THEORY OF MIND, SOCIAL INFORMATION PROCESSING, AND CHILDREN'S SOCIAL BEHAVIOR

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ABSTRACT

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Aggression and prosocial behavior have been shown to have important implications for later social adjustment for children (see Parker & Asher, 1987 for a review). Social information processing, including children’s social goals, predicts children’s aggressive and prosocial behaviors (Crick, 1995; Crick & Werner, 1998; Delveaux & Daniels, 2000; Dodge, 1980; Nelson & Crick, 1999). Less is known about whether another social cognitive variable, theory of mind, relates to children’s social behaviors. The current study sought to elucidate the relations among theory of mind, social goals, and children’s teacher-, peer-, and self-rated physical aggression, relational aggression, and prosocial behavior. Seventy children between the ages of 8 to 10 completed measures of theory of mind and social goals, and rated themselves and their peers on social behaviors. Their teachers also completed ratings for each child’s aggressive and prosocial behavior. Results indicated that theory of mind skills and social goals are related in some instances to physical aggression, relational aggression, and prosocial behavior. However, the source of the rating (i.e., teacher, peer or self), especially in regards to relational aggression, conditioned the results. There were also gender differences. Further research should take gender and the rater into consideration, as well as other potentially important aspects of social information processing in the prediction of children’s aggression and prosocial behavior. It also is important to examine other types of aggressive behavior, such as verbal aggression.
To Oscar.
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CHAPTER 1: INTRODUCTION

Aggression is a well-examined topic among child peer relations researchers, mainly because of its association with negative personal and social outcomes (see Parker & Asher, 1987 for a review). Although most research on aggression has focused on physical aggression (e.g., hitting, kicking), recently, researchers also have attended to other forms of aggression, such as relational aggression (i.e., spreading rumors, social exclusion) (Crick, 1995). Both forms of aggression have been linked to detrimental social outcomes for children. Physically aggressive behavior has been linked to future peer rejection (Crick, 1996). Relational aggression has been associated with depression and, for girls, with loneliness, isolation, and future peer rejection (Crick, 1996; Crick & Grotpeter, 1995). On the other hand, prosocial behaviors (i.e., voluntary acts in which one engages to benefit others) have been associated with positive peer outcomes and with future peer acceptance (Crick, 1996).

Many research studies have demonstrated that children’s social cognitions are linked to their engagement in aggressive and prosocial behaviors (e.g., Crick, 1995; Crick & Werner, 1998; Dodge, 1980; Nelson & Crick, 1999; Sutton, Smith & Swettenham, 1999). Social information processing models serve as the major framework for studying children’s social cognitions (Crick & Dodge, 1994). Research has demonstrated links between social information processing and aggressive/prosocial behaviors (e.g. Crick, 1995; Crick & Werner, 1998; Delvaux & Daniels, 2000; Dodge, 1980; Nelson & Crick, 1999), and interventions aimed at enhancing children’s social information processing have been found to improve their social behaviors (Dodge, Bates & Petit, 1990; Fraser et al., 2005; Guerra & Slaby, 1990; Hudley & Graham, 1993; Rabiner & Coie, 1989).
Much less attention has been paid to how children’s theory of mind, which is their ability to understand other’s mental states, may relate to their social behavior. This relationship is important to explore for several reasons. First, studies so far have produced mixed results as to whether there is a connection between theory of mind skills and aggressive behavior, although there is a clear link between theory of mind skills and prosocial behavior (e.g. Baird & Astington, 2004; Sutton et al., 1999). Second, many intervention programs target children’s perspective taking skills as a way to reduce aggression, but, as Sutton argues, this could have a negative effect if some children are using their theory of mind toward aggressive ends (Sutton et al., 1999). Lastly, disentangling how children’s theory of mind and aggressive/prosocial behaviors may be linked will provide a unique avenue of exploring how social cognition relates to behavior.

In the literature review, I will introduce and review research on these two theoretical constructs: theory of mind (ToM) and social information processing (SIP). Next, I will compare and contrast these constructs. I will review the research about links between these two forms of social cognition and aggressive/prosocial behavior. Finally, I will propose a model illustrating how SIP skills may moderate relations between ToM and aggressive behavior, such that links may be stronger or may only exist when SIP skills are impaired. This model forms the basis of an empirical research study that I will then describe.

Theory of Mind

Construct

Theory of mind has been defined as “the ability to represent the mental states of others, that is: their thoughts, desires, beliefs, intentions and knowledge” (James & Blair, 2003, p. 144; see also Frith, 1989; Leslie, 1987; Premack & Woodruff, 1978). Children are thought to develop
specific theories about certain aspects of the world, one of which is psychology (Carey, 1985; Champagne, Klopfer & Gunstone, 1982; Murphy & Medin, 1985; Wellman, 1990). Thus, theory of mind is a “naive psychology”—children’s attempts to make sense of links among beliefs, behaviors, and thoughts (Wellman, 1990).

Not surprisingly, children’s theory of mind becomes more advanced with age (see Wellman, 1990 for a review). Children as young as 18 months are able to understand that others have intentions (Meltzoff, 1995). By age three, they are able to see connections between what people want (desires) and what people do (behaviors), but they do not understand the nature of beliefs—that others have their own perception of reality that can be different from the way things really are (Bee & Boyd, 2007). Theory of mind becomes more complex when children change from attributing a person’s actions solely to their desires, to attributing the other’s actions to a belief-desire connection (Wellman, 2000). For example, when asked why a child will look in a specific location for a toy, a child three years old or younger might respond “because he wants to play with it,” while an older child might answer “he thinks it is there and he wants to play with it.” This shift to making connections between beliefs (i.e. “he thinks it is there”) and desire (i.e. “he wants to play with it”) occurs around ages three to four (Wellman & Lagatta, 2000). During the grade school years, children’s theory of mind further develops in that they also see the mind as an active processor of information that is almost always involved in thought (Wellman, 2000).

Measures

Researchers have developed several measures of theory of mind designed to capture skills at increasing levels of sophistication. A basic theory of mind task involves false belief. First-order false belief includes knowledge that other people have different mental states, and therefore could hold a false belief (Wimmer & Perner, 1983). An example of a first-order false
belief task is the “Sally and Anne test.” This task involves a comic strip in which Sally has a basket and Anne has a box. Sally puts a ball in the basket and leaves the room. Anne enters and moves the ball to the box. The participant is asked, “When Sally returns, where will she look for the ball? If the participant answers, “In the basket,” he/she has an understanding of false belief—Sally will look where she last thought the ball was. If the participant answers the box, he/she does not have an understanding of false belief—Sally will look where I [the participant] know the ball is (Baron-Cohen, Leslie, & Frith, 1985). These tasks are passed by most children by age four (Wellman, 2000).

A slightly more advanced task is a second-order false belief task. This involves understanding that a person could hold a belief about a belief (Kinderman, Dunbar & Bentall, 1998; Liddle & Nettle, 2006). An example of a second-order false belief task is: “A man and a woman are in a room. The woman puts something somewhere, such as putting a book on a shelf. She then leaves the room. The man hides the book in another location. Unbeknownst to him, the woman is peeking back through a keyhole or a window and sees him moving the book. The subject is asked, ‘When the woman comes back in, where will the man think that she thinks the book is?’” (Stone, Baron-Cohen, & Knight, 1998, pp. 641). If the participant answers, “On the shelf,” he/she has an understanding of second-order false belief—the man thinks the woman will look where he thinks she last saw the book. If the participant answers, “Where he hid it,” he/she does not have an understanding of second-order false belief—the participant reports the man thinks the woman will look where she saw the man move the book. These tasks are typically passed by age six to seven (Dziobek et al., 2006; Stone et al., 1998).

