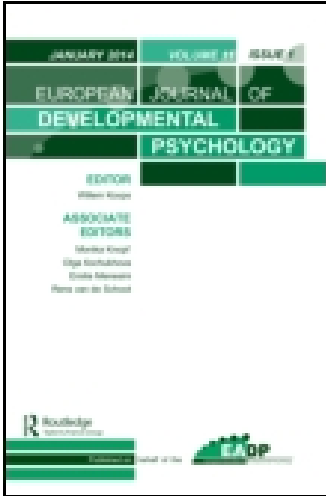


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Dissociation between cognitive and affective empathy in youth with Asperger Syndrome

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Autism spectrum conditions, among them Asperger Syndrome (AS), are generally described as entailing deficits in “cognitive empathy” or “theory of mind”. People with AS tend to have difficulties recognizing emotions, although the extent of these difficulties is still unclear. This study aimed to assess empathic profile in youth with AS ($N = 38$) and controls matched on age, sex and IQ. The study aimed to test if a dissociation between cognitive and affective empathy exists in AS. The study also aimed to explore emotion recognition in people with AS, and how it relates to emotional valence (positive, negative, and neutral emotions). The AS group scored lower than controls on cognitive empathy but scored within the average range on affective empathy. A deficit in emotion recognition was found in the AS group for positive emotions. These results confirm earlier findings in cognitive empathy and provide new insight about emotion recognition abilities in this population.

Keywords: Asperger Syndrome; Empathy; Emotion recognition; Theory of mind; Eyes Test.

Asperger Syndrome (AS) is an autism spectrum condition (ASC) characterized by social-communication impairments alongside unusually narrow interests/repetitive behaviour. People with AS differ from those with autism by the absence of language delay and IQ on average (American Psychiatric Association [APA], 2000). In addition, people with AS may be interested in connecting with others (Happé, 2005). Social deficits in AS have been explained as a function of an underlying deficit in theory of mind (ToM; Baron-Cohen, 1995; Baron-Cohen & Weelwright, 2004). Emerging research is revealing the complexity of this

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deficit (Smith, 2009), with findings suggesting that it is far from straightforward (Rogers, Dziobek, Hassenstab, Wolf, & Convit, 2007; Smith, 2009).

Empathy

Baron-Cohen and Weelwright (2004) define empathy as having two components: the ability to *recognize* other people's mental states (such as intentions, beliefs, desires and emotions), and the ability to *respond* to these with an appropriate emotion. This two-factor definition of empathy sidesteps the traditional debate about whether empathy is a wholly emotional response (the emotion triggered by another person's emotions) or an entirely cognitive operation (the ability to put oneself into another person's shoes and perceive the world from their point of view). In line with classic models of empathy such as Feshbach's model, in which empathy is conceptualized as entailing cognitive and affective processes (Feshbach, 1978), the current consensus among scholars leans towards recognizing both components as necessary to define empathy (Decety & Jackson, 2004; Dziobek et al., 2008; Reniers, Corcoran, Drake, Shryane, & Völlm, 2011).

Cognitive empathy involves adopting others' perspective by recognizing and labeling their mental state (Feshbach, 1978; Reniers et al., 2011). This ability to attribute desires, beliefs, intentions, and emotional states to another person is also called ToM (Baron-Cohen, 1995; Baron-Cohen, Leslie, & Frith, 1985) and is a basic requirement for empathy (Declerck & Bogaert, 2008). Recent studies have used the terms cognitive empathy and ToM interchangeably (Baron-Cohen, Wheelwright, Hill, Raste, & Plumb, 2001; Blair, 2005; Jones, Happé, Gilbert, Burnett, & Viding, 2010; Lawrence, Shaw, Baker, Baron-Cohen, & David, 2004).

Affective empathy includes having an *appropriate* emotional response triggered by the other person's emotion (Blair, 2005; Decety & Jackson, 2004; Reniers et al., 2011). The word "appropriate" is important since affective empathy is not just *any* emotional response to another's emotion (e.g., a psychopath feeling pleasure at someone else's pain would not constitute affective empathy). The emotional response does not need to match the triggering emotion, but it does need to reflect that the observer *cares* how the other person feels (Baron-Cohen, 2011).

