the test were based on the procedure outlined by Happé, Winner, and Brownell (1998), supplemented by a detailed rating scheme that was communicated personally to the authors by Happé. Each answer was given 2 points if it was fully and explicitly correct, 1 point if partially or implicitly correct, and 0 points if clearly incorrect. Interrater reliability for this test was high, with an ICC of 0.99.

### Procedure

All participants were tested individually at the Center for Brain Health, NYU School of Medicine in a quiet room by trained examiners. The IRI and the Strange Stories test were administered in the same order to all study participants as part of a larger social cognition battery.

### Statistical Analyses

The data were analyzed using the Statistical Program for Social Sciences version 11.0. Independent *t*-tests were used to test for between-group differences. In order to obtain a “purer” comparison of affective empathy, we contrasted the groups in that domain while controlling for ToM skills and results of the IRI cognitive subscales. Effect sizes for the between-group differences were calculated using Cohen’s *d*, computed using pooled variance (Cohen, 1988). Finally, Pearson correlations were used to identify associations between the administered tests. All analyses were two-tailed.

## Results

Mean scores on the IRI and the Strange Stories test are shown in Table 2. Group means comparisons revealed

that the AS group scored significantly lower on the cognitive scales of the IRI (PT and F).

Results were quite different for the affective scales. Although the AS group tended to score lower, there was no significant difference between the two groups on the EC scale (see Table 2). When we controlled for performance on measures of cognitive empathy (PT) and ToM (Strange Stories task) this trend disappeared,  $F(1, 38) = 0.13, p = 0.724$ . In addition, the AS group scored higher than the controls on the PD scale. This result did not change after controlling for performance on the PT scale or the Strange Stories task,  $F(1, 38) = 5.05, p = 0.03$ .

As expected, the AS group did significantly worse than the control group on the Strange Stories test. There was no significant difference between the groups on the control items (see Table 2).

To assess the associations between measures of cognitive empathy, affective empathy, and ToM, we evaluated the correlations between the scales of the IRI and the Strange Stories task in the control group (see Table 3a). The analyses demonstrate a significant positive association between the two affective scales of the IRI, the EC and PD scales. In addition, the two cognitive scales, the PT and F scales, also showed significant positive correlations. Associations between the IRI affective and cognitive scales were small and non-significant. Moreover, the Strange Stories task was not associated with the affective scales, but was associated with the IRI cognitive scales.

In order to investigate whether or not the relationships between cognitive and affective empathy and ToM are different in AS, we also ran correlational analyses between the IRI and the Strange Stories test in the AS group (see Table 3b). We found that while the two affective scales of the IRI (the EC and PD scales) were positively and significantly associated, the cognitive scales (PT and F) were not. Moderate associations were seen between the EC and PT scale and

**Table 2** Means, standard deviations, and effect sizes of scores on the Interpersonal Reactivity Index (IRI) scales and the Strange Stories test

| Variable              | Group               |                               | t     | df | p      | d    |
|-----------------------|---------------------|-------------------------------|-------|----|--------|------|
|                       | Control<br>(n = 21) | Asperger syndrome<br>(n = 21) |       |    |        |      |
| IRI— affective scales |                     |                               |       |    |        |      |
| Empathic concern      | 20.0 ± 4.7          | 16.9 ± 6.5                    | 1.82  | 40 | 0.08   | 0.56 |
| Personal distress     | 9.6 ± 5.2           | 15.8 ± 8.0                    | -2.99 | 40 | 0.01   | 0.92 |
| IRI— cognitive scales |                     |                               |       |    |        |      |
| Perspective taking    | 18.9 ± 4.3          | 10.5 ± 6.4                    | 4.99  | 40 | <0.001 | 1.54 |
| Fantasy               | 15.1 ± 5.7          | 11.4 ± 5.6                    | 2.13  | 40 | 0.04   | 0.65 |
| Strange stories test  |                     |                               |       |    |        |      |
| Theory of mind items  | 15.5 ± 0.8          | 14.0 ± 3.1                    | 2.28  | 40 | 0.03   | 0.70 |
| Control items         | 3.9 ± 0.3           | 3.8 ± 0.6                     | 0.9   | 40 | 0.35   | 0.29 |