Although the majority of research on theory of mind has utilized first- and second-order false belief tasks, there has been a more recent development of additional tasks designed to
Theory of Mind 5

capture advanced skills (e.g. Baron-Cohen, O’Riordan, Stone, Jones & Plaisted., 1999; Happé, 1994). The need for these tasks evolved when it was discovered that high functioning individuals with autism spectrum disorders could pass first- and second-order belief tasks but still seemed to have theory of mind deficits (Happé, 1994). One advanced task involves story comprehension (Happé, 1994). This task focuses on the ability to understand mental states involving irony, double bluff, mistakes, and white lies. These tasks are typically mastered after age eight (Baron-Cohen et al., 1999).

The “Theory-of-Mind test” (TOM) is another recently developed ToM test, which, like the story comprehension test, combines several types of ToM skills (Muris et al., 1999; Steerneman, 1994). It measures a participant’s skills at emotion recognition, first- and second-order false beliefs, and understanding humor (Muris et al., 1999; Steerneman, 1994). Most of the tasks are passed by children ages six to seven, but there is significant variability up to age nine (Muris et al., 1999).

The “Reading the Mind in the Eyes” task measures a child’s ability to select mental state descriptors from the information available in pictures of people’s eyes (Baron-Cohen, Wheelwright, Spong, Scahill, & Lawson, 2001). Children are given one correct and three incorrect cognitive and emotional descriptors of eyes and asked to pick the correct one. Eight to twelve year old children scored significantly higher than six to eight year old children on this task.

Another advanced task for measuring theory of mind, the faux pas task, incorporates the ability to understand what another might feel in addition to what he/she might think. This task measures one’s ability to detect a faux pas, which is defined as “when a speaker says something without considering if it is something that the listener might not want to hear or know, and which
typically has negative consequences that the speaker never intended” (Baron-Cohen et al., 1999, pg. 408). An example of a vignette given to depict faux pas is: “James bought Richard a toy airplane for his birthday. A few months later, they were playing with it, and James accidentally dropped it. ‘Don’t worry’ said Richard, ‘I never liked it anyway. Someone gave it to me for my birthday.’” (Baron-Cohen, et al., 1999, pp. 416). In order to successfully detect a faux pas, one must have an understanding of the differing mental states of the listener and the speaker in the story, and the emotional meaning of what is being said (Baron-Cohen et al., 1999).

Age and gender differences have been found in faux pas tasks. Younger children (five to six year olds) scored significantly lower than older children (eight to nine year olds) on faux pas tasks (Banerjee & Watling, 2005). In another faux pas study, eleven year olds scored significantly higher than seven and nine year olds, and nine year olds scored significantly higher than seven year olds (Baron-Cohen et al., 1999). In terms of gender, girls scored higher than boys (Baron-Cohen et al., 1999). Although there was not a significant age by gender interaction, girls tended to show the most improvement from seven to nine years of age, while boys showed the most improvement from nine to eleven years of age (Baron-Cohen et al., 1999).

In the current study, ToM ability will be measured by the faux pas task. There are several reasons why a faux pas detection task is an appropriate choice for assessment of ToM for the current study. First, the current study will investigate ToM in eight to ten year old children, and the results discussed above make it clear that there is not a ceiling effect in this age group for faux pas tasks, whereas other tasks such as first and second-order false belief do have a ceiling effect in this age group (Dziobek et al., 2006). Second, the faux pas detection task allows for assessment of two aspects of ToM, cognitive and emotional, which will be important when examining variables such as aggression, where emotions play an important role (Baron-Cohen et
Third, the task is more comprehensive than one such as “Reading the Mind in the Eyes” task, because it requires more than mental state recognition. Last, it examines one type of theory of mind ability, in contrast to measuring several types, like Happé’s story comprehension task (1994) and the TOM test (Muris et al., 1999) measures, and therefore may tap into a more well-defined construct than measures that are broader in scope.

One potential limitation of the faux pas task is that all of the vignettes used, and indeed the construct being measured, have a negative emotional tone. Specifically, in order for a faux pas to occur, someone has to say something that is unintentionally upsetting and hurtful. While exploring the relationship between this negatively-themed aspect of theory of mind and aggressive/prosocial behavior is central to the current study, it is important to parcel out the emotional tone from the “imagining another’s mind” component of the faux pas task. In order to do that, the current study will also include vignettes depicting “accidental kindness,” which I define as a positively-toned situation in which someone says something nice without intending to do so. The vignettes for measuring accidental kindness have been adapted for the current study from Baron-Cohen et al., 1999). For example, “John was in one of the cubicles in the toilets at school. Sam and Eddy were at the sinks nearby. Sam said, “You know that new boy in the class—you know, his name is John. Doesn’t he look cool!” John then came out of the cubicles. Peter said, “Oh, hi John. Are you going to play football now?” (Baron-Cohen et al., 1999). Scoring for these vignettes will be similar to the faux pas vignettes and will be elaborated further in the method section.

There are various ways in which performance on the faux pas task can be measured. In the original study, Baron-Cohen et al. (1999) first gave first- and second-order false belief tasks
to the participants to identify whether children had achieved this level of ToM functioning. In administering the faux pas task, each child heard a total of ten stories on audiotape, and answered four questions per story to determine his/her ToM score. The questions included: (1) faux pas detection: In the story, did someone say something they should not have said? (correct answer always yes); (2) identification: What did they say that they should not have said? (answer specific to story); (3) comprehension: Each question was specific to story, identifying whether the child had a basic understanding of story; and (4) false belief: Did the character know/remember that? (specific to story, correct answer always no). A score of one was received for each story for which the child answered all four questions correctly.

Banerjee and Watling (2005) modified this administration in several ways. They used a computer-based assessment with forced choice answers. In addition to the four types of questions asked by Baron-Cohen et al. (1999), the authors asked two additional items for each story: (1) feelings: How does Y [the insulted character] feel now? Answer choices: Happy/pleased or sad/upset; and (2) intention: Did X [the offending character] want to make Y upset? Answer choices: yes or no. Unlike Baron-Cohen et al. (1999), responses to each question were averaged across the stories, allowing for more detailed comparisons (e.g., whether there are age-related changes in detection of faux pas, intention, etc.). Banerjee and Watling’s (2005) approach is more comprehensive than that of Baron-Cohen et al. (1999) because it assesses whether children can correctly identify the feelings the insulted character would have, assesses their ability to understand that something that has a negative outcome may not have been intended (i.e., what was X’s mental state when he/she committed the faux pas?), and has sub-scores to the general faux pas task score. Having reviewed the relevant research on children’s
theory of mind, I turn now to an examination of another cognitive construct the current study will investigate, namely, social information processing.