Different empathic profiles in psychopathology

Within psychiatry there are two conditions that show empathy deficits: ASC and psychopathic personality disorder (categorized as a subgroup of antisocial personality disorder [DSM, 2013]). Rogers et al. (2007) tested a group of adults with AS using empathy and ToM tests and confirmed the presence of deficits in cognitive empathy while affective empathy remained intact. Jones et al. (2010) compared performance on different tests of affective empathy and ToM in

adolescents with psychopathic traits, adolescents with AS, adolescents with conduct problems and a control group. They found that in comparison to the other groups, the AS group scored lower than the control group on cognitive empathy, but within the average range on the tests of affective empathy. In contrast, the group with psychopathic tendencies showed the opposite pattern: intact cognitive empathy and impairments in affective empathy. Similar results were reported by Schwenck et al. (2012), who compared adolescents with conduct disorder (with and without severe symptoms of antisocial behaviour), adolescents with ASC, and a control group. The current evidence suggests that the empathy profiles of these conditions, ASC and psychopathy, are strikingly different, pointing to a behavioural and neurological *double dissociation* within the empathy circuit (Baron-Cohen, 2011). This dissociation between cognitive and affective empathy has also been documented in other “empathy disorders” (Baron-Cohen, 2011) such as borderline personality disorder, schizophrenia, and schizotypy (Harari, Shamay-Tsoory, Ravid, & Levkovitz, 2010; Henry, Bailey, & Rendell, 2008; Montag, Heinz, Kunz, & Gallinat, 2007).

Differences in emotional recognition in psychopathology

In addition to the deficit in empathy, people with AS also lack accuracy when recognizing emotions (Baron-Cohen, Wheelwright, Hill et al., 2001; Baron-Cohen, Wheelwright, Spong, Scahill, & Lawson, 2001; Golan, Baron-Cohen, & Golan, 2008). Emotion recognition is one of the first steps in empathy because once a person knows what the other is feeling, they can act appropriately (Rogers et al., 2007). Among people with AS, a deficit in recognizing emotions is already well established (Uljarevic & Hamilton, 2013). However, it is not fully understood (Harms, Martin, & Wallace, 2010). For example, Wright et al. (2008) documented deficits recognizing happiness, sadness and anger in young people with ASD (8–16 years old) but concluded “no generalized emotion recognition problems” (p. 620). In other studies, however, it has been found that young adults with AS need more time than neurotypical controls to identify sadness but recognize anger faster (Ashwin, Wheelwright, & Baron-Cohen, 2006; Schwenck et al., 2012). There is also evidence showing a deficit in recognizing positive emotions, the recognition of negative ones being relatively preserved in adolescents and adults (Kuchinke, Schneider, Kotz, & Jacobs, 2011; Shamay-Tsoori, Gev, Aharon-Peretz, & Adler, 2010). Studies comparing recognition of basic vs. complex emotions have also yielded mixed results. Several findings have reported that children and adolescents with AS have difficulties recognizing even basic emotions (Kuusikko et al., 2009; Law Smith, Montagne, Perret, Gill, & Gallagher, 2010; Wright et al., 2008), whereas other studies found intact recognition of basic emotions but impairments on recognizing complex ones in children, adolescents and young adults (Baron-Cohen, Spitz, & Cross, 1993; Golan et al., 2008).

Emotion recognition is affected by different forms of psychopathology (Baron-Cohen, Wheelwright, Hill et al., 2001; Baron-Cohen, Wheelwright, Spong et al., 2001; Besche-Richar, Bourin-Tisseron, Olivier, Cuervo-Lombard, & Limosin, 2012; Harkness, Sabbagh, Jacobson, Chowdrey, & Chen, 2005). While studies using the “Reading the Mind in the Eyes” test (Eyes Test; Baron-Cohen, Wheelwright, Hill et al., 2001) have found deficits in emotion recognition in patients with schizophrenia and patients with depression (Besche-Richar et al., 2012; Lee, Harkness, Sabbagh, & Jacobson, 2005), young adults with dysphoric symptomatology showed enhanced recognition when categorizing the Eyes Test items as either positive, negative or neutral (Harkness et al., 2005). No studies have used this categorization of the Eyes Test items in population with AS, in spite of its wide use within the field.

