J Autism Dev Disord (2016) 46:2520–2525
DOI 10.1007/s10803-016-2761-1

BRIEF REPORT

Brief Report: Sensitivity of Children with Autism Spectrum Disorders to Face Appearance in Selective Trust

Pengli Li[1] · Chunhua Zhang[2] · Li Yi[3]

Published online: 2 March 2016

Abstract The current study examined how children with Autism Spectrum Disorders (ASD) could selectively trust others based on three facial cues: the face race, attractiveness, and trustworthiness. In a computer-based hide-and-seek game, two face images, which differed significantly in one of the three facial cues, were presented as two cues for selective trust. Children had to selectively trust the own-race, attractive and trustworthy faces to get the prize. Our findings demonstrate an intact ability of selective trust based on face appearance in ASD compared to typical children: they could selectively trust the informant based on face race and attractiveness. Our results imply that despite their face recognition deficits, children with ASD are still sensitive to some aspects of face appearance.

Keywords Autism spectrum disorders · Face appearance · Selective trust · Race · Attractiveness · Trustworthiness

Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by social deficits, stereotyped behaviors, restricted interests, and some cognitive dysfunctions. As an important aspect of social life, children's trust behavior experiences tremendous change in preschool years (e.g., Vanderbilt et al. 2011). Yet abnormal trust behavior has been recently observed in children with ASD: compared with typically developing (TD) children, children with ASD tend to display a trust bias towards others: they are less likely to distrust others when repeatedly deceived (Yi et al. 2013, 2014). A key aspect of children's trust behavior is the selective trust, noted as children's preference for reliable and accurate informants over unreliable and inaccurate ones (e.g., Clement et al. 2004; Harris 2007). Previous literature on selective trust in TD children has shown that in preschoolers years, children develop the selective trust based on several social cues, such as their relationship with informants (Corriveau and Harris 2009), informants' past reliability (Corriveau and Harris 2009; Koenig and Harris 2005), informants' confidence level (Jaswal 2004; Jaswal and Neely 2006), and informants' intentions and deceptive history (Lee and Cameron 2000; Mascaro and Sperber 2009; Vanderbilt et al. 2011). However, very little is known about how selective trust develops in children with ASD. The current study was designed to examine the selective trust based on face appearance in children with ASD, in comparison with TD children.

The current study sheds light on the selective trust based on face appearance, given that human faces could provide plenty of social information and thus have powerful influence on social judgment (Todorov et al. 2013; Zebrowitz and Montepare 2008). Adults and children could infer character traits, such as trustworthiness, competence, and dominance, after brief exposure to the faces (Cogsdill et al. 2014; Todorov et al. 2009). Facial features of interest in our study included race, attractiveness, and trustworthiness, which have great influence on interpersonal

✉ Li Yi
yilipku@pku.edu.cn

[1] Department of Psychology, Sun Yat-sen University, 135 Xingang West Road, Guangzhou 510275, Guangdong, China

[2] Qingdao Autism Research Institute, 7 Jinsong Seven Road, Qingdao 266000, Shandong, China

[3] Department of Psychology and Beijing Key Laboratory of Behavior and Mental Health, Peking University, 5 Yiheyuan Road, Beijing 100871, China

interaction and trust behavior. First, face race is such important grouping information that people process own- and other-race faces differently as early as infancy (i.e., other race effect, Walker and Tanaka 2003). People show in-group favoritism, the tendency to cooperate with in-group members more than out-group members (e.g., Masuda and Fu 2015; Zebrowitz et al. 2007), and the preference to trust people from their own race (e.g., Kinzler et al. 2011; Uslaner2002). Second, attractiveness is also a very important characteristic of human faces that can influence our trust behavior toward others. For example, preschool children were found to selectively endorse information from attractiveness informants (Bascandziev and Harris 2014). Third, trustworthiness, by definition, is directly related to trust behavior by providing the initial trustworthy information to form the first impression of a stranger. Children and adults could evaluate trustworthiness from facial appearance to infer persons' trait (Cogsdill et al. 2014). Poor evaluation of trustworthiness—trusting an untrustworthy individual or mistrusting a trustworthy one—could lead to negative consequences in social interaction, such as losing opportunities for cooperation (Bzdok et al. 2011). Therefore, the ability to selectively trust informants according to face race, attractiveness, and trustworthiness is crucial in social life. Considering the impairments of social interaction in ASD, it's of great significance to examine whether children with ASD retain the ability to use these three face attributes to behave selective trust.

However, it's generally believed that individuals with ASD have abnormalities in recognizing and scanning faces according to prior studies (e.g., Klin et al. 2002; Pelphrey et al. 2002). Yet some recent studies show that some aspect of human faces, the face race information, has been preserved in individuals with ASD (Yi et al. 2015, 2016). Therefore, the present study aimed to examine whether children with ASD could selectively trust others according to subtle differences in facial appearance. To date, only one study has investigated the relationship between selective trust and facial features in ASD: using the classic trust game paradigm, Ewing and colleagues found that both ASD and TD children could discriminate trustworthy and untrustworthy faces, but only TD children's trust behavior was influenced by these facial cues (Ewing et al. 2014).

The present study aimed to examine if children with ASD and their age- and ability-matched TD peers could selectively trust the informants based on the face appearance. We employed a developmentally appropriate, computer-based hide-and-seek game, adapted from the classic selective trust task, which asks children to make the selective trust decision based on the different personal traits of two informants (e.g., Clement et al. 2004). In our study, we asked children to find a prize based on multiple facial cues, that is, the face race, attractiveness, and trustworthiness. We presented on the computer each time a pair of two face images corresponding to two trust choices, which differed significantly in one of the three dimensions of facial cues. In order to correctly find the prize, children had to selectively trust the own-race, attractive, and trustworthy faces other than other-race, unattractive, and untrustworthy ones.

Method

Participants

Participants, including 30 children with ASD (4.8–8.2 years, $M = 6.13$, $SD = 0.81$) and 30 typical peers (5.0–7.0 years, $M = 5.86$, $SD = 0.65$), were recruited from a special school for children with ASD and a normal school in Qingdao, China (see Table 1). Children with ASD were all previously diagnosed by professional clinicians and all met the diagnostic criteria of ASD according to DSM-IV-TR (APA 2000). Since the Autism Diagnostic Observation Schedule (ADOS; Lord et al. 2000) and the Autism Diagnostic Interview-Revised (ADI-R; Lord et al. 1994) have not been officially validated and widely adopted in China, the diagnosis of children with ASD was confirmed by the Chinese version of Autism Spectrum Quotient: Children's version (AQ-Child; Auyeung et al. 2008), the Social Responsive Scale (SRS; Constantino and Gruber 2002), and the Social Communication Questionnaire (SCQ; Rutter et al. 2003). TD children were matched with the ASD group by the chronological age, the non-verbal IQ scores (measured by the Raven test), and the verbal mental age (VMA, computed from the scores of Peabody Pictorial Vocabulary Test, PPVT).

Material

A total of 60 female face pictures were used in the formal experiment, representing three dimensions of facial cues: race, attractiveness, and trustworthiness. The 60 faces formed 30 pairs, 10 of which differed in one dimension. The 30 pairs of female cue face pictures were selected from a set of 97 Chinese adult female faces, based on results from a pilot study. In addition, 6 Chinese female faces and 6 attractiveness-matched Chinese male faces were selected to be used as practice stimuli. All pictures were morphed into gray oval shapes and other features like hair and ear were removed (Fig. 1).

We asked 40 university students to rate the attractiveness of original 75 face pictures in a 7-point likert scale. Ten of the highest rated face pictures ($M = 4.50$,

Table 1 Participant characteristics in each group

		N	Male/ female	Mean age in years (*SD*)	NVIQ[a] raw score (*SD*)	Standardized NVIQ (*SD*)	PPVT (*SD*)	VMA (*SD*)
ASD		30	26/4	6.13 (0.81)	27.43 (7.61)	101.30 (12.76)	85.77 (20.81)	6.63 (1.07)
TD		30	26/4	5.86 (0.65)	24.50 (5.84)	97.23 (8.94)	90.37 (21.36)	7.00 (1.02)
Difference (t test)[b]	ASD vs. TD	N/A	N/A	0.27	2.93	4.07	−4.60	−0.37

[a] IQ was measured by the Combined Raven Test (CRT-C2)

[b] $p > .05$

$SD = 0.46$) and ten of the lowest rated face pictures ($M = 2.08$, $SD = 0.14$) were selected and paired randomly to generate the 10 pairs of faces in the attractiveness condition, $t(18) = 15.95$, $p < .001$. The remaining 55 pictures plus with 22 new pictures were rated by another 40 students in trustworthiness. The 10 highest rated ($M = 4.49$, $SD = 0.21$) and 10 lowest rated faces ($M = 2.89$, $SD = 0.20$) were paired randomly to serve as the stimuli in the trustworthiness condition, $t(18) = 17.55$, $p < .001$. For the race attribute condition, 10 Chinese and 10 Caucasian female face pictures were selected and matched in attractiveness, $t(18) = 0.32$, $p = .755$, and trustworthiness, $t(18) = 0.43$, $p = .675$. The location of the two pictures (left or right) was counterbalanced throughout trials.

Procedure

In the practice, children were asked to participate in a hide-and-seek game in which they needed to find a hidden candy in one of the two boxes. In the game, the experimenter placed two face photos (one male and one female) on the top of the two boxes separately, saying "this person says the candy is here, and this person says the candy is here". Children were then asked to guess where the candy was. No feedback was provided. After 3 trials of practice, children were asked to play the same game on the computer. Two boxes with one face picture above each were presented on the screen (as in Fig. 1). Each practice contained three trials and no feedback was given in the computer practice block.

The formal experiment followed the same procedure as the computer practice, except that children were provided with feedback of their choice (Fig. 1). Each pair of faces represented one of the following contrasts: own- vs. other-race faces, attractive vs. unattractive faces, and trustworthy vs. untrustworthy faces. If children chose the boxes below the own-race faces, the attractive faces, or the trustworthy faces, a candy feedback would be given to indicate children's correct choice (Fig. 1a). Otherwise, an empty box would appear on the screen indicating their failure of finding the candy (Fig. 1b). The formal experiment consisted of 30 trials, with 10 trials for each condition.

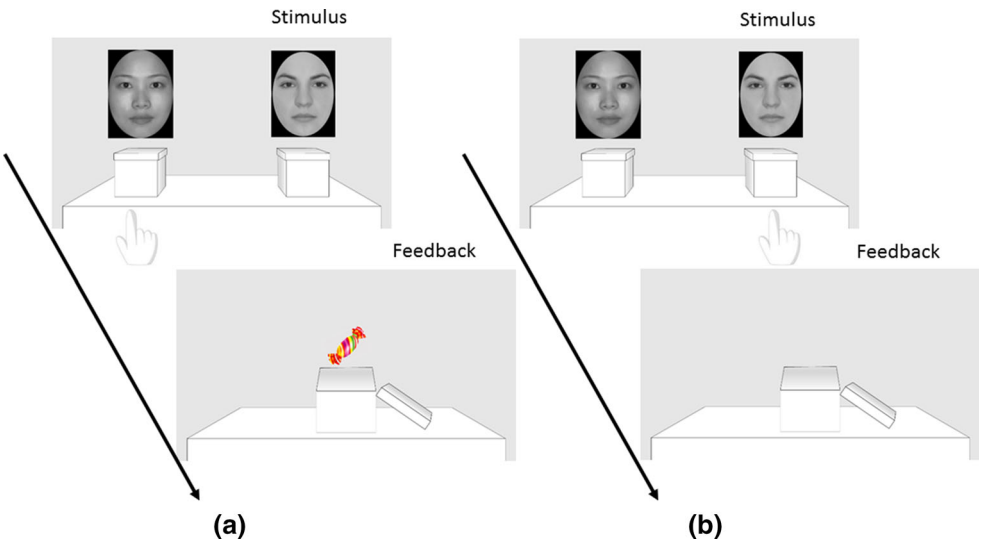

Fig. 1 Samples of a single trial in the race condition: a correct choice with a candy feedback (**a**) and an incorrect choice with an empty box feedback (**b**)

Results

Children scored 1 if they made a correct choice, and 0 if their choice was incorrect. Accuracy, as shown in Fig. 2, was computed as the number of correct choices divided by the total number of trials. We used one-sample *t* tests to compare the accuracies with the chance level (50 %) for each group and condition. Results showed that both groups' performance was significantly above chance (50 %) in the race condition, ASD, $M = 0.61$, $SD = 0.18$, $t(29) = 3.27$, $p = .003$; TD, $M = 0.65$, $SD = 0.17$, $t(29) = 4.74$, $p < .001$. Children with and without ASD selectively trust own-race faces rather than other-race faces. In the attractiveness condition, only the ASD group performed significantly better than chance, ASD: $M = 0.59$, $SD = 0.19$, $t(29) = 2.56$, $p = .016$; TD: $M = 0.51$, $SD = 0.16$, $t(29) = 0.23$, $p = .818$. Children with ASD, but not TD children, selectively trusted attractive faces compared to unattractive ones. In the trustworthiness condition, the ASD and TD groups' accuracies marginally differed from the chance, ASD: $M = 0.56$, $SD = 0.18$, $t(29) = 1.96$, $p = .06$; TD: $M = 0.56$, $SD = 0.17$, $t(29) = 1.79$, $p = .084$.

We then conducted a 3 (Condition: Race, Attractiveness vs. Trustworthiness) × 2 (Group: ASD vs. TD) mixed-design ANOVA to examine the effects of group and condition on selective trust. Results of the two-way ANOVA showed a Condition effect, $F(2, 116) = 4.41$, $p = .014$, $\eta^2 = .071$. A priori contrasts indicated that accuracy in the race condition was higher than that in the attractiveness condition ($M_{diff} = 0.082$, $p = .015$). Neither Group effect nor the Condition × Group interaction reached the significant level, $F(1, 58) = 0.317$, $p = .576$, $\eta^2 = .005$; $F(2, 116) = 1.996$, $p = .141$, $\eta^2 = .033$, respectively.

Discussion

In this study, a hide-and-seek game was designed to test whether children with and without ASD could selectively trust the informants according to three facial cues: race, attractiveness, and trustworthiness. Results show that the performance of children with ASD in our appearance-based selective trust task was comparable to TD children. Both groups selectively trusted own-race over other-race faces, which was consistent with the previous evidence of the sensitivity to the face race in ASD (Yi et al. 2015, 2016). Also, children with ASD displayed selective trust in accordance with face attractiveness, whereas TD children's selective trust did not depend on attractiveness. This indicates that despite their face recognition and processing abnormalities, children with ASD are still sensitive to the race and attractiveness of facial appearances and use them in certain social interactive situations.

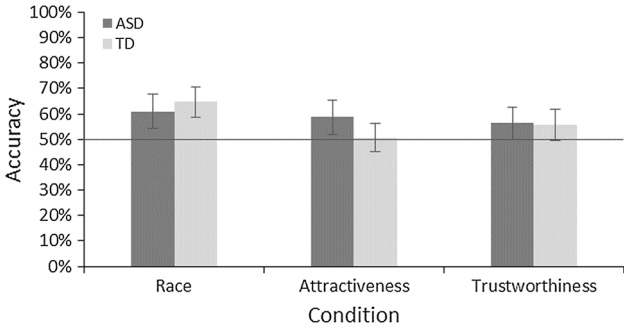

Fig. 2 Accuracy of ASD and TD groups in the race, attractiveness, and trustworthiness conditions. *Error bars* represent 95 % CIs

An intriguing finding of our study was the sensitivity of children with ASD to the face attractiveness. We speculated that this sensitivity to the face attractiveness may be related to their sensitivity to visual symmetry: individuals with ASD are found to be more sensitive than typical people to the visual stimuli with symmetric pattern (e.g., Perreault et al. 2011). Considering the positive influence of face symmetry on face attractiveness found in previous literature (e.g., Grammer and Thornhill 1994; Schmid et al. 2008), it is not surprising that children with ASD are more sensitive to face attractiveness than typical children in the current study. This sensitivity to face attractiveness in children with ASD enhanced their selective trust performance based on attractiveness in the current study. Further studies with more focus on the sensitivity to face attractiveness in ASD and its underlying mechanism are recommended.

In addition, we found that both groups showed a similar tendency of selective trust towards trustworthiness, but neither reached the significant level. This is consistent with the work of Ewing et al. (2015), which found that the effect of perceived trustworthiness of faces on trust behavior was significant in 10-year-olds children and adults yet marginally significant in 5-year-olds children. These two results may demonstrate a developmental explanation: trustworthiness is a complex face feature and thus could be understood and used relatively late compared to other facial features in both typical and non-typical children. Young children have to gain their understanding of trustworthiness through sufficient and complicated interpersonal interaction and experience, which is especially difficult for children with ASD. Future studies should explore the developmental trajectory of the understanding and use of the three facial cues, in ASD and non-ASD population.

The two-way ANOVA results further revealed that the accuracies in the race condition are significantly higher than those in the attractiveness condition, which suggests that for facial appearances, race was a more salient face cue than attractiveness. In the current literature, many studies

have found evidence of children's sensitivity to face race (Bar-Haim et al. 2006). However, to the best of our knowledge, no research has yet gone further to compare their responses to race with that to attractiveness. Our results indicate that attractiveness is not as apparent as race, which puts forward an exploration on how appearances-based selective trust develops in children with and without ASD. According to our results, race-based selective trust may develop earliest among the selective trust based on race, attractiveness, and trustworthiness.

The current study was a first attempt of a series of studies to explore how children with ASD use facial cues in social interactive situations, and the relationship of their face processing and social interaction deficits. One limitation of the current study was the potential confounds between the attractiveness and trustworthiness ratings in our material. The correlation of the two ratings in the face pictures in the two conditions is 0.60 ($p < .001$, Pearson correlation coefficients), which confirms the high correlation between the attractiveness and trustworthiness ratings ($r = 0.79$) reported by Oosterhof and Todorov (2008). We speculated that this is because attractiveness and trustworthiness are conceptually overlapped for natural faces: attractive faces are more likely to be evaluated as trustworthy, and vice versa (Todorov et al. 2008). Another piece of supportive evidence is that the evaluations of the attractiveness and trustworthiness have been observed to activate overlapping brain networks (Bzdok et al. 2011). Future studies should be undertaken to investigate the effects of these two face features independently, using computer-generated faces to represent the two dimensions respectively. Another noteworthy issue is that although we designed our computer task based on the classic selective trust task originally, as the experiment went on, children may have learned the association between the facial attributes and the reward, resulting in a diminished role of selective trust in their performance.

Future research should also concentrate on the following directions. First, the current research could be expanded to explore how children with ASD perceive and rely on more dimensions of facial cues in selective trust, such as competence, dominance, and aggressiveness. Second, future research should be undertaken to investigate ASD and non-ASD children's understanding and use of facial cues in other social situations, such as deception, helping, sharing behaviors. Third, ASD children's selective trust based on other social cues, such as eye gazes, facial expression, and body gestures, should also be studied with sophisticated experimental designs. Finally, using eye tracking technique in the future studies to explore children's underlying cognitive strategies of using facial cues in the selective trust task is also suggested.

Overall, this study shows that children with ASD can perform as well as TD children in the appearances-based selective trust task. This indicates that, despite their face recognition and processing deficits, the sensitivity to the face features is preserved in children with ASD, and their ability to selectively trust others based on the face race and attractiveness are intact. Our study suggested that by using appropriate tasks, children with ASD could be trained to pay attention to and make use of certain face cues in social interactions, which may provide an implication for possible intervention protocol to improve the social abilities of children with ASD.

Acknowledgments This work was supported by grants from National Natural Science Foundation of China (31571135, 31200779). The authors are grateful to Tianbi Li, ShuYuan Feng, Xiao Yu, the staff in Qingdao Elim School, Xingfuzhijia Kindergarten, Yilei Kindergarten, and Chigangyuan Kindergarten, for their generous assistance in completing the study.

Author Contributions LY was responsible for designing and overseeing the experiment, and writing the manuscript. PL was responsible for designing and conducting the experiment, and drafting the manuscript. CZ was involved in data collection. All authors read and approved the manuscript.

References

Auyeung, B., Baron-Cohen, S., Wheelwright, S., & Allison, C. (2008). The autism spectrum quotient: children's version (AQ-Child). *Journal of Autism and Developmental Disorders, 38*, 1230–1240. doi:10.1007/s10803-007-0504-z.

Bar-Haim, Y., Ziv, T., Lamy, D., & Hodes, R. M. (2006). Nature and nurture in own-race face processing. *Psychological Science, 17*, 159–163.

Bascandziev, I., & Harris, P. L. (2014). In beauty we trust: Children prefer information from more attractiveness informants. *British Journal of Developmental Psychology, 32*(1), 94–99.

Bzdok, D., Langner, R., Caspers, S., Kurth, F., Habel, U., Zilles, K., et al. (2011). ALE meta-analysis on facial judgments of trustworthiness and attractiveness. *Brain Structure Function, 215*, 209–223.

Clement, F., Koenig, M., & Harris, P. (2004). The ontogenesis of trust. *Mind and Language, 19*, 360–379.

Cogsdill, E. J., Todorov, A. T., Spelke, E. S., & Banaji, M. R. (2014). Inferring character from faces: A developmental study. *Psychological Science, 25*, 1132–1139. doi:10.1177/0956797614523297.

Constantino, J. N., & Gruber, C. P. (2002). *The social responsiveness scale*. Los Angeles: Western Psychological Services.

Corriveau, K., & Harris, P. L. (2009). Choosing your informant: Weighing familiarity and recent accuracy. *Developmental Science, 12*, 426–437.

Ewing, L., Caulfield, F., Read, A., & Rhodes, G. (2014). Appearance-based trust behavior is reduced in children with autism spectrum disorder. *Autism,*. doi:10.1177/1362361314559431.

Ewing, L., Caulfield, F., Read, A., & Rhodes, G. (2015). Perceived trustworthiness of faces drives trust behavior in children. *Developmental Science, 18*, 327–334.

Grammer, K., & Thornhill, R. (1994). Human (Homo sapiens) facial attractiveness and sexual selection: the role of symmetry and averageness. *Journal of Comparative Psychology, 108*(3), 233.

Harris, P. L. (2007). Trust. *Developmental Science, 10*, 135–138.

Jaswal, V. K. (2004). Don't believe everything you hear: Preschoolers' sensitivity to speaker intent in category induction. *Child Development, 75*, 1871–1885.

Jaswal, V. K., & Neely, L. A. (2006). Adults don't always know best. *Psychological Science, 17*, 757–758.

Kinzler, K. D., Corriveau, K. H., & Harris, P. L. (2011). Children's selective trust in native-accented speakers. *Developmental Science, 14*(1), 106–111.

Klin, A., Jones, W., Schultz, R., Volkmar, F., & Cohen, D. (2002). Visual fixation patterns during viewing of naturalistic social situations as predictors of social competence in individuals with autism. *Archives of General Psychiatry, 59*, 809–816.

Koenig, M., & Harris, P. L. (2005). Preschoolers mistrust ignorant and inaccurate speakers. *Child Development, 76*, 1261–1277.

Lee, K., & Cameron, C. A. (2000). Extracting truthful information from lies: emergence of the expression-representation distinction. *Merrill-Palmer Quarterly, 46,* -1-20.

Lord, C., Risi, S., Lambrecht, L., Cook, E. H, Jr, Leventhal, B. L., DiLavore, P. C., et al. (2000). The autism diagnostic observation schedule-generic: A standard measure of social and communication deficits associated with the spectrum of autism. *Journal of Autism and Developmental Disorders, 30*, 205–223. doi:10.1023/A:1005592401947.

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. doi:10.1007/BF02172145.

Mascaro, O., & Sperber, D. (2009). The moral, epistemic, and mindreading components of children's vigilance towards deception. *Cognition, 112*, 367–380.

Masuda, N., & Fu, F. (2015). Evolutionary models of in-group favoritism. *F1000prime reports, 7*.

Oosterhof, N. N., & Todorov, A. (2008). The functional basis of face evaluation. *Proceedings of the National Academy of Sciences, 105*(32), 11087–11092.

Pelphrey, K. A., Sasson, N. J., Reznick, J. S., Paul, G., Goldman, B. D., & Piven, J. (2002). Visual scanning of faces in autism. *Journal of Autism and Developmental Disorders, 32*, 249–261.

Perreault, A., Gurnsey, R., Dawson, M., Mottron, L., & Bertone, A. (2011). Increased sensitivity to mirror symmetry in autism. *PLoS ONE, 6*(4), e19519–e19519.

Rutter, M., Bailey, A., & Lord, C. (2003). *The social communication questionnaire: Manual.* Western Psychological Services.

Schmid, K., Marx, D., & Samal, A. (2008). Computation of a face attractiveness index based on neoclassical canons, symmetry, and golden ratios. *Pattern Recognition, 41*(8), 2710–2717.

Todorov, A., Mende-Siedlecki, P., & Dotsch, R. (2013). Social judgments from faces. *Current Opinion in Neurobiology, 23*, 373–380. doi:10.1016/j.conb.2012.12.010.

Todorov, A., Pakrashi, M., & Oosterhof, N. (2009). Evaluating faces on trustworthiness after minimal time exposure. *Social Cognition, 27*, 813–833. doi:10.1521/soco.2009.27.6.813.

Todorov, A., Said, C. P., Engell, A. D., & Oosterhof, N. N. (2008). Understanding evaluation of faces on social dimensions. *Trends in Cognitive Sciences, 12*(12), 455–460.

Uslaner, E. M. (2002). *The moral foundations of trust*. Cambridge: Cambridge University Press.

Vanderbilt, K. E., Liu, D., & Heyman, G. D. (2011). The development of distrust. *Child Development, 82*, 1372–1380.

Walker, P. M., & Tanaka, J. W. (2003). An encoding advantage for own-race versus other-race faces. *Perception, 32*, 1117–1125.

Yi, L., Fan, Y., Li, J., Huang, D., Wang, X., Tan, W., et al. (2014). Distrust and retaliatory deception in children with autism spectrum disorder. *Research in Autism Spectrum Disorders, 8*, 1741–1755.

Yi, L., Pan, J., Fan, Y., Zou, X., Wang, X., & Lee, K. (2013). Children with autism spectrum disorder are more trusting than typically developing children. *Journal of Experimental Child Psychology, 116*, 755–761.

Yi, L., Quinn, P. C., Fan, Y., Huang, D., Feng, C., Li, J., et al. (2016). Children with Autism Spectrum Disorder scan own-race faces differently from other-race faces. *Journal of Experimental Child Psychology, 141*, 177–186. doi:10.1016/j.jecp.2015.09.011.

Yi, L., Quinn, P. C., Feng, C., Li, J., Ding, H., & Lee, K. (2015). Do individuals with autism spectrum disorder process own- and other-race faces differently? *Vision Research, 107*, 124–132. doi:10.1016/j.visres.2014.11.021.

Zebrowitz, L. A., Bronstad, P. M., & Lee, H. K. (2007). The contribution of face familiarity to ingroup favoritism and stereotyping. *Social Cognition, 25*, 306–338.

Zebrowitz, L. A., & Montepare, J. M. (2008). Social psychological face perception: Why appearance matters. *Social and Personality Psychology Compass, 2*, 1497–1517. doi:10.1111/j.1751-9004.2008.00109.x.Social.