Social Information Processing

Social information processing theory provides an explanation about how children make decisions in social interactions (Crick & Dodge, 1994). In Crick and Dodge’s (1994) reformulated model, they proposed that there are six steps by which children process social information, and that each step influences the other steps of information processing (see Figure 1 for an illustration from Crick & Dodge, 1994). Social information processing theory states that children use a “latent mental structure,” from which they draw information in each social situation, as well as an active process of encoding environmental cues (Crick & Dodge, 1994). Therefore, the social decisions children make are influenced by their learning history and temperament, as well as the specifics of each situation. The steps of social information processing are thought to be distinct, each representing a unique construct (Crick & Dodge, 1994; Dodge & Price, 1994). At the same time, some data show that deficits may be additive across SIP steps (i.e., the more steps with which a child has difficulty, the more aggressively he/she will behave) (Lansford et al., 2006).
As noted above, there are six steps in the revised social information processing model. Each step will be reviewed, with relevant age and gender differences noted, because the execution of social information processing changes with age and across genders (Crick & Dodge, 1994). A recent study examining all SIP steps over 12 years found that, overall, females had better social information processing than males (Lansford et al., 2006). Children in this study were first assessed in kindergarten and the last assessment was in 11th grade.

In terms of specific steps, the first step is encoding of cues, which involves selectively attending to cues from internal and external sources (Crick & Dodge, 1994). Older children have been found to be superior to younger children in encoding skills in peer entry, provocation, and authority command situations (Dodge & Price, 1994).

The second step is interpretation of cues that have been encoded. The interpretation involves evaluating past performance as well as intent attributions (why others are acting the way they are acting) (Crick & Dodge, 1994). Intent attributions can be either hostile (others are
viewed as engaging in provoking behaviors to harm the subject) or benign (others are viewed as engaging in provoking behaviors for accidental reasons) (Dodge, 1980). For intent attributions, vignettes in which the provocateur has ambiguous intent are typically used, because this is the type of situation in which aggressive children have deficits (i.e., attribute hostile intent) (Dodge, 1980). For example, a vignette might read, “Imagine that you are walking to school and you’re wearing your new tennis shoes. You really like your new shoes and this is the first day you’ve worn them. Suddenly, you are bumped from behind by another kid. You stumble and fall into a mud puddle and your new shoes get muddy.” Vignettes can have either an instrumental or a relational conflict. Instrumental conflicts involve conflicts over concrete items or situations (i.e., a science project; one’s place in line) (Crick & Werner, 1998). Relational conflicts are conflict over social matters (i.e., getting invited to a party; being ignored by other children) (Crick & Werner, 1998). Example questions for measuring hostile attribution include asking children why the action occurred (on purpose versus accidentally), and whether the child in the story was trying to be mean (Crick, Grotpeter, & Bigbee, 2002). Studies have demonstrated age differences in hostile attribution bias (Crick, 1995; Crick et al., 2002). Specifically, younger children (third/fourth graders) show more hostile attribution bias in instrumental conflicts, compared to older children (fifth/sixth graders) (Crick, 1995). Also, third and fourth graders demonstrate more hostile attribution bias than sixth graders, and fourth graders show more than fifth graders (Crick et al., 2002).

Emotions are also an important part of the SIP model, and have been studied along with hostile attribution bias (Crick, 1995; Crick & Dodge, 1994; Crick et al., 2002). SIP theory proposes that, if children feel distressed by provocation, they may be more likely to interpret others’ actions as hostile (Crick & Dodge, 1994). Example questions tapping emotional distress
include asking a child how upset or mad he/she would be if the story were true (Crick, 1995; Crick et al., 2002). Girls have been shown to be more distressed by relational provocation than were boys (Crick, 1995; Crick et al., 2002). Third graders were more distressed by relational provocation than were sixth graders (Crick et al., 2002).

The third SIP step is clarification of goals. It is theorized that during this step, children select a goal, which they work to accomplish (Crick & Dodge, 1994). Goals are defined as “focused arousal states that function as orientations toward producing (or wanting to produce) particular outcomes” (Crick & Dodge, 1994, pg. 76). To measure goals, children are read a vignette in which a child’s ability to get something desired is thwarted (e.g., another child grabs away a basketball that the child is using (Delveaux & Daniels, 2000). Goals are typically measured by asking children, after they have selected a strategy they would use in response to the conflict, “what would be your goal?” Answer choices specific to the goal are developed, and may include categories such as pursuing self-interest, maintaining personal control, revenge, avoiding trouble, maintaining equality, and maintaining relationships with the focal peer (Delveaux & Daniels, 2000). Gender differences have been noted in goal selection. In a sample of fourth through sixth graders, girls rated goals of equality and maintaining the relationship higher than did boys, while boys rated self-interest and revenge goals higher than did girls (Delveaux & Daniels, 2000). Older children were less likely than younger children to endorse the goal of maintaining relationships with the peer group (Delveaux & Daniels, 2000).

The fourth SIP step is response access or construction, which involves children developing solutions to the interpersonal situation by drawing on past experiences or by inventing new solutions (Crick & Dodge, 1994). To investigate this step of SIP, children are asked what they would do if they were in the situation (Crick & Werner, 1998; Quiggle, Garber,
Panak, & Dodge, 1992). Quiggle et al. (1992) found that boys generated more aggressive responses than did girls.

The fifth SIP step is response decision. During this step, children evaluate the solutions they have generated and select the best one. The criteria children use for evaluation of the “best solution” include outcome expectancies (what will happen if the solution is enacted), self-efficacy (how able they are to enact the solution), and response evaluation (how appropriate the solution is) (Crick & Dodge, 1994). Vignettes with the provocateur exhibiting clearly hostile intent are typically used to examine children’s response generation and decision steps (Crick & Werner, 1998; Quiggle et al., 1992). For example, a vignette might read, “At lunch one day, you are looking for a place to sit. You walk over to a table with one empty seat left. Just as you are about to sit down, another kid comes over and says ‘I want this seat.’ Then the kid sits down in your spot.”

For outcome expectancies, children may be asked whether, if they engage in a certain type of response (e.g. aggressive or assertive behavior), they will get what they want, or whether the other child will like them (Crick & Werner, 1998). For self-efficacy, children are asked how easy or hard it would be for them to engage in a certain type of response (Quiggle et al., 1992). For response selection, children are asked how often they would choose a certain type of response if the situation happened a lot (Crick & Werner, 1998). For response evaluation, children are asked how good or bad it is to engage in a certain response (Crick & Werner, 1998). A sample of third through sixth graders demonstrated that, in evaluating responses to instrumental conflict, boys had higher physical aggressive response decision scores than girls (Crick & Werner, 1998). In contrast, in evaluating responses to relational conflict, girls had higher relationally aggressive response decision scores than boys (Crick & Werner, 1998).
The final step of social information processing is behavioral enactment, which involves acting out the chosen solution (Crick & Dodge, 1994). Older children have been found to be superior to younger children in behavioral enactment in peer entry, provocation, and authority command situations (Dodge & Price, 1994).

In investigating SIP, the current study will examine step three (goal selection). This step has been selected because it involves a child’s motivation in social situations. This focus on motivation enables observation of a unique combination of cognitive and emotional influences on behavior. Specifically, goals involve emotional drives, as well as social cognition—what the person wishes to have happen in the situation. The impact of higher-functioning or lower-functioning ToM on aggressive/prosocial behaviors may differ depending what one typically wants to accomplish in social situations, and examining goals provides a means to assess this.

Having reviewed the research on both theory of mind and social information processing, I turn now to an examination of these two constructs as they relate to and are distinct from each other.