Current study

The purpose of the present study was twofold: to extend research in empathy in youth with AS, and to explore the nature of their deficit in emotion recognition. Using the perspective-taking (PT) subscale of the interpersonal reactivity index (IRI) (Davis, 1980, 1983) and the Eyes Test (Baron-Cohen, Wheelwright, Spong et al., 2001) to measure cognitive empathy (via self-report and performance tasks, respectively), we hypothesized that participants with AS would score lower than their non-AS peers. Using both a self-report measure and a performance measure is interesting in order to test if there is a deficit, and whether are they aware of it. According to the existing evidence, no difference was predicted between the two groups on affective empathy.

We also aimed to explore whether there exist differences between participants with and without AS on emotion recognition and if these differences vary according to the emotional valence (e.g., positive, negative, and neutral) or there is a global impairment in emotion recognition. For this purpose, we used the Eyes Test (Baron-Cohen, Wheelwright, Spong et al., 2001; Harkness et al., 2005).

METHODS

Participants

The sample comprised $N = 38$ participants with AS (34 males) aged 9–17 years ($M = 12.92$ years, $SD = 2.36$) with IQ on average range ($M = 102.02$; $SD = 11.38$). Participants were recruited via several Spanish Asperger Syndrome Associations. No differences between boys and girls were found either on age or IQ. At the time of the study, they were attending social skills training group for 2 h/week. Matched controls comprised of 38 participants matched for age ($M = 13.47$ years; $SD = 1.78$), IQ ($M = 106.65$; $SD = 10.38$) and sex. They were recruited via schools. There were no statistical differences either on age or

IQ between both groups ($p > 0.05$). For the participants with AS, their parents' age was also obtained. The fathers' mean age was 46.9 years ($SD = 5.46$) and the mothers' mean age was 43.5 years ($SD = 5.48$). Thirty-three per cent of the participants were single child, 55.5% reported to have one sibling and 11.5% had two siblings. For the control group, 24% reported to be single child, 51% had one sibling, 20% had two siblings and 5% reported to have more than two siblings.

To participate in the study, participants with AS were required to have a diagnosis of AS from a clinical psychologist or psychiatrist, using DSM-IV criteria (APA, 2000) and to have an IQ score above 85 on the Wechsler Intelligence Scale for Children III (Wechsler, 1991). Intelligence scores for the AS group were provided by the psychologists of the Association, as part of their diagnostic reports. For the control group, IQ was provided by the school. Both groups had IQ in the average range.

Measures

IRI (Davis, 1983; Spanish adaptation by Pérez-Albéniz, de Paúl, Etxebarria, Paz-Montes, & Torres, 2003). To assess empathy we used the PT and empathic concern (EC) subscales from the IRI, following other studies carried out with children and adolescents (Brouns et al., 2013; Schonert-Reichl, Smith, Zaidman-Zait, & Hertzman, 2012). The seven-item PT subscale assesses the tendency to take another's point of view (e.g., "I try to look at everybody's side of a disagreement before I make a decision"). The EC subscale is composed of seven items and assesses affective responses, such as the tendency to experience feelings of concern for others (e.g., "I often feel sorry for kids who don't have the things I have"). Items were rated on a Likert scale with 1 = *not at all like me* to 5 = *always like me*. The reliability of each subscale obtained in this sample was $\alpha = 0.61$ for PT and $\alpha = 0.65$ for EC. Supportive evidence for the construct validity of the EC and PT subscales of the IRI has been obtained previously (Davis, 1980, 1983; Schonert-Reichl et al., 2012).

The Eyes Test (Baron-Cohen, Wheelwright, Spong et al., 2001; Spanish adaptation by Rueda, Cabello, & Fernández-Berrocal, 2013). This is a measure of advanced ToM. It requires the participant to identify the mental state of the person in the photo just from information around the eye region of the face. This instrument measures both emotion recognition and cognitive empathy, a term that has been used interchangeably with ToM (Baron-Cohen, Wheelwright, Hill et al., 2001; Blair, 2005; Lawrence et al., 2004). We used the child version, comprising 28 black and white photographs of the eye area. Around each photo are four words describing different emotional/mental states and the participant has to choose which word best describes what the person in the photo is thinking or feeling. The items were classified by their emotional value as positive (eight items; e.g., happy), negative (nine items; e.g., sad) and neutral (11 items; e.g., contemplative) based on previous studies (Harkness et al., 2005; Lee et al., 2005).

