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Comparison of the advanced theory of mind skills in Turkish Children with autism and typically developing children

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Abstract

Theory of mind (ToM) has been applied in an attempt to explain the social impairments that characterize children with autism spectrum disorder (ASD). However, an examination of several Turkish ToM studies revealed that ToM belief tests often have been used inappropriately to assess typically developing (TD) children and those adult versions of the Eyes Test and other ToM tests have been used inappropriately to assess adults with psychiatric disorders. Among the studies examined, none had used advanced ToM tests such as the Eyes Test and the Strange Stories Test to compare TD children and children with autism. The objective of this study was to examine the ToM levels attained by children with autism and TD children between the ages of 7 and 13 years, using the advanced ToM Strange Stories and Eyes tests. Compared with ASD children, TD children achieved higher scores on the Eyes and Strange Stories tests.

Keywords: Autistic Disorder, culture, theory of mind psy,chological tests, child development.

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1. Introduction

Impairment and insufficiencies in social behaviour are some of the basic characteristic of individuals in the autism spectrum disorder group (DSM-IV-TR, 2000). One of the many approaches used to explain such social impairment symptoms employs cognitive psychology. The cognitive approach explains these impairments in relation to three main cognitive domains: (1) deficiencies or impairments in executive functions, (2) weak central coherence, and (3) deficiencies or impairments in a person's theory of mind (ToM).

There have been many discussions in the scientific literature about ToM as well as many similar concepts, but it was Premack and Woodruff who first used the term "theory of mind," which they defined as an individual's ability to understand that other people also have beliefs, desires, and intentions (1978). ToM operates across a wide range of social behaviour, from empathizing, understanding others' emotions, joking, and bluffing as well as knowing and understanding the desires and beliefs of the people with whom we interact. Hence, it is thought that the ToM is closely related to social competence (Howlin, Baron-Cohen & Hadwin, 1999).

During typically development, a person's ToM begins being shaped from infancy. Reactions to social stimuli in early infancy includes the following antecedents of ToM development: smiling, crying, attaching emotionally to others, mimicking the simple expressions of the human face, engaging in mutual attention, following the fixation points of others' eyes, and directional pointing, which will develop subsequently (Howlin, Baron-Cohen & Hadwin, 1999). Babies begin to be able to talk about mental states (e.g., emotions, wants, beliefs, thoughts, dreams, bluffs) between 18 to 30 months (Bruner, 1983), and, at about the age of 2 years, they begin to understand the emotions of others (Wellman, 1990) and to be shaped by the "seeing leads to knowing" principle (Howlin, Baron-Cohen & Hadwin, 1999). In order for a child to have a socially functional ToM, he/she needs to be able to refer to the mental states of others and to be able to predict their behaviour (Premack & Woodruff, 1978). Children with TD can pass a "wrong belief" test at the age of four (Wimmer & Perner, 1983), and, according to Wellman, Cross, & Watson (2001), passing of these tests is a sign that they have acquired the "mind reading" skill, being able to predict/intuit, for example, others' intentions, wants, or emotions. The first stage of mind reading is established by 4 years of age, but ToM development continues such that at about the age of 6 years, children begin to understand the beliefs of other people (Baron-Cohen, 1989a). During the school years, children develop more advanced skills related to understanding emotions and thoughts, and these skills are significant in their relationships with peers (Hughes & Leekam, 2004). At later ages and during adulthood, the ToM allows complex skills such as understanding bluffs, recognizing lying behaviour and tricks, persuading, understanding emotions, and predicting thoughts or intentions that others have not expressed explicitly (Lieberman, 2007).

Many studies have shown that individuals with autism are typically late in developing mind reading skills and that they can never reach the levels attained by their TD peers. ASD children have particular difficulty acquiring ToM skills important for communication (e.g., understanding mimicking, tone of voice, intention and especially others' emotions) as well as empathizing, understanding jokes and metaphors (Baron-Cohen, 1991; Beeger, Rieffe, Terwogt & Stockmann, 2003; Golan, Baron-Cohen, Golan, 2008; Hale & Tager-Flusberg, 2005; Happe, 1994; Peterson, Wellman & Liu, 2005; Wellman, Cross & Watson, 2001).