Theory of Mind and Social Information Processing

The theory of mind and social information processing models are complex and multi-faceted. Both theories are used to examine children’s social cognitions: research on ToM involves children’s social cognition about others’ thoughts whereas research on SIP mainly involves children’s self-referencing social cognition, with the exception of attributions of intent. Both theories have components of perspective taking: research on ToM is concerned with children’s social cognitions about others’ mental states, whereas research on SIP investigates children’s social cognition about others’ intentions (hostile attribution bias). Finally, both theories have been utilized to explain individual differences in children’s social behavior (see
Theory of Mind 15

Crick & Dodge, 1994; Slaughter & Repacholi, 2003 for reviews). Only one study directly comparing social information processing skills and theory of mind skills was located during the current review (Capage & Watson, 2001). This study compared performance on false-belief tasks with response generation in preschoolers and kindergarteners, and the authors reported that generating relevant responses to interpersonal situations was modestly correlated with performance on false belief tasks ($d = .50$), whereas generating aggressive responses was modestly negatively correlated with performance on false belief tasks ($d = .58$) (Capage & Watson, 2001).

Given the similarities between ToM and SIP, it is important to examine the differences between these theories. First, there is a great deal of difference in specificity. Theory of mind is thought to be a global ability a child possesses that unfolds developmentally (Wellman, 2000). There is debate among theory of mind researchers about how proximal or distal theory of mind abilities are to actual social functioning (Davies & Stone, 2003). Social information processing, on the other hand, is thought to be mainly “online,” activated during and influenced by situational characteristics (Crick & Dodge, 1994). A multitude of factors are therefore thought to impact whether deficits in social information processing actually lead to more undesirable behaviors, whereas in theory of mind, one either has or does not have the ability to complete the task.

Another difference in the two concepts is that theory of mind is concerned with one’s knowledge of others’ mental states, whereas social information processing primarily deals with one’s own mental process. For example, theory of mind tasks examine whether a child can reason as to why another person did what he/she did, whereas SIP measures examine whether a child’s cognitions leading up to his/her potential behavioral choices. James and Blair (2003)
argued that there is a difference between ToM and SIP in that ToM requires one to evaluate why person X did what they did to person Y, whereas SIP requires one to evaluate why person X did what they did to you. James and Blair (2003) argued that a child could have a normally developed ToM, but react emotionally when an action is directed toward him/herself, and therefore have a hostile attribution bias. ToM and SIP also differ in that ToM is a static ability, whereas SIP is a process. ToM theory does not explain in detail the process by which children reason about another’s mental state in the moment they are reasoning (it does explain how this reasoning becomes more sophisticated over time) (Wellman, 2000). SIP, on the other hand, is a theory of how social reasoning occurs, moment by moment (Crick & Dodge, 1994). To summarize, the discrepancies between ToM and SIP include: (1) differing amounts of situational specificity, (2) the reference point of cognition (self vs. other), and (3) the degree of complexity (static vs. process). Overall, ToM and SIP, although both social cognitive concepts, are indeed distinct, and it is likely that there is only a moderate degree of overlap between these two constructs empirically. Having described the concepts and pertinent research on ToM and SIP, we turn now to an examination of how these constructs relate to aggressive and prosocial behavior. Before examining the associations between these constructs, it is important to define aggressive and prosocial behavior.

Aggression and Prosocial Behavior

Aggression is typically defined as behaviors in which one engages with the desire to hurt or harm another (Crick & Rose, 2000; Myers, 1990; Vander Zanden, 1993). Most research on social cognition and aggression has focused on physical aggression, which is any act that harms others through physical aggression or through the threat of physical aggression (Crick, 1995). Behaviorally, physical aggression may involve acts such as hitting, pushing, and kicking
There are age and gender differences in physical aggression. Physical aggression decreases with age (Cairns, Cairns, Neckerman, Ferguson, & Gariépy, 1989; Loeber, 1982), and a multitude of studies have shown that males are more prone to physical aggression than females (Crick & Rose, 2000).

Relationally aggressive behavior is defined as efforts to hurt others through manipulating social situations, harming others’ social relationships, and damaging their feelings of belonging (Crick & Grotpeter, 1995). Behaviorally, relational aggression may involve acts such as spreading rumors, social exclusion, and relationship manipulation (Crick, 1995). Age and gender differences in relational aggression are not as consistent as in physical aggression, but, in general, studies find that relational aggression increases with age, and that females are more relationally aggressive than males (Björkqvist et al., 1992; Crick et al., 1998; Crick & Rose, 2000).

Prosocial behavior has been defined as “voluntary behavior intended to benefit another” (Eisenberg & Fabes, 1998). Behaviorally, prosocial behavior involves acts such as sharing, helping, and comforting (Fabes & Eisenberg, 1996; as cited and presented in Eisenberg & Fabes, 1998). Prosocial behavior tends to become more sophisticated with age, corresponding with increased abilities to empathize with others (Bar-Tal, Raviv & Leiser, 1980). Among children, females tend to engage in more prosocial behavior than males (Fabes & Eisenberg, 1996; as cited and presented in Eisenberg & Fabes, 1998).

Having introduced and reviewed the concepts of ToM, SIP, and aggressive and prosocial behavior, I now will discuss potential associations between ToM, SIP, and, correspondingly, physical aggression, relational aggression, and prosocial behavior.
ToM and Physical Aggression

Theory of mind abilities and physical aggression likely have a complex relationship. Several studies have shown that ToM and conduct disorder (CD)/disruptive behavior disorder (DBD) diagnosis are not related (i.e., CD/DBD children do not seem to be impaired in ToM skills). For example, Sutton, Reeves, and Keogh (2000) studied children ages eleven to thirteen using the “Reading the Mind in the Eyes” task. The authors found that ToM scores were not correlated significantly with child self-reported disruptive behavior scores ($d = .18$). However, disruptive behavior disorder contains many behaviors besides aggression. The authors noted that some of the additional behaviors encapsulated in a DBD diagnosis, such as lying and deception, require functional ToM. Buitelaar, van der Wees, Swaab-Barneveld, and van der Gaag (1999) reported that conduct disorder children did not differ significantly from normal children on first- and second-order false belief tests. A potential confound, however, is that there were only four conduct disordered children tested, and they were significantly older than the normal controls, meaning that any delays in ToM development may have been masked. Happé (1996) reported that conduct disordered children were not significantly different from normal children in their ability to pass first-order false belief tasks. These children were, however, rated by their primary teacher as exhibiting particularly low levels of engagement in behaviors that require a well-functioning ToM, such as “refrains from statements that might embarrass” and “responds to hints/indirect cues in conversation” (Happé, 1996). Happé (1996) proposed two reasons for these results. First, she put forth a “theory of nasty minds,” meaning that children with behavioral problems may have a theory of mind that is skewed to view others’ minds as holding mal-intent. This seems to be more akin to hostile attribution bias than to straightforward theory of mind—it speculates not as to the ability to imagine another’s mind, but rather, as to what one
constructs the contents of that mind to be. Happé also proposed that children with behavior problems are perhaps not completely deficient in theory of mind, but rather, delayed in acquiring it. Happé further stated that more advanced tests of theory of mind could help to show whether there is support for this hypothesis.