Four scores were obtained: total score and scores for positive, negative and neutral eyes.

Procedure

This study is part of a larger study of emotional characteristics of pre-adolescents and adolescents with AS and their parents. Participants with AS were recruited from three AS Associations in Spain. The objectives and methodology of the study were explained to their parents to obtain informed consent. This group was assessed individually in sessions between 60 and 90 min long. They were given the tests and the researcher, beside them, read the questions out loud. Neither for the Eyes Test nor for the IRI there was a limited time, and each participant could think over each question as much time as needed. It should be noted that none of the participants required an amount of time that could be considered as excessive. The control group was recruited at school. After obtaining permission from the principal and informed consent from the parents, the surveys were administered during scholar time in the same way as with the group with AS. Participants of the control group were selected randomly, according to their sex and age. Neither of the groups was told the objectives of the study.

Data analysis

Data were analysed using the Statistical Package for Social Sciences (SPSS), version 18 for Macintosh. Several multivariate analysis of variance (MANOVA) were carried out with the objective of analysing the differences obtained in the subscales of the IRI and in the Eyes Test between both groups. The effect size of these differences was calculated using partial eta squared (Cohen, 1988).

RESULTS

To test whether differences existed between those participants with and without AS in both empathy and emotion recognition, MANOVA was carried out. Results for the subscales of the IRI (self-report measures of cognitive and affective empathy) are presented first, followed by results obtained for the Eyes Test. For this measure, a total score was obtained as well as scores for each emotional valence: positive, negative and neutral.

IRI subscales

The results for the subscales of the IRI are shown in [Table 1](#). First, Pearson correlations were carried out within the subscales of the IRI and between the subscales of the IRI and the Eyes Test. Positive associations were found between PT and EC ($r = 0.42$; $p = 0.001$) and between PT and the Eyes Test total score

TABLE 1
 Descriptives and MANOVA of the scores on the IRI and on the Eyes Test by the control group and the group with AS

| Variable | Group | | | | | | | | | | F | p | Partial η^2 | | |
|-------------------------|------------------------|------------------------|------|------------------------|------------------|------------------------|------|------------------------|------|------------------------|------|---|------------------|--|--|
| | Control (N = 38) | | | | | AS (N = 38) | | | | | | | | | |
| | Possible range min-max | Observed range min-max | Mean | Observed range min-max | Mean | Observed range min-max | Mean | Observed range min-max | Mean | Observed range min-max | | | | | |
| IRI | | | | | | | | | | | | | | | |
| Perspective taking | 7 | 35 | 11 | 30 | 23.03 \pm 4.22 | 7 | 28 | 20.13 \pm 4.91 | 7.34 | 0.008 | 0.09 | | | | |
| EC | 7 | 35 | 12 | 34 | 26 \pm 4.47 | 13 | 32 | 24.29 \pm 4.81 | 2.08 | 0.15 | 0.02 | | | | |
| Eyes Test | | | | | | | | | | | | | | | |
| Total score | 0 | 28 | 15 | 26 | 19.63 \pm 2.79 | 10 | 24 | 17.97 \pm 3.84 | 4.07 | 0.04 | 0.05 | | | | |
| Positive eyes (8 items) | 0 | 8 | 4 | 10 | 6.71 \pm 1.47 | 3 | 9 | 6.05 \pm 1.43 | 3.79 | 0.05 | 0.05 | | | | |
| Neutral eyes (11 items) | 0 | 11 | 4 | 9 | 6.81 \pm 1.33 | 1 | 9 | 6 \pm 2.19 | 2.10 | 0.06 | 0.02 | | | | |
| Negative eyes (9 items) | 0 | 9 | 3 | 8 | 6.10 \pm 1.16 | 3 | 9 | 5.74 \pm 1.45 | 2.59 | 0.11 | 0.03 | | | | |

($r = 0.12$; $p = 0.05$) whereas no association was found between EC and the Eyes Test total score ($p > 0.05$). The scores for each of the subscales of the IRI (PT and EC) were computed by summing the score of the items (the higher the score the higher PT and EC; Shanafelt et al., 2005). The MANOVA revealed significant differences between both groups on the PT dimension, confirming a deficit in cognitive empathy in AS measured via self-report. Based on Cohen's (1988) recommendations, the effect size found was medium. No significant differences were found between both groups on EC subscale ($p > 0.05$).

Eyes Test

A MANOVA was carried out to check if a group difference existed on the Eyes Test (see Table 1). This analysis showed that the AS group scored significantly lower on the Eyes Test total score. Analyses for each dimension of emotional valence (positive, negative, and neutral) were also carried out. For the positive eyes score, the multivariate analysis revealed a statistically significant difference, the AS group's score being lower than that of the control group. The effect size for the difference on both total Eyes Test score and the positive eyes score was medium according to Cohen (1988). No differences were found either for the negative eyes or for the neutral eyes.

DISCUSSION

People with AS usually show impairments in aspects of empathy and emotion recognition. Due to these deficits, during adolescence youth with AS usually become “target” of bullies because they find it difficult to establish and maintain friendship with their peers and do not distinguish between “friendly jokes” and aggression or offenses. During this period, the role of peers becomes crucial for the development of the sense of autonomy and self-concept (Kuusikko et al., 2008; Nilsen, Karevold, Røysamb, Gustavson, & Mathiesen, 2013). Social belonging also works as a protective factor against bullying and isolation. Thus, empathizing and accurately recognizing others' emotions, which are essential requirements for friendship and social belonging, are key aspects during this period (Howlin, 2004; Kuusikko et al., 2008). The current study shows that a dissociation between cognitive and affective empathy exists, with the latter relatively preserved. Regarding their abilities to recognize emotions, the results show deficits in recognizing emotions dependent on the emotional valence. To explore these two domains, we administered the PT subscale of the IRI to measure cognitive empathy, and the EC subscale to measure affective empathy. The Eyes Test was used as both a performance measure of cognitive empathy (Lawrence et al., 2004) and emotion recognition (Baron-Cohen, Wheelwright, Hill et al., 2001; Harkness et al., 2005; Lee et al., 2005).

Empathic profile of youth with AS

We conceptualized empathy as composed of two domains: cognitive and affective empathy (Baron-Cohen & Weelwright, 2004; Davis, 1983; Jones et al., 2010; Schwenck et al., 2012). The results support our hypothesis regarding a dissociation in empathy in pre-adolescents and adolescents with AS. While participants with AS scored lower than controls on both measures of cognitive empathy (self-report and performance), no differences were found on the affective dimension. These results replicate previous findings with adults and adolescents (Dziobek et al., 2008; Jones et al., 2010; Rogers et al., 2007; Schwenck et al., 2012), but here they have been obtained via self-report and performance measures, which means that adolescents with AS are aware of their own difficulties to adopt another's perspective. Some questions exist regarding the ability of people with ASC to understand their own emotions. It has been shown, however, that they are capable of responding adequately when asked to report their own emotions (Berthoz & Hill, 2005). Hill, Berthoz, and Frith (2004) concluded that people with AS are able to provide adequate responses on self-report measures of emotions. This evidence suggests that we can trust the results obtained using the IRI.

According to Baron-Cohen (1995), this dissociation is due to a primary deficit in ToM, which is impaired because of atypical development of the neural systems involved (Baron-Cohen, ÓRiordan, Stone, Jones, & Plaisted, 1999). Since this impairment only affects the cognitive approach to the situation, once it is explained, they are able to have the appropriate affective response (Rogers et al., 2007). Another explanation is in terms of the Weak Central Coherence theory (Frith, 2003). According to this hypothesis, a focus on detail inhibits people with AS from creating a global representation, as social situations require. Rogers et al. (2007) place a different emphasis on the social anxiety that characterizes AS. They suggest that anxiety interferes with the cognitive processing of social situations. However, it should be noted that the relationship could be in the opposite direction since one would expect a cognitive deficit of this kind to also cause social anxiety.