Values given as  $M \pm SD$

**Table 3** Correlations between the Interpersonal Reactivity Index (IRI) and the Strange Stories test in the (a) control group ( $n = 21$ ) and (b) Asperger group ( $n = 21$ )

|                       |    | PD     | PT     | F       | Strange Stories |
|-----------------------|----|--------|--------|---------|-----------------|
| (a) Control group     |    |        |        |         |                 |
| IRI— affective scales | EC | 0.486* | 0.272  | 0.343   | 0.097           |
|                       | PD | –      | 0.086  | 0.241   | –0.063          |
| IRI— cognitive scales | PT | –      | –      | 0.609** | 0.456*          |
|                       | F  | –      | –      | –       | 0.272           |
|                       |    |        |        |         |                 |
| (b) Asperger group    |    |        |        |         |                 |
| IRI— affective scales | EC | 0.471* | 0.342  | 0.032   | –0.134          |
|                       | PD | –      | –0.037 | 0.225   | 0.022           |
| IRI— cognitive scales | PT | –      | –      | –0.025  | 0.048           |
|                       | F  | –      | –      | –       | –0.107          |

EC empathic concern, PD personal distress, PT perspective taking, F fantasy

\*  $p < 0.05$ , \*\*  $p < 0.001$

between the PD and F scale. However, these correlations did not reach the level of significance. The Strange Stories test was not significantly correlated with any of the scales of the IRI in this group.

## Discussion

The primary goal of this paper was to begin to describe the nature of both cognitive and affective empathy among individuals with AS, a group that, despite little direct empirical support, has been labeled as lacking in empathy. Using the IRI, a multi-dimensional measure of empathy, we demonstrate that although individuals with AS scored lower than normal controls on measures of cognitive empathy, the two groups did not differ on EC, a measure of affective empathy. Furthermore, the AS group scored higher than controls on a second measure of affective empathy, PD. On the other hand, as expected, the AS group scored lower than controls on both of the cognitive scales of the IRI (PT and F) suggesting that individuals with AS have problems understanding the perspective of both real and fictional people. This confirms the findings of the few previous studies using self-report measures to assess empathy uni-dimensionally in AS (Baron-Cohen & Wheelwright, 2004; Shamay-Tsoory et al., 2002).

To the best of our knowledge, this is the first time that affective empathy has been measured at the same time as cognitive empathy in a group of adults with AS. This manuscript represents the first report of a lack of significant differences between AS and control groups on the EC (EC subscale), which measures an individual's feelings of warmth, compassion, and concern for others. Although AS individuals tended to score lower than controls on the EC subscale, controlling for cognitive empathy and ToM eliminated that trend, showing no difference between the groups. Our data indicate that individuals with AS appear to have as much care

and concern for other people as unaffected individuals do. Although this finding is at variance with previous reports of deficits in empathy in individuals with AS (Baron-Cohen & Wheelwright, 2004; Flor-Henry, 1998; Shamay-Tsoory et al., 2002), it is in keeping with anecdotal reports from parents and clinicians that suggest that autistic individuals can be very caring.

On the second affective scale, PD, the AS group actually scored significantly higher than controls. This indicates a greater tendency to have self-oriented feelings of anxiety and discomfort in response to tense interpersonal settings. Although this could be interpreted as a demonstration of greater empathy, it should be noted that individuals with AS have been reported to have higher levels of anxiety in general (Green, Gilchrist, Burton, & Cox, 2000; Kim, Szatmari, Bryson, Streiner, & Wilson, 2000), which may have increased PD scores.

While these findings provide initial empirical evidence that individuals with AS are not impaired in affective empathy, evidence of normal affective empathy may not be readily apparent in a natural setting. The low scores on the PT scale of the IRI suggest that individuals with AS have difficulty understanding the feelings and perspective of others. Consequently, individuals with AS may not react to situations as expected and may therefore seem cold or uncaring. However, our data would suggest that when individuals with AS are given the information that allows them to understand the point of view of others, they have as much concern and compassion as unaffected individuals. Future research should evaluate whether individuals with AS are observed to respond with more affective empathy after learning how to better recognize the emotions of others through social skills training.

The second goal of this study was to begin to assess the overlap between the concepts of empathy (both cognitive and affective) and ToM. Among controls, the correlations among the affective and cognitive scales of

the IRI resemble previous reports of the psychometric properties of the measure. Specifically, the affective scales (EC and PD) showed a significant positive correlation, as did the cognitive scales (PT and F). There were moderate intercorrelations between the affective and cognitive scales, although these correlations did not reach the level of significance, confirming Davis' (1980, 1983) proposal that cognitive and affective empathy represent two separate, although related, constructs.

As anticipated, correlational analyses showed that the PT scale of the IRI was positively correlated with the Strange Stories test. The F scale also showed positive associations to the Strange Stories test, although these results did not reach statistical significance. We found no association between affective empathy and ToM, as neither of the affective scales of the IRI were significantly correlated with the Strange Stories test.