There is some preliminary evidence that children with aggressive behaviors may be delayed in ToM. In a study examining ToM with a faux pas task, Banerjee and Watling (2005) found that children whom peers rated as rejected or controversial performed significantly more poorly on detecting the faux pas ($d = .47$), seeing the insult as unintentional ($d = .41$), and recognizing ignorance that led to the faux pas ($d = .35$). The authors noted that they believed this relationship may exist specifically because of the aggression linked with rejected and controversial children. Sutton et al. (1999), in his study of seven to ten year old children, reported a slight trend for teacher-rated physical aggression scores to correlate negatively with ToM skills ($d = .50$). Interestingly, the authors found that peer-rated bullying scores correlated positively with ToM skills ($d = .61$), as did teacher-rated verbal aggression scores ($d = .95$). This suggests that different types of aggressive behaviors may require different levels of sophistication of ToM. Lastly, a study with younger children showed that tasks that are not at ceiling for the age group being studied do indeed detect differences in ToM. Specifically, Capage and Watson (2001) found that ToM scores on false-belief tasks were negatively related to teacher ratings of aggression in preschool and kindergarteners ($d = .58$). Overall, these studies suggest that the relation between ToM and physical aggression is likely to be in the form of subtle delays, and that the ToM tasks being used need to be age-appropriate in order for these differences to become apparent. Faux pas tasks, therefore, are ideal to assess for differences in elementary school children because they are not mastered until ages nine to eleven (Baron-
Cohen et al., 1999). In conclusion, I hypothesize that ToM will be negatively related to physical aggression. I turn now to examine the association between SIP and physical aggression.

**SIP and Physical Aggression**

Extant research has documented links between social information processing skills and children’s physical aggression. As it is the focus of this study, step three (goal selection) will be discussed. Physical aggression has been found to have a positive association with goals of self-interest, personal control, and revenge in a sample of fourth to sixth graders, and to have a negative association with goals of maintaining equality and maintaining the focal peer relationship (\(d\) ranges from .43 to 2.27) (Delveaux & Daniels, 2000). Peer-rated physical aggression was found to have a positive association with a dominance/revenge goal (\(d = .61\)) (Hughes et al., 2004). Even among children who made a hostile attribution for ambiguous intent, aggressive children scored significantly higher on goals of getting back at the protagonist, making others feel bad, protecting oneself, and looking strong, and significantly lower on goals of working things out peacefully, getting along with other children, and taking care of the problem, compared to children whose strategy for handling conflicts was mainly to problem solve or withdraw (Erdley & Asher, 1996). Given that all of these studies have noted revenge as a goal on which aggressive children score highly, the current study will focus on the goal of revenge as it relates to physical aggression. Accordingly, I hypothesize that higher endorsement of the revenge goal will be positively associated with physical aggression.

**Interaction of ToM and SIP in Predicting Physical Aggression**

From the literature reviewed above, one may conclude that both ToM deficits and the SIP goal of revenge may be associated with physical aggression. To take this one step further, if a child has deficits in both types of social cognition (ToM and SIP), he/she will see the situation
from his/her own perspective and it will be laced with hostility, thus, this child may be especially vulnerable to engaging in physically aggressive behavior. In the current study, I propose that lower-functioning, in combination with high endorsement of the revenge goal, will be more strongly associated with physical aggression than will higher-functioning ToM with high endorsement of the revenge goal. In other words, a child who is delayed in being able to understand another’s mental state, as well inclined toward having revenge goals, will be more likely to engage in physical aggression than another child who endorses revenge goals, but is better able to understand another’s mental state. I hypothesize that the interaction of ToM and SIP deficits may place one especially at risk for engaging in physical aggression. That is, the association between physical aggression and ToM will be moderated by endorsement of the revenge goal.

Theory of Mind, Social Information Processing, and Relational Aggression

ToM and Relational Aggression

Because of the social nature of relational aggression, it may have a different association with ToM than physical aggression. By definition, relational aggression involves some degree of theory of mind skills. For example, in order to spread a rumor, one must know what to say in order to hurt the other person. Relational aggression has been correlated with peer-rated estimates of social intelligence \( (d = .50) \) (Kaukiainen et al., 1999), but a few studies have shown that relational aggression is not linked with ToM skills. For example, Sutton et al. (1999) found that relational aggression was uncorrelated with theory of mind abilities \( (d = .22) \). Baird and Astington (2004) also did not find a connection between second-order false belief tasks of ToM and relational aggression. It may be that relationally aggressive children are seen by others as socially intelligent because they are able to use social situations to their advantage. However,
given the lack of a correlation between ToM and relational aggression in previous research, the
evidence suggests that relationally aggressive children are unlikely to be advantaged over non-
aggressive children in ToM, but rather, to have an average range of ToM abilities. There may
be cases, however, in which adequate to advanced theory of mind skills are linked with
relationally aggressive behavior. I propose here that the distinguishing factor may be individual
differences in SIP skills.

*SIP and Relational Aggression*

Overall, research has shown an association between relational aggression and social
information processing skills. Regarding the clarification of goals step, a study on a sample of
fourth to sixth graders demonstrated that relational aggression had a positive association with
goals of self-interest, personal control, revenge, avoiding trouble, and maintaining peer group
relationships, and a negative association with goals of maintaining equality and maintaining
focal peer relationship goals (\(d\) ranges from .39 to 1.96) (Delveaux & Daniels, 2000). Peer-rated
relational aggression has been found to have a positive association with a dominance/revenge
goal (\(d = .58\)) (Hughes et al., 2004). In contrast, Crain et al. (2005) reported that several
instrumental and relational goals were unrelated to peer nominations of relational aggression in a
study of fourth to sixth grade girls (\(d\) ranges from .00 to .39; \(d = .26\) for the revenge goal).

Endorsement of goals such as revenge appears to be related to engaging in relational
aggression appear. Because endorsement of a revenge goal has been shown by some studies to
be related to both physical and relational aggression, participants’ ratings of the revenge goal
will be used to evaluate the hypotheses regarding physical and relational aggression.
Accordingly, I hypothesize that endorsement of the revenge goal and relational aggression will
be associated.
Interaction of ToM and SIP to Predict Relational Aggression

Evidence has been provided to show that ToM skills and relationally aggressive behavior are not directly related, whereas endorsement of the revenge goal is often linked with relationally aggressive behaviors. It may be that ToM skills are only linked with relationally aggressive behavior when the revenge goal is highly endorsed. That is, the ability to understand others’ mental states may be used for aggressive purposes when one desires to get revenge. This idea is consistent with theories of relational aggression that state that relationally aggressive children use their social intelligence for negative ends (Kaukiainen et al., 1999). Research has shown that relational aggression is positively related to cognitive aspects of social intelligence (peer-rated) for girls $(d = .54)$ (Andreaou, 2006). I argue that the association between theory of mind and relational aggression is not as straightforward. Specifically, it may be that some type of association between theory of mind and relational aggression exists, but only for those who endorse high levels of the revenge goal. The more skilled one is at ToM, in combination with high revenge goals, the more one may be at risk for relational aggression. I propose that having a higher-functioning ToM, combined with high levels of a revenge goal, will be linked with relational aggression, as compared to having lower-functioning ToM and high revenge goals. That is, the association between theory of mind and relational aggression will be moderated by endorsement of the revenge goal.