Studies of schizophrenia (Henry et al., 2008), borderline personality disorder (Harari et al., 2010), schizotypy (Montag et al., 2007), conduct disorder (Schwenck et al., 2012) and psychopathic personality disorder (Blair, 2005) have found specific deficits in affective empathy, making AS the only clinical group to date to show this specific dissociation for cognitive empathy. The finding is also important in underlining that people with AS are actually aware of their difficulties and are capable of certain forms of empathy when they are given the right information (Rogers et al., 2007). Therefore, if given help to "read" the social situation (e.g., by telling the person with AS that someone is upset or angry, etc., using explicit language rather than assuming they will infer this implicitly), they may be capable of connecting with others and maintaining

appropriate social interactions. This fits with the notion of “mindblindness” (Baron-Cohen, 1995), which may be the stage in information-processing where data are not being properly analysed.

Patterns of emotion recognition of youth with AS

The second objective of this study concerned emotion recognition, which is essential for appropriate social functioning (Baron-Cohen, Wheelwright, Hill et al., 2001). We explored whether the impairment in this ability is global or depends on the emotion’s valence. Categorizing the stimuli in the Eyes Test as positive, negative and neutral (Harkness et al., 2005), we found a significant difference between groups for the recognition of positive eyes with lower scores by the AS group. This means that the deficit on emotion recognition is not global but dependent on the kind of emotion. No difference was found in their abilities to recognize negative and neutral emotions. Previous studies have also reported no impairments in the recognition of negative emotions in AS (Ashwin et al., 2006; Hall et al., 2010). From a neurobiological perspective, Hall et al. (2010) showed that the amygdala is capable of transmitting emotionally salient information to the cortex via a sub-cortical pathway, and suggested that this mechanism may be preserved in ASC. From a developmental perspective, the greater importance that recognizing negative emotions has for survival could account for why this is preserved in AS (e.g., recognizing anger prepares one to be ready to defend oneself; Izard, Fine, Mostow, Trentacosta, & Campbell, 2002). Evidence suggests that infants late in their first year pay more attention to negative emotions and learn their meanings and consequences better than those of positive ones (Kotsoni, Haanôo, & Johnsonó, 2001; Vaish, Grossmann, & Woodward, 2001).

Regarding the deficit found for positive emotions, previous research has shown deficits in population with AS to recognize them (Shamay-Tsoori et al., 2010). Kuchinke et al. (2011) proposed the existence of a negative bias in this population (a tendency to interpret emotional cues as negative). From a neurobiological perspective, Shamay-Tsoori et al. (2010) reported a brain asymmetry that may prevent people with AS from accurately recognizing positive emotions. Further research into this interesting dissociation is warranted.

Limitations and future directions

This study has some limitations: First, neither a social desirability scale nor a performance measure of affective empathy was included (Montag et al., 2007). Second, the results obtained using a self-report measure could suggest that adolescents with AS are aware of their own difficulties. However, we should consider other possibilities. For example, information about AS that the adolescents overhear might be influencing their own perception of themselves.

Future research using longitudinal designs will help to further uncover how empathy develops. Although the sex ratio for this syndrome is 4:1 (male: female) (Ghaziuddin, Weidmer-Mikhail, & Ghaziuddin, 1998), it would be interesting to replicate these findings in a larger sample including more girls, to test their developmental and social differences. Regarding the specific deficit in emotion recognition found for positive emotions, several questions emerge: Does it relate to the ability of people with AS to share these emotions? If they are given the right information, could they empathize with other's positive emotions? Future research could answer these questions using performance measures of both cognitive and affective empathy (e.g., The Empathy Accuracy Task; Ickes, 1993) in combination with other self-report measures that cover the ability to empathize with both negative and positive emotions, such as the basic empathy scale (Jolliffe & Farrington, 2006). Further research on the recognition of neutral emotions is also needed. For example, are these emotions easier or more difficult to recognize compared to negative emotions? Finally, an important consideration would be to measure social skills and social adjustment in order to gain some insight into the connection between empathy and social development in ASC.

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