SOCIAL-INFORMATION PROCESSING AND EXPERIENCES WITH VICTIMIZATION IN CHILDREN AND ADOLESCENTS WITH AUTISM SPECTRUM DISORDER

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Abstract

Several researchers have found that peer victimization is more frequent in those with ASD, yet few studies have examined the underlying social cognitive mechanisms involved. Crick and Dodge's (1994) social-information processing (SIP) model has been used to examine bullying in aggressive populations and has more recently been applied to difficulties with social interaction more broadly. The model consists of six steps that operate in a circular manner, from the encoding of social cues, to the behavioural enactment of a selected response. Only two studies have examined the SIP model with those with ASD and have found differences in encoding and assertive response selection in those with ASD. The current study is the first to examine victimization and SIP together in those with ASD. Further, this study is the first to include eye-tracking methodology to gain further insight into the encoding stage of processing.

Twenty-four children with typical development aged 6-17 were compared with 24 children with high-functioning ASD. Those with ASD are more likely to experience victimization, according to parent report, across all types of bullying. The ASD group had a lower proportion of looking time to faces, during the ambiguous social exclusion video. Several social-information processing differences were also noted: those with ASD made more encoding errors, fewer assertive responses, and more passive responses (for a hostile social exclusion video only). Encoding errors were significantly correlated with victimization, but only in the ASD group. Some areas of

similarity were also found across groups. Few participants in either group generated aggressive solutions. The groups were generally equivalent in their propensity to make hostile attributions and in the number of responses generated. The proportion of looking time was significantly related to victimization, assertive and passive responses across the entire sample for some of the videos. These potential processing differences may have cascading effects on the ability of those with ASD to effectively manage social interactions. Theoretical and clinical implications are examined and future research directions are suggested.

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Introduction

Peer relationships in childhood and adolescence play a critical role in healthy development (Cairns & Cairns, 1994; Rubin, Bukowski, Parker, & Damon, 1998). Children with difficulties in social competence show a wide range of problems in development, including an increased risk of experiencing victimization through bullying. Researchers have also indicated that there are differences in how children process social information and that these differences can impact and are impacted by, children's experiences with aggression, both as a perpetrator and as a victim. Given that Autism Spectrum Disorders (ASD) are characterized by difficulties in social interaction, communication, and understanding of social situations, individuals with an ASD are at particular risk of marginalization and victimization. In this study, experiences of peer victimization, social-information processing, and the relation between the two were examined in children and adolescents with an ASD. A brief summary of relevant information about bullying in the general population is provided. The literature review is organized first to provide an overview of factors related to bullying involvement that might put youth with ASD at risk for victimization. Then a more in depth review of research with ASD populations is included. Following this, a general overview of social-information processing, as conceptualized by Crick and Dodge (1994), is provided, followed by a brief discussion of how the model can be applied to bullying involvement. Next, a detailed summary of the studies that have examined this model in youth with an ASD is presented.

Bullying in the General Population

Bullying is a relationship problem in which there is recurring physical or verbal aggression, characterized by a power differential (Olweus, 1993; Pepler, Craig, & O'Connell, 1999). This power imbalance can be based on a number of variables, including: physical size, age, social status, intellectual level, and disability (Olweus, 1993; Pepler, Jiang, Craig, & Connolly, 2008). Prevalence estimates vary considerably depending on method, nevertheless, it is clear that bullying is common among children and adolescents. One large-scale international study conducted by the World Health Organization of children aged 11-15 years indicates that the prevalence of victimization in the general population of Canadian children in 2005-2006 was 35% (Molcho et al., 2009). Longitudinal research indicates that there is smaller subset of children and adolescents in Canada (5 to 20%) who experience chronic bullying and victimization throughout their schooling (Pepler, Jiang, Craig, & Connolly, 2008). A large-scale American study using a nationally-representative sample of over 7000 students in grades 6-10 examined the prevalence of specific types of bullying perpetration and victimization within the last 2 months. Almost 54% of the sample reported experiencing at least one incident of verbal victimization, which included making fun of another child and making threats. Just over 51% of students reported social bullying, which was defined as social exclusion and gossip about the child. Almost 21% reported physical victimization and just under 13% reported cyber victimization (using electronic social media to tease or exclude a peer) (Wang, Iannotti, Luk, & Nansel, 2010). Peer victimization has been associated with a wide range of negative outcomes, including: academic difficulties, school avoidance, substance use, internalizing problems, and suicidal ideation (Alsaker &Valkamover, 2001; Boivin, Hymel, & Bukowski, 1995; Boulton & Underwood, 1992;

DeRosier, Kupersmidt, & Patterson, 1994; Hanish, & Guerra, 2002; Kaltiala-Heino, Rimpela, M., Marttunen, M., Rimpela, A., & Rantanen, P., 1999; Kochenderfer, & Ladd, 1996; Myklebust, 2002).

Risk Factors for Bullying Involvement

Cook, Williams, Guerra, Kim, & Sadek, (2010) conducted a meta-analytic review of the literature and identified several characteristics that were common to individuals involved with bullying perpetration, victimization, or both. Those who were involved in bullying were more likely to report symptoms of externalizing and internalizing problems, negative beliefs about themselves and others, lower levels of social competence, and difficulties with problem-solving in a social context. Differences were also noted between children who bully, those who are victimized, and those involved in both perpetration and victimization. Children involved in bullying perpetration tend to have more externalizing symptoms than internalizing symptoms, while the reverse pattern is found for children who are victimized. Children who bully tend to be negatively influenced by their peers, while those who are victimized are more likely to experience rejection or isolation from peers. Children who are involved in both perpetration and victimization have a tendency toward co-morbid problems with internalizing and externalizing and are more likely to experience both rejection from and negative influence by peers.

Children and adolescents with special needs, including intellectual disabilities, learning disabilities (LD), language impairments, and other health care issues, are at significantly higher risk of both victimization and perpetration (Davis, Howell, & Cooke 2002; Estell et al, 2009; Norwich & Kelly, 2004; Perry, Kusel, & Perry 1998; Rose,

Espelage, & Monda-Amaya, 2009; Saylor & Leach, 2009; Van Cleave & Davis, 2006). In fact, in an extensive literature review on bullying in special education it was noted that researchers typically report rates of victimization within this population as being above 50% (Rose, Monda-Amaya, & Espelage, 2011). Psychiatric disorders are also associated with increased involvement in bullying and victimization. Kumpulainen, Rasanen, and Puura (2001) found that 71% of children who bully, 50% of children who are victimized, and 77% of those who are involved in both bullying and victimization met criteria for psychiatric disorders (including: ADHD, conduct problems, depression, anxiety), compared with 22% of those who were not involved. Additionally, several researchers indicate that the more restricted the special education placement, the higher the rates of bullying perpetration and victimization, such that those who were in self-contained classrooms showed higher rates of bullying and victimization than did students in more inclusive placements in middle school and early high school (Mishna, 2003; Norwich & Kelly, 2004).

In a review of several mechanisms underlying difficulties in social competence in children with LDs, Mishna (2003) concluded that there is likely an interplay between multiple factors, all of which could easily be applied to the ASD population. First, children with LDs are more likely to experience frustration in school related to their learning difficulties, causing them to withdraw from peers. Second, they may have fewer opportunities to develop relationships with typically developing peers due to special education placements (e.g., special classrooms, time in resource classrooms). Third, there may be neurological impairments that impact both the learning disability and processing of social information. All three of these factors may interact to impact the social competence and, consequently, the bullying experiences, of individuals with an ASD.

Bullying and Victimization Experiences of Children with ASD

Building on what is known about bullying and victimization behaviours, there are several characteristics of ASDs that may increase the likelihood of victimization. Children and adolescents with ASD are often socially isolated and tend to lack friendships, which can increase the likelihood of being targets of bullying because having friends and the presence of friends have been found to be protective factors (Bauminger, & Kasari 2000; Chamberlain, Kasari, & Rotheram-Fuller, 2007; Estell et al., 2009; Hodges, & Perry, 1999; Martlew, & Hodson, 1991). Difficulties with communication may also increase the risk of victimization in individuals with ASD because assertive and effective communication has also been shown to be a protective factor in coping with bullying situations (Arora, 1991; Haq & Le Couteur, 2004; Sharp & Cowie, 1994). Individuals with ASD are also more likely to react to provocations with strong emotional reactions, such as visible anxiety or crying, which has been found to increase the likelihood of victimization (Boivin et al., 1995; Gray, 2004). The restricted interests and stereotyped behaviours that characterize ASD are likely to be perceived by some peers as being odd or different from others, resulting in an increased risk of being targeted (Boivin et al., 1995; Boulton, 1999; Dunn, Saiter, & Rinner, 2002; Gazelle & Ladd, 2003; Gray, 2004; Haq & Le Couteur, 2004; Hodges & Perry, 1999; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1999). Individuals with ASD may be more at risk for bullying perpetration as well, due to increased likelihood of aggressive responding and limited social-problem solving capabilities, but they may be unaware that they are bullying due to limited insight (Van Roekel, Scholte, & Didden, 2010). All of these factors may contribute to an increased risk of bullying involvement in individuals with ASD.

In line with this possibility, it is widely acknowledged by clinicians and parents that individuals with ASD experience more victimization than their typically developing peers; yet there is a surprising paucity of research in the area. The handful of published studies in the area have been summarized in a recent review paper (see Appendix A; Schroeder, Cappadocia, Bebko, Pepler, & Weiss, under revision) and are described briefly below.

In the first study to examine victimization experiences in children and adolescents with ASD, Little (2002) found an overall prevalence rate of 94%, with almost three-quarters of parents reporting that their child had been hit in the past year and 75% reporting that their child had experienced emotional bullying. To compare, victimization rates are typically around 30% in the general population (e.g., Molcho et al., 2009). More recently, Cappadocia, Weiss, & Pepler (2012) conducted an online parent-report study of victimization of children and adolescents with ASD. Overall, 77% of parents reported that their child had experienced at least one occurrence of victimization within the past month, with 46% reporting victimization at least once per week. Social bullying was the most common form of victimization, reported by 69% of parents, with 39% reporting weekly or more frequent occurrences. Verbal bullying was also common, with 68% of the sample reporting at least one occurrence within the past month and 37% reporting weekly or higher frequency. Physical bullying was reported by 42% of the sample, with 15% of the sample reporting weekly or more frequent occurrences. These results are generally consistent with earlier results from Little (2002), suggesting that bullying towards those with ASD has not waned in the past decade.

A study of 30 students with AS or HFA in mainstream school revealed that relative to a typically developing comparison group, students with AS/HFA were four

times as likely to be bullied (Wainscot, Naylor, Sutcliffe, Tantam, & Williams, 2008). Of those who reported victimization, those with AS/HFA reported significantly more victimization experiences than the typically developing comparison group, with 40% of students with AS or HFA reporting daily victimization (vs. 15% of comparison) and 33% reporting victimization 2-3 times per week (vs. 15% of comparison). Together these studies indicate that children with ASD experience very high levels of victimization at the hands of their peers, which may compound their social-emotional difficulties.

Recently researchers have begun to examine cyber bullying within an ASD population. Results from these studies indicate fairly low incidence comparable to what is found in the general population, with 10-15% of parents reporting that their children or adolescents with ASD were bullied via cell phone or Internet (Cappadocia et al., 2012; Kowalski & Fedina, 2011) and 4-21% of adolescents with ASD reporting cyber victimization themselves (Didden et al., 2009; Kowalski & Fedina, 2011), compared to just under 13% of self-reported victimization in the general US population (Wang et al., 2010). It is interesting that the trend of elevated rates of traditional victimization of those with ASD has not been found with cyberbullying. These results are difficult to interpret because no studies on cyber victimization in ASD to date have included a comparison group. Consequently, little is known about underlying reasons why elevations in cyber victimization of those with ASD have not been found. It may be that the social difficulties experienced by those with ASD are less noticeable in the impersonal online situation, or that cyber victimization is under-reported in those with ASD because parents often have to rely on their children to report it and those with ASD may have difficulty detecting it.

Finally, some studies have considered whether those with ASD experience victimization at a rate that is similar to or greater than those with other health care or learning needs. Although rates have been similar in a few studies, the majority of researchers report that those with ASD experience increased rates of victimization. Those with ASD were found to be at an increased risk relative to those with other health care needs: mood disorder, cystic fibrosis (Twyman, et al., 2008), speech/language impairment (Sterzing, Shattuck, Narendorf, Wagner, & Cooper, 2012), and special education needs (Rowley et al., 2012). The literature regarding victimization in those with ASD relative to those with learning disabilities is inconsistent, with one study indicating greater risk in ASD (Symes & Humphrey, 2010) and others finding comparable rates (Sterzing et al., 2012; Twyman et al., 2008). Those with ASD have been found to have victimization rates comparable to those with ADHD (Twyman et al., 2008) and somewhat lower than those with intellectual disability (Sterzing et al., 2012).

Research on Associated Social Factors

More recently, researchers have begun to look at social correlates of victimization among children with ASD. In a parent-report survey, Sofronoff, Dark, and Stone (2011) found that higher levels of social vulnerability (e.g., naïveté, trust, etc.) predicted peer victimization relative to other emotional and mental health predictors. Interestingly, Rowley and colleagues (2012) found that children with ASD who experienced less social impairment reported higher levels of perpetration and victimization. In contrast, Sterzing and colleagues (2012) found victimization was related to lower social skills in those with ASD. They also found that victimization was more likely in those with ASD with some conversational ability. It may be that those with ASD who are at particular risk for

victimization are those who have sufficient social skills to attempt to engage in social interactions.

Van Roekel and colleagues (2010) included a social-information processing component in their study of victimization in adolescents with ASD. Participants watched 14 video clips that contained either bullying situations or positive social interactions and were asked to report whether the clip featured physical, verbal, or relational bullying. The researchers examined rates of false positives (reporting bullying while watching non-bullying video clips) and false negatives (reporting no bullying while watching bullying clips). Overall, the researchers found that their sample of adolescents with ASD demonstrated performance comparable to the general population, reporting very few errors on the video clips. Participants who had high levels of teacher- and self-reported victimization were more likely to misinterpret positive social interaction video clips as involving bullying, although the effect sizes were modest. Conversely, the more participants were involved in bullying perpetration, as rated by teachers and peers, the more likely they were to misinterpret bullying scenarios as not involving bullying.

Humphrey and Symes (2010) conducted the only qualitative study of bullying among children with ASD to date, using semi-structured interviews with 36 adolescents with ASD. A thematic analysis was used to develop a theoretical framework for understanding how children with ASD respond to bullying. Seeking help from teachers was the most commonly reported response strategy. Enlisting support from friends and dealing with it alone (e.g., ignoring or retaliating with violence) were also common responses. Asking parents for help was selected as a last resort response option. The response strategies were chosen largely based on the child's perceived likelihood that it would be effective in stopping the bullying, based on past experience.

Taken together, these results indicate that individuals with an ASD are at an increased risk of victimization, both physical and social-relational (Cappadocia et al., 2012; Carter, 2009; Little, 2002; Symes & Humphrey, 2010; Twyman et al., 2008; Van Roekel et al., 2010; Wainscot et al., 2008). Consistent with the general population, cyber-victimization rates are quite low, relative to other forms of bullying (Didden et al., 2009; Cappadocia et al., 2012). Children and youth with ASD also experience higher rates of victimization than peers with some other mental and physical health care needs, based on self and parent report (Rowley et al., 2012; Symes & Humphrey, 2010; Twyman et al., 2008).

Several studies have included a measure of social exclusion, ostracism, or number of friendships, which have all been found to be related to rates of victimization within the ASD population (Cappadocia et al., 2012; Carter, 2009; Little, 2002; Symes & Humphrey, 2010; Twyman et al., 2008; Wainscot et al., 2008). Many researchers note that this is likely due to the fact that many individuals with ASD lack the protective factor of having a number of friends to buffer against being a target of bullying. In addition, the behavioural and sensory differences that characterize ASDs may also play a role in their exclusion and their being targeted by children who bully because they are different.

Another factor that has not been examined in the ASD population is that there may be underlying difficulties with the processing of social information and social problem-solving that may lead to both an increased risk of social exclusion and involvement in bullying victimization and perpetration. Van Roekel and colleagues (2010) are the only researchers to have examined the relation between bullying and social-information processing. They found that errors in perceiving the presence of bullying was related to rates of bullying perpetration and victimization in adolescents

with ASD. This indicates that examining social perceptions may be important in understanding the relationship between bullying and ASD. However the study was limited in scope because its' focus was on the perception of bullying with a basic yes or no question.

The current study will expand on these preliminary measures of associated social competence factors to examine multiple stages of social-information processing, from perception to response selection. The model that has received the greatest amount of theoretical and empirical support is the Social-information processing model developed by Crick and Dodge (1994) initially to better understand aggressive behaviour. A brief summary of the theoretical underpinnings of this model is provided. Research linking the SIP directly to bullying involvement will be reviewed next, followed by a review of the limited studies that have included this model in samples of children with ASD.

Overview of Social-information Processing

The Social-information processing model is the most widely accepted model to explain aggression in children and the impact of early physical abuse on the development of later aggressive behaviours (Crick & Dodge, 1994). The model has been supported by research that indicates that it can be applied to social competence and difficulties more broadly (Crick, & Dodge, 1996; Dodge, Lochman, Harnish, Bates, & Pettit, 1997; Pettit, Polaha, & Mize, 2001). The model consists of six steps that operate in a circular manner, from the encoding of social cues, to the behavioural enactment of a selected response (see Appendix B). The first step involves the encoding of the sensory components of a social situation. The second step involves the cognitive interpretation of the information encoded. This step has been found to be particularly important as it may have cascading

effects on later stages of processing (Camodeca & Goossens, 2005). The third step involves the clarification and selection of goals relevant to the particular situation. The fourth step is response generation and the fifth is response selection. The final, sixth step is behavioural enactment of the selected response. Lemerise and Arsenio (2000) suggest that these abilities, combined with previous experience and biological capacities, impact differences in social behaviours among individuals.

Children who have a tendency towards aggressive behaviour show differences from less aggressive children across all steps of the SIP. Researchers indicate that children with aggression problems process fewer benign social cues and fewer social cues in general (Dodge & Crick, 1990). Children with aggressive behaviour problems are also more likely to make negative attributions to neutral situations, the second step of the SIP model (Dodge & Crick, 1990). They are also more likely to select goals that are harming to relationships (Dodge & Crick, 1990; Harper, Lemerise, & Caverly, 2010). In the fourth step of the model, children with problems with aggression generate fewer solutions to social problems (Guerra & Slaby, 1989) and are able to generate fewer non-aggressive response options (Crick & Dodge, 1994). If prompted to reflect on their responses, children with problems with aggression are able to generate more socially competent responses which suggests that they may have the knowledge to respond in a prosocial manner, but they have difficulty spontaneously producing prosocial responses (Rudolph & Heller, 1997). At the response evaluation and selection step, children with aggression problems rate aggressive responses more positively, expect beneficial outcomes following aggressive responses, and report more self-efficacy in performing aggressive responses (Dodge & Crick, 1990). Children with aggressive behaviour problems are also

significantly more likely to actually perform aggressive responses in the sixth stage of the processing cycle.

Horsley and colleagues (2010) conducted one of the few studies of the early stages of SIP using a ground-breaking method that integrated eye-tracking technology while participants (N=60, 10-13 years) viewed cartoon images that depicted a social interaction involving provocation or ambiguous intent. Interestingly, children with higher levels of aggression were no more likely to look at hostile cues than those with lower levels of aggression. Instead, children with higher levels of aggressive actually spent more time examining non-hostile cues and yet they rated the vignettes as containing more hostile intent than those with lower levels of aggression. The authors concluded that instead of a bottom-up style of processing, these children tend to use a top-down information processing style, guided by a hostile intent schema. They purport that these schemas direct attention to and prevent further processing of non-hostile cues-which are inconsistent with their hostile intent schema.

Researchers have extended use of the SIP model beyond those with aggression problems to those with other exceptionalities. Children with intellectual disabilities experience high levels of social rejection relative to their peers (Prasad, 1994), thus researchers have become interested in examining the SIP model among children with intellectual disabilities. Relative to a typically developing comparison group, children with mild intellectual disability showed less accuracy and more hostile attributions to ambiguous social cues (Gomez & Hazeldine, 1996). Similarly, given the high co-occurrence of ADHD, aggressive behaviour, and social difficulties (Pliszka, Carlson, & Swanson 1999; Waschbusch, 2002), research into SIP in youth with ADHD has been an important step in understanding social relations within this population. For example,

Moore, Hughes, and Robinson (1992) found that participants who were hyperactive and rejected showed errors at the stage of encoding and in the use of social cues, relative to those who were rejected but not hyperactive and to those who were not rejected with or without hyperactivity. These findings are supported by additional research that indicates that, relative to children with oppositional defiant/conduct disorders, children with ADHD encode fewer social cues and generate fewer responses to social problems (Matthys, Cuperus, & Van Engeland, 1999).

SIP and Bullying Involvement

Two studies have directly examined bullying and the SIP model, despite the fact that it has long been identified as a potentially relevant and useful model (Lemerise & Arsenio, 2000). Camodeca and colleagues (2003) used a peer nomination method to examine bullying perpetration and victimization among a sample of over 200 students across a one year span (mean age 7 to 8 years; Camodeca, Goossens, Schuengel, & Terwogt, 2003). Participants were read stories describing scenes that depicted social interactions that were either ambiguous or blatantly hostile and participants were asked to provide possible responses to the interactions. Results indicated that children who were not involved in bullying perpetration or victimization responded more assertively than did children who bullied or who were victimized. These researchers also found that overall, with prompting, aggressive answers decreased, while irrelevant answers increased. Asking for help from an adult or a peer was the most commonly selected response. Children involved in bullying as both victims and perpetrators were more likely to make hostile attributions to the ambiguous videos than their non-involved peers.

In a similar study, Camodeca & Goossens (2005) examined several stages of the SIP in 242 children (mean age 9.75 months) who were assigned a bullying status by peer nominations. Those involved in bullying and victimization tended to make more hostile attributions, were more likely to select retaliation as a response, reported more anger, and were more likely to report higher self-efficacy in the use of aggression than their non-involved peers. Children who bullied also reported higher self-efficacy in the use of verbal persuasion. Victimized children reported the greatest amount of sadness. The authors note that those involved in bullying tend to assume that others are also engaging in aggression deliberately; thus, they are able to hold others responsible for negative behaviours. Those who were not involved in bullying did not report that aggression would be a useful problem-solving method and they were not likely to list retaliation as a goal. They did not make aggressive responses in any of the SIP steps, nor did they make hostile attributions. They also did not express strong emotional responses (sadness or anger).

SIP in Individuals with ASD

There is a surprising paucity of research examining SIP in the ASD population, given that difficulties in social cognition and interaction are characteristic of the population. However, some research findings with the ASD population provide evidence of deficits at specific stages of SIP. For example, Pierce and colleagues (1997) examined social perception in children with autism using video clips of positive and negative social interactions. They found that children with autism had more difficulty interpreting these situations than a typically developing comparison group. Loveland and colleagues (2001) have also found that their sample of individuals with an ASD had difficulty detecting

socially inappropriate behaviours in video clips, but only when these scenes incorporate verbal interactions. Consistent with these findings, Channon and colleagues (2001) found that adolescents with an ASD had difficulty recalling relevant facts after exposure to social problem solving stories. One possible implication from these results is that children with ASD can understand cues from simple situations, but have difficulty integrating cues in more complex situations (Van Roekel et al., 2010). Two studies that can be mapped onto the later stages of SIP indicate children and adolescents with ASD have more difficulty selecting the best possible solutions to social problems (Bernard-Opitz, Sriram, & Nakhoda-Sapuan, 2001; Channon, Charman, Heap, Crawford, & Rios, 2001), but that improvements can be found when these skills are directly trained (Bernard-Opitz et al., 2001). Taken together, results from these studies point to the potential utility of examining the SIP more directly in children and adolescents with ASD.

To my knowledge, only two specific studies have directly examined the SIP in ASD samples. Meyers and colleagues (2006) designed a study to examine the utility of the Social-information processing model in a sample of 31 children aged 7-14 with Asperger syndrome relative to those with typical development, using stories and videos depicting social interactions (Meyers, Mundy, Van Hecke, & Durocher, 2006; see Table 1 for a summary). Three stages of social-information processing were studied: encoding (What happened?), interpretation of intent (Why did this happen?), and response selection (What would you do if this happened to you?). Encoding errors were recorded, intent was rated for hostile attributions and behavioural responses were rated as being assertively competent, passive-inept, or aggressive. The researchers found that individuals with AS made more encoding errors and provided more passive and fewer

assertive responses than the typically developing comparison group; however, there were no significant differences between groups on making hostile attributions, or in number of aggressive responses generated. Overall, these results are consistent with the research summarized in the previous section in that those with ASD were found to have difficulty understanding some of the social cues provided in the videos and that they had more difficulty generating assertive solutions to the social problems depicted. In this study, the researchers also examined the impact of co-occurring mental health issues on SIP. The researchers found that children with co-occurring mental health concerns showed more encoding errors than those without these concerns. Children who rated themselves as having poor interpersonal relationships were found to make more aggressive response selections. These results are consistent with results from the general population that indicate a link between internalizing and externalizing problems and SIP. Finally, the authors also found that SIP was related to verbal mental age, but not to non-verbal or chronological age, suggesting that language abilities may be of particular importance in supporting SIP skills and social competence more generally. Interestingly, performance on false belief tasks used to measure Theory of Mind was not found to be related to SIP performance. The authors conclude that social cognitive abilities and attributional biases may be distinct processes and that understanding social cognitive abilities in children with Asperger syndrome may not predict how they cope in more real-life social situations.

A second study by Embregts and van Nieuwenhuijzen (2009) examined multiple stages of SIP in 26 children with pervasive developmental disorder-not otherwise specified (PDD-NOS) and mild Intellectual Disability (ID) ranging in age from 10-14 years using videos depicting peer provocation and peer entry scenarios (see Table 1).

These participants were compared with individuals with mild ID without autism and a typically developing comparison group. They examined encoding (What happened?), interpretation (Why did this happen?), response generation (What would you do? other options?), response evaluation (Was this a good way to respond? select a response from three options), and self-efficacy (Would you be able to respond like that?). Results indicate that relative to typically developing peers, children with PDD-NOS + mild ID encode more negative and more emotional cues. Further, they were less likely to evaluate assertive responses favourably and provided lower self-efficacy ratings in their ability to enact assertive responses than the typically developing comparison group. These results are in line with other findings of children with mild ID (van Nieuwenhuijzen, de Castro, Wijnroks, Vermeer, & Matthys, 2009) indicating that children with mild ID may be able to choose assertive responses when presented with options, but have difficulty generating them spontaneously. The authors note that this conclusion extends to ASD as well. These results are consistent with the results from Meyers and colleagues (2006) who also found different patterns in SIP of individuals with ASD. Both studies indicate differences in encoding and selection or positive evaluation of assertive responses. Interestingly, both studies failed to demonstrate significant group differences in hostile attributional biases, or aggressive response generation. Embregts and van Nieuwenhuijzen's research findings differ from those of Meyers and colleagues in that they did not find group differences in spontaneous generation of assertive or passive responses. Further, Embregts and van Nieuwenhuijzen and Channon and colleagues also found no differences in the number of responses generated between ASD and TD groups, but they did find differences in the quality of responses.

Table 1: Summary of studies examining SIP in ASD

	N	Sample	Age	Control	Measure	Questions	Results
Meyer et al. (2006)	31	AS	7-14 Years	TD	10 stories-provocation; 24 videos-peer entry, friendship initiation, rejection, object acquire	1) Encoding-what happened, 2) Intent-why did this happen, 3) Behavioural-what would you do if this happened to you	1) more SIP encoding errors 2) similar hostility rating 3) more passive SIP 4) fewer assertive SIP responses 5) similar aggressive responses
Embregts & van Nieu-wenhuij-zen (2009)	26	PDD-NOS +mild ID	10-14 years	Mild ID & TD	5 videos-peer provocation and entry	1) Encoding-what happened, 2) interpretation-why did this happen, 3) response generation-what would you do; other options, 4) evaluation - was this a good way to respond; select from three options,5) self-efficacy-would you be able to respond like that	1) more negative encoding (vs. TD) 2) similar hostility rating 3) similar number of responses 4) similar assertive, submissive and aggressive responses generated 5) lower evaluation of assertive responses (vs. TD) 6) lower efficacy in assertive response (vs TD)

Current Study

The research reviewed highlights several key points: 1) victimization is a problem in special needs populations, especially for children and youth with an ASD, 2) the SIP model may help explain involvement in bullying, and 3) at least some stages of SIP are impacted in individuals with ASD. The primary goals of the current study were to replicate previous findings regarding victimization in the ASD population, to use eye-tracking to examine looking patterns while viewing dynamic social scenes, to extend current findings on SIP in ASD, and to explore the relationship between victimization, looking patterns, and SIP in typically developing (TD) and ASD samples.

In the current study, I collected surveys on both self- and parent-reported victimization among a sample of children and adolescents with Asperger syndrome and high-functioning autism (ASD group) compared with a matched typically developing sample of children and adolescents. Four types of victimization were examined: physical, social, verbal, and cyber. This was the first study to use multiple informants to explore several types of victimization in ASD compared with typical development.

To explore the SIP model, participants viewed a series of videos depicting brief social encounters between two or more children that included a potential provocation (e.g. a child steps on another child's homework, a group of children stop talking when another child walks by). The proportion of time that participants spent attending to faces while watching these videos was measured using eye-tracking technology and compared between each group. This was the first study known to incorporate eye-tracking methods to examine SIP in those with ASD.

Several stages of the SIP model were examined by asking a series of questions after each video. Performance was compared between the ASD and TD groups.

Encoding was assessed by asking participants to recall what happened in the video. Intent attribution was measured with a question about whether or not children in the video intended to be mean. Participants were then asked to generate as many solutions as they could to the problem depicted in the video. These responses were categorized as assertive, passive, or aggressive, and the proportion of each type of response was calculated. The relationship between victimization, looking patterns, and SIP were examined. This was the first study to examine multiple stages of social-information processing in relation to victimization in the ASD population.

Hypotheses

1. Consistent with the literature summarized in Appendix A, it is predicted that the rates of victimization are higher in youth with ASD relative to the TD group across each type of victimization according to both parent and child report. It is further anticipated that child report is somewhat lower than parent report across both groups.

2. Consistent with the growing body of literature that indicates that those with ASD attend less to faces during social scenes relative to their typically developing counterparts (e.g. Klin, Jones, Schultz, Volkmar, & Cohen, 2002; Riby & Hancock, 2009), it is hypothesized that individuals with ASD spend less time attending to the faces of children in the videos than the TD group.
3. Based on findings in previous studies (Embregts & van Nieuwenhuijzen, 2009; Meyers et al., 2006) and the characteristic difficulties in understanding social cues, it is predicted that individuals with ASD make more errors in encoding what happens during the SIP videos than those with typical development.

4. Previous researchers have not found group differences during the intent attribution stages of SIP (Embregts & van Nieuwenhuijzen, 2009; Meyers et al., 2006). It is predicted that there is equivalence between the ASD and TD groups regarding rates of hostile attribution.
5. Consistent with previous studies (Embregts & van Nieuwenhuijzen, 2009; Meyers et al., 2006), it is predicted that youth with an ASD provide a similar number of solutions to the social problems overall relative to the TD group and that the quality of their responses differ. In particular, the ASD group report fewer assertive responses and more passive responses relative to the TD group. Group equivalence in overall rates of aggressive responding is predicted.
6. No studies to date have addressed whether looking time towards faces is correlated with victimization. It is purported that across both groups, proportion of looking time toward faces is negatively correlated with victimization.
7. This is the first study to explore the relationship between encoding errors and victimization in an ASD population, thus there is no background literature on which to base predictions. It is hypothesized that encoding errors are positively correlated with victimization for both groups because it is theorized that those who miss social cues are more likely to be targeted by bullies.
8. In line with findings by Camodeca and Goosens (2005), it is predicted that hostile intent attributions is positively correlated with victimization rates for both groups.
9. No researchers to date have explored the relationship between the number of solutions generated to social problems and victimization. It is hypothesized that the number of responses generated is negatively correlated with victimization. Consistent with findings by Camodeca and colleagues (2003), it is hypothesized

that proportion of assertive responses is negatively correlated with victimization in both groups. It is further predicted that the proportion of passive and aggressive responses are positively correlated with victimization rates for both groups.

Method

Participants

Participants ranged in age from 6-17 years and included 24 children in the ASD group and 24 in the TD comparison group (see Table 2). The ASD sample was 92% Caucasian, 4% Asian, and 4% mixed (African/Caucasian). The TD sample was 88% Caucasian, 8% Asian, and 4% mixed (African/Caucasian). Socioeconomic status was estimated using a 9-point rating scale of occupational status based on Barratt's (2006) updated version of the Hollingshead occupational rating scale (1957, 1975). Both samples included a high percentage of parents with careers in the high status categories, with 47% of fathers and 39% of mothers of the children with ASD and 62% of fathers and 37% of mothers of TD children within the top three categories (Table 3). Thirty percent of participants in the ASD sample were in a typical classroom placement with no additional supports, 52% were in a typical classroom with special accommodations, 13% were in a special education/ASD classroom and 1 participant was homeschooled. All participants in the TD group were in a typical classroom, with 8% of the group receiving special accommodations for learning needs. The TD and ASD groups had a similar ratio of males to females, with 83% males in the ASD group and 79% males in the TD group. Participants were group-matched based on age and IQ. No group differences were found in age between the ASD group (M = 11.25 years, SD = 2.49) and the TD group (M =

10.10 years, SD = 2.66), $t(45)$ = -1.53, p = .13. The resulting samples were similar in age, with each participant having a counterpart in the other group whose age was within 2 years of theirs, and most with a counterpart within 1 year. There were no group differences in verbal intelligence (VIQ) standard score between the ASD group (M = 104.00, SD = 20.29) and the TD group (M = 109.63, SD = 12.17), $t(31.82)$ = 1.11, p = .28. There were also no group differences in performance intelligence (PIQ) between the ASD (M = 102.43, SD = 17.61) and the TD groups (M = 105.65, SD = 9.94), $t(30.94)$ = 30.94, p = .47. Similarly, no differences were found on full-scale intelligence scores (FSIQ) between the ASD (M = 103.82 years, SD = 20.50) and the TD groups (M = 109.13, SD = 11.49), $t(23.37)$ = .96, p = .35. The resulting samples were comparable in overall intelligence, with each participant having a counterpart in the other group with an FSIQ score within 20 points of theirs and most with a counterpart who was comparable within 10 points. As expected, the ASD group had significantly higher standard scores on the Krug's Asperger Disorder Index (KADI;M = 87.52 years, SD = 15.81) than did the TD group (M = 64.38, SD = 6.89), $t(29.79)$ = -6.46, $p < .001$.

Within the ASD group, 57% of participants had a diagnosis of Asperger syndrome, 26% autism, 13% PDD-NOS, and 4% ASD. ADI-R or ADOS scores were available for 44% of participants in the ASD group. Scores were classified according to the AGRE classification system (AGRE, n.d.) and all participants met criteria for autism. The CARS-2 was also used to assess ASD symptoms. Scores above 30 are indicative of autism and those with Asperger syndrome or PDD-NOS would be expected to score below that cutoff. CARS-2 scores ranged from 20.5 to 34.5, (M = 27.13, SD = 3.18). These scores indicate that children in this sample had symptoms of autism on the mild end of the spectrum.

Table 2: Group description

Group	Age (Years)	Verbal IQ Score	Performance IQ Score	Full Scale IQ Score	KADI Standard Score
ASD					
(n = 24)		(n = 21)	(n = 21)	(n = 17)	
M	11.25	104.00	102.43	103.82	87.52
SD	2.49	20.29	17.61	20.50	15.81
Range	7.00 – 16.80	70 – 149	65 – 129	76 – 142	60 – 107
TD					
(n = 24)		(n = 24)	(n = 23)	(n = 23)	
M	10.10	109.63	105.65	109.13	64.38
SD	2.66	12.17	9.94	11.49	6.89
Range	6.20 – 14.90	83 – 133	89 – 121	87 – 125	60 – 82

Table 3: Occupational status (%)

Group	N/R	N/A	N/E	9	8	7	6	5	4	3	2	1
ASD												
Father	30	0	0	4	13	30	13	0	4	0	4	0
Mother	17	0	17	13	13	13	13	0	4	0	9	0
TD												
Father	21	13	0	25	8	29	0	0	4	0	0	0
Mother	21	0	13	8	21	8	29	0	0	0	0	0

N/R=no response; N/A=not applicable because single-parent family; N/E=not currently employed; 9=major professionals, upper level executives; 8=professionals, administrators; 7=minor professionals, managers; 6=technicians, semiprofessionals, artists; 5=clerical and sales workers, 4=skilled manual workers, craftsmen, 3=operators and semi-skilled workers, 2=unskilled workers; 1=labourers, manual labourers

ASD participants were contacted from the Bebko Lab research pool or were prior research participants who had agreed to be contacted about additional research opportunities. These participants had initially been recruited to participate in research through a registry run by the Autism Spectrum Disorders - Canadian American Research Consortium (ASD-CARC) and by an online advertisement with the Geneva Centre for Autism and Autism Ontario. Most typically developing participants were recruited through word-of-mouth and 12.5% of the TD participants were siblings of those in the ASD group. In order to be included in the ASD group, a diagnosis of AS, autism, PDD-NOS, or ASD was required, along with at least average cognitive functioning in either the verbal or the non-verbal domain, and no uncorrected vision or hearing problems.

Measures

Child measures. *Wechsler Abbreviated Scale of Intelligence* (WASI; The Psychological Corporation, 1999). The WASI is a brief measure of intelligence designed for individuals from age 6-89 years. It takes approximately 20 minutes to administer. Sattler (2001) reports good psychometric properties. Standard scores VIQ and PIQ for these participants were derived based on subtest scaled scores. Twenty-four percent of participants had IQ tests on file from previous research or diagnostic reports completed within the past 24 months. IQ tests included the Stanford-Binet 5 and the Wechsler Intelligence Scale for Children-IV.

Childhood Autism Rating Scale-Second Edition-High Functioning Version (CARS-2; Schopler, Van Bourgondien, Wellman, & Love, 2010). The CARS-2 was used to assess the level of severity of autistic symptoms in the ASD group. It was completed by the researcher and it takes approximately 15 minutes. The manual reports good

reliability and discriminant validity and strong correlation with the previous version of the measure. The first edition of the CARS was found to have good reliability and discriminant validity for identifying autism (Garfin, McCallon, & Cox, 1988).

Parent measures. *Autism Diagnostic Interview- Revised* (ADI-R; Lord, Rutter, & LeCouteur, 2003). The ADI-R is a standardized, semi-structured caregiver interview focusing on quality of social interaction, communication and language, and repetitive, restricted and stereotyped interests and behaviour. It also contains questions about developmental milestones. Internal consistency is good for the social interaction, communication and language sections, and adequate for restricted/stereotyped behaviours. Inter-rater reliability reported in the manual is also good. The participants will be assessed using the ADI-R to confirm 'autism' diagnosis and related AGRE categories. Participants will have scores that at least fall on the 'autism spectrum.' This measure takes 2-4 hours to administer; scores were obtained from the ASD-CARC database or from phone interviews.

Krug Asperger's Disorder Index (KADI; Krug, & Arick, 2003). This is a 32-item scale that indicates the presence or absence of behaviours that are indicative of AS and was designed to both identify those with AS and to discriminate between AS and HFA. This measure was completed by parents in approximately 15-20 minutes. It was norm-referenced based on a standardization sample of 486. According to the manual, Cronbach's alpha for total score is .93. Inter-rater reliability is reported at 90% agreement between raters. Stability across a two-week time period is .98. Within the standardization sample, the authors found sensitivity at .78, specificity .94, and positive predictive value of .83. In a review of five diagnostic tools for AS, Campbell (2005) concluded that the KADI had the strongest psychometric properties.

Social Skills Improvement System Rating Scales (SSIS; Gresham & Elliott, 2008). This is a norm-referenced measure of social behaviours in children and adolescents. The parent-completed measure includes statements that are rated according to frequency of occurrence within the past 2 months. Domains assessed are: communication, cooperation, assertion, responsibility, empathy, engagement, and self-control. Doll and Jones (2010) found that the measure had good reliability and validity.

Test measure. *Promoting Relationships and Eliminating Violence Network Assessment Tool-Parent and Child Versions* (PREVNet tool; PREVNet Assessment Working Group, 2008). The PREVNet tool is a parent- or self-completed survey that assesses victimization and perpetration. The following definition of bullying was provided to the participants:

> "*There are lots of different ways to bully someone. Bullying is not an accident. A person who bullies wants to hurt the other person and does it more than once. Bullying is unfair. The person who bullies has an advantage over the person being victimized. For example, the person who bullies is older, or stronger, or bigger. Sometimes a group of students will pick on one student.*"

Types of bullying involvement examined are physical, verbal (including name calling and threats), social (including exclusion and spreading rumours), and cyber (electronic social media). Parents and children were asked questions such as: "How often has your child been bullied in the past 4 weeks?" Respondents are given a choice of 5 response option: *never, once or twice, 2 or 3 times, once per week*, and *several times per week.*

Stimuli

Participants were presented with nine videos from the Social-information processing Application, which are part of the Social-Emotional Assessment and Learning programs and are commercially produced and distributed by innovation Research & Training (2009). Each video includes a brief depiction (approximately 30 seconds) of a social interaction between two or more children involving potential provocation. These videos were filmed from the first-person perspective with the cameras recording the scene the way it would appear to the participant in real-life. This perspective enables participants to "see" the scene as if they were in it, to increase the likelihood that the participant will identify with the protagonist. An audio narration track provides a brief, objective description of the events that occur in the video. Participants were presented with a total of nine videos. The first video was used for training. Participants were then presented with five videos that depict social interactions in which the intent of the perpetrator was ambiguous (e.g., may have been hostile, may have been accidental) and three videos in which the intent of the perpetrator was more clearly hostile. Video content included two videos depicting social exclusion (e.g., a group of children who stop talking when the main character is nearby), three depicting destruction of property (e.g., stepping on the main character's homework), and three depicting physical aggression (e.g., a student hits the main character with his backpack). There was one ambiguous video included for each type of video-social exclusion, property destruction, and physical aggression.

Apparatus

Videos were presented on a 26-inch television. The participants sat with their eyes in line with the middle of the screen, approximately 2-feet away. The participants' eye

movements were recorded at a rate of 60Hz, using a Tobii X60 eye-tracker placed below the computer monitor. A video camera was also set up above the monitor to record the participants' faces while viewing the videos.

Experimental Procedure

The first video shown was used to provide participants with the opportunity to gain familiarity with the first person perspective. Once it was clear that the participants understood the video perspective, they were presented with the testing videos. Two randomly ordered sequences of the stimuli were created. After each of the eight videos, participants were asked a series of eight questions, some open-ended, some close-ended. All responses that required coding were coded by the first author and a research assistant blind to participant group. Only questions that will be analyzed in this paper are described. The coding scheme was based on a manual developed by a SIP researcher team at Vanderbilt University (Brown, 1988). The ability to encode the videos was assessed by asking participants: "What happened in the video?" All encoding responses were coded for accuracy. Encoding errors were scored out of three. A score of 0 was given to responses that included the critical event and did not include any elaborations that were not present in the video or audio tracks. Responses that included some details about what the characters might have been thinking or feeling were not counted as errors as long as they were consistent with the videos. Responses were given a 1 if they failed to include the critical event and/or they included description of events that did not happen in the video. Responses were given a score of 2 if they described only irrelevant details and events that did not happen in the video. Total agreement score across raters was 97.8% and all discrepancies were resolved through discussion.

Intent was assessed by asking: "Do you think the other child meant to be mean?" Participants were shown a five-point likert response scale, with a 1 being defined as *definitely mean*, a 3 being *maybe mean, maybe not mean*, and a 5 being *definitely not mean*. To assess the response generation step, participants were asked: "What would you do if this happened to you?" and "What else could you do?" until they were unable to generate any new responses. The number of responses was compared across groups. Inter-rater agreement was 97.1% across all videos and discrepancies were resolved through discussion. Responses were coded for aggressive, passive/submissive, or prosocial/assertive content and a proportion of each type of response was calculated. Using the same scoring criteria, response selection was assessed by asking: "What would be the best thing to do?" All responses were double-coded and inter-rater agreement for response type ranged from 96.8 to 99.8%.

General Procedure

Information letters were distributed and informed consent was obtained from the participants' parents and assent was obtained from the youth themselves (see Appendix C & D). Youths were presented with the SIP-AP task, followed by an additional task that was not examined in the study (a preferential looking video task). In total, these tasks lasted approximately 40 minutes. After a break, youth were assessed using the CARS and the WASI, lasting approximately 20 minutes. Then children were provided with the PREVNet Tool, which they completed independently, followed by an opportunity to follow-up on responses in an interview format. The instructions of the PREVNet Tool were read aloud to all participants and their parents in both the TD and the ASD groups. Total testing time for the children lasted from 1.5 to 2 hours. During the children's

experiment session, parents completed the KADI, the SSIS, the CBCL, and the PREVNet Tool.

Data Analyses

Frequency analyses were conducted to report overall victimization rates, as well as frequency of specific types of victimization. Some of the bullying and SIP data were skewed and thus not normally distributed. Consequently, non-parametric tests were used to compare groups when appropriate. All analyses were conducted with an alpha level of .05. Results were reported using the Bonferroni adjustment to account for the reduction in alpha associated with the use of multiple tests. However, given the relatively small sample size and subsequent reduction in power, results were also reported without the Bonferroni adjustment and these are the results that were explored in the discussion section. Mann-Whitney tests were used to compare victimization between groups. Intra-class correlations were run to compare parent- and self-reports of victimization. The eye-tracking data were examined using Mann-Whitney tests to compare total duration of looking time at the stimuli in general, and at faces in particular. Descriptive analyses were conducted to examine SIP across all stages. All SIP analyses compared scores across all 8 videos. Then each video was considered independently. Total encoding errors, total proportion of aggressive responses, and all comparisons of SIP variable of specific videos were conducted using Mann-Whitney tests. Comparison of total intent attribution, number of responses generated, and proportion of passive and assertive responses were made using t-tests. Comparison of categorical SIP variables was done using chi-square. SSIS scores were compared across groups using t-tests. Spearman's

rho correlational analyses were conducted to assess the relationship between victimization and SIP stages, eye-tracking data, and SSIS scores.

Results

Victimization

Data regarding victimization through peer bullying were non-parametric, thus all group comparisons were made using Mann-Whitney tests. In line with Hypothesis 1, parent-reported total victimization rates were higher in the ASD group, $M = 7.19$, $SD = 3.23$, in comparison to the TD group, $M = 4.48$, $SD = 1.04$, $U = 112.50$, $z = -3.34$, $p = .001$. In contrast, somewhat contrary to the hypothesis, no differences were found in total child-reported victimization between the ASD group, $M = 6.48$, $SD = 3.68$, and the TD group, $M = 5.21$, $SD = 1.98$, $U = 195.00$, $z = -1.39$, $p = .16$.

Seventy percent of parents of children with ASD reported some incidence of victimization within the past month, relative to 22% of parents of TD participants. This group difference in parent-reported presence or absence of victimization was significant, $z = -3.13$, $p = .001$. A total of 62% of children from the ASD group and 37.5% of children in the TD group reported some incidence of victimization, although this group difference was not significant, $z = -1.46$, $p = .14$. Percentages of each type of victimization are summarized in Table 4. Figures 1 and 2 compare the percentage of participants in each group reporting any victimization (sum of frequencies ranging from monthly to multiple times per week) as reported by parents and the children, respectively. Mann-Whitney tests were used to compare the frequency of each type of victimization between the ASD and TD groups.

Table 4: Percentage of parent- and self-reported physical, social, verbal, and electronic forms of victimization over the past month

		%				
	N	Never	Once	2-3 Times	Weekly	2+/Week
Physical						
Parent						
ASD	21	67	14	14	0	5
TD	23	91	9	0	0	0
Self						
ASD	22	77	5	5	9	5
TD	24	92	4	0	0	4
Verbal						
Parent						
ASD	21	48	19	10	10	14
TD	23	82	9	4	4	0
Self						
ASD	21	62	14	5	0	19
TD	24	71	13	8	0	8
Social						
Parent						
ASD	21	57	10	10	19	5
TD	23	91	9	0	0	0
Self						
ASD	21	76	5	5	0	14
TD	24	79	8	8	4	0
Electronic						
Parent						
ASD	21	81	10	10	0	0
TD	23	100	0	0	0	0
Self						
ASD	22	82	14	0	0	5
TD	24	100	0	0	0	0

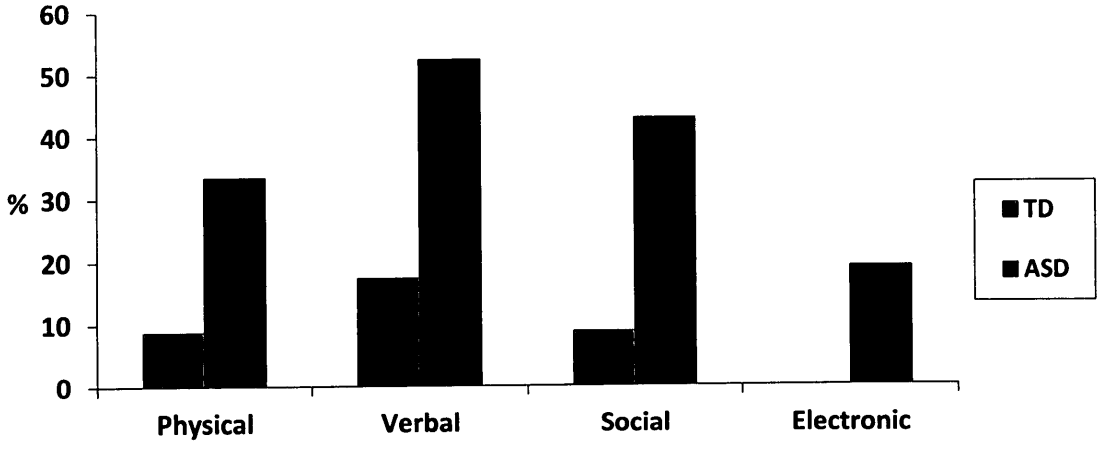

Figure 1: Parent-reported Victimization (percentage of participants reporting at least one occurrence of each type of victimization in the past month)

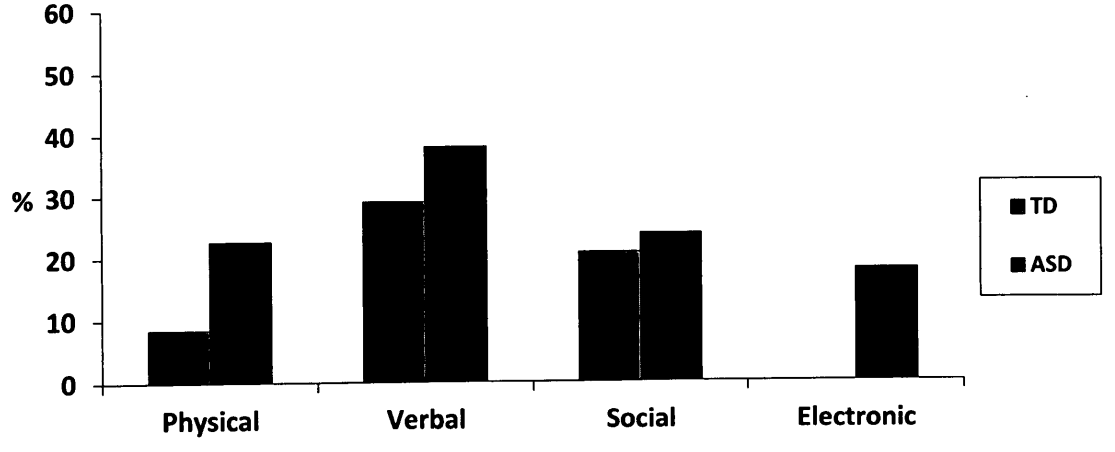

Figure 2: Child-reported Victimization (percentage of participants reporting at least one occurrence of each type of victimization in the past month)

Consistent with predictions, the ASD group was found to have significantly greater rates of parent-reported rates of victimization across all four types of victimization (Table 5). No group differences were found in self-reported physical, verbal, and social victimization. Self-reported electronic victimization was more common in those with ASD relative to the TD group, none of whom reported any electronic victimization. With the Bonferroni adjusted alpha, the group differences in parent-reported verbal and social victimization remain significant; however, group differences in parent-reported physical and electronic victimization and self-reported electronic no longer reach significance.

Table 5: Mann-Whitney group comparisons of parent- and self-reported victimization

	ASD Mean (SD)	TD Mean (SD)	U Value	z Value	p Value
Parent					
Physical	1.62 (1.07)	1.09 (.29)	178.00	-2.12	.03*
Verbal	2.24 (1.51)	1.30 (.77)	151.00	-2.52	.01*
Social	2.05 (1.39)	1.09 (.29)	152.00	-2.77	.006**
Electronic	1.29 (.64)	1.00 (0)	195.00	-2.17	.03*
Self					
Physical	1.59 (1.22)	1.21 (.83)	226.00	-1.34	.18
Verbal	2.00 (1.58)	1.63 (1.21)	225.00	-.74	.46
Social	1.71 (1.45)	1.38 (.82)	238.00	-.44	.66
Electronic	1.32 (.89)	1.00 (0)	216.00	-2.16	.03*

Note: victimization scores ranged from 1=none to 5=2+/week.
*$p<.05$, **$p<.001$

A series of one-way random intra-class correlations was run to assess the agreement between parent- and self-reported victimization for each type of victimization (Table 6). Somewhat surprisingly, little agreement was found between parent- and self-reported physical or verbal victimization in either the ASD group, or the TD group. Within the TD group, agreement for social victimization was significant, while it was not significant for the ASD group. All parents and children in the TD group reported no involvement in electronic victimization, thus there was perfect agreement among parent- and self-report for this form of victimization. Within the ASD group, parent and child agreement for electronic victimization was also significant. With the Bonferroni adjustment, the significant correlations between parent and self-reported electronic victimization remains for both groups; however, the correlation between parent- and self-reported victimization in the TD group no longer achieves significance.

Table 6: Intra-class correlations comparing parent- and self-reported victimization

Parent / *Self*	Physical	Verbal	Social	Electronic
TD				
Physical	-.08			
Verbal		.17		
Social			.54*	
Electronic				1.00**
ASD				
Physical	.39			
Verbal		.34		
Social			-.03	
Electronic				.76**

*p=.05, **p>.001

Spearman correlations were run to assess the relationship between victimization and sample characteristics: age, IQ, CARS, and KADI scores. Within the ASD group, a significant negative correlation was found between age and parent-reported victimization, r_s (21) = -.67, p = .001. A significant negative correlation was found within the TD group between age and parent- and child-reported victimization, r_s (23) = -.49, p = .032, and r_s (24) = -.44, p = .03, respectively. No other significant correlations were found, all ps > .07. With the Bonferroni adjustment, the significant negative correlation between age and parent-reported victimization remains in the ASD group, but the correlation between age and parent- and self-reported victimization fail to achieve significance in the TD group.

Eye-tracking: Proportion Looking Time at Faces

Eye-tracking data were analyzed for three of the eight videos, based on the greatest visibility of faces in the video. Due to technological difficulties, data were available for a subset of the participants, with 17 participants in the TD group and 14 in the ASD group. Each analysis included only participants for whom sufficient eye-

tracking data were collected.[1] For the ambiguous property destruction video, 15 participants from the TD group and 11 from the ASD group were included in the analyses. For the hostile social exclusion video, 16 participants in the TD group and 14 of the ASD group were included. For the ambiguous social exclusion video, 17 in the TD group and 12 in the ASD group were included. Independent-samples t-tests did not reveal any significant differences in intelligence between the subgroups of participants for each of the videos, all *p*s > .14. A significant difference in age was found between the TD group, $M = 10.10$, $SD = 2.49$, and the ASD group, $M = 12.37$, $SD = 2.73$, $t(24) = -2.01$, $p = .04$, for the ambiguous property destruction video. There was also a significant difference in age between the TD group, $M = 9.83$, $SD = 2.39$, and the ASD group, $M = 11.93$, $SD = 2.82$, $t(28) = -2.20$, $p = .04$, for the hostile social exclusion video. The difference in age between the TD group, $M = 10.00$, $SD = 2.43$, and the ASD group, $M = 11.84$, $SD = 2.98$, $t(27) = -1.82$, $p = .08$, for the ambiguous social exclusion video approached significance. Mann-Whitney tests revealed no group differences in overall looking time for any of the videos, all *p*s > .17.

Consistent with hypothesis 2, the ASD group spent less time attending to faces than the TD group; however, not all of these group differences achieved significance. Mann-Whitney tests revealed a significant group difference in proportion of looking time at faces of the people involved in the potential provocation relative to total time viewing the screen for the ambiguous social exclusion video. Specifically, the ASD group spent a lower proportion of the time looking at faces, $M = .38$, $SD = .06$, compared with the TD

[1] Eligibility of trials was determined by looking time at the whole screen. Group comparison analyses were conducted to compare results at multiple levels of stringency in determining the number of eligible trials. Group comparison results remained consistent across each level of stringency. Consequently, the least stringent criterion for determining eligibility of looking time trial was used to ensure the greatest power.

group, $M = .55$, $SD = .05$, $U = 53.00$, $z = -2.17$, $p = .03$. No differences in proportion of looking time at faces during the hostile social exclusion video were found between the ASD, $M = .46$, $SD = .28$, compared with the TD group, $M = .55$, $SD = .21$, $U = 27.00$, $z = -.53$, $p = .65$. No differences in proportion of time spent looking at faces for the ambiguous video depicting property destruction were found between the ASD group, $M = .30$, $SD = .16$, compared with the TD group, $M = .42$, $SD = .25$, $U = 59.00$, $z = -1.22$, $p = .24$.

Spearman correlations were run to assess relationships between proportion of time looking at faces during each video and sample characteristics. No significant correlations were found, all $ps > .15$. Correlations were also run to examine the relationship between proportion of time looking at faces during each video, social-information processing, and social skills. Proportion of passive responses was significantly negatively correlated with proportion of looking time at faces during the ambiguous social video, $r\ (28) = -.46$, $p = .01$, and the correlation approached significance for the ambiguous property destruction video, $r\ (25) = -.39$, $p = .055$. Proportion of looking time at faces during the ambiguous social exclusion video was significantly positively correlated with proportion of assertive responses, $r\ (28) = .56$, $p = .002$. This correlation remains significant with the Bonferroni adjustment, but the others did not. No other significant correlations between any of the other victimization scores, SIP variables, or SSIS scores and proportion of time looking at faces for any of the videos, all $ps > .07$.

Social-information processing: Preliminary Analyses

Two master sequences were developed to ensure that order in which the videos were presented was counter-balanced. Mann-Whitney tests were conducted with

sequence order set as the grouping variable. No significant group differences were found for any of the SIP total variables: encoding errors, $p = .79$; intent attribution, $p = .62$; number of responses generated, $p = .79$; proportion of passive responses, $p = .09$; assertive responses, $p = .27$, and aggressive responses, $p = .63$. Chi-squares were used to examine the relationship between the type of response selected and master sequence. These results were not interpretable due to low expected cell counts; however, frequency data did not indicate any notable patterns between master sequences.

Social-information processing: Main Analyses

Encoding errors were summed across all videos to yield a total encoding error score ranging from no encoding errors across any of the videos (0) to totally irrelevant recall of events from every video (16). Overall, participants in both groups made few encoding errors. Consistent with the third hypothesis, Mann-Whitney tests revealed that those with ASD were significantly more likely to make encoding errors, $M = 1.48$, $SD = 1.63$, than the typically developing comparison group, $M = .5$, $SD = 1.01$, $U = 143.00$, $z = -2.36$, $p = .02$. Logistic regressions were conducted to assess if group (ASD versus TD) could be predicted based on encoding error made during each video, but none achieved significance, all ps >.39. Although these results were not significant, a review of the frequency of encoding errors indicates that all participants made more errors in encoding of the social scenarios compared with the other videos and that the ASD group made two- to three-times more errors on these videos than the TD group (see Table 7). Z-tests demonstrate group differences during the ambiguous property destruction video, $z = 2.14$, $p = .032$, and the group difference approached significance for the ambiguous social video, $z = 1.92$, $p = .054$ (see Table 8). A negative Spearman correlation between

encoding errors and verbal IQ within the TD group was found, r_s (22) = -.45, p = .05, but not in the ASD group. This correlation does not remain significant when the Bonferroni adjustment is made. Encoding errors were not significantly correlated with any other variables, all ps > .08.

Table 7: Frequency of encoding errors by group

	N	% No Errors/ Relevant	% Some Errors/ Partially Relevant	% Many Errors/ Not Relevant
TD				
Hostile/Property-RH	23	100	0	0
Hostile/Social-WL	24	88	13	0
Hostile/Physical-FT	24	92	4	4
Ambiguous/Property-BG	24	100	0	0
Ambiguous/Property-RM	24	92	4	4
Ambiguous/Social-LP	24	92	8	0
Ambiguous/Physical-PE	23	100	0	0
Ambiguous/Physical-BP	24	100	0	0
ASD				
Hostile/Property-RH	22	92	9	0
Hostile/Social-WL	23	65	17	17
Hostile/Physical-FT	21	95	5	0
Ambiguous/Property-BG	23	83	13	4
Ambiguous/Property-RM	22	82	18	0
Ambiguous/Social-LP	23	70	22	9
Ambiguous/Physical-PE	22	100	0	0
Ambiguous/Physical-BP	22	86	14	0

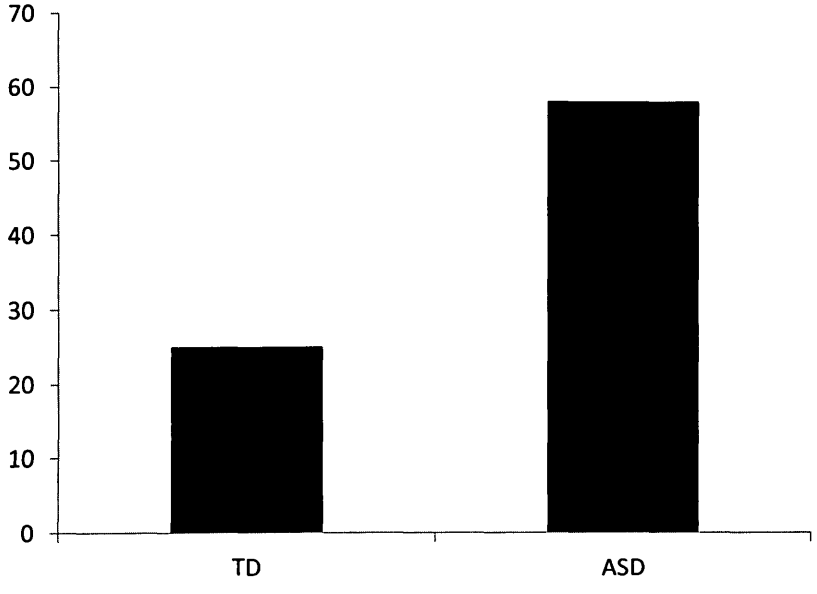

Figure 3: Frequency of Encoding Errors

Table 8: Z-test group comparisons of encoding errors for each video

	TD		ASD			
	N	% No Errors	N	% No Errors	*z*	*p*
Hostile/Property-RH	23	100	22	92	1.48	.139
Hostile/Social-WL	24	88	23	65	1.80	.071
Hostile/Physical-FT	24	92	21	95	-0.48	.631
Ambiguous/Property-BG	24	100	23	83	2.14	.032*
Ambiguous/Property-RM	24	92	22	82	0.99	.322
Ambiguous/Social-LP	24	92	23	70	1.92	.054
Ambiguous/Physical-PE	23	100	22	100	0	1.000
Ambiguous/Physical-BP	24	100	22	86	1.87	0.062

As predicted in hypothesis 4, both groups were generally equivalent in their intent attributions, as indicated by the extensive overlap of the confidence intervals for each group, ASD 95% CI [18.19, 24.19] and TD 95% CI [18.61, 22.75]. Consistent with these findings, independent t-tests revealed no significant differences in total intent attribution between the ASD group, $M = 21.19$, $SD = 6.60$, and the TD group, $M = 20.68$, $SD = 4.67$, $t(41) = -.29$, $p = .77$ (Table 8). Mann-Whitney tests comparing intent ratings across groups on each video were not significant, all *ps* >. 14. Age and intent attribution were positively correlated in the ASD group, such that as age increased, negative intent attribution decreased, $r(21) = .45$, $p = .04$. This correlation no longer achieves significance when the Bonferroni adjustment is applied. No other significant correlations were found between intent attribution and any of the sample characteristics, all *ps* > .14.

Table 9: Frequency of intent attributions by group

	N	% Definitely Mean	Probably Mean	Maybe Mean Maybe Not	Probably Not Mean	Definitely Not Mean
TD						
Hostile/Property-RH	23	83	17	0	0	0
Hostile/Social-WL	24	46	25	13	13	4
Hostile/Physical-FT	24	33	29	13	8	17
Ambiguous/Property-BG	24	8	8	54	17	13
Ambiguous/Property-RM	24	25	21	8	33	13
Ambiguous/Social-LP	24	21	17	46	13	4
Ambiguous/Physical-PE	23	22	9	22	30	17
Ambiguous/Physical-BP	24	13	13	8	46	21
ASD						
Hostile/Property-RH	22	82	5	0	9	5
Hostile/Social-WL	23	44	22	13	17	4
Hostile/Physical-FT	21	43	29	14	10	4
Ambiguous/Property-BG	23	13	9	35	13	30
Ambiguous/Property-RM	22	23	14	9	27	27
Ambiguous/Social-LP	23	22	22	30	26	0
Ambiguous/Physical-PE	22	36	5	36	14	9
Ambiguous/Physical-BP	22	14	5	9	27	46

Independent t-tests were also used to compare the total number of responses generated across groups (Table 9). As predicted in hypothesis 5, the confidence intervals for both groups overlapped extensively, ASD 95% CI [17.46, 28.44] and TD 95% CI [19.32, 28.41]. This indicates that the groups were generally equivalent in the number of responses made. Consistent with these findings, there were no significant group differences in total responses generated, with the ASD group producing a similar number of responses, $M = 22.95$, $SD = 11.74$, as the TD group, $M = 23.86$, $SD = 10.26$, $t(40) = .27$, $p = .79$. Additionally, Mann-Whitney results were not significant across any of the videos, all $ps >$. 09. Verbal IQ and the number of responses generated were negatively correlated for the TD group, $r(22) = -.55$, $p = .02$. A significant negative correlation was also found with full-scale IQ within the TD group, $r(21) = -.47$, $p = .03$. These correlations no longer achieve significance when the Bonferroni adjustment is used. No other significant correlations were found between the number of responses generated and any of the sample characteristics, all $ps > .11$.

Table 10: Number of responses by group

	N	Range	Mean	SD
TD				
Hostile/Property-RH	23	1-8	3.26	1.76
Hostile/Social-WL	24	1-9	3.75	2.03
Hostile/Physical-FT	24	0-6	2.92	1.53
Ambiguous/Property-BG	24	1-9	3.46	2.09
Ambiguous/Property-RM	24	1-8	3.21	1.64
Ambiguous/Social-LP	24	0-7	3.25	1.94
Ambiguous/Physical-PE	23	0-6	2.48	1.38
Ambiguous/Physical-BP	24	0-4	2.46	1.06
ASD				
Hostile/Property-RH	22	1-11	3.45	3.08
Hostile/Social-WL	23	1-5	3.17	1.34
Hostile/Physical-FT	21	0-17	3.29	3.58
Ambiguous/Property-BG	23	0-6	2.48	1.70
Ambiguous/Property-RM	22	0-5	2.59	1.44
Ambiguous/Social-LP	22	0-9	2.64	1.92
Ambiguous/Physical-PE	22	0-16	2.27	3.25
Ambiguous/Physical-BP	22	0-7	2.05	1.65

Responses were coded as passive, assertive, or aggressive, and a proportion of each type of response was calculated using the total number of responses as the denominator.

In contrast with the group differences anticipated in the fifth hypothesis, t-tests revealed no significant differences in proportion of responses that were passive for the ASD group, $M = 64.69$, $SD = 21.01$, compared with the TD group, $M = 56.55$, $SD = 18.81$, $t\ (43) = -1.37$, $p = .18$ (Table 10). Mann-Whitney tests revealed that the ASD group provided a greater proportion of passive responses after viewing an ambiguous social video, $M = 67.83$, $SD = 34.05$, compared with the TD group, $M = 48.34$, $SD = .28$, $U = 151.00$, $z = -1.98$, $p = .05$. This group difference does not persist when the Bonferroni adjustment is made. No other significant differences in the proportion of

passive responses were found, all *ps* > .22. The proportion of passive responses was not significantly correlated with any of the sample characteristics, all *ps* >.10.

Table 11: Proportion of passive responses by group

	N	Range	Mean	SD
TD				
Hostile/Property-RH	23	25-100	67.03	28.58
Hostile/Social-WL	24	0-100	63.45	29.27
Hostile/Physical-FT	23	0-100	54.49	34.56
Ambiguous/Property-BG	24	0-100	48.38	36.87
Ambiguous/Property-RM	24	0-100	54.04	28.52
Ambiguous/Social-LP	22	0-100	48.34	28.41
Ambiguous/Physical-PE	22	0-100	67.50	27.06
Ambiguous/Physical-BP	23	0-100	51.81	32.47
ASD				
Hostile/Property-RH	22	0-100	63.93	32.15
Hostile/Social-WL	23	0-100	62.39	32.29
Hostile/Physical-FT	20	0-100	63.75	41.03
Ambiguous/Property-BG	21	0-100	59.92	35.51
Ambiguous/Property-RM	21	0-100	64.76	36.49
Ambiguous/Social-LP	21	0-100	67.83	34.05
Ambiguous/Physical-PE	18	0-100	72.57	33.06
Ambiguous/Physical-BP	19	0-100	56.39	44.68

Consistent with predictions, the confidence intervals for both groups overlapped extensively, ASD 95% CI [2.74, 15.94] and TD 95% CI [0.61, 6.41], indicating general equivalence between the groups regarding proportion of aggressive responses made. In line with this finding, Mann-Whitney tests confirmed no significant differences in proportion of responses that were aggressive for the ASD group, $M = 9.34$, $SD = 14.89$, compared with the TD group, $M = 3.50$, $SD = 6.88$, $U = 209.50$, $z = -1.31$, $p = .19$ (Table 11). No significant differences in the proportion of aggressive responses were found, all $ps > .13$ for any of the videos. A significant negative correlation was found between verbal-IQ and the proportion of aggressive responses in the ASD group, $r\ (20) = -.45$, $p = .05$. This correlation was not significant when using the Bonferroni adjustment. No other significant correlations were found between the proportion of aggressive responses and any of the sample characteristics, all $ps > .16$.

Table 12: Proportion of aggressive responses by group

	N	Range	Mean	SD
TD				
Hostile/Property-RH	22	0-67	9.28	21.99
Hostile/Social-WL	24	0-11	.46	29.04
Hostile/Physical-FT	23	0-60	3.33	34.11
Ambiguous/Property-BG	24	0-33	2.55	36.98
Ambiguous/Property-RM	24	0-50	5.56	29.03
Ambiguous/Social-LP	22	0-25	2.05	27.98
Ambiguous/Physical-PE	22	0-20	.91	27.13
Ambiguous/Physical-BP	23	0-75	4.71	31.53
ASD				
Hostile/Property-RH	22	0-100	22.67	31.18
Hostile/Social-WL	23	0-75	7.32	18.47
Hostile/Physical-FT	20	0-100	12.50	30.89
Ambiguous/Property-BG	21	0-67	3.97	14.82
Ambiguous/Property-RM	21	0-40	1.90	8.73
Ambiguous/Social-LP	21	0-60	5.71	18.05
Ambiguous/Physical-PE	18	0-94	9.84	25.04
Ambiguous/Physical-BP	19	0-100	8.08	23.80

Consistent with hypothesis 5, t-tests revealed that the ASD group made significantly fewer assertive responses, $M = 23.47$, $SD = 18.84$, than the TD group did, $M = 38.98$, $SD = 17.39$, $t(44) = 2.90$, $p = .006$ (Table 12). The ASD group had a lower proportion of assertive responses regarding an ambiguous social video, $M = 25.93$, $SD = 34.08$, compared with the TD group, $M = 48.09$, $SD = 27.98$, $U = 135.00$, $z = -2.39$, $p = .02$. The ASD group also had a lower proportion of assertive responses regarding a hostile video depicting physical harm, $M = 23.75$, $SD = 36.80$, compared with the TD group, $M = 42.17$, $SD = 34.11$, $U = 151.50$, $z = -1.99$, $p = .05$. These group differences on the specific videos were no longer significant when the Bonferroni adjustment was applied. The difference in the proportion of assertive responses regarding an ambiguous

video depicting physical harm approached significance, with the ASD group making a lower proportion of assertive responses, $M = 17.59$, $SD = 28.85$, relative to the TD comparison group, $M = 31.59$, $SD = 27.13$, $U = 135.00$, $z = -1.83$, $p = .07$. No other significant differences in the proportion of assertive responses were found, all $ps > .14$. There was a significant positive correlation between performance-IQ and the proportion of assertive responses in the ASD group, $r\ (20) = .51$, $p = .02$. This correlation was no longer significant when the Bonferroni adjustment was used. No other significant correlations were found between the proportion of assertive responses and any of the sample characteristics, all $ps > .16$.

Chi-square tests were conducted to compare groups regarding the type of response that they selected as the best response option; however, these results could not be interpreted because the expected cell counts were too small.

Table 13: Proportion of assertive responses by group

	N	Range	Mean	SD
TD				
Hostile/Property-RH	23	0-75	21.56	21.99
Hostile/Social-WL	24	0-100	36.09	29.04
Hostile/Physical-FT	23	0-100	42.17	34.11
Ambiguous/Property-BG	24	0-100	47.34	36.98
Ambiguous/Property-RM	24	0-100	40.40	29.03
Ambiguous/Social-LP	22	0-100	48.09	27.98
Ambiguous/Physical-PE	22	0-100	31.59	27.13
Ambiguous/Physical-BP	23	0-100	41.30	31.53
ASD				
Hostile/Property-RH	22	0-88	13.41	24.28
Hostile/Social-WL	23	0-100	27.39	32.08
Hostile/Physical-FT	20	0-100	23.75	36.80
Ambiguous/Property-BG	21	0-100	33.73	34.00
Ambiguous/Property-RM	21	0-100	28.57	34.62
Ambiguous/Social-LP	21	0-100	25.93	34.08
Ambiguous/Physical-PE	18	0-100	17.59	28.85
Ambiguous/Physical-BP	19	0-100	35.53	43.55

Social Skills Score

Independent samples t-tests revealed significant differences in parent-rated Social Skills standard scale score between the ASD group, $M = 82.80$, $SD = 13.01$, compared with the TD group, $M = 100.23$, $SD = 16.15$, $t(40) = 3.83$, $p < .001$. Across the entire sample, SSIS Social Skills standard scores were found to be significantly negatively correlated with KADI scores, $r(42) = -.41$, $p = .007$. No other significant correlations with sample characteristics were found, all ps $>.11$.

Correlations Among Variables

Consistent with hypothesis 6, parent-reported victimization was found to be significantly negatively correlated with proportion of time looking at faces for the ambiguous social exclusion video, $r\ (26) = -.57$, $p = .002$, and the hostile social exclusion video, $r\ (27) = -.58$, $p = .002$. Child-reported victimization was found to be significantly negatively correlated with proportion of time looking at faces for the ambiguous social exclusion video, $r\ (28) = -.51$, $p = .005$, and the ambiguous property destruction video, $r\ (24) = -.42$, $p = .04$.

Consistent with hypotheses, within the overall sample, parent-reported victimization was negatively correlated with number of responses generated, $r_s(40) = -.31$, $p = .05$, and the negative correlation with proportion of assertive responses approached significance, $r_s(43) = -.29$, $p = .056$. A positive correlation between parent-reported victimization and proportion of passive responses approached significance, $r_s(42) = .29$, $p = .057$. These correlations no longer achieved significance with the Bonferroni adjustment.

Surprisingly, neither parent- nor child-reported victimization was significantly correlated with any of the SIP variables in the TD group, all *p*s > .11. Similarly, child-reported victimization was not significantly correlated with any of the SIP variables in the ASD group, all *p*s > .13. As predicted, in the ASD group, encoding errors were significantly correlated with parent-reported victimization, $r_s(20) = .51, p = .02$. This correlation did not reach significance when the Bonferroni adjustment was used. Parent-reported victimization was not significantly correlated with any other SIP variables, all *p*s > .16. The correlation between SSIS scores and the number of responses generated in the TD group approached significance, $r(20) = .44, p = .051$. SSIS score was significantly correlated with encoding errors in the ASD group, $r(18) = -.58, p = .01$. This correlation was no longer significant with the Bonferroni adjustment. No other significant correlations were found between SSIS and any other variables, all *p*s > .16.

Discussion

The aim of this study was to examine victimization and social-information processing in children and adolescents with autism spectrum disorders relative to those with typical development. More specifically, it was posited that early social-information processing difficulties in those with ASD impact their ability to generate adaptive solutions to social problems, which increases their likelihood of becoming targets of bullying. This is one of the first studies to look at the SIP model in those with ASD, use eye-tracking technology to explore the encoding stage of SIP, examine the relationship between victimization and SIP, and examine these variables together in an ASD sample. This study is also one of the few to explore multiple types of victimization across multiple raters. In general, it was hypothesized that children with ASD would experience

more victimization than those with typical development. Further, group differences in social-information processing were also predicted. The results of this study largely supported these hypotheses.

Peer Victimization

Consistent with the literature, my first hypothesis was confirmed; rates of victimization were found to be higher in the ASD group relative to the TD group (Cappadocia et al., 2012; Carter, 2009; Kowalski & Fedina, 2011; Little, 2002; Rowley et al., 2012; Sofronoff et al., 2011; Symes & Humphrey, 2010; Twyman et al., 2008; Van Roekel et al., 2010; Wainscot et al., 2008). Within the present study, 70% of parents of children with ASD reported that their child had experienced at least one type of victimization within the past month, relative to only 22% of parents of typically developing children. In particular, rates of parent-reported victimization across each type of bullying were elevated in the ASD group relative to the TD group. Over half of the parents in the ASD group reported that their child had experienced verbal victimization, 43% reported social victimization, 33% physical, and 19% electronic. These high rates of victimization experienced by children with ASD are generally consistent with rates reported in the literature (Cappadocia et al., 2012; Wainscot et al., 2008).

On self-report measures, almost two-thirds of the children with ASD reported that they had experienced some form of victimization relative to 38% of those with typical development; however, this difference was not significant. No group differences were found across different forms of victimization, except that self-reported electronic victimization was higher in the ASD group than the TD group. The rates of self-reported

victimization in this sample were comparable to or somewhat higher than rates reported by other researchers (Didden et al., 2009; Kowalski & Fedina, 2011; Rowley et al., 2012; Van Roekel et al., 2010; Wainscot et al., 2008).

Interestingly, correlations between parent and self-reported victimization were significant for the typically developing group, but not the ASD group. Within the general population, correlations between parent and child-reported victimization is generally modest. The one study that included correlational analyses of parent and child reported victimization in the ASD population also found modest correlations; however, this study only looked at one question for the parent report and compared that with a victimization score on the ADOS (Rowley et al., 2012). Thus further research is needed to determine the relationship between child and parent report in children with ASD.

There are several possible reasons for the discrepancy between child- and parent-reported victimization. First, it could be that children with ASD were unable to understand the victimization survey. This possibility was controlled for by reading the instructions aloud to every parent and child participant in both groups, including an operational definition of bullying, and following up on inconsistent responses. Alternatively, these results may indicate that children with ASD are less able to detect the occurrence of bullying. Conversely, it may be that parents of those with ASD are more likely to interpret innocuous situations as bullying because their child's ASD diagnosis serves as a sort of prime for parents to notice victimization. Most likely it is a combination of these explanations.

The communication, behavioural, and sensory differences that characterize ASDs may play a role in the victimization and marginalization of children with ASD among their peers, as children who bully may target them for being different. It is less clear what

the specific differences in social cognition may put children with ASD at increased risk for victimization and bullying. Social naivety, characterized by vulnerability to deception and common among children with ASD, has been identified as a strong predictor of victimization among children in this population (Sofronoff et al., 2011). Van Roekel and colleagues (2010) found that errors in social perception with respect to perceiving the presence of bullying were related to rates of victimization in adolescents with ASD. These studies provide preliminary evidence of the role of some specific social deficits that are associated with involvement in bullying of those with ASD, which may prove critical in the development and modification of intervention strategies that are tailored for children and youth with ASD. These studies support the rationale for looking further into specific social processing differences and exploring how they may be related to victimization.

Eye-tracking

The second hypothesis, that those with ASD would spend a lower proportion of their time looking at faces, was partially confirmed. The proportion of looking time spent on faces was significantly lower for those with ASD relative to those with typical development, but only for the ambiguous social exclusion video. Those with ASD spent an average of 38% of their looking time attending to faces relative to 56% of the TD group.

These results are consistent with the growing body of literature that indicates that those with autism attend less to faces in social scenes than those with typical development (e.g. Klin et al., 2002; Riby & Hancock, 2009). The current study demonstrates distinct looking patterns of those with ASD relative to typically developing

children while viewing the ambiguous social exclusion video but not the other types of videos. This distinction provides unique insight into the early processing deficits that may underlie subsequent social difficulties. These findings indicate an early processing deficit in attending to faces in certain social contexts in those with ASD that may have a cascading impact on higher-order processing of social cues and generation and implementation of problem-solving solutions. Decreased attending to faces in ambiguous social contexts may lead to reduced opportunity to process salient social cues, although the incidence of encoding errors in this study was quite low, so no relation between proportion of time looking at faces and encoding errors could be detected (Riby & Hancock, 2009). This is particularly problematic for scenes depicting social exclusion because in those, the faces are providing most of the salient cues to be able to understand the potential provocation. These social information processes will be considered next.

Social-information Processing

Consistent with hypotheses and the findings of Meyers and colleagues (2006), the ASD group made significantly more encoding errors than the TD group. This finding indicates that children with ASD were more likely than their typically developing peers to fail to report the critical event in the video or to report events that did not occur in the video. Although there were no significant differences across the videos, there was a trend towards those with ASD making more errors during social exclusion videos relative to the other videos which further supports the notion of a cascading sequence of processing difficulties, starting at the perception and encoding stages that may be unique to complex social situations.

The fourth hypothesis was also supported. Consistent with previous research (Embregts & van Nieuwenhuijzen, 2009; Meyers et al., 2006), the groups were generally equivalent in hostile attributional biases. Further, the degree to which the characters were rated as being mean across participants was generally consistent with *a priori* evaluations of the hostility of the videos, such that those scenarios were considered hostile by the researchers, were also rated as being the most hostile videos by children in both groups. These results, when combined with results of other studies, indicate that children with ASD are able to detect negative cues of hostile intent and that they are likely to recognize ambiguity of intent in less hostile videos.

The fifth hypothesis was partially confirmed. Consistent with previous research, both groups were generally equivalent in the number of responses generated (Channon et al., 2001; Embregts & van Nieuwenhuijzen, 2009). Although the number of responses was generally consistent across groups, some interesting differences in the quality of responses made emerged. In particular, children with ASD produced significantly fewer assertive responses relative to those with typical development, which is consistent with previous research (Meyers et al., 2006, but not Embregts & van Nieuwenhuijzen, 2009). Counter to the hypotheses and to the findings of Meyers and colleagues, there no significant group differences found in the total number of passive responses across videos. However, those with ASD did make a higher proportion of passive responses to the hostile social exclusion video only. These results are consistent with Meyers and colleagues, because most of the videos that they used contained social inclusion/exclusion scenarios. The results from this study may indicate that group differences in passive responding are more common in social exclusion provocations than in provocations involving physical aggression or property destruction, although no

studies to date have examined this dimension. The present findings indicate that children with ASD are more likely than those with typical development to respond in a passive manner, such as walking away, ignoring, or telling the teacher to situations of social exclusion in particular. Their choice of a passive response may be related to the particular complexity of the social cues inherent to complex social exclusion scenarios. It may also be that they perceive themselves as lacking the social standing to be able to effectively respond assertively when they are excluded. Group differences are also indicated based on the observation that KADI scores (measuring ASD symptom severity) were higher in those who made all passive responses to videos relative to those who made no passive responses to each video. As predicted based on previous studies, the proportion of aggressive responses was low in both groups and both groups were generally equivalent in the proportion of aggressive responses made (Embregts & van Nieuwenhuijzen, 2009; Meyers et al., 2006).

Associations Among Variables

The proportion of time looking at faces was significantly negatively correlated with victimization across all three videos. Further, the proportion of passive responses made was significantly negatively correlated with proportion of time looking at faces for both the ambiguous social exclusion video and the ambiguous property destruction video. Interestingly, the proportion of assertive responses only correlated with looking time towards faces during the ambiguous social exclusion video. Taken together, these results indicate that there seems to be a real-world connection between early visual processing of faces and victimization experience. Further, attending to faces was related to problem-solving, particularly in ambiguous situations. Those who looked less at faces were more likely to generate passive responses during the ambiguous situations, but not in the

hostile condition. This discrepancy may indicate an important role of looking patterns in decision making specifically in situations, in which the intent of the other person is unclear; it may be that if a child misses some of the visual social cues needed to interpret a situation, that the child might elect to make a more passive response, such as walking away. Looking time towards faces was also positively related to the proportion of assertive responses, but only for the ambiguous social exclusion condition. It may be that for social exclusion situations where the intent of others is unclear, children elect to make assertive responses only when they feel they have gained enough information. This certainty may be less relevant when the intent is more clearly hostile or when the situation is not as personally meaningful (the outcome of a boardgame vs. not being invited to a party).

Contrary to expectations, encoding errors were not significantly correlated with the proportion of looking time towards faces. This may be an issue of power as there was a relatively small sample used for the eye-tracking data. Alternatively, it may be that looking patterns and encoding errors contribute independently to social problem solving and real world outcomes. Nevertheless, these results demonstrate the utility of integrating eye-tracking technology to understand the encoding stage. Further, these results indicate that looking patterns may be useful for predicting potential response patterns, as those children who looked less frequently at faces were more likely to provide a higher proportion of passive responses and those children with higher proportion of looking time to faces made a higher proportion of assertive responses. To extend this even further, it is interesting to note that looking patterns are predictive of a real-world social outcome -- victimization. These results provide preliminary support for a model of cascading effects within social information processing that begin at the visual

encoding phase, impacting problem-solving solutions generated, and ultimately impacting real-world victimization outcomes. Conclusions should be interpreted with caution, however, because the sample size was not large enough to adequately assess the potential relationship between eye-tracking analyses and encoding errors made.

Inter-correlations between SIP variables and victimization rates showed interesting patterns between the TD and ASD participants. It was hypothesized that encoding errors, hostile intent attribution, and passive and aggressive responding would be positively correlated with victimization, while assertive responding would be negatively correlated with victimization. This hypothesis was partially confirmed, encoding errors were significantly correlated with parent-reported victimization, but only in the ASD group. It may be that the low frequency and limited variance of encoding errors and victimization in the TD group made it difficult to detect significant correlations. Additionally, it may be that processing differences account for some of the differences in victimization experiences for children with ASD, while differences in higher-order processes, behavioural differences, or situational factors may be implicated in victimization experiences of children with typical development.

Contradictory to hypotheses, hostile attributions were not significantly correlated with victimization. This contradicts findings by Camodeca and Goosens (2005) that the children who had been victimized in their study were more likely to make hostile intent attributions than those who had not been victimized. It may be that their victimization sample consisted of children who were more consistently and severely victimized than participants in our sample and that results are most salient for those with chronic and severe victimization. In the current study, only current victimization was explored, thus the issue of chronicity was not addressed. Further, the current study relied on parent- and

self-report, whereas Camodeca and Goosens used a peer nomination procedure to select participants who were frequently victimized, an approach that is more likely to identify children who experience more serious victimization problems.

Consistent with the hypotheses, victimization was found to be significantly negatively correlated with the number of responses generated across the whole sample, such that as victimization increased, the number of responses generated decreased. Although other researchers have not examined this relationship directly, it makes sense that those who have more difficulty generating responses may be more likely to experience increased rates of victimization, as those who are able to think of a range of possible response options are probably more likely to be able to respond flexibly to different situations, thus reducing their likelihood of getting targeted by children who bully. Across the entire sample, the association between victimization and passive and assertive responding approached significance. These results highlight the potential real-world significance of problem-solving style: children who are able to respond to conflict in an assertive manner are less likely to be targets of victimization in the future. Further, these results are somewhat consistent with those of Camodeca and colleagues (2003) who found that children who were frequently victimized made fewer assertive responses relative to those not involved with bullying. Further research is needed to elucidate the relationship between problem-solving style and involvement in victimization. Contrary to predictions, there were no significant correlations between victimization and aggressive response style, likely because aggressive responses were relatively infrequent in both groups

Some interesting patterns of association with age were noted across groups. Age was negatively correlated with parent and self-reported victimization in the TD group.

This finding is consistent with the well-documented trend of decreasing victimization with age in typical development (e.g. Nansel et al., 2001). Research with children with ASD has demonstrated a similar age trend - that younger children experience more victimization than older children (Cappadocia et al., 2012; Little, 2001; Montes & Haltermann, 2007; Twyman et al., 2008). The current study demonstrated a significant negative correlation between victimization and age in participants with ASD, but only for parent-report. These results are consistent with the fact that parent- and self-reported victimization were only found to be correlated in the TD group. Nevertheless, the current results are generally consistent with age trends found in typical development and ASD - that as children grow older, their victimization experiences become less frequent. It may also be that as TD children grow older, they become more accurate reporters of their own victimization experiences. Longitudinal or cross-sectional research that includes multiple informants can be used to test this idea and to assess the possibility that children with ASD become more accurate reports but at a slower rate than their TD peers. Within the ASD group only, intent attribution was found to become less hostile with age. It may be that for children with ASD in particular, their ability to understand the complexity of intention may increase with age, experience, and possibly training. When they are younger, it may be that their understanding of the motivation of the potential provocateur may be based primarily the critical event and not on the more subtle cues that indicate more complexity.

Intelligence was also related to some of the SIP variables. In particular, verbal intelligence was negatively correlated with encoding errors in the TD group only. Thus, for children with typical development, encoding errors may be related to more global verbal processing issues and not just problems with encoding of social information.

However, this interpretation should be attenuated somewhat by the observation that all but one TD participant verbal intelligence scores at or above the average range. For children in the TD group, verbal and full-scale IQ were negatively correlated with the number of responses generated. The direction of this correlation seems counter-intuitive. However, as discussed above, it may be that those with higher IQ were more efficient responders and were satisfied with their first few answers. It may also be that they were able to understand the task more readily and that they understood that testing would progress more quickly faster if they said that they could not think of additional responses. While order effects were not found in this study, visual inspection of the data indicates that fewer responses were generated for videos presented in the latter portion of the testing sequence. Verbal IQ scores were negatively correlated with the proportion of aggressive responses and Performance IQ was positively correlated with assertive responses in the ASD group only. This suggests that those with lower IQ and ASD may have more difficulty generating prosocial response options and that it may require more effortful recruitment of general cognitive competence to generate prosocial solutions for those with ASD. This could potentially slow down their capacity to respond quickly and effectively in complex social situations, which may, in turn, increase their likelihood of being targeted by children who bully.

Summary of Findings

Taken together, these results indicate several key areas of difference between those with ASD and typical development. Those with ASD are more likely to experience victimization, according to parent report, across all four bullying types. There was discrepancy between parent- and self-reported victimization ratings found in children with ASD but not for those in the TD group.

Children with ASD had a lower proportion of time looking at faces, but only during the ambiguous social exclusion video. Several social-information processing differences were also noted: those with ASD made more encoding errors, fewer assertive responses, and more passive responses (for a hostile social exclusion video only). Interestingly, encoding errors were significantly correlated with victimization, but only in the ASD group.

There were also some areas of similarity across groups. Few participants in either group generated aggressive solutions. Further no differences were found between groups regarding hostile attributions or number of responses generated. The proportion of looking time to faces was significantly related to victimization, assertive and passive responses across the entire sample for some of the videos.

From these results, it appears that children with ASD process social situations in a manner different from their typically developing peers and that this different processing capacity is related, in part, to their experiences of victimization. In particular, those with ASD appear to spend less time attending to faces than peers in situations that involve ambiguous social exclusion. Concurrently, children with ASD make more encoding errors. These processing differences may have cascading effects on the ability of children with ASD to effectively manage social interactions. Consistent with this interpretation, those with ASD had more difficulty generating assertive problem-solving solutions in the present study, which likely impacts their risk for experiencing more chronic victimization and many other social difficulties. These results indicate some areas in which those with ASD are similar to those with TD, namely their intent attribution and response generation abilities.

To demonstrate the implication of these results, imagine that Billy, a child with ASD, is walking behind his classmate who hits him in the face with his backpack while putting it on. If Billy does not attend to the face of his peer, he may miss important non-verbal cues that could be used to understand the intent of the other student. A snarl or a furrowed brow might lead Billy to understand that the other student hit him with his bag on purpose, while a look of concern might indicate that the student's actions were accidental. Billy's encoding errors might, in turn, reduce his capacity to generate a range of possible responses. If the other student hit him accidentally, telling the teacher or responding aggressively would reduce the likelihood that the other student would be interested in spending time with Billy in the future. This sort of a strong reaction to a potentially accidental hit might also place Billy at greater risk for being victimized and marginalized in the future because the other student might think that Billy is mean or that he is odd for over-reacting. Consequently, Billy will have fewer opportunities to develop and refine his social-information processing skills.

Limitations and Future Directions

This study is an important first step towards understanding some of the social processing difficulties in those with ASD. Further, this study is a critical first step towards better understanding the real-world implications of these differences. However, there are methodological limitations that decrease the scope of these findings, and highlight several key areas for future research. The main results and future research directions are summarized in Figure 4.

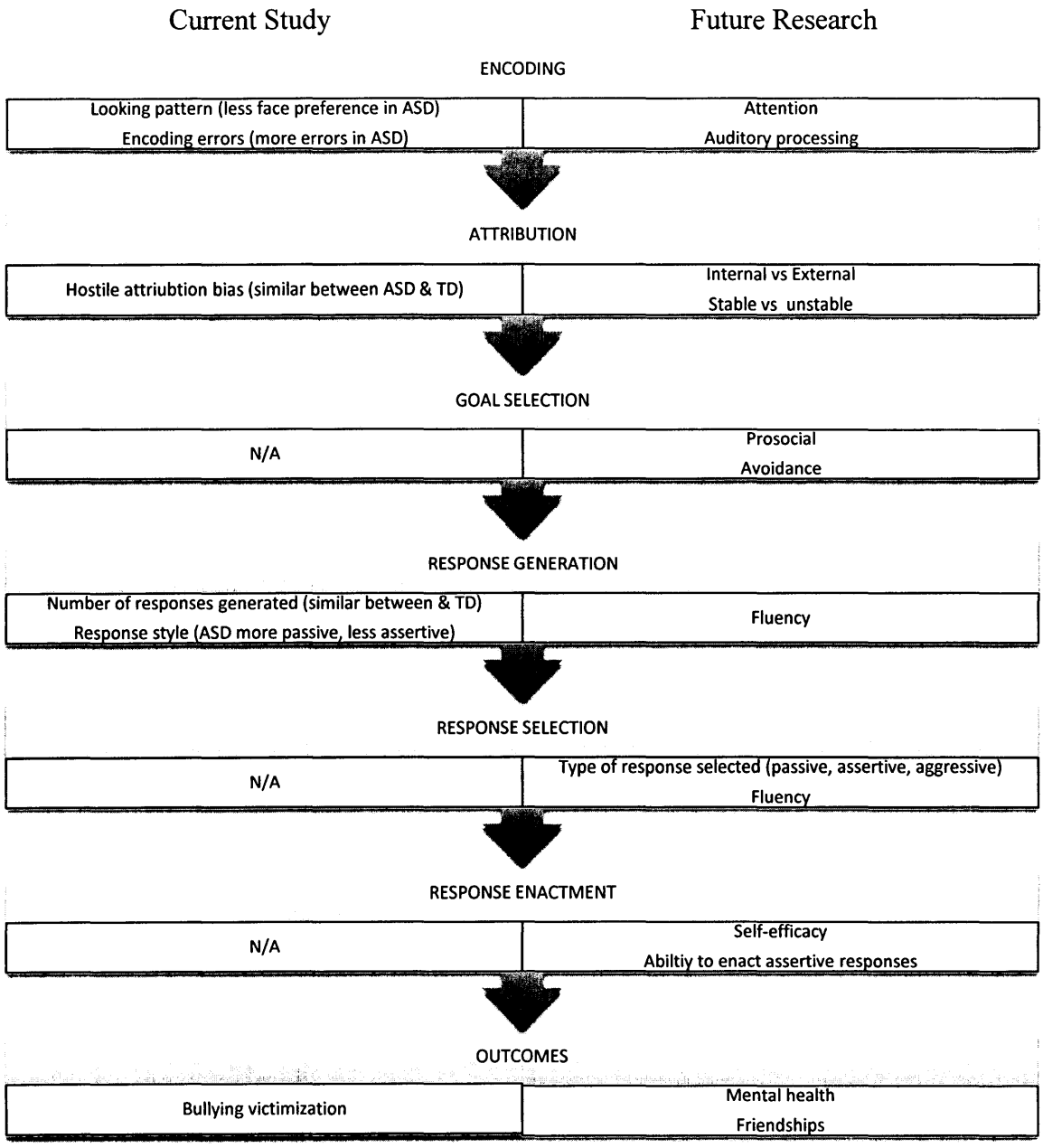

Figure 4: Summary of Current Findings and Areas for Further Research

A more in depth exploration of victimization within an ASD sample is important. Given the discrepancy between higher parent and lower self-reported victimization found in the ASD group, researchers should also consider teacher or peer victimization ratings to gain a better understanding of the parent and self-report inconsistency found. A wider range of perspectives will provide insight into differences across settings. The current study provides a snapshot of victimization experiences within the past month, which may not be reflective of the child's experiences at other time points and does not account for chronicity of victimization. Chronic victimization is associated with particularly poor outcomes, including mental health problems and learning difficulties. It is likely that rates of chronic victimization are higher in those with ASD, yet this is an area that has not yet been researched. To examine this more fully, a longitudinal study that includes frequent recording of victimization experiences over an extended period of time is needed.

Future research with adapted stimuli will serve to complement and expand on the findings from the current study. The current study demonstrated some interesting differences between children with ASD and those with typical development in early processing performance while viewing the ambiguous social exclusion video. These types of complex social situations may be useful analogues to the real-life social difficulties faced by children with ASD. As such, social exclusion appears to be an important area for further inquiry. Further, in the current study, a narration audio track provided the context for the videos, which served to cue participants to what they should be attending while watching the videos. An interesting direction for future research would be to examine spontaneous looking patterns to similar videos without narration to provide context. In order to generalize the results of this study to those on the lower end

of the spectrum, researchers will need to use innovative methods, perhaps including the use of eye-tracking to explore looking patterns as in the present study, as well as more structured tasks that require forced-choice responses rather than open-ended questions.

An important methodological consideration, particularly when working with participants with more severe symptoms of ASD and/or more cognitive difficulties, is the medium used to present the social-information processing vignettes. Early research on SIP used printed vignettes or cartoons and more recent studies have typically used videos. Studies with ASD samples have all used videos, which reduces the processing load for participants and likely enhances their ability to imagine themselves in the situation. In the current study, videos recorded from the first-person perspective were used and a practice trial to train participants to take the perspective of the main character in the video was included. These factors likely helped to support participants' understanding of the videos, as none of the participants had difficulty understanding the task. However, given difficulties with perspective taking characteristic of ASD, studies of those more severely impacted by their symptoms may benefit from using direct observational methods in a naturalistic setting. Role-playing scenarios with participants with ASD might also reduce the demand on their imagination by making the task more concrete. A role-playing method may also provide participants with the opportunity to reflect on the cognitive processes involved in their understanding, interpretation, and response selection in real time.

Results from this study provide preliminary support for a relationship between response style and victimization in those with ASD; however, additional studies with larger samples are needed to elucidate these relationships. Further research is needed regarding the enactment phase of social-information processing in those with ASD using

role-play, as those with ASD are able to generate prosocial solutions, but may have difficulty successfully enacting these responses. Further, it would be interesting to explore the automaticity of processing by examining temporal latency between when participants view a potential provocation and when they enact a response. Ecologically valid observational recordings could extend these laboratory findings further and may provide information regarding the rapidity and effectiveness of those with ASD to enact assertive responses in real-life.

Although many of the participants with ASD had problems with SIP and experienced increased rates of victimization some of those in the ASD sample did not. A critical direction for future research is to examine the factors that contribute to social problem solving competence in some children with ASD using a larger sample. Future research should explore the interplay between internal factors and important contextual factors (e.g. school environment, peers, family) that predict better outcomes in those with ASD. Internal factors, such as strong communication skills, cognitive abilities, symptom profile, attributional style, and personality type may all relate to both SIP and bullying experiences. For example, some children with ASD may be able to compensate somewhat for their social processing deficits by applying their general cognitive abilities to social situations, which may be an effective strategy in many social situations. Those with better communication skills may also have a larger repertoire of options available to be able to navigate complicated social situations. Behavioural factors, such as stronger self-regulation abilities, less obvious behavioural characteristics, or more socially acceptable topics of perseverative interest (e.g. music or movies) may also be predictive of lower rates of bullying. An equally important area for further research is to determine

the ecological factors that are predictive of better SIP and lower rates of victimization in those with ASD. Factors that should be examined include: type of school program (mainstream vs special education), social skills training, acceptance programming within schools, parent-teacher interaction quality, disclosure status, involvement in recreational activities, number of friendships, sibling relationships, parent support, and parent effectiveness in teaching socialization skills. An understanding of these factors will contribute to improved services for children with ASD.

Clinical Implications

The development of social capacity is critical for healthy development and serves as a protective factor across the lifespan (e.g. Masten & Coatsworth, 1998; Obradovic, van Dulmen, Yates, Carlson, & Egeland, 2006). Social competence in childhood lays the foundation for successful peer interaction across development. Social capacity promotes positive peers relationships, which are protective factors against victimization and marginalization. Consequently, it is important that interventions support improved social competence in and acceptance of those with ASD.

This study highlights several areas that may warrant specific, targeted intervention. At the encoding level, training programs can be developed to help those with ASD to attend better to faces and to build towards more automatic processing of non-verbal facial cues. Further, those with ASD can be supported in learning to attend to verbal and non-verbal cues presented by others. A broader question, however, is the degree to which those with ASD would benefit from better attending to bullying cues. It may be protective for them to occasionally not register that others may be making fun of them, as constantly attending to those sorts of cues may impact their self-esteem and their

confidence in approaching new social situations. Nevertheless, it is obviously important for children to notice serious victimization and for them to learn to read the subtle cues that differentiate bullying with mean intent from playful teasing. It was anecdotally noted that during the sessions, children in the ASD group often asked to clarify if friends teasing one another in a joking manner should be considered bullying. Playful teasing is a common means for social interaction and affiliation, so it is important that children with ASD be able to make that differentiation.

Researchers have demonstrated significant improvements in number and quality of responses generated during social problem-solving tasks by children with ASD after explicit training (Bernard-Opitz et al., 2001; Bland, 1987). These results indicate that a useful adjunct to existing social skills development programs that target social-information processing may help to improve social problem solving and may help to address concerns of victimization in those with ASD. In particular, programs should emphasize *in vivo* practice of enactment of prosocial, assertive responses, and include homework assignments that promote practicing the skill in real-life, and following up on the success of practice to determine areas of strength as well as areas for further development.

At the same time, it may be important for clinicians consider the possibility of an adaptive benefit of a more passive response style in some children with ASD. It may be that for minor potential victimization situations, a passive response, such as ignoring or walking away, may be a better method for diffusing a potentially escalating negative social situation than failed attempts as assertive responses. The evidence-based WITS program encourages children to pursue assertive as well as passive options (Walk Away, Ignore, Talk it Out, Seek Help) when faced with peer conflict (Geistbrecht, Leadbeater,

& MacDonald, 2011; Leadbeater, Hoglund, & Woods, 2003). This approach may be of particular relevance to children with ASD. If an individual with ASD has low confidence in his or her ability to enact assertive responses, s/he may have difficulty doing so effectively, which may increase the likelihood of further marginalization and targeting. It is important for clinicians, educators, and parents to recognize and respect the limitations and strengths of each individual with ASD when helping to support the development of his or her social problem-solving skills. Programs that include specific tactics for coping with bullying, such as the PEERS program, are of particular relevance for the ASD population as generalization of new skills into real-world social functioning is often a challenge (Laugeson & Frankel, 2010). Measures of bullying frequency, as well as tasks of social-information processing may be useful as measures of efficacy of social skills programs.

Although supporting skill development in children with ASD is a critical first step towards improving social success and reducing bullying involvement, there are limits to the degree to which the individual can, or should change. It is equally important that social policy focuses on developing interventions that are targeted for people with ASD to supplement more broad school-wide intervention programs. It is critical that schools build programing towards the promotion of tolerance and acceptance of differences and to encourage and support students in taking action when they witness bullying. Similarly, it is imperative that educators and other school staff receive training regarding how to support the unique needs of those with ASD. Teachers can help engage those with ASD who are neglected by peers because they avoid initiating social interactions. Teachers may also be able to facilitate the interactions of children with ASD who are actively trying to participate in social interactions so that they are less likely to result in

peer rejection. Teachers can use "social architecture" to provide a context that supports positive peer interactions and reduces conflict that will benefit all students. For example, they can arrange seats to facilitate communication for group work, or they can take student needs and skills into account when composing groups (Pepler, 2006). Intervention strategies that approach bullying and social problems at multiple levels are required to support adaptive social relationships within the ASD population because adaptive peer relations are critically important for development through childhood and adolescence and into adulthood.

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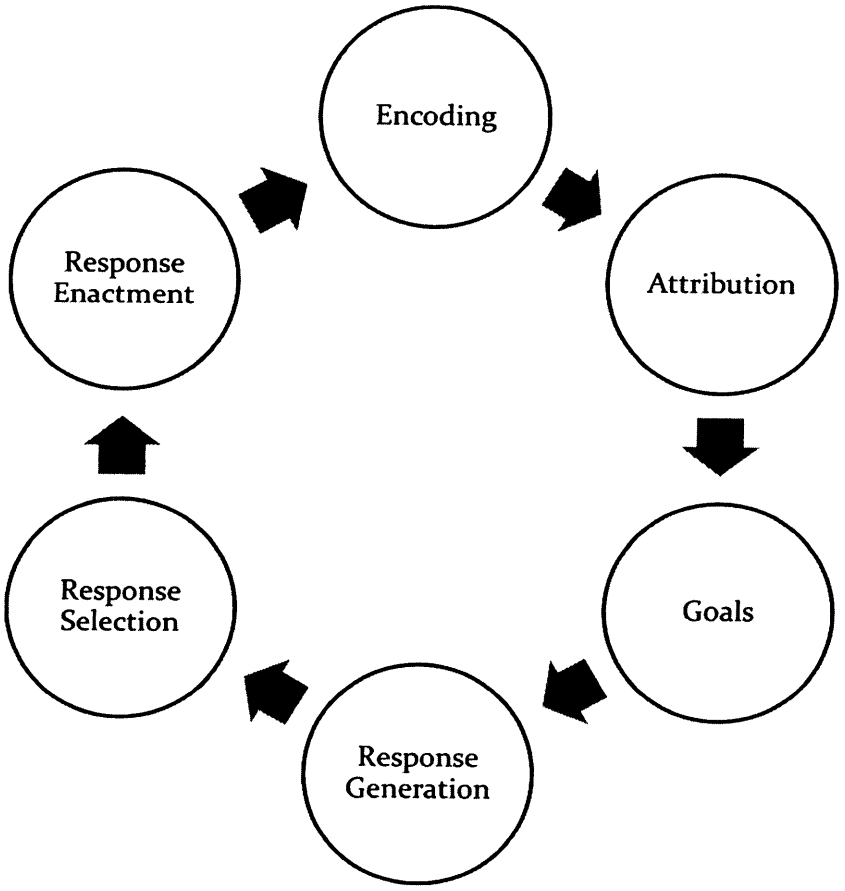
Appendix A: Summary of research examining victimization and perpetration in ASD

Author (year)	N	Age (yrs)	Control	Rater	Bullying Timeframe & Frequency
Little (2002)	411	4-17	No	Parent	Past year 94% overall; 74% hit; 75% emotional
Montes & Halterman (2007)	322	6-17	General population	Parent	Past month Comorbid ADHD and ASD: 4x more likely to bully than general population (44%)
Shtayermman (2007)	10	Mean = 19.7	No	Self and Parent	N/A
Twyman et al. (2008)	32	8-17	TD	Self	Past month ASD high relative to other healthcare needs and TD control
Wainscot et al. (2008)	30	11-18	TD	Self	Timeframe not specified ASD (vs. TD): 10% not bullied (vs. 44%), 17% ignored (vs. 11%), 50% tease (vs. 37%), 17% physical (vs. 4%)
Carter (2009)	34	4-21	No	Parent	Past year 65% overall; 47% physical; 50% scared; 44% picked on
Didden et al. (2009)	114	12-19	No	Self	Past week 4-9% internet/phone bullying or victimization
Humphrey & Symes (2010)	36	11-16	No	Self	N/A
Symes & Humphrey (2010)	40	Teens	LD; TD	Self	Past week ASD>DYS=TD
Van Roekel et al. (2010)	230	12-19	TD	Teacher, Peer, & Self	Past month *Bullying:* 46% teacher; 15% peer; 19% self *Victimization:* 30% teacher; 7% peer; 17% self
Kowalski & Fedina (2011)	42	10-20	No	Self and Parent	Past 2 months *Child:* Traditional – 38% perpetration and

					57% victimization; Cyber – 6% perpetration and 21% victimization *Parent*: Traditional – 36% perpetration and 70% victimization; Cyber – 3% perpetration and 15% victimization
Sofronoff et al. (2011)	133	6-16	No	Parent	<u>Time frame not specified</u> 46% verbal teasing; 16% verbal bullying; 32% physical; 10% exclusion (i.e., social); 15% disability-focused; 2% cyber
Cappadocia et al. (2012)	192	5-21	No	Parent	<u>Past month</u> 77% overall; 42% physical; 68% verbal; 69% social; 10% cyber
Rieffe et al. (2012)	64	9-14	TD	Self	N/A
Rowley et al. (2012)	100	10-12	Special education needs without ASD; UK population norms	Self, parent, and teacher	<u>Past Six Months</u> Parent – 14% perpetration, 33% victimization Teacher – 8% perpetration, 12% victimization <u>Current</u> Child – 42% victimization
Sterzing et al. (2012)	900	13-17	LD; Intellectual Disability; Speech/ Language Impairment	Parent	<u>Past year</u> 46% victimization 15% perpetration 9% both
Zablotsky et al., 2013	1221	6-15	No	Parent	<u>Past month</u> 38% victimization 9% perpetration

Based on table from Schroeder, Cappadocia, Bebko, Pepler, & Weiss (submitted)

Appendix B: Dodge & Crick (1994) Social-information processing Model



Appendix C: Informed Consent Letters for Parents

INFORMED CONSENT LETTER FOR PARENTS

"Bullying and Victimization among Children and Youth with Asperger Syndrome"

We are researchers from York University working on a project that examines bullying and victimization in children and adolescents. After being informed about what it involves, I am hoping that you will agree to have you and your child participate in this study.

You and your child will be asked to complete a survey over the phone or in person, which should take approximately 10 minutes each. We will ask questions about your child's experiences with being bullied and bullying others to find out how long the bullying behaviours and/or victimization experiences have been going on for and what types of bullying (i.e., verbal, physical, social) have been experienced, as well as your child's motivations for bullying (if applicable) and feelings and reactions about bullying others and/or being victimization. Your participation in this study can be completed in one session, or broken up into two smaller sessions if required. Interviews with you and your child will be audio-taped. If you would prefer, however, we can conduct the survey without audio-taping.

It is important to note that you and your child are not obligated in any way to participate in this study, and no services that you or your child receive will be affected in any way if you choose not to participate. Any information collected will be confidential, kept in a secure locked research area, and only those people directly involved in our research will have access to the data. All audio-tapes will be used for analysis only, and will be kept in a locked cabinet. Data will be destroyed after 5 years. Should you decide to withdraw from the study all data collected for the current study will be destroyed. Only grouped, anonymous data will be reported; no individual identifying information will ever be reported unless you are contacted for explicit written permission in the future. The information that you provide will be kept confidential to the fullest extent possible by the law.

You and/or your child can stop participation in this study at any time. Should you wish to withdraw from the study, your relationship with the researchers and/or York University will not be jeopardized.

The topic of this study may bring up feelings of sadness or anxiety about bullying experiences. Participants and their parents are encouraged to contact the researchers should they wish to discuss these feelings. Participants and parents will be provided with an opportunity to discuss their thoughts and feelings upon the completion of the study, or at any point after participating in the study, Resources about bullying and available services will be provided to all participants.

This research is being conducted by two doctoral students, Jessica Schroeder and Catherine Cappadocia, under the direction of their professors Dr. James M. Bebko and Dr. Debra Pepler at York University. Dr. Bebko has over 30 years of experience with children with ASD and Dr. Debra Pepler has over 25 years of experiences with children involved in bullying. You may contact the research team at any time by phoning Jessica Schroeder at (416) 736-2100 ext. 20706; Catherine Cappadocia at (416)736-5528; Dr. James Bebko at ext. 66250, or Dr. Debra Pepler at ext. 66155.

If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or email acollins@yorku.ca). This study has been reviewed and approved by the Human Particpants Review Sub-committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics Guidelines.

I am fully aware of the nature and extent of my and my child's participation in this project as stated above. I hereby agree for my child to participate in this project. I acknowledge that I have received a copy of this consent statement.

Parent/ Guardian Name (Please print full name): _____

Parent/ Guardian Signature: _____ Today's date:_____

Do you consent to audio-taping the interview? ☐ YES ☐ NO

INFORMED CONSENT LETTER FOR PARENTS

"Social-information processing in Children and Youth with Autism Spectrum Disorders and Typical Development"

We are researchers from York University working on a project that examines social-information processing in children and adolescents. After being informed about what it involves, I am hoping that you will agree to have you and your child participate in this study.

Your child will be asked to watch television for approximately 30 minutes, where s/he will see short video clips of social situations between 2 or more children. Your child will then be asked a few questions about what happened in the scene and how the children in the video might be able to handle the situation. Then your child will be asked to watch a 2 minute video with images of a woman talking, with a soundtrack that matches up with one of the videos. If you agree, your child's face will be recorded while they watch the videos. Their eye movements will be also recorded during this 30 minute period. Also, we ask that they complete a short intellectual test, which involves puzzle-type activities and verbal knowledge. In addition, a parent will be asked to fill out three brief surveys to help to give the researchers a better understanding of the child's social skills, communication abilities, and behaviour. All together, we expect this to take no more than 1 hour and a half. This study can be done in one session, or broken up into two smaller sessions if required. Parents may be asked to complete an additional survey by phone. This will be the Autism Diagnostic Interview-Revised, if it has not already been completed prior to participation. This will take between 2-4 hours. A gift card will offered to your child for agreeing to participate in the study.

It is important to note that you and your child are not obligated in any way to participate in this study, and no services that you or your child receive will be affected in any way if you choose not to participate. Any information collected will be confidential, kept in a secure locked research area, and only those people directly involved in our research will have access to the data. All audio- and video-tapes will be used for analysis only, and will be kept in a locked cabinet. Data will be destroyed after 5 years. Should you decide to withdraw from the study all data collected for the current study will be destroyed. Only grouped, anonymous data will be reported; no individual identifying information will ever be reported unless you are contacted for explicit written permission in the future. The information that you provide will be kept confidential to the fullest extent possible by the law. You and/or your child can stop participation in this study at any time. Should you wish to withdraw from the study, your relationship with the researchers and/or York University will not be jeopardized.

The topic of this study may bring up feelings of sadness or anxiety. Participants and their parents are encouraged to contact the researchers should they wish to discuss these feelings. Participants and parents will be provided with an opportunity to discuss their thoughts and feelings upon the completion of the study, or at any point after participating in the study.

This research is being conducted by a doctoral student, Jessica Schroeder, under the direction of her professors Dr. James M. Bebko at York University. Dr. Bebko has over 30 years of experience with children with ASD. You may contact the research team at any time by phoning Jessica Schroeder at (416) 736-2100 ext. 58495 or Dr. James Bebko.

If you have any questions about this process, or about your rights as a participant in the study, please contact the Sr. Manager & Policy Advisor for the Office of Research Ethics, 5th Floor, York Research Tower, York University (telephone 416-736-5914 or email acollins@yorku.ca). This study has been reviewed and approved by the Human Particpants Review Sub-committee, York University's Ethics Review Board and conforms to the standards of the Canadian Tri-Council Research Ethics Guidelines.

I am fully aware of the nature and extent of my and my child's participation in this project as stated above. I hereby agree for my child to participate in this project. I acknowledge that I have received a copy of this consent statement.

Parent/ Guardian Name (Please print full name): _____

Parent/ Guardian Signature: _____ Today's date: _____

Do you consent to audio-taping the interview? ☐ YES ☐ NO Do you consent to video-taping? ☐ YES ☐ NO

May we keep your name on our file as someone we might contact in the future if there is another research project? There is no obligation implied, and a separate consent form would be signed or not signed at that time.☐YES☐NO

Appendix D: Assent Letters

ASSENT LETTER FOR CHILDREN

"Bullying and Victimization among Children and Youth with Asperger Syndrome"

Why are we doing this study?

We would like to learn more about how you get along with other students at school and your experiences with bullying (bullying others or being bullied).

What will happen during the study?

You will be asked some questions about how you get along with others and your experiences with bullying over the phone or in person. This should take about 15 minutes.

Are there good or bad things about the study?

We don't think that there are any bad things about the study.

Who will know about what I said or did in the study?

If you are part of this study, your name will not be given to anyone. We won't tell anyone about what you said or did. We will not play the recording of you to anyone and will erase the recording once you are done. If you would prefer not to be recorded, that's okay, I can still do the survey. Also, we will throw out any papers that we used in the study.

Can I decide if I want to be in the study?

You can decide if you want to be in the study. It is O.K. if you do not want to be part of the study. It is O.K. if you say yes now and change your mind later. Your parents know about the study and have said that you can be in it. Please ask questions that you have at any time.

I understand my participation in this project as explained above. I agree to participate in this project. I did receive a copy of this consent statement.

Name (Please print full name): _____

Signature: _____ Today's date: _____

ASSENT LETTER FOR CHILDREN

Why are we doing this study?
We would like to learn more about how you understand social situations involving children.

What will happen during the study?
You will watch a special video. It that will show you lots of things like a woman talking, a game, and some cartoons. We will be tracking where you look. Then later we will ask you to complete some puzzles and ask you some questions about the meaning of different words to help us to understand how you think.

Are there good or bad things about the study?
We don't think that there are any bad things about the study.

Who will know about what I said or did in the study?
If you are part of this study, your name will not be given to anyone. We won't tell anyone about what you said or did. We will not play the recording of you to anyone and will erase the recording once you are done. If you would prefer not to be recorded, that's okay, I can still do the survey. Also, we will throw out any papers that we used in the study.

Can I decide if I want to be in the study?
You can decide if you want to be in the study. It is O.K. if you do not want to be part of the study. It is O.K. if you say yes now and change your mind later. Your parents know about the study and have said that you can be in it. Please ask questions that you have at any time.

I understand my participation in this project as explained above. I agree to participate in this project. I did receive a copy of this consent statement.

Name (Please print full name): _____
Signature: _____ Today's date:_____