Theory of Mind, Social Information Processing, and Prosocial Behavior

ToM and Prosocial Behavior

Although few studies have examined prosocial behavior and theory of mind skills, related factors such as peer acceptance and social skills have been linked with more advanced theory of mind skills (Angelopoulos & Moore, 2000, Dockett, 1997, as cited in Baird & Astington, 2004;
Watson, Nixon, Wilson, & Capage, 1999). One study that did examine teacher ratings of prosocial behavior and theory of mind as assessed by second-order false beliefs tasks found that teacher-rated prosocial behavior and theory of mind skills were positively correlated \((d = 1.58)\), as were teacher-rated peer competence and ToM skills \((d = .90)\), in children ages four through seven (Baird & Astington, 2004). Cassidy, Werner, Rourke, Zubernis, and Balaraman (2003) reported that performance on theory of mind tasks was correlated with observer-rated helping behavior \((d = .82)\) and with peer-rated likeability \((d = .72)\). Watson et. al. (1999) found that first-order false belief understanding was linked with teacher-rated social skills in young children, and two other studies showed that children’s first-order false belief understanding was linked with popularity among peers (Angelopoulos & Moore, 2000; Dockett, 1997). Performance on false belief tasks has been shown to predict scores on a teacher-rated social competence scale in preschool and kindergartener children \((d = 1.32)\) (Capage & Watson, 2001). These studies suggest that well-functioning theory of mind skills are related to prosocial behavior, but more research on older children with advanced theory of mind tasks is needed to confirm that this pattern continues developmentally. Accordingly, I hypothesize that ToM skills and prosocial behavior will be associated.

An important caveat to these findings, however, is the hypothesis mentioned above about the association between theory of mind and relational aggression, namely, that well-functioning ToM skills might also be used to hurt others. Even though well-functioning theory of mind skills are linked with prosocial behavior, having a normal or above average theory of mind does not guarantee a child will use these skills for prosocial purposes.

**SIP and Prosocial Behavior**
Consistent with my hypothesis regarding relational aggression, social information processing skills may contribute to individual differences in how theory of mind skills are utilized. Research suggests a positive correlation between prosocial SIP goals and prosocial behavior. In the clarification of goals step, prosocial children were more likely to report a relational goal (e.g., getting along with the focal peer) in both instrumental and in relational provocation, compared to a comparison group ($d = 4.48$) (Nelson & Crick, 1999). In a sample of fifth and sixth graders, prosocial behavior was positively related to communal goals ($d = .45$ for boys and $d = .50$ for girls) (Salmivalli, Ojanen, Haanpää, & Peets, 2005). Delveaux and Daniels (2000) reported that prosocial behavior was linked with goals such as getting along with the focal peer ($d = 2.67$). Overall, the research suggests that prosocial behavior is tied to having positively slanted SIP (e.g., choosing prosocial goals). Accordingly, I hypothesize that high endorsement of a goal of getting along with a focal peer (peace) will be associated with prosocial behaviors.

**Interaction of ToM and SIP to Predict Prosocial Behavior**

I hypothesized that both ToM and the SIP goal of peace will be linked with prosocial behaviors. It may be that prosocial behavior is most likely to result when a child is able both to understand others’ mental states and desires to get along with others even in conflictual situations. In contrast, as argued above, a child who endorses revenge goals, combined with well-functioning ToM skills, may be more likely to engage in socially manipulative behaviors, and may be disinclined toward prosocial behavior. Also, even among children with high levels of the prosocial goal, having a higher-functioning ToM may further enhance one’s ability to engage in prosocial behavior. I argue here that having both well-functioning theory of mind skills and high endorsement of a peace goal likely endow children with a greater motivation to
engage in prosocial behavior, as compared to having lower-functioning ToM and prosocial goals. That is, the association between theory of mind and prosocial behavior will be significantly stronger when the peace goal is highly endorsed than it will be when there is a low level of endorsement of the peace goal; endorsement of the SIP peace goal will moderate the association between ToM and prosocial behavior.

Gender Differences

Gender differences in the topic areas being discussed herein are important to note. The empirical evidence supports the notion that gender should be taken into consideration in the current study. Gender differences have been noted in all three sets of variables being examined. For example, girls tend to be more advanced in ToM skills than boys of the same age (Baron-Cohen, et. al., 1999). In terms of SIP, girls rated the goal of maintaining the relationship higher than did boys, whereas boys rated the revenge goal higher than did girls (Delveaux & Daniels, 2000). Boys tend to engage in more physically aggressive behavior, whereas girls tend to engage in more prosocial behavior, and, at least in some studies, in more relationally aggressive behavior as well (Crick & Rose, 2000; Fabes & Eisenberg, 1996; as cited and presented in Eisenberg & Fabes, 1998). Given this evidence, in the current study, I will examine gender differences by conducting analyses separately for males and females. These are exploratory analyses; therefore, no hypotheses as to the nature of the potential gender differences are offered.

The Present Study

Purpose

In the present study, I seek to address two aims. First, I will examine the relations among ToM skills, SIP goals, and physical aggressive, relationally aggressive, and prosocial behaviors. Second, I will determine whether SIP goals moderate associations between ToM and physically
aggressive, relationally aggressive, and prosocial behaviors. As noted above, all of these analyses will be conducted separately for boys and girls.

**Hypotheses**

Hypothesis 1: Direct relations of ToM and SIP goals with aggressive and prosocial behavior

1a. Controlling for age differences if needed, ToM and the revenge goal will be correlated with physically aggressive behavior.
   i. ToM will be negatively correlated with physically aggressive behavior.
   ii. The goal of revenge will be positively correlated with physically aggressive behavior.

1b. Controlling for age differences if needed, ToM scores will be unrelated to relationally aggressive behavior. Controlling for age differences if needed, the revenge goal will be correlated with relationally aggressive behavior.
   i. ToM scores will be unrelated to relationally aggressive behavior.
   ii. The goal of revenge will be positively correlated with relationally aggressive behavior.

1c. Controlling for age differences if needed, ToM and the peace goal will be positively related to prosocial behavior.
   i. ToM will be positively correlated with prosocial behavior.
   ii. The goal of maintaining the focal peer relationship (peace) will be positively correlated with prosocial behavior.
Hypothesis 2: Moderating effects of SIP goals on relations between ToM and aggressive and prosocial behavior

2a. Physical aggression: The revenge goal will moderate the association between ToM skills and physically aggressive behavior. It is predicted that there will be a significantly stronger negative association between theory of mind and physically aggressive behavior when revenge goals are high, as compared to the association between ToM and physically aggressive behavior when revenge goals are low.

2b. Relational aggression: The revenge goal will moderate the association between ToM skills and relationally aggressive behavior. It is predicted that there will be a positive association between theory of mind and relationally aggressive behavior only when revenge goals are high.

2c. Prosocial behavior: The peace goal will moderate the association between ToM skills and prosocial behavior. It is predicted that there will be a significantly stronger positive association between theory of mind and prosocial behavior when the peace goal is high, as compared to the association between ToM and prosocial behavior when the peace goal is low.
CHAPTER II: METHODS

Participants

Participants included 83 children ages eight through ten. Attempts were made to obtain a balanced gender ratio. Participants were included only if they passed first-order false beliefs tasks, and met a minimum threshold for verbal ability (see below for a more detailed description of these inclusion criteria). Based on these criteria, 11 participants were eliminated because they did not meet the minimal thresholds. In addition, one participant whose parents had granted consent declined to provide assent and was not included. One participant who completed the theory of mind section of the study, and had teacher/peer-ratings completed for her, died before the group survey portion of the study was completed; thus, this participant’s data was excluded from analyses. This left 70 children who participated in the entire study: 35 boys and 35 girls. Of these 70 children, one participant exhibited a response bias for a portion of the self-rating scale for aggression and prosocial behavior. These items were deleted and the participant’s score was prorated based on the items she answered without a response bias.