The terms “theory of mind” and “empathy” have been previously used interchangeably (Baron-Cohen et al., 2001; Gillberg, 1992; Roeyers et al., 2001). Our data, however, although only correlational in nature, suggest that while cognitive empathy may overlap considerably with ToM, affective empathy seems to be at least partially independent. In light of these findings, we would suggest that in order to fully describe empathic abilities in future studies, greater care should be taken to differentiate theory of mind or cognitive empathy from affective empathy.

In order to further understand the characteristics of empathy in AS, we also looked at the relationship between the IRI scales and the Strange Stories test in the AS group. As previous studies have demonstrated deficits in cognitive empathy and ToM among individuals with AS, we did not expect the associations between cognitive and affective scales to be the same in the AS group as in the control group. In fact, the only significant association in the AS group was a positive correlation between the two affective scales, EC and PD. In contrast to the control group, among individuals with AS the two cognitive scales (PT and F) were not significantly correlated, nor were there any significant correlations between the PT scale and the Strange Stories test. It is possible that this different pattern of association among individuals with AS is due to the presence of specific deficits in this disorder. For example, while individuals with AS have difficulties on both cognitive subscales, their scores on the PT subscale were especially low (as indicated by the effect size), suggesting that they are particularly impaired in this domain. In unaffected individuals, all aspects of empathy are somewhat linked, while in AS selective and more profound deficits might abolish the associations.

Although our findings are very interesting, our ability to draw conclusions based on these data is somewhat limited by our small sample size. Nevertheless, these data provide clear justification for further studies on the empathic abilities of individuals with AS.

The main results presented in this report are from self-report data, which has some intrinsic weaknesses. Although high-functioning autistic individuals have proven capable of completing self-report measures in previous studies (Baron-Cohen & Wheelwright, 2004; Shamay-Tsoory et al., 2002), it would be desirable for future research to develop new methodologies for measuring both components of empathy objectively and directly.

The main objective of this study was to assess the empathic abilities of individuals with AS. Our results suggest that previous reports of impairments in empathy among individuals with AS may have neglected the affective component of empathy. Using a multi-dimensional measure to assess both the cognitive and affective components of empathy simultaneously, we have demonstrated that individuals with AS report as much care and concern as unaffected individuals. A description of individuals with AS that includes “deficits in empathy” as a central characteristic carries with it several moral implications and may even lead to adverse social consequences. In light of the findings presented here, we propose that the issue of empathy deficits in AS be revisited and expanded to include more multi-dimensional analyses.

**Acknowledgments** Kimberley Rogers is now at the Department of Psychology at the Graduate Center of the City University of New York, NY. Isabel Dziobek is now at the Max-Planck Institute for Human Development, Neurocognition of Decision Making, Berlin, Germany. Oliver T. Wolf is now at the Institute of Psychology at the University of Bielefeld, Bielefeld, Germany. Jason Hassenstab is now at the Department of Psychology at Fordham University. This research was funded by a grant from the National Alliance for Autism Research to Dr. Convit. Isabel Dziobek was in part supported by a training grant by the Cusanuswerk, Germany.

## References

- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington: American Psychiatric Association.
- Asperger, H. (1944). Die “Autistischen Psychopathen” im Kindesalter. *Archiv fur Psychiatrie und Nervenkrankheiten*, 117, 76–136.
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: an investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34(2), 163–175.

- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “reading the mind in the eyes” test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 42(2), 241–251.
- Bjorkqvist, K., Osterman, K., & Kaukiainen, A. (2000). Social intelligence-empathy = aggression? *Aggression and Violent Behavior*, 5(2), 191–200.
- Blacher, J., Kraemer, B., & Schalow, M. (2003). Asperger syndrome and high functioning autism: research concerns and emerging foci. *Current Opinion in Psychiatry*, 16(5), 535–542.
- Christopher, F. S., Owens, L. A., & Stecker, H. L. (1993). Exploring the darkside of courtship: a test of a model of male premarital sexual aggressiveness. *Journal of Marriage and the Family*, 55, 469–479.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale: Lawrence Erlbaum Associates.
- Davis, M. (1980). A multidimensional approach to individual differences in empathy. *Catalogue of Selected Documents in Psychology*, 10, 85.
- Davis, M. (1983). Measuring individual differences in empathy: evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44(1), 113–126.
- Dziobek, I., Fleck, S., Kalbe, E., Rogers, K., Hassenstab, J., Brand, M., Kessler, J., Woike, J., Wolf, O. T., & Convit, A. (2006). Introducing MASC: a movie for the assessment of social cognition. *Journal of Autism and Developmental Disorders*, (in press).
- Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin*, 101(1), 91–119.
- Flor-Henry, P. (1998). 82 EEG cartography of Asperger’s syndrome and psychopathy compared to healthy controls. *International Journal of Psychophysiology*, 30(1–2), 33–34.
- Geer, J. H., Estupinan, L. A., & Manguno-Mire, G. M. (2000). Empathy, social skills, and other relevant cognitive processes in rapists and child molesters. *Aggression and Violent Behavior*, 5(1), 99–126.
- Gillberg, C. L. (1992). The Emanuel Miller Memorial Lecture 1991. Autism and autistic-like conditions: subclasses among disorders of empathy. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 33(5), 813–842.
- Green, J., Gilchrist, A., Burton, D., & Cox, A. (2000). Social and psychiatric functioning in adolescents with Asperger syndrome compared with conduct disorder. *Journal of Autism and Developmental Disorders*, 30(4), 279–293.
- Happé, F. G. (1994). An advanced test of theory of mind: understanding of story characters’ thoughts and feelings by able autistic, mentally handicapped, and normal children and adults. *Journal of Autism and Developmental Disorders*, 24(2), 129–154.
- Happé, F. G., Winner, E., & Brownell, H. (1998). The getting of wisdom: theory of mind in old age. *Developmental Psychology*, 34(2), 358–362.
- Hoffman, M. L. (1984). Interaction of affect and cognition in empathy. In C. E. Izard, & R. B. Kagan (Eds.), *Emotions, cognition and behavior* (pp. 103–131). Cambridge: Cambridge University Press.
- Kaland, N., Moller-Nielsen, A., Callesen, K., Mortensen, E. L., Gottlieb, D., & Smith, L. (2002). A new ‘advanced’ test of theory of mind: evidence from children and adolescents with Asperger syndrome. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 43(4), 517–528.
- Kim, J. A., Szatmari, P., Bryson, S. E., Streiner, D. L., & Wilson, F. J. (2000). The prevalence of anxiety and mood problems among children with autism and Asperger syndrome. *Autism*, 4(2), 117–132.
- Kohler, W. (1929). *Gestalt psychology*. New York: Liveright.
- Lord, C., Rutter, M., & Le Couteur, A. (1994). Autism diagnostic interview—revised: a revised version of a diagnostic interview for caregivers of individuals with possible pervasive developmental disorders. *Journal of Autism and Developmental Disorders*, 24, 659–685.
- Mead, G. H. (1934). *Mind, self, and society*. Chicago: University of Chicago Press.
- Mehrabian, A., & Epstein, N. (1972). A measure of emotional empathy. *Journal of Personality*, 40(4), 525–543.
- Piaget, J. (1932). *The moral judgment of the child*. New York: Free Press.
- Premack, D., & Woodruff, G. (1978). Does the chimpanzee have a ‘theory-of-mind’? *Behavioral and Brain Sciences*, 4, 515–526.
- Roeyers, H., Buysse, A., Ponnet, K., & Pichal, B. (2001). Advancing advanced mind-reading tests: empathic accuracy in adults with a pervasive developmental disorder. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 42(2), 271–278.
- Shamay-Tsoory, S. G., Tomer, R., Yaniv, S., & Aharon-Peretz, J. (2002). Empathy deficits in Asperger syndrome: a cognitive profile. *Neurocase*, 8(3), 245–252.
- Spraggins, E. F., Fox, E. A., & Carey, J. C. (1990). Empathy in clinical dietitians and dietetic interns. *Journal of the American Dietary Association*, 90(2), 244–249.
- Travis, L., Sigman, M., & Ruskin, E. (2001). Links between social understanding and social behavior in verbally able children with autism. *Journal of Autism and Developmental Disorders*, 31(2), 119–130.
- Wing, L. (1981). Asperger’s syndrome: a clinical account. *Psychological Medicine*, 11(1), 115–129.
- Yirmiya, N., Sigman, M. D., Kasari, C., & Mundy, P. (1992). Empathy and cognition in high-functioning children with autism. *Child Development*, 63(1), 150–160.
- Zachary, R. A. (1940). *Shipley Institute of Living Scale—revised*. Los Angeles: Western Psychological Services.
- Zachary, R. A., Paulson, M. J., & Gorsuch, R. L. (1985). Estimating WAIS IQ from the Shipley Institute of Living Scale using continuously adjusted age norms. *Journal of Clinical Psychology*, 41(6), 820–831.