Social Cognitive Processing in Elementary School Children with Asperger Syndrome

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Abstract: Twenty students with Asperger syndrome were compared to 20 typically developing peers to determine their relative effectiveness in interpreting social intentions of others and to examine whether with a given interpretation of social intention there were differences in the social interaction strategies chosen by these two groups of students. An independent samples t-test indicates that the typically developing group performed significantly better on encoding conflicts and benign intention cues. Mixed ANOVAs reveal significant differences between groups for rating of a peer as “not mean” based on cue type, and that the group with Asperger syndrome was more likely to cite use of aggressive strategies. Recommendations focus on methods of teaching social perception and strategy generation for students with Asperger syndrome.

Much attention has been given to individuals with Asperger syndrome in recent years. Though Asperger (1944) originally wrote about four children who presented a unique pattern of behavior, Wing’s (1981) account of individuals presenting similar behaviors sparked greater interest and resulted in publication of over 100 articles on the topic (Klin & Volkmar, 1997). Further, inclusion of Asperger syndrome in the International Classification of Diseases (ICD-10; World Health Organization [WHO], 1993) and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994) has increased public awareness and permitted uniformity in describing this disorder.

According to the DSM-IV, individuals with Asperger syndrome exhibit clinically significant impairment in social functioning. They have been described both as aloof and as evidencing aggressive tendencies (Barnhill, 2001). Of significance, Rubin and Clark (1983) noted that peers often reject children who exhibit socially extreme behavior manifested by either aggression or withdrawal. In turn, peer rejection has been linked with lower school performance, aspiration level, vocational competence, and participation in social activities (Bagwell, Newcomb, & Bukowski, 1998) and with less favorable attitudes toward school (Ladd, 1990). Additionally, rejected children have higher rates of conduct disorder, substance abuse, criminal offenses, and teacher-rated behavioral problems than their non-rejected peers (Ollendick, Weist, Borden, & Greene, 1992). Because of these factors, social incompetence leading to the social rejection of children with Asperger syndrome may have serious long-term negative consequences.

Coie, Dodge, and Kupersmidt (1990) suggested that some socially maladjusted children tend to become withdrawn because their negative peer relationships cause them to take a negative view of social interaction. Crick (1991), cited in Crick and Dodge (1994), demonstrated that withdrawn socially maladjusted children do hold negative views of social interaction and expect to be disliked by peers and excluded from activities. This finding leads to the hypothesis that the relationship between social information processing and social maladjustment is reciprocal (Crick & Dodge).

Crick and Dodge (1994) proposed a detailed model of social information processing consisting of six stages. In stage one, children encode social cues by considering both external environmental cues and internal cues...
drawn from a database of previous experience. In stage two, children interpret the cues by ascribing social intent to the behavior of others and evaluating the outcome of the social exchange for themselves and others. The third stage consists of the child selecting a goal or desired outcome for the social outcome, followed by the fourth stage in which the child accesses responses from memory or creates new behaviors in response to the social situation. The fifth stage consists of evaluating the anticipated outcomes for each possible response, determining their ability to perform the response, and deciding whether the response is appropriate. The final stage occurs when the child enacts the selected response.

Studies of social cognition have found that socially rejected children offered fewer possible behaviors in response to hypothetical stories than did their peers (Pettit, Dodge, & Brown, 1988). Further, Leffert, Siperstein, and Millikan (2000) found that children with mental retardation had difficulty focusing simultaneously on multiple and incongruous social cues, used fewer social strategies to deal with conflict situations, and employed strategies similar to those selected by younger peers without disabilities. Studies of social cognition in children with Asperger syndrome have found that they perform more poorly in processing an array of facial stimuli than peers who were matched on verbal ability (Davies, Bishop, Manstead, & Tantum, 1994) and use fewer cues when determining emotional state than did children in a comparison group (Koning & Magill-Evans, 2001).

Learning acceptable social skills is one of the most important and long lasting lessons that children acquire in school, so the difficulty that social tasks present for children with Asperger syndrome indicates a need for investigation of the causes of their social problems. Specifically, more research is needed to determine whether children with Asperger syndrome are able to accurately perceive and interpret social information and whether they formulate productive strategies in situations of social conflict. The first purpose of this study was to determine the relative effectiveness with which both students with Asperger syndrome and typically developing students are able to interpret the social intentions of their peers in situations in which there are conflicting cues between the intention and the outcome of an action. The second purpose of this study was to determine if, with a given interpretation of social intention, there is a difference in the social interaction strategy chosen by students with Asperger syndrome and typically developing students.

Method

Participants

Twenty children with Asperger syndrome were matched with 20 typically developing children for this study. The Asperger syndrome group was created first by soliciting parents of children registered with the University of Miami’s Center for Autism and Related Disabilities, which covers Miami-Dade, Broward, and Palm Beach counties in South Florida. The typically developing group was created by selecting volunteer participants who matched the experimental group participants on the variables of grade and gender. Mean grade level of participants was 4.32 and 4.25, respectively for the experimental and control groups and the mean ages were 9.6 years and 9.35 years respectively. Both groups consisted of 18 males and 2 females.

Materials

Participants’ social-cognitive processing of social perception and social strategy generation was assessed through the use of eighteen 30-second videotaped vignettes created by Dodge, Pettit, Bates, and Valente (1995) in which the protagonist wears a numbered shirt. Both male and female actors of varying ethnicity portray both the protagonists and antagonists in the vignettes. Nine vignettes depicted peer entry conflict situations in which a child’s attempt to join a group of peers is rebuffed. Of these nine vignettes, three showed situations in which the protagonist wears a numbered shirt. Both male and female actors of varying ethnicity portray both the protagonists and antagonists in the vignettes. Nine vignettes depicted peer entry conflict situations in which a child’s attempt to join a group of peers is rebuffed. Of these nine vignettes, three showed situations in which the antagonist’s social intentions were hostile (as evidenced by comments such as “We don’t want you here.”), three vignettes depicted benign intentions (distinguished by comments such as “The teacher says only the two of us can play.”), and three vignettes were ambiguous in their portrayal of social intentions (characterized by behaviors such as failing to respond to the protagonist).
The other nine vignettes showed peer provocation conflicts in which another student disrupts the protagonist’s activity. The nine peer provocation vignettes also included three that displayed hostile intentions, three that displayed benign intentions, and three in which the intentions were ambiguous.

Procedure

Participants were seen individually at a private setting for a session lasting 30 to 45 minutes. Children were told that they would be shown a series of vignettes, that as they watched the videos they should pretend that they were the child wearing the numbered shirt, and that they would be asked a series of questions after each vignette. They were then presented with two practice vignettes on the monitor, and received practice interviews after each vignette.

Encoding story conflict. To assess participants’ encoding of the story conflict, each interview began by asking, “What happened in this story?” to determine ability to distinguish between peer entry and peer provocation conflict types. If the child’s response did not indicate complete understanding of the conflict, the child was queried by asking, “Did anything else happen in the story?” Responses were scored to reflect whether the participant observed a peer entry conflict or a peer provocation conflict, and no scoring indicated that the child did not notice a conflict.

Encoding cue interpretation. To assess encoding of the cue interpretation, participants were next asked, “Were the other children in the story being mean or not mean?” This was followed by asking each participant, “How can you tell that the other child was being mean or not mean?” The responses to the second question were only used in the six vignettes (three peer entry vignettes and three peer provocation vignettes) depicting benign intentions, and were scored to indicate instances in which the participant noticed benign intention cues but did not believe them (e.g., the participant said, “The student said ‘Oops, sorry’ but he didn’t mean it”).

Encoding strategy generation. To assess the participants’ strategy generation, they were asked a final question, “What would you do if this happened to you?” If the participant’s response indicated indecision, they were queried, “What do you think you would do?” Responses were scored as either: a) aggressive; b) assertive; c) accommodating; d) appeal to authority; e) avoidant; or f) other. Only the first response generated by the participant was scored.

Reliability. Each of the scoring sheets for the study were examined and scorers reached the following agreement rates for the variables: 82 percent for encoding of conflict cues, 55 percent for encoding of benign intention cues, 100 percent for attribution of a student as “mean” or “not mean,” 95 percent for rejection of benign intention cues, and 81 percent for strategy generation.

Results

This study compared the social cognitive processing of elementary school students with Asperger syndrome to that of their typically developing peers. Specifically, children were compared on their ability to distinguish between conflict types (peer entry or peer provocation), their ability to encode benign social intention cues, and whether they accepted or rejected benign intention cues. Additionally, children were compared on their attribution of a peer as “mean” or “not mean” based on the type of social cue presented (benign, ambiguous, or hostile) and strategies used to respond to conflicts based on their attribution of a peer as “mean” or “not mean.” A series of independent samples t tests and mixed ANOVAs were used in these analyses, and when appropriate, intention cues (benign, ambiguous, or hostile) and conflict type (peer entry or peer provocation) were used as within subject variables.

Analysis of Social Perception

Encoding story conflict. Independent samples t tests were performed to compare the means of the typically developing group and the Asperger syndrome group on correct encoding of story conflicts (peer entry or peer provocation). Children’s encoding of social cues resulted in a possible range of scores from zero to 18. A comparison of mean performance of typically developing students and students with Asperger syndrome resulted in a
mean of 17.20 for the typically developing group (SD = 0.95) and a mean of 15.95 for the Asperger syndrome group (SD = 2.28) with a significance level of .03. A Levene’s test for the equality of variances for encoding of the story conflict yielded an F of 10.71 and a p value of .00, so equal variances were not assumed for the t test. It provided a t of 2.26 with 25 degrees of freedom and a two-tailed p value of .03. This result indicated that the difference between the typically developing group and the Asperger syndrome group on the encoding of conflict situations was statistically significant, with students in the typically developing group better able to recognize the type of conflict to which they would later be asked to respond than the children in the Asperger syndrome group. However, the large difference in the standard deviations of these two groups indicated that there was greater variability in the ability of students with Asperger syndrome to encode conflict cues. Some students with Asperger syndrome were able to encode conflict cues as well as their typically developing peers, but nearly half of the students in the Asperger syndrome group performed more poorly on this task.

Encoding benign intention cues. Independent samples t tests were performed to compare the means of the typically developing group and the Asperger syndrome group on encoding of benign intention cues. With a possible range from zero to six, mean for the typically developing group was 4.55 (SD = 1.19) and mean for the Asperger syndrome group was 3.50 (SD = 1.19), indicating that the typically developing group was better at encoding benign intention cues. The Levene test for equality of variances for the encoding of benign intentions resulted in an F of 4.52 with a p of .04, so a t test with equal variances not assumed was used and resulted in a t of 2.23 with 35 degrees of freedom and a two-tailed p of .03. Difference between the two groups on the encoding of benign intentions was statistically significant. Additionally, the typically developing group rejected 57% of the benign intention cues encoded and the Asperger syndrome group rejected 66% of the benign intention cues encoded.

Interpretation social intention cues. The third analysis examined participants’ attribution of a peer as “mean” or “not mean” between vignettes depicting benign, ambiguous, and hostile social cues through the use of a mixed ANOVA design. Table 1 shows the number, mean, standard deviation, and range for the typically developing and Asperger syndrome groups for the attribution of a peer as mean when presented with benign, ambiguous, and hostile social cues. As documented in Table 1, the control group’s attribution of a peer as “mean” increased consistently as the cues in the vignettes became increasing hostile (benign to ambiguous to hostile), while members of the Asperger syndrome group were more likely to rate a peer as “mean” in vignettes in which benign cues were present than in those vignettes presenting ambiguous cues. This analysis was checked for main effects based on belonging to the Asperger syndrome group and typically developing group.

A mixed ANOVA showed that there was no significant difference between groups on their attribution of a peer as “mean” across all cue types. A second main effect was examined for differences across cue types, and an interaction effect was evaluated to see if there was a difference between groups due to type of cue presented. There is a significant difference between the two groups in their attribution of a peer as mean by cue type (F = .21, p = .65). Analysis of the interaction effect indicates that the difference in attributions among cue types is a function of group membership.

Analysis of generation of strategies by conflict type. An ANOVA was used to analyze the generation of strategies to deal with peer entry or peer provocation conflicts based on membership in the typically developing or Asperger syndrome group. In this analysis, the six strategy types (aggressive, assertive, accommodat-
ing, appeal to authority, avoidant, and other) were the dependent variables. This analysis focused on determining whether there is a difference in strategy use between peer entry and peer conflict situations, and whether this difference was influenced by group membership. Additionally, the analysis examined whether there is a difference between the types of strategies used in all conflict situations.

The ANOVA reveals that there are significant differences in the use of aggressive \( F(1, 38) = 7.27, p = .01 \), assertive \( F(1, 38) = 62.07, p = .00 \), accommodating \( F(1, 38) = 4.33, p = .04 \),, appeal to authority \( F(1, 38) = 7.17, p = .01 \), and avoidant \( F(1, 38) = 32.36, p = .00 \) strategies between peer entry and peer provocation conflict situations, but there is no significant difference in the use of the “other” strategy dependent upon the type of conflict presented. Additionally, it reveals that the differences in strategy selection for peer entry and peer provocation conflicts are the same for both groups of students. Finally, it indicates that there is a significant difference between groups in the use of aggressive strategies \( F(1, 38) = 7.27, p = .01 \), with the Asperger syndrome group having a greater level of use of this strategy. There were no significant between-group differences in the use of any of the other strategies.

**Analysis of generation of strategies by attribution of “mean” or “not mean.”** The final analysis used independent samples \( t \) tests to compare means of the typically developing and Asperger syndrome groups on strategy selection for the six vignettes containing ambiguous social cues to determine if there was a relationship between participants’ perception of the protagonists’ intent and the strategy selected to deal with the conflict. A Levene’s test for equality of variances yielded an \( F \) of 20.10 and a \( p \) of .00 so equal variances were not assumed for the \( t \) test. It provided a \( t \) of 2.26 with 22 degrees of freedom and a two-tailed \( p \) of .03, so there is a significant difference in the group means for the use of the aggressive strategy when the peer is perceived as “mean,” with the Asperger syndrome group having the higher mean. No significant differences were found between the means for any of the other \( t \) tests. It was impossible to perform a \( t \) test for aggressive strategies when the peer was perceived as “not mean” because the standard deviations of both groups were zero.

**Discussion**

**Purpose**

This study was conducted to determine if there are differences in social cognitive processing of students with Asperger syndrome and their typically developing peers. This goal was accomplished by showing students videotaped vignettes depicting peer entry and peer provocation conflict situations in which benign, ambiguous or hostile social cues were embedded. After watching the vignettes students were interviewed to ascertain whether they could identify the conflict situation, whether they considered the antagonist to be “mean” or “not mean,” whether they noticed and accepted any benign intention cues, and what type of strategy they would use if placed in a similar situation.

Specifically, the investigation compared the ability of students in these two groups to encode conflict cues and benign intention cues, and to determine which types of social cues (benign, ambiguous, or hostile) resulted in the children describing other children as “mean” or “not mean.” Finally, this study examined the strategies selected by members of these two groups when faced with peer entry or peer provocation conflicts, and when they had attributed another student to be “mean” or “not mean.”

**Encoding of social conflict cues.** These results support the belief that children with Asperger syndrome are less accurate in encoding social information and are consistent with several studies. Koning and Magill-Evans (2001) found that children with Asperger syndrome have impaired social perception, and other researchers have noted that children with Asperger syndrome perform more poorly when processing arrays of facial stimuli (Davies et al., 1994) and use fewer cues when determining emotional state than children in a comparison group (Koning & Magill-Evans). Finally, Grossman, Klin, Carter, and Volkmar (2000) found that the use of verbal mediation as a compensatory strategy may be insufficient when children with Asperger syndrome experience the complex social exchanges present.
in everyday life. These findings are reinforced by the poor performance of participants with Asperger syndrome when presented with multiple stimuli and complex social interchanges on the vignettes used in the present study.

Encoding of benign intention cues. All participants also had the opportunity to reject benign intention cues that they had encoded. For instance, when a student was asked, “How could you tell if the other child in the story was being mean?” the student may have responded, “She said she was sorry for erasing my work, but she didn’t mean it.” Though the students with Asperger syndrome encoded fewer of the benign intention cues embedded in the vignettes than did the students in the typically developing group, they rejected a higher percentage of those cues that they did encode (66 percent vs. 57 percent). Hence, this research found a cumulative effect in the encoding of benign intention cues, with the students with Asperger syndrome first encoding fewer benign intention cues than the typically developing group, and then rejecting a higher percentage of those cues that they did encode.

Deficient pragmatic language is a characteristic of Asperger syndrome (Attwood, 1998). Receptive pragmatic language impairments may have interfered with a participant’s ability to encode conflict cues in the vignettes, resulting in poorer encoding skills for students with Asperger syndrome. Poor expressive pragmatic language skills may have also confounded the research, however, by making it difficult for some participants to clearly communicate what they observed in vignettes. If this were the case, it may be that the students with Asperger syndrome were able to encode conflict and benign intention cues at a more accurate rate than reported, but were not able to clearly communicate encoding of these cues.

Attribution of a peer as “mean” or “not mean” based on type of social cue presented. A comparison of children’s attributions of peers as “mean” or “not mean” was conducted to determine if there were differences in attributions between the Asperger syndrome group and typically developing group based on the type of social cue (benign, ambiguous, or hostile) presented. Range for each attribution (benign cue, “mean” attribution; ambiguous cue, “mean” attribution; hostile cue, “mean” attribution) was zero to six.

Although both groups of students had the highest “mean” ratings of peers after watching vignettes with hostile cues, students in the typically developing group were less likely to rate a peer as “mean” after viewing vignettes in which benign intention cues were present and were more likely to rate a peer as “mean” after watching vignettes in which ambiguous cues were depicted. On the other hand, students in the Asperger syndrome group were less likely to rate a peer as “mean” after watching vignettes depicting ambiguous cues, and were more likely to rate a peer as “mean” after watching vignettes depicting benign cues. This further supports the finding that students with Asperger syndrome have difficulty encoding benign intention cues, because otherwise one would assume that recognition of benign intention cues should result in fewer attributions of a peer as “mean” as demonstrated by the typically developing group.

Results of a mixed ANOVA revealed that there was no significant difference between the Asperger syndrome group and the typically developing group on their attribution of a peer as “mean” or “not mean” across all cue types. This can be interpreted as meaning that both groups were equally likely to consider a peer “mean” when presented with conflict situations containing a variety of conflict cues. The ANOVA did reveal a significant difference between the two groups in their attribution of a peer as “mean” by cue type, with the typically developing group more likely to attribute a peer as “mean” when ambiguous and hostile cues were presented and the Asperger syndrome group more likely to attribute a peer as “mean” when benign cues were presented. The interaction effect indicated that the difference by cue type was a function of group membership. In other words, given a specified cue type one could determine whether a student was more or less likely to rate a peer as “mean” if the student’s group membership was known. Again, this is due to the increased ratings of a peer as “mean” by members of the Asperger syndrome group when presented with ambiguous cues, and is indicative of their inability to integrate a variety of social cues when determining social intent (Koning & Magill-Evans, 2001).
Strategy selection for peer entry and peer provocation conflicts. A comparison of the selection of strategies for children with Asperger syndrome and typically developing peers was conducted. The comparison looked for differences in strategy selection between peer entry and peer provocation conflict types, and determined if the differences in strategy selection for peer entry and peer provocation conflicts were the same for students in the Asperger syndrome group and the typically developing group. Finally, this analysis explored whether there are differences in the types of strategies selected for both conflict types based on membership in the Asperger syndrome or typically developing group.

The analysis revealed that different strategies were selected for use in peer entry and peer provocation conflict situations, with the exception that “other” strategy usage was the same regardless of conflict type. For all participants, the mean strategy selection for peer entry conflict situations was highest for avoidant, followed by assertive, appeal to authority, accommodating, aggressive, and other. Likewise, in peer provocation conflict situations, the mean strategy selection for all participants was highest for assertive, followed by aggressive, avoidant, appeal to authority, accommodating, and other.

The difference in strategies selected across the conflict types was the same regardless of group membership. For peer entry conflicts, the mean strategy selection for typically developing students was highest for avoidant, followed by assertive, appeal to authority, accommodating, aggressive, and other. The mean strategy selection for peer entry conflicts for the Asperger syndrome group was highest for avoidant, followed by assertive, aggressive, appeal to authority, accommodating, and other. For peer provocation conflicts, the mean strategy selection for typically developing students was highest for assertive, followed by avoidant, appeal to authority, accommodating, aggressive, and other. The rank ordering of mean strategy selection for peer provocation conflicts for students with Asperger syndrome was assertive, aggressive, avoidant, other, appeal to authority, and accommodating.

Finally, the Asperger syndrome group was significantly more likely to state that they would use an aggressive strategy regardless of the conflict type presented. This is not surprising in light of the research indicating that parents of children with Asperger syndrome rate their children as having significant problems with externalizing behaviors and as being at risk in areas such as verbal aggression (Barnhill, 2001). Further, though the difference was not statistically significant, students in the Asperger syndrome group were relatively less likely to select assertive strategies than their typically developing peers, supporting a similar finding by Koning and Magill-Evans (2001).

In addition to the fact that the students in the Asperger syndrome group were more likely to cite use of aggressive strategies, some individuals within this group also gave graphic descriptions of the type of aggression that they would commit. One student gave responses such as “I’d smack him once,” “I’d smack him twice,” “I’d knock over the table where they were sitting,” and “I’d hit him on the head with the computer so that the glass cut their faces and they got electrocuted.” Another student gave responses such as “I’d show him my penis,” “I’d show him my butt,” “I’d poop on him,” and “I’d spit in her mouth.” None of the members of the typically developing group mentioned aggressive strategies in this great of detail, or with this range of aberrant activity, but instead tended to offer strategies such as “I’d do the same thing back to him.” Further research may investigate the connection between verbalization of aggression and behaviors actually enacted in social situations.

It is also important to consider the types of “other” strategies that participants offered in response to conflict situations. A frequently used “other” strategy for the typically developing group was “I wouldn’t do anything.” Students in the Asperger syndrome group, however, cited strategies such as “I’d laugh,” “I’d say thank you,” or “I’d cry.” Also, several individuals within the Asperger syndrome group offered “other” strategies that were irrelevant or nonsensical, such as “I’d tell him he has a spot on his tie” even though the antagonist was not wearing a tie and this response had no relevance to the conflict scenario. An examination of how these individuals expected irrelevant responses to improve the conflict situa-
tion would provide keen insight into the social cognitive processing of these individuals.

Strategy selection for student attributed to be “mean” or “not mean.” Children’s selection of social strategies for students whom they have attributed to be “mean” or “not mean” were examined for the vignettes in which ambiguous social cues were presented. Only the six vignettes in which ambiguous social cues were displayed were studied because this analysis focused on perceived intentions rather than portrayed intentions. Results revealed that there were no significant differences between group means on the strategies selected for peers who had been attributed to be “not mean.” Additionally, the only significant difference between groups for peers considered “mean” was for use of the aggressive strategy (t = 2.26, p = .03), with the Asperger syndrome group significantly more likely to cite aggression selection for students with Asperger syndrome. The Asperger syndrome group had significantly higher levels of aggressive strategy selections for both peer entry and peer provocation social conflicts and when they considered a peer to be “not mean,” though the difference was not statistically significant. Research indicates that students who exhibit high rates of aggressive behavior, however, are likely to face peer rejection (Asher & Renshaw, 1981). Students with Asperger syndrome are likely to benefit from instruction that will enable them to select and enact alternative strategies in situations in which they would otherwise respond aggressively.

Educational Implications

Results of this study have several significant implications for the education of students with Asperger syndrome. First, many students with Asperger syndrome are known to interpret language literally (Attwood, 1998) and to have difficulty recognizing sarcasm (Attwood; Gross, 1994; Myles & Simpson, 2001). Participants in the Asperger syndrome group in this study rejected benign intention cues at a higher rate than did their typically developing peers. Students with Asperger syndrome may benefit from instruction designed to help them distinguish between sarcasm and sincerity so that they can better understand when to accept or reject benign intention cues present in typical social interactions.

Additionally, it seems that social skills instruction should focus on determining the relevant stimuli to attend to when attempting to ascertain the social intentions of peers. Klin, Jones, Schultz, Volkmar, and Cohen (2002), in an eye gaze study of individuals with autism, found that the participants with autism in his study often watch the lips of speakers, whereas participants without disabilities relied more on watching eyes to determine nonverbal cues. In a similar fashion, children with Asperger syndrome may be attending to irrelevant aspects of the non-verbal behavior of peers when trying to encode conflict situations. Direct instruction regarding body language and other non-verbal cues may make it possible for students with Asperger syndrome to more accurately encode the social intentions of others.

A third implication for education is the need for improved instruction in social strategy selection for students with Asperger syndrome. The Asperger syndrome group had significantly higher levels of aggressive strategy selections for both peer entry and peer provocation social conflicts and when they considered a peer to be “not mean.” Additionally, they selected a higher rate of aggressive strategies when they considered a peer to be “not mean,” though the difference was not statistically significant. Research indicates that students who exhibit high rates of aggressive behavior, however, are likely to face peer rejection (Asher & Renshaw, 1981). Students with Asperger syndrome are likely to benefit from instruction that will enable them to select and enact alternative strategies in situations in which they would otherwise respond aggressively.

Increased use of social stories to teach social skills and pragmatic communication skills is likely to provide benefits to students with Asperger syndrome. Social stories have been widely used to teach appropriate social behavior to children with autism (Gray, 2002) and their use with students with Asperger syndrome has been described anecdotally (Rogers & Myles, 2001). This technique involves describing social situations in terms of relevant social cues and defining appropriate social responses (Swaggart et al., 1995). Because the social and communicative deficits associated with Asperger syndrome are less than those associated with autism, this approach is likely to improve the social and communicative performance of students with Asperger syndrome. Use of social stories to teach how to interpret non-verbal communication and how to select strategies in conflict situations is likely to be especially useful for these children.

Limitations

Limitations in this study pertain primarily to the sample size. A small percentage of those
solicited choose to participate in this study, so there may be qualitative differences between those who did and did not choose to participate. Further, there was no random sampling for either group, and use of a larger sample may have lowered the probability of a type II error, resulting in an increased number of significant differences.

An additional limitation of this study is the bimodal distribution of the encoding of conflict situations and the encoding of benign intentions for the Asperger syndrome group. This raises the possibility that this group was composed of two groups of individuals with this diagnosis; those who are socially aware and those who are not.

Finally, student performance was examined to determine if a fatigue factor resulted in poorer performance on the encoding of conflict cues for the last five vignettes as compared to the first five vignettes. This analysis revealed that students in the Asperger syndrome group correctly encoded 93 percent and 91 percent of conflict cues, respectively. While encoding performance did deteriorate in the later vignettes, the change in performance was similar for the two groups. Although this represents a possible limitation of the study, it does not appear to confound results.