Procedures

The procedure for the current study involved two data collections. First, consent was gathered from children’s parents by sending home consent forms (see Appendix A). Approximately 220 forms were distributed to 11 classrooms, with 83 parents agreeing to allow their child to participate. Thus, a consent rate of 38% was obtained in the current study. When a child’s parent returned the consent form, the child was given a small incentive (bag of stickers, pencil, etc.). Data were collected during a class period at the child’s school. Children were given an assent form to complete (see Appendix B). Children participated in an individual data collection session, which took place in a quiet room in their school. The purpose of this session
was to collect data on children’s ToM skills. Children completed tasks measuring their verbal ability and their first and second-order false belief abilities. If children scored below one and one-third standard deviations below the mean on the verbal ability test, or failed the first-order false belief task, they were dismissed from further participation in order to minimize their potential frustration. If children passed these screening measures, the faux pas task was administered. The full administration took about 30 minutes to complete. Children were asked not to share the content of the questions asked during the interview portion with other children who had not yet participated.

At a separate time, children participated in a group data collection session consisting of a demographic questionnaire and measures of SIP skills and aggressive and prosocial behaviors. All measures were read aloud to the group by a trained research assistant, and monitors were available to provide clarification and assist individual children. The administration of the survey took between 30 and 40 minutes to complete.

Teachers were also asked to complete a brief survey in which they reported on their students’ aggressive and prosocial behaviors. They were given a consent form to complete (see Appendix C). When teachers completed the survey, they were given a small incentive ($10 gift card).

Measures

Control and Screening Criteria Variables

Several variables were assessed as potential control variables/screening criteria. These included demographic variables, as well as measures of verbal ability and false belief tasks.

Demographic variables. A basic demographic measure was administered (see Appendix D). Specifically, children reported their age and gender.
Verbal ability. Because the faux pas task that was administered has sometimes been correlated with verbal ability (Baron-Cohen et al., 1999), children were given a brief verbal ability measure to screen for severe delays in verbal ability. If children scored below one and one-third standard deviations of the norm for their age and gender, they were excluded from the current study, ensuring that children who participated had at least a low average score of verbal ability (Wechsler, 2003). To assess children’s verbal ability, the vocabulary subtest from the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV) was administered. This subtest is part of the verbal comprehension subscale and measures children’s knowledge of words and formation of concepts (Wechsler, 2003). There are 36 items on this test: four picture items and 32 verbal items. This subtest has shown excellent internal consistency, test-retest reliability, and inter-rater reliability, as well as construct validity by correlating significantly with other intelligence measures (Wechsler, 2003). Children were given the test up to the point at which they reached the minimum criteria for inclusion in the current study.

False belief tasks. First and second-order false belief tasks (see Appendix E) were administered to ensure that children had basic theory of mind skills before they attempted the more complex faux pas task. For the first order false belief task, two dolls (Sally and Anne) were introduced to the children. Children were first asked what each doll’s name was (Naming Question). Next, Sally placed a marble in her box and left the scene. Anne then took the marble and hid it in her box. Sally then returned and the child was asked “Where will Sally look for her marble?” (Belief Question). Two control questions: “Where is the marble really?” (Reality Question) and “Where was the marble in the beginning?” (Memory Question). For the second order false belief task, the administration was the same as the one above, except that when Sally left the room, she looked back through a keyhole while Anne was moving the marble. When
Sally returned, the child was asked “Where does Anne think Sally will look for the marble?” (Belief Question). These tasks were taken from Baron-Cohen et al. (1985) and Baron-Cohen et al. (1999). Children were shown the above scenarios and had to answered all four questions correctly (see Appendix E) in order to pass the test. Originally, it was planned for children to have to pass both the first and second order false belief tasks to be included in the study, but several children failed the second order test, so the criteria were lowered to needing to pass only the first-order false belief task. No significant differences on any study variables were found between children who passed only the first-order false belief task and those who passed both. Children were given two chances to pass the first-order task if needed. If they failed the first-order belief task on both attempts, they were not assessed further with the faux pas task to decrease potential frustration.

**Theory of Mind Skills**

*Faux pas task.* Theory of mind skills were measured using the Faux Pas Task, developed by Baron-Cohen et al. (1999) (see Appendix F). This measure consisted of ten vignettes measuring a child’s ability to detect a faux pas. A sample vignette reads: “Kim helped her mom make an apple pie for her uncle when he came to visit. She carried it out of the kitchen. ‘I made it just for you,’ said Kim. ‘Mmm,’ replied Uncle Tom, ‘That looks lovely. I love pies, except for apple, of course!’” As described in the introduction, the current study also included five vignettes that measure “accidental kindness” as a counterbalance to the negative slant of the faux pas measure (see Appendix F). The accidental kindness vignettes were adapted for the current study from control questions provided in Baron-Cohen et al. (1999). A sample accidental kindness vignette reads: “Kate helped her mom make a chocolate cake covered in icing for her neighbor Richard when he came to visit. She carried it out of the kitchen. ‘I made it just for
you,’ said Kate. ‘Mmm,’ replied Richard, ‘That looks lovely—I love cake, especially chocolate cake!’ (adapted from Baron-Cohen et al., 1999).

The current study used the same response questions from Banerjee and Watling’s (2005) adapted version to measure children’s abilities in the faux pas task. Therefore, there were six questions asked per vignette. These include: (1) faux pas detection: In the story, did someone say something they should not have said? (correct answer always yes); (2) identification: What did they say that they should not have said? (answer specific to story); (3) comprehension: for the vignette above, “What kind of pie had Kim made?” (answer specific to story); (4) false belief: for the vignette above, “Did Uncle Tom know that the pie was an apple pie?” (correct answer always no); (5) feelings: How does Kim feel now? (correct answer always sad/upset); and (6) intention: Did Uncle Tom want to make Kim upset? (correct answer always no).

Questions were slightly modified for the accidental kindness vignettes. There were still six questions asked per vignette. These include: (1) accidental kindness detection: In the story, did someone say something that was a compliment? (correct answer always yes); (2) identification: What did they say that was a compliment? (answer specific to story); (3) comprehension: for the vignette above, “What kind of cake had Kate made?” (answer specific to story); (4) false belief: for the vignette above, “Did Richard know that the cake was a chocolate cake?” (correct answer always no); (5) feelings: How does Kate feel now? (correct answer always happy/pleased); and (6) intention: Did Richard want to make Kate happy/pleased? (correct answer always no).

Children were assigned an overall score, consistent with the Baron-Cohen et al. (1999) methodology, in which the first four questions had to be answered correctly in order for the child to receive a score of 1 for that vignette; vignette scores were then averaged, giving a range of 0-
1. In addition, consistent with Banerjee and Watling’s (2005) methodology, “question scores” were assigned, meaning that children received an average score of how many times they answered the same question type correctly across vignettes. Subscores on each question could range from 0-3.

There are little data available on the reliability of the faux pas measure. Both Baron-Cohen et al. (1999) and Banerjee and Watling (2005) noted that children performed better on certain questions than on others (i.e., better on comprehension than on detection of faux pas). Performance across the subscales need not be consistent because certain aspects of faux pas detection are likely to be more difficult than others. Banerjee and Watling (2005) also compared scores on the same question across vignettes, and found the “pie” vignette to be significantly harder than the others. Therefore, in the current study, the ToM scale was examined for internal consistency. There was a Kuder-Richardson 20 of .76 for the current study. More difficult stories may help to buffer against a ceiling effect in the older age group, so stories that are harder or easier were retained unless all of the children passed/failed them. All stories were passed by some but not all of the participants and were retained. In terms of construct validity, the faux pas task has been shown to discriminate children with autism and Asperger Disorder from children without these disorders (Baron-Cohen et al. 1999).

Social Information Processing Skills

Several measures of SIP skills were administered as part of the data collection, with social goals being the measure that was included in the current study.

Social goals. To assess children’s endorsement of goals, children were administered a measure developed by Delveaux and Daniels (2000), which those authors adapted from Chung and Asher (1996) (see Appendix G). For the current study, four of the vignettes from Delveaux
and Daniel’s measure were used. A sample vignette reads: “At school one day, you are working on a science project with another kid. Just when you are almost done with your half of the project, the other kid says, ‘I don’t like this.’ Then the kid throws your half of the project away” (Crick & Werner, 1998).

The original measure contained seven goals; however, because Delveaux and Daniels (2000) reported low correlations with outcome variables and/or significant overlap with other goals, the goals of avoiding trouble (i.e., staying out of trouble with authority figures), and maintaining equality (i.e., working out a mutually agreeable solution) were not evaluated in the current study. Therefore, children evaluated five goals for each story. These goals included: pursuing self-interest (i.e., trying to get the target item back), maintaining personal control (i.e., not allowing the other child to bully), revenge (i.e., getting back at the other child), maintaining a relationship with the focal peer (i.e., trying to get along with the focal peer), and maintaining relationships among the peer group (i.e., ensuring that other children will still like him/her). As mentioned in the hypotheses, the current study focused how the goals of revenge and maintaining relations with the focal peer might interact with ToM to predict aggressive and prosocial behavior, and, therefore, those are the goals that were further evaluated. Children rated the degree to which they would want each goal to happen on a 5-point scale, ranging from 1 (Not at all) to 5 (A whole lot). Each goal score was averaged, yielding a range from 1-5. Delveaux and Daniels (2000) reported that Cronbach’s alphas assessing internal consistency ranged from .84 to .96. In the current study, Cronbach’s alphas were .85 and .79 for the revenge and peace goals, respectively. In terms of construct validity, performance on this measure has been shown to relate in predictable ways to strategy choice (i.e., revenge goal predicted endorsement of physically aggressive strategy) (Delveaux & Daniels, 2000).
Aggressive and Prosocial Behaviors

Teacher and peer ratings of aggressive and prosocial behaviors. Measures of children’s physical and relational aggression were adapted from the Direct Indirect Aggression Scale (Björkqvist et al., 1992) (see Appendix H). Items measuring prosocial behavior were developed by the Powerful Choices Research Group and were added to this scale. In the original scale, children were asked to rate each classmate on several behaviors after the stem of “Tell us how each of your classmates acts when he/she has problems with or gets angry with another classmate.” The measurement was simplified for the purposes of the current study by including only one item to measure physical aggression, one for relational aggression, and one for prosocial behavior. A similar simplified method was also utilized by Coie, Dodge and Coppotelli (1982), who developed a reduced item scale with behavioral descriptors to obtain peer nominations of cooperative, disruptive, shy, aggressive, help seeking and peer leadership behaviors, and found it to relate in meaningful ways to peer status. The current study used a peer-rating system, in which each child rated his/her classmates on a scale of 1 (Never) to 5 (Always). In the current study, to measure physical aggression, the item read, “How often does each classmate hit, kick and shove others?” For relational aggression, the item read, “How often does each classmate try to get others to dislike the person he/she is mad at, shut others out of the group, and say bad things behind others’ backs?” For prosocial behavior, the item read, “How often does each classmate try to cheer others up, say nice things to others, and work things out calmly when they have a problem with someone?”

For the peer-rated items, each student initially received a score based on the sum of the ratings they received for each category, divided by the number of children who rated them. It was found that there were many children for whom peers did not report any physical or relational
aggression. For peer-rated physical aggression, 45% of participants were reported to display no physical aggression. For peer-rated relational aggression, 23% were reported to display no relational aggression. Using mean scores on these variables would have resulted in a restricted range. Therefore, these variables were dichotomized. Children were given a score of 0 for peer-rated physical aggression if no classmates rated them as being aggressive, and a score of 1 if any classmates noted physically aggressive behavior. The same approach was taken for relationally aggressive behavior. There was not a restricted range for prosocial behavior, so each child received a prosocial behavior score, ranging from 1 to 5, based on the average of their peer-ratings.

Teacher-ratings were based on the same approach as peer-ratings (see Appendix I). In the current study, to measure physical aggression, the item read, “How often does each child hit, kick and shove others?” For relational aggression, the item read, “How often does each child try to get others to dislike the person he/she is mad at, shut others out of the group, and say bad things behind others’ backs?” For prosocial behavior, the item read, “How often does each child try to cheer others up, say nice things to others, and work things out calmly when they have a problem with someone?”

Teachers rated each child’s physical aggression, relational aggression, and prosocial behavior on a scale of 1-5. The result was similar to the peer-ratings; 69% of participants were reported to display no physical aggression; 48% were reported to display no relational aggression. Therefore, as with the peer-rated physical and relational aggression, these two scores were dichotomized, with 0 indicated the teacher did not report any physical/relational aggression and 1 indicating the teacher reported some amount of physical/relational aggression. Prosocial
scores were more robust; for teacher-ratings of prosocial behavior, participants were assigned the score their teacher gave them, ranging from 1 to 5.

*Self-report of aggressive and prosocial behaviors.* For self-reports of aggression and prosocial behaviors, an adaptation of the Direct Indirect Aggression Scale (Björkqvist et al., 1992) and the Powerful Choices Research Group was used (see Appendix J). There were eight physical aggression items, twelve relational aggression items, and ten prosocial items. Children were asked to rate how often they engaged in the behaviors listed. For example, the original peer nomination item of “Who hits others?” was changed to read “How often do you hit others?” Children rated each behavior on the following scale (1 = never, 2 = rarely, 3 = sometimes, 4 = pretty often and 5 = very often). Using this methodology with adolescents, with slight differences in behaviors listed, Lister (2007) found these scales to be reliable (Cronbach’s alpha = .81 for physical aggression, and .77 for relational aggression). As with peer and teacher-ratings of physical and relational aggression, there were substantial percentages of participants who did not report any physical or relational aggression (62% and 32%, respectively), so these scores were dichotomized. Children received a score of 0 if they did not endorse any physical aggression, and a score of 1 if they endorsed any physical aggression; likewise for relational aggression. Prosocial behavior scores were more robust and children were given an average score of self-rated prosocial behavior ranging from 1 to 5. There was a Cronbach’s alpha of .83 for self-rated prosocial behavior.
CHAPTER III: RESULTS

Overview of Statistical Analyses

Preliminary Analyses

Data reduction. Data reduction techniques were employed to explore whether variables within the ToM domain could be reduced. Correlation matrices were examined to determine the associations among subscales. It was expected that the two components of ToM that were measured (faux pas and accidental kindness), would be moderately correlated and would be able to be combined. Correlations between the SIP goals and between the peer-, teacher-, and self-ratings of physical aggression, relational aggression, and prosocial behavior were also examined for possible data reduction.

Data transformations. The data were examined for skewness. If the data were skewed, appropriate transformation were employed.

Demographic differences. Relations between demographic variables and the main study variables were evaluated by computing three analyses: (1) an ANOVA where age and gender were entered simultaneously to examine their association with ToM, (2) a MANOVA where age and gender were entered simultaneously to examine their association with the goals of revenge and peace, and (3) a MANOVA where age and gender were entered simultaneously to examine their association with teacher-, peer-, and self-ratings of physical aggression, relational aggression, and prosocial behavior. Age differences were to be controlled for if there was a systematic variation between the different ