International Journal of Disability, Development and Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/cijd20

The Potential Usefulness Of The Social Attribution Task (SAT) in Diagnosing Girls with ASD

Hagit Nagar Shimoni, Yael Leitner, Roni Yoran-Hegesh, Ya'arit Bokek-Cohen, Shahar Gindi & Abraham Weizman

To cite this article: Hagit Nagar Shimoni, Yael Leitner, Roni Yoran-Hegesh, Ya'arit Bokek-Cohen, Shahar Gindi & Abraham Weizman (2021): The Potential Usefulness Of The Social Attribution Task (SAT) in Diagnosing Girls with ASD, International Journal of Disability, Development and Education, DOI: 10.1080/1034912X.2021.1904503

To link to this article: https://doi.org/10.1080/1034912X.2021.1904503

Published online: 26 Apr 2021.

Submit your article to this journal

View related articles

View Crossmark data

Full Terms & Conditions of access and use can be found at
https://www.tandfonline.com/action/journalInformation?journalCode=cijd20

INTERNATIONAL JOURNAL OF DISABILITY, DEVELOPMENT AND EDUCATION
https://doi.org/10.1080/1034912X.2021.1904503

Routledge
Taylor & Francis Group

Check for updates

The Potential Usefulness Of The Social Attribution Task (SAT) in Diagnosing Girls with ASD

Hagit Nagar Shimoni[a], Yael Leitner[a], Roni Yoran-Hegesh[b], Ya'arit Bokek-Cohen[c], Shahar Gindi[d] and Abraham Weizman[e]

[a]Marot Autism Center, Child Development Institute, Dana-Dwek Children's Hospital, Tel Aviv Sourasky Medical Center, Tel Aviv, Israel; [b]Child and adolescent Clinic, Be'er Ya'akov Mental Health Center, Be'er Ya'akov, Israel; [c]School of Nursing, Academic College of Tel Aviv Jaffa, Tel Aviv, Israel; [d]Faculty of Education, Beit Berl College, Kfar Saba, Israel; [e]Research Unit, Geha Mental Health Center, Petach Tikva, Israel

ABSTRACT

Clinical observations suggest that girls suspected to have ASD manage to perform better in social and emotional tasks than boys, leading to a camouflage effect which results in the under-diagnosis of girls with ASD. We used the Social Attribution Task (SAT) in order to assess the performance of 12 girls who were previously diagnosed with ASD, and additionally to compare their performance in SAT to that of 12 boys who were previously diagnosed with ASD. No significant differences were found between girls and boys in all the indices of SAT except for the Person index; girls performed better than the boys in the Person index. The lack of significant differences between the boys and the girls in five out of the six SAT indices suggests that girls with ASD do not have a better social understanding than boys. They outperformed the boys only when the instructions included a clue that triggered them to name human traits, as they are instructed to do in the Person index. Implications of the usefulness of the Social Attribution Task (SAT) for diagnosing ASD in girls are discussed.

KEYWORDS

ASD; autism; camouflage; social attribution task; theory of mind

Introduction

Studies on individuals who were diagnosed with ASD indicate that the diagnosis has a positive impact on their wellbeing including self-acceptance, self-understanding and a more positive reframing of their lives (Lewis, 2017). Clinical observations, however, suggest that girls suspected to have ASD manage to perform better in social and emotional tasks than boys, leading to a camouflage effect which results in the under-diagnosis of girls with ASD (Head, McGillivray & Stokes, 2014; Green, Travers, Howe, & McDougle, 2019). The camouflage effect has important implications, as girls who are falsely undiagnosed will not receive the appropriate treatment, and during the years of camouflage they pay a high personal price in their attempt to hide their difficulties (Beck, Lundwall, Gabrielsen, Cox, & South, 2020).

Social desirability may influence individuals with autism to hide or camouflage their autism. Research has consistently shown that girls are more apt in disguising their autism,

CONTACT Hagit Nagar Shimoni hagitnagar8@gmail.com

© 2021 Informa UK Limited, trading as Taylor & Francis Group

in what has been termed as a 'camouflage effect' (e.g., Parish-Morris et al., 2017). Lai et al. (2017) suggested that the quantitative discrepancy between a person's outward behavioural presentation in social and interpersonal situations and the person's status with regard to autism can be used as a measure of camouflaging. In a study on parents' perspectives, parents of girls with ASD described their daughters as trying to conceal or mask their difficulties, but no parents of boys with ASD reported such behaviour (Sutherland, Hodge, Bruck, Costley, & Klieve, 2017). Dean, Harwood, and Kasari (2017) conducted observations on children in the playground, and documented how autistic girls used compensatory behaviours such as staying near peers and weaving in and out of activities.

The female camouflage phenomenon has been documented using different measures including the Questionnaire for Autism Spectrum Conditions (Ormond, Brownlow, Garnett, Rynkiewicz, & Attwood, 2018), the ADOS and ADI-R (Ratto et al., 2018). The latter further discovered that girls with higher IQs were less likely to meet criteria on the ADI-R. This led the researchers to suggest that lower functioning girls with ASD are similar to their male counterparts, while high-functioning girls present differently than high-functioning boys.

One explanation for girls' camouflage effect is the diagnostic use of verbal measures that ask explicitly about social situations. Girls with autism use more emotional expressions, and are more likely to label others' internal states than autistic boys, thus producing better scores on such explicit social tasks without the underlying social skills (Boorse et al., 2019; Kauschke, van der Beek, & Kamp-Becker, 2016).

Klin (2000) has suggested that nonverbal measures can be useful in overcoming high-functioning individuals' confounding verbal abilities. One such measure is the Social Attribution Task (SAT), which was originally developed for research in autism, and has since been used in several other confusing conditions. For example, individuals with Williams Syndrome have a verbal ability that is very high relative to their cognitive ability, and the SAT was useful in predicting their social reciprocity in natural settings (Van der Fluit, Gaffrey, & Klein-Tasman, 2012). The SAT was also found useful in comparing young adults with recent onset schizophrenia, to individuals with high functioning ASD and healthy controls (Martinez et al., 2019).

The purpose of this report is to describe pilot research findings that suggest using the Social Attribution Task developed by Klin (2000) as a supplementary diagnostic tool that helps to evaluate the social understanding and skills of children who undergo the process of ASD diagnosis.

Materials and Method

Measures

Klin (2000) noted the discrepancy between the performance of people with ASD on explicit tasks of social reasoning, which were considerably better than their performance on tasks of underlying skills such as theory of mind (ToM) tasks (Livingston, Carr, & Shah, 2019), and better than their performance in more naturalistic settings. To address this discrepancy, he developed a social cognitive procedure characterised by reducing the confounding potential of the verbal mediation of task presentation by minimising verbal instruction, reducing explicit definitions of the task, measuring the social elements of the

task, and using stimuli that can be interpreted at different levels of social cognitive ability, from absence of social attributions to attributions including mental states and interactions.

The SAT requires the participants to view a short clip (50 seconds) that shows geometric figures moving in synchrony with one another, when the action of one geometric figure is contingent on the action on another. Participants are shown the clip three times and asked different questions each time. The procedure takes approximately 20 minutes, and the materials are then transcribed and analysed. The SAT is appropriate for individuals ages 6 and above including adults.

In this study, we use the SAT in order to assess the performance of girls who were previously diagnosed with ASD, and additionally to compare their performance in SAT to that of boys. The SAT is designed to empirically explore the gap between performance in the ToM task and the level of social adaptation in real-life, when all factors that are assumed to promote the former, but not necessarily the latter, are minimised (Klin, 2000).

Six SAT indices were used: (1) The Salience index refers to participants' social interpretation as it is expressed by the number of social elements mentioned spontaneously, when a higher score reflects better social ability; (2) The Pertinence index refers to participants' inhibition of reasoning processes that are not relevant to social attribution. This index score corresponds to the percentage of propositions contained in the participant's spontaneous narratives that were non-pertinent. Lower scores reflects better social ability; (3) The ToM Cognition index corresponds to the percentage of pertinent propositions containing cognitive mental state terms such as: desire, thoughts, motivation, intention, or behaviours intended to alter another person's mental states. On the ToM Cognition index, the higher the score the better; (4) The ToM Affect index corresponds to the percentage of propositions from the total number of propositions made containing emotional states that are attributed to characters in the video. On the ToM Affect index, the higher the score the better; (5) The Animation index corresponds to a summary measure of the narrative's general level of social attribution on a 6-point Likert scale, with the higher the score the better; (6) The Person index is measured by adding a suggestion to the participant that each shape is a person, asking what kind of person each shape is and evaluating the personality attributions made. On the Person index, the higher the score the better.

Participants

The sample included a group of 12 girls and a group of 12 boys (age: M = 15.14, SD = 4.08 years) with IQ in the normal range, who were previously diagnosed with ASD. All girls attended a classroom in a regular school and had to present an IQ assessment showing an IQ>70 for the IPRC. The IQ data for the girls, however, was not available. There was no significant between-group age difference (Student's $t = 0.23$, $DF = 22$, $p > .05$; Mann Whitney test: $U = 67.00$, $p > 0.05$). Data obtained with this procedure are a series of narratives which are coded according to seven index scores. In the current study, six indices were used.

Two experienced psychologists scored the SAT protocols according to Klin's (2000) guidelines. Inter-rater reliability coefficients for these protocols were computed, and are

Table 1. Means, SD and t-test values for differences between boys and girls.

	Girls		Boys			
Measures	SD	Mean	SD	Mean	$F_{(1,22)}$	Mann-Whitney
Salience	0.23	0.44	0.16	0.43	0.01	65.00
Pertinence	0.12	0.18	0.15	0.14	0.39	54.00
ToM Cognitive	0.12	0.17	0.10	0.09	3.51	46.00
ToM Affective	0.06	0.07	0.07	0.07	0.03	67.50
Animation	1.44	3.08	1.56	2.92	0.07	67.00
Person	1.77	3.67	0.89	1.67	12.19***	24.50***

***p < .001, remains significant following Bonferroni correction for multiple comparisons.

presented as follows: pertinence (R = 0.92); animation (R = 0.75); ToM cognitive (R = 0.53); ToM affective (R = 0.91); person (R = 0.82); salience (R = 0.91). The research was approved by an institutional review board.

Data Analysis

Descriptive statistics were used in order to represent the participants' characteristics. A one-way ANOVA was conducted to determine the differences between the two groups.

Results

Table 1 presents the results of the boys and girls on the six SAT indices. ANOVA conducted separately for each index of SAT revealed no significant differences between boys and girls in five out of the six indices. The only significant effect of sex was found for the Person Index ($F_{(1, 22)} = 12.19$, $p < .001$). Comparison of the mean scores of this index showed that girls scored significantly higher than boys. Since the standard deviations were larger than the mean scores, a Mann-Whitney test was conducted. This analysis also revealed a significant difference between girls and boys for only the Person Index measure ($p < 0.001$; Table 1). The difference in Person Index measure remained significant following Bonferroni correction for multiple comparisons.

Discussion

The lack of significant differences between the boys and the girls in five out of the six indices suggests that girls with ASD do not have a better social understanding than boys; they outperformed the boys only when the instructions included a clue, as instructed to do in the Person index (. . . "Let's assume the figures are people, . . ., what kind of a person is the small triangle? . . . ", etc.). However, without being provided with such prompts, the girls did not demonstrate a better social understanding of the short video, as manifested by the other indices. This finding is in accordance with previous research indicating that girls with autism use more emotional expressions, and are more likely to label others' internal states than autistic boys (Boorse et al., 2019; Kauschke et al., 2016).

We find the importance of these results to be the similarity between the two groups rather than the differences. The camouflage effect was found on many important

diagnostic instruments such as the Q-ASC (Ormond et al., 2018), ADOS and ADI-R (Ratto et al., 2018), and when analysing conversational patterns (Sutherland et al., 2017). The present study provides modest support to the claim that the SAT circumvents the camouflage effect.

We conclude with a recommendation to add to the well-established global and comprehensive diagnostic battery, such as ADOS-2 and ADI-R, a more specific supplementary diagnostic task, namely SAT, which assesses ToM. The finding regarding the Person index should serve as a warning sign for clinicians to use measures that prompt as little as possible when diagnosing girls. For this reason, we suggest that clinicians employ the index that uses no prompts, and relies most heavily on the participant's spontaneous reaction – the Salience index. We suggest using this index alone given the practical limitations of using a demanding coding scheme within a clinical assessment. In this index, the narrative is assessed to the extent that it includes the social narrative and comprises the number of social elements (from a total of 20 typical items) which the participant identified. While this is not a diagnostic tool, the Salience index has the added value of asking for a spontaneous narrative that may help clinicians expose some of the social difficulties that girls manage to camouflage when they are given more prompts.

The relatively small sample size constitutes a limitation of the study, and it is recommended to test the efficiency of SAT in exposing concealed ASD in larger samples of girls. We nevertheless believe that SAT, because it evaluates a specific ability (ToM), should be further investigated, in order to explore its diagnostic potency and to determine if it should be added to the existing battery of screening and measurement tools, to enhance our ability to avoid the under-diagnosis of girls with ASD. We also suggest that treatment of girls with ASD should always bear in mind the discrepancy between their emotional vocabulary and actual understanding. Finally, when planning novel diagnostic tools for ASD in girls, it would be useful to design tools that do not offer prompts, because the clues help girls camouflage their disability.

Disclosure Statement

The authors declare no conflict of interests.

ORCID

Abraham Weizman http://orcid.org/0000-0002-9765-8938

References

Beck, J. S., Lundwall, R. A., Gabrielsen, T., Cox, J. C., & South, M. (2020). Looking good but feeling bad: "Camouflaging" behaviors and mental health in women with autistic traits. *Autism*, *24*(4), 809–821.

Boorse, J., Cola, M., Plate, S., Yankowitz, L., Pandey, J., Schultz, R. T., & Parish-Morris, J. (2019). Linguistic markers of autism in girls: Evidence of a "blended phenotype" during storytelling. *Molecular Autism*, *10*(1), 14.

Dean, M., Harwood, R., & Kasari, C. (2017). The art of camouflage: Gender differences in the social behaviors of girls and boys with autism spectrum disorder. *Autism*, *21*(6), 678–689.

Green, R. M., Travers, A. M., Howe, Y., & McDougle, C. J. (2019). Women and autism spectrum disorder: Diagnosis and implications for treatment of adolescents and adults. *Current Psychiatry Reports*, *21*(4), 22.

Head, A. M., McGillivray, J. A., & Stokes, M. A. (2014). Gender differences in emotionality and sociability in children with autism spectrum disorders. *Molecular autism*, *5*(1), 1–9.

Kauschke, C., van der Beek, B., & Kamp-Becker, I. (2016). Narratives of girls and boys with autism spectrum disorders: Gender differences in narrative competence and internal state language. *Journal of Autism and Developmental Disorders*, *46*(3), 840–852.

Klin, A. (2000). Attributing social meaning to ambiguous visual stimuli in higher-functioning autism and Asperger syndrome: The social attribution task. *The Journal of Child Psychology and Psychiatry and Allied Disciplines*, *41*(7), 831–846.

Lai, M. C., Lombardo, M. V., Ruigrok, A. N. V., Chakrabarti, B., Auyeung, B., Szatmari, P., … Baron-Cohen, S. (2017). Quantifying and exploring camouflaging in men and women with autism. *Autism*, *21*(6), 690–702.

Lewis, L. F. (2017). A mixed methods study of barriers to formal diagnosis of autism spectrum disorder in adults. *Journal of Autism and Developmental Disorders*, *47*(8), 2410–2424.

Livingston, L. A., Carr, B., & Shah, P. (2019). Recent advances and new directions in measuring theory of mind in autistic adults. *Journal of Autism and Developmental Disorders*, *49*(4), 1738–1744.

Martinez, G., Mosconi, E., Daban-Huard, C., Parellada, M., Fananas, L., Gaillard, R., … Amado, I. (2019). "A circle and a triangle dancing together": Alteration of social cognition in schizophrenia compared to autism spectrum disorders. *Schizophrenia Research*, *210*, 94–100.

Ormond, S., Brownlow, C., Garnett, M. S., Rynkiewicz, A., & Attwood, T. (2018). Profiling autism symptomatology: An exploration of the Q-ASC parental report scale in capturing sex differences in autism. *Journal of Autism and Developmental Disorders*, *48*(2), 389–403.

Parish-Morris, J., Liberman, M. Y., Cieri, C., Herrington, J. D., Yerys, B. E., Bateman, L., … Schultz, R. T. (2017). Linguistic camouflage in girls with autism spectrum disorder. *Molecular Autism*, *8*(1), 48.

Ratto, A. B., Kenworthy, L., Yerys, B. E., Bascom, J., Wieckowski, A. T., White, S. W., … Scarpa, A. (2018). What about the girls? Sex-based differences in autistic traits and adaptive skills. *Journal of Autism and Developmental Disorders*, *48*(5), 1698–1711.

Sutherland, R., Hodge, A., Bruck, S., Costley, D., & Klieve, H. (2017). Parent-reported differences between school-aged girls and boys on the autism spectrum. *Autism*, *21*(6), 785–794.

Van der Fluit, F., Gaffrey, M. S., & Klein-Tasman, B. P. (2012). Social cognition in Williams syndrome: Relations between performance on the social attribution task and cognitive and behavioral characteristics. *Frontiers in Psychology*, *3*, 197.