It is important to measure ToM skills in individuals with autism or social communication impairments in order to design appropriate interventions. One tool used to measure ToM is the false-belief test, first used in 1978 by Dennett. The best-known test used to measure simple/first-order false beliefs is the "Sally-Anne Test" (Wimmer & Perner, 1983). Leslie & Frith (1988) used real people to prepare this test for use with babies and, thereafter, adaptations of this test have been used in many studies. Another false-belief test is the "unexpected content" test (Perner, Leekam & Wimmer, 1987). Even though these two tests are considered to be basic, some consider the "Appearance-reality" test

used by Flavell (1983) to be among the first-order false-belief tests (Astington & Jenkins, 1999). The "Ice-cream truck task," developed by Perner and Wimmer (1985) and the "Chocolate-bar task" developed by Flobbe, Verbrugge, Hendriks and Krämer (2008) are examples of the second-order false-belief tests. Children with typically development can pass the first-order false-belief tests at the ages of aged 3, 5, and 4 years, whereas they can pass the second-order false-belief tests at the ages of 6 to 7 years (Baron-Cohen, 1989b).

False-belief tests display a peak effect after the ages of 6 to 7 years. In addition, research has shown that some individuals with autism, and especially those with high functioned autism (HFA) or Asperger syndrome, can easily pass false-belief tests until the age of 6 to 7 years (Ozonoff, Pennington & Rogers, 1991). These individuals exhibit inadequacies only in the advanced-order tests, and, therefore, "advanced order" mind-reading tests have been developed for older ages (Baron-Cohen, Jolliffe, Mortimore & Robertson 1997a; Baron-Cohen, Wheelwright & Jolliffe, 1997b).

Advanced mind-reading tests that assess different aspects of this ability have been used to determine overall mind-reading level. First among these is the "Strange Stories Test," developed in 1994 by Happe. The Strange Stories test has been translated into several languages (e.g., Danish, Dutch, and French) (Kaland, Møller-Nielsen, Smith, Mortensen, Callesen & Gottlieb, 2005; Spek, Scholte & Van Berckelaer-Onnes, 2009; Zalla, Sav, Stopin, Ahade & Leboyer, 2009). Using more complex and natural contexts, this test evaluates individuals who have passed the first- and second-order false-belief tests. The test has been used in a study that compares individuals with autism and adult individuals with TD, and it has been determined that individuals with autism display significant inadequacies. The second study is the "Reading the Mind in the Eyes Test," developed by Baron-Cohen et al. (1997a) for individuals with autism and that is known, in short, as the "Eyes Test." Since the Eyes Test requires that the subject understand "mental/cognitive states" and be able to match them with images of portions of human faces that include the eyes, it is thought that this test can measure an individual's advanced ToM skills (Baron-Cohen, Wheelwright, Hill, Raste & Plumb, 2001). The children's version of the Eyes Test has been used in many studies to measure advanced ToM skills (Brent, Rios, Happe & Charman, 2004; Dorris, Espie, Knott & Salt, 2004).

Culture can be an important factor in understanding mental states, empathy, and general ToM skills (Liu, Wellman, Tardif & Sabbagh, 2008; Wellman, Cross & Watson, 2001). The use of false-belief tests to evaluate the ToM skills of children with TD is increasing in Turkey (Bayramoglu & Hohenberg, 2007; Granti, 2004; Keceli-Kaysılı & Acarlar, 2011; Uylas & Girli, 2011; Yagmurlu, Berument & Celimli, 2005; Yagmurlu, Koymen & Sanson, 2005). However, a small number of studies compared children with autism and children with TD, using first- and second-order false-belief tests. Atasoy's study (2008) determined that children with autism show lower performance in comparison with TD and those with mental retardation. The performance of ASD and TD children has been compared on the first- and second-order false-belief tests by Girli and Tekin (2010a). Sari-Taymaz's (2011) research compared the ToM proficiencies of pre-school-age children (4- to 6-years old) who displayed normal development with those of 4- to 8-year-old children with mental disabilities or autism. Comparison on the Strange Stories Test revealed that normal development children scored significantly higher than did the autistic and mentally disabled children, and the average scores of the mentally disabled group were significantly higher than those of the autistic group.

Girli and Tekin (2010b) conducted a preliminary study to adapt the children's version of the Eyes Test and the Strange Stories Test in order to compare TD children with children with autism. They found that the performance of TD children was better than that of the ASD group. More studies are needed to assess the value of advanced ToM tests for evaluating ASD individuals in the Turkish cultural context. Such studies will also contribute to cross-cultural data regarding the ToM skills. Using advanced ToM tests of the Strange Stories Test and the Eyes Test, the objective of this study is to examine the ToM skill levels of 7- to 13-year-old children with autism compared with TD.

2. Method

2.1. Participants

2.1.1. Inclusion and exclusion criteria

It was assumed that the participants should have some prerequisite skills in order to be able to take the advanced ToM tests. These skills included a receptive language level of at least a 6-year-old in order to determine whether children with autism have the ability to understand the words used in the tests. The Peabody Picture Vocabulary Test was administered to both participant groups to make this determination. In addition, we relied on a literature survey (Baron-Cohen, Leslie & Frith, 1985; Perner, Frith, Leslie & Leekam, 1989) to ascertain passing scores on a second-order false-belief test (Baron-Cohen, 1989b) as a prerequisite for inclusion in the study. This test allowed us to determine whether poor performance on the Eyes Test was due to mental problems of children younger than 6 years and also to determine whether or not the children could take advanced-level tests. Passing scores on first-order false-belief tests such as the "Sally-Anne Task" and the "Smarties Task" and on second-order false-belief tests such as the "Ice-cream truck task" and "Chocolate-bar task" were a prerequisite for both participant groups to be included in the study.

Children (N = 97) between the ages of 7 and 13 years volunteered to take part in the study; 62 had ASD. We excluded 25 of the 97 because they did not meet the inclusion criteria. The final sample consisted of 37 children with ASD (female, n = 3; male, n = 34) and 39 TD children. The ASD subjects had been diagnosed with autism by child psychiatrists and clinical psychologists at the child psychiatry departments of university hospitals, according to DSM-IV-TR (2000) diagnosis criteria. The subjects' average age was 10.51 yrs (SD = 2.43 yrs).

TD participants (N = 39) were randomly selected by the guidance counsellor from among autistic students and their peers at public schools for children with autism (female, n = 11; male n = 28) and who had been "specified as having no problems regarding social-behaviour and learning" and with none having family members with autism or intellectual disability. Their average age was 10.87 yrs (SD = 1.34 yrs). To help ensure that the students had similar socio-economic backgrounds, the participants were selected from families whose parents included middle-class government employees.

2.2. Instruments

2.2.1. Prerequisite instruments

Peabody Picture Vocabulary Test: This test was developed in 1959 by Dunn and Dunn in order to determine the verbal skills of children between the ages of 2 and 12 years, and the validity and reliability of the Turkish adaptation of this test was conducted in 1972 by Kantz et al. The subject is asked to point out the repeated verbs and words one by one from four pictures and one point is given for each correct reply. The parallel-form reliability of the test varies between .64 and .84. The criterion-dependent validity values of the test have been determined as .82–.86 with the Stanford-Binet Mental Test and as .41–.74 with the Wechsler Intelligence Scale for Children (Oner, 2006). The test was administered to the participants individually, and each test taker took about 20 to 30 minutes.

Sally-Anne Task: The Sally-Anne task was modelled closely on Baron-Cohen et al. (1985). The test includes the description of two protagonists, Sally and Anne. (We changed these names to the popular Turkish names "Selin" and "Ece.") In addition, the child test taker is presented with the description of a scenario, which includes a box and a basket, as follows: Selin puts her marble into the basket, and then she leaves the scene. While she is away, Ece transfers the marble into the box and she leaves the

scene. When Selin returns to the scene, the experimenter asks the child a Thought Question ("Where does Sally think her marble is?"). After the child answers, a Behaviour Question is asked ("Where will Selin look for her marble?") Finally, a Reality Control Question (reality question) is asked ("Where is the marble?"). The reliability result of this test's KR-21 value was .78 (Girli & Tekin, 2010a).

Smarties Task: The original task was developed by Hogrefe, Wimmer & Perner in 1986. We used a Bonibon box and a crayon, having changed "Smarties" to "Bonibon," a well-known Turkish brand for a similar product, with a typical and well-known box similar to that of Smarties. We used a crayon because children use crayons often and can easily name it. For the test, we placed a crayon in a bonibon box. We showed the bonibon box to the child and asked two control questions ("What is this?" and "What is in it?"). For these questions, the child was expected to give the answers "bonibon box" and "bonibon," respectively. For these questions answers like "jelibon," or "chocolate," were also accepted. Then we asked a Belief Question ("If I show this to X, [where "X" is someone whom the child knows and who is not present in the room], what will X think is in here?"). The reliability results of this test's KR-21 value was .82 (Girli & Tekin, 2010a).

Ice-cream truck task: This test was developed by Perner and Wimmer in 1985. This second-order test involves a story, and, while telling the story, we showed pictures to the child. We changed names into well-known Turkish names, and we replaced the picture of a church picture with a picture of a school, in order to reduce the potential for confusion or distraction while listening to the story. The story is as follows: "Meltem and Can are in the park. Can wanted to buy ice cream from the ice-cream man, but he did not have any money. The ice-cream man tells her that he will be there all afternoon. Can goes off home to get money for ice cream. After that, the ice-cream man tells Meltem that he changed his mind and he is going to drive to the school yard and sell ice cream there. The ice-cream man sees Can on the road to school and he tells him that he is going to the school yard to sell ice-cream there. Meltem goes to Can's house but Can is not there. His mom tells her that he has gone to buy ice-cream." The test administrator then asks the child test taker: Where does Meltem think can has gone, to school or to the park? Then, a control question is asked ("Where did Can go to buy ice-cream?") The reliability result of this test's KR-21 value is .84. For the over all test results, the KR-21 value is .83 (Girli & Tekin, 2010a).

Chocolate-bar task: Task was developed by Flobbe, Verbrugge, Hendriks, and Krämer (2008). There were two protagonists, Arda and Ceren. We changed names into well-known Turkish names. They were in a room with a window. There were also a box and a drawer in the room. Arda's mother came and gave him a bar of chocolate. Arda put his chocolate in drawer. Then he left the room. Ceren transferred chocolate from drawer to box. While she was doing that, Arda saw him from the window. After that, Arda came back to the room. There was a thought balloon over his head that showed that he wanted his chocolate. A second-order belief question was asked: Where does Ceren think Arda will look for his chocolate, drawer or box? Then, a control question was asked; Where will Arda look fort the chocolate? Reliability results of the chocolate bar task KR-21 value is .84 (Girli & Tekin, 2010a).

2.2.2. Research Instruments

The demographic information of the participants was obtained from the authorized personnel of the students' schools with the consent of their guardians. The Eyes Test and Strange Stories Test were used to assess advanced level ToM skills.

The Strange Stories Test and Eyes Test were translated into Turkish by three Ph.D.-level professionals working on autism in order to attain "language equivalence." These three translations were combined to form a "temporary test," and the solicited opinions of five specialists were used to revise the tests, which were then translated back into English by a professional translator. No incoherence was determined in the English text, and the final Turkish drafts of the tests were then used in this study.

Strange Stories Test: This test, composed of short stories, measures the mentalizing skills of individuals. The stories contain events that may take place in daily life, and, thus, it is expected that the subject will be able to determine the difficulties that can be faced in his/her natural environment (Happé, 1994). Successful responses given to questions related to the stories indicate that the individual will be able to refer to advanced mental states such as the emotions, thoughts and intentions of others (White, Hill, Happé & Frith, 2009). The Strange Stories Test has been used in many studies as a valid and reliable scale (Happe, 1994; Harkness, Sabbagh, Jacobson, Chowdrey & Chen, 2005; Cheung, Chen & Yeung, 2009). In studies of Turkish children with TD, the Turkish translation of the test replaces the names of well-known people and places with well-known Turkish names. The Cronbach Alpha internal consistency coefficient has been calculated as .74. The Cronbach Alpha internal consistency coefficient has been determined as .76 for mental state, .78 for animal stories, and .69 for physical stories. The item-total correlation values vary between .32 and .75 (Girli & Tekin, 2010b).

Eyes Test: The Reading the Mind in the Eyes Test, known in short as the "Eyes Test," was developed by Baron-Cohen et al. (1997a). The subject is asked to view a photograph and to select what the person in the photograph is feeling from among 4 basic emotions (e.g., happy, sad, angry, or frightened) in addition to more "complex" emotions (e.g., insolent, distrustful, scheming). The test was revised in 2001 to include simpler words that children can understand (Baron-Cohen, Wheelwright, Hill, Raste & Plumb, 2001). The child version of the test is used for ages 6 and older. There are 36 photos in the adult version of the test and 28 photos in the child version. All faces have been standardized to the same dimensions (15 $\times$ 10 cm), and all photos are in black and white. In addition, the same part of the face—from the middle of the nose to the eyebrows—is visible in each photo. Correctly answered questions answered about the photos receive a score of "1," with a maximum cumulative score of 28. Attaining a score of 9 or more is an indication that the replies are not a function of chance (Baron-Cohen et al., 2001). High scores indicate good social cognition and ToM skills.

The validity and reliability of the test with Turkish children was assessed by Girli (2014) with a total of 235 children aged 6 to 16 years (TD, n = 202; autism diagnosis, n = 33; female, n = 99 [42.1%]; male, n = 136 [57.9%]). The Cronbach alpha value based on the total scores was .72. The Cronbach alpha internal consistency coefficient varies between .69 and .71. The average score of children with typically development (X = 17.06) was significantly higher than those of the children with autism (X = 13.06) [t(233) = 5.09, p = .000 < .05]. Females had significantly higher scores compared with males [t(200) = 2.14, p = .033 < .05]. The Eyes Test performance differed significantly as a function of age [F = 9.008, p = .000 < .05] and younger children are less successful than older children. The same test material was been used in the current study.

2.2.3. Procedure

The data were obtained from individually administered tests with children with TD in the guidance service room at their respective elementary schools. Initially the first- and second-order false-belief tests were administered (requiring 30 to 40 min), and the replies of the children were been recorded by the researcher. Advanced-level tests were administered individually with children who passed these tests, and each application required 40 to 45 min. The Eyes Test responses were recorded by the researcher. The strange stories test was applied by sitting side by side with the child and the child has followed the story with his/her eye as the researcher read and his/her replies were recorded on a digital magnetic tape.

2.2.4. Reliability

A second evaluator later listened to the recorded responses and scored 30% of these responses in order to determine the inter-rater reliability, using the formula ([agreement/agreement + disagreement] $\times$ 100), and it was determined that the results were 98% in accordance.

3. Results and Discussion

In this study, advanced ToM skill levels of 7- to 13-year-old children with autism and without autism were investigated. Firstly, using the Kolmogorov-Smirnov Test, the data were assessed to determine whether they exhibited a normal distribution. The difference between the scores of the ASD group and children with TD was examined via the Student's t test. Any correlations between the Eyes Test and the Strange Stories Test scores were also examined.

Table 1. The Eyes Test scores of children with TD vs ASD, including Student's t test results

Diagnosis	N	X	SS	t	SD	p
TD	39	20.1282	2.1420	8.223	66	.000*
ASD	37	13.5172	4.3721			

**P* < .0001

As can be seen in Table 1, there was a statistically significant difference between the groups on the Eyes Test, with TD children scoring higher than ASD children. In the Baron-Cohen et al., (2001) study, some autism and Asperger syndrome subjects received lower scores in comparison with TD and Tourette syndrome subjects, despite the fact that they were university graduates. While the correct responses of children with autism to complex emotion questions varied between 5 and 10 percent, children with TD identified these emotions correctly 30 to 40 percent of the time. Whereas basic emotions (e.g., happy, sad, frightened, angry) are easily identified in all cultures, in some cultures the same facial expression can evoke a different emotion word, or there may be no specific words for various nuances in emotional expressions (Ekman, 1994). In a study examining the effect of language and culture on emotion identification, it was observed that British participants are inclined to consider the expression for "anger" as one for "surprise" (Carroll & Russell, 1996; cited by Yıldırım, Kasar, Guduk, Ates, Kucukparlak & Ozalmete, 2011). Thus, language differences make it difficult to understand more complex mental state expressions.

Table 2. Scores on the Strange Stories and Physical Stories tests of children with TD vs ASD, according to the Animal Stories and Mental State Stories Sub-Test, including t test results

	Diagnosis	N	X	SS	t	SD	p
Total Score	TD	39	12.5238	1.86062	6.635	39	.000*
	ASD	37	7.6000	2.81724			
Physical Stories	TD	39	14.8095	5.5912	1.501	39	.142
	ASD	37	12.4000	4.61576			
Animal Stories	TD	39	12.0952	2.50808	4.482	39	.000*
	ASD	37	7.7500	3.62557			
Mental State Stories	TD	39	12.5238	5.5912	6.635	39	.000*
	ASD	37	7.6000	4.61576			

**P* < .0001

The analyses in Table 2 shows that children with ASD score significantly lower than children with TD, according to the total scores on the Strange Stories Test. A statistically significant difference also emerged between the two groups for the mental state and animal stories, whereas no difference was found for the physical stories. Compared with ASD subjects, children with TD explained the cause–effect relationships in social situations better and used more sophisticated mental-state expressions (e.g., "may have thought," "should have felt," "must have said because he/she felt sad.") than ASD children. Whereas children with ASD generally do not answer questions regarding why the character portrayed in the test behaved in a given way, and, instead, gave concrete but less complex responses (e.g., "I don't know" or "very hungry"). Happé (1994) found that compared with a control group, adults with autism or Asperger syndrome had more difficulty in determining the mental states of the character and used fewer correct mental state terms when explaining the character's behaviour. Girli and Tekin (2010b) observed that the ratio of correct responses for both children with TD and ASD is higher for basic emotions such as happy or sad. However, more complex emotions such as guilt or anxiety present a greater challenge, especially for the ASD group.

It was determined that there was statistically significant relationship between the total scores on the Strange Stories Test and the Eyes Test, as expected ($r = 0.483$, $p < 0.01$). These results are in accordance with other studies in the literature. Children with autism can more easily make sense of physical events; however, they have difficulty grasping the relationships between animals or humans in terms of intention, tricking, planning, or mental states. Similarly, Baron-Cohen et al. (2001) determined that participants have difficulty understanding the emotions and thoughts from the facial expressions or eyes of people. Boren-Cohen et al. (2001a) have determined in their study that the result patterns of the Eyes test reflect the results in the Strange Stories test of Happé.

Peterson and Slaughter (2009) have used a simplified version of the Eyes Test, which they named the "Simplified Eyes Test," along with a second-order false-belief test, and have found statistically significant differences between the scores of children and adults with ASD and TD children on wrong-belief tests. They also found statistically significant differences using wrong-belief tests with children with autism and children with TD, but they found no difference between the groups using the Eyes Test. Explanations posited for these results are the fact that 40 percent of the children with autism had HFA and that the words in the test had been simplified.

Some studies indicate that the ToM skills of children with Asperger syndrome are better than those of children with autism (Ozonoff, Pennington & Rogers, 1991; Ozonoff & Miller, 1995). However, a comparison between autism, High Function Autism or Asperger syndrome sub-groups could not be conducted because there was no information as to which sub-category the children with autism fell into within the ASD group. Similarly, Hoogenhout and Malcolm-Smith (2014) used a cross-sectional design to examine ToM skills in 4- to 16-year-olds with or without autism. They found that increased age was only associated with increased ToM in ASD when verbal ability was high. In contrast, in increased age was associated with higher ToM scores regardless of TD children's verbal ability. The researchers argued that delayed development of ToM occurred in high-functioning autism, PDD-NOS (pervasive developmental disorder not otherwise specified), and Asperger's syndrome. In contrast, ToM did not improve detectably in low-functioning autism, supporting the deviance model of development in this population. Individuals with ASD are deficient in ToM abilities. The results of some studies on the effects of ToM training and social skills training indicated a substantial increase in social interactions and ToM scores (Begeer, Malle, Nieuwland & Keysar, 2010; Fisher & Happe, 2005; Gevers, Clifford, Mager & Boer 2006; Perry, 2008). Hence, ToM tests can be used as evaluation tools when planning courses to improve social skills, and they can be used to determine the starting level of such ToM training.

4. Limitations and Recommendations

A gender comparison could not be conducted in this study, because the number of girls with autism was insufficient. However, study on a Turkish sample (Girli & Tekin, 2010b) has shown that similar to studies carried out abroad (Charman, Ruffman & Clements, 2002) females score more highly than males in identifying emotions from the eyes.

The cross-sectional design of the current study limits confidence in the inferences we make from our data, because, while a cross-sectional design can show that older children have greater ToM skills than younger children have, it cannot permit an unchallenged inference that these skills are due to development alone. A large-scale longitudinal study of ToM in ASD, examining the questions considered here, however, could help settle this question.

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