**Suggestions for Future Research**

Results of this study point to areas in which research could benefit students with Asperger syndrome. One possible topic for study is investigation of the reasons that students with Asperger syndrome have difficulty encoding benign intention cues. This study determined that students with Asperger syndrome are more likely to consider a peer “mean” when benign intention cues are present than they are when the social cues are ambiguous, and that students with Asperger syndrome are more likely to reject benign intention cues than their typically developing peers. Determination of the factors causing students with Asperger syndrome to reject the sincerity of apologies and other benign intention cues could result in improved instruction about the social intentions of others.

Another area for investigation is determining the factors that cause students with Asperger syndrome to be relatively more likely to consider a peer “not mean” when presented with ambiguous social cues compared to their typically developing peers. Determination of whether students with Asperger syndrome are likely to interpret lack of a response to a request as tacit approval for the request would establish the need for assertiveness education for these students when they do not receive clear communication from peers.

A third area for investigation relates to the ability of students with Asperger syndrome to generate alternative social strategies in situations in which they would initially select an aggressive strategy. For example, it would be helpful to know how a child would respond if told that he or she would be unable to enact the aggressive response that had been selected or was asked what he or she thought the consequences of the action would be. This investigation could result in findings that when students with Asperger syndrome are discouraged from using aggressive strategies, their strategy selections are more similar to those of their typically developing peers.

According to the reformulated social processing model proposed by Crick and Dodge (1994), students evaluate their ability to enact a response prior to actually enacting it. Hence, students may select different responses to conflict situations in hypothetical situations such as this study than they would in real situations in which they would be required to enact the selected strategy. A comparison between the strategies students say they would employ and those they actually use in conflict situations would be revealing. In reality, typically developing students may be more likely to enact aggressive strategies than they said, and students with Asperger syndrome may also enact different strategies than they said they would. For example, in a classroom situation a student with Asperger syndrome may decide that it would be too difficult or the consequences would be too severe if he were to display private body parts, resulting in his selection of another strategy to enact.

Additionally, some of the participants in this study may have given responses indicating what they thought the interviewer wanted to hear rather than indicating what they would
actually do in the situation. An investigation of the effects of social desirability on the responding of students with Asperger syndrome and their typically developing peers could provide greater insight into the findings of this study. This could be followed by another study determining what students with Asperger syndrome consider to be a socially desirable response.

Finally, research is needed on additional factors influencing the social-cognitive processing of students with Asperger syndrome. Leffert et al. (2000) determined that the students with mental retardation in their study selected strategies to deal with conflict situations that were similar to those selected by younger peers without disabilities. Studies to determine effects of age, educational placement, and gender on the social-cognitive processing of students with Asperger syndrome will provide valuable information that may allow for differentiated instructional approaches for children who vary on these characteristics.

Summary

This study compared the social cognitive processing of students with Asperger syndrome to that of their typically developing peers. Specific attention was paid to the ability of students with Asperger syndrome to encode conflict and benign intention cues, to the type of social cues that resulted in a participant’s attribution of a peer as “mean” or “not mean,” to the strategies that they selected in response to different types of conflict situations, and to the strategies that they selected when they perceived a peer to be “mean” or “not mean.” This study confirmed that students with Asperger syndrome were less able to encode conflict cues and benign intentions than their typically developing peers. It also revealed that both groups of students were most likely to attribute a peer as being “mean” when shown hostile intention cues but students with Asperger syndrome were most likely to attribute a peer as “not mean” when shown ambiguous social cues. Finally, it demonstrated that students with Asperger syndrome were significantly more likely to describe use of aggressive strategies in social conflict situations than their typically developing peers.

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Received: 30 October 2002
Initial Acceptance: 23 December 2002
Final Acceptance: 15 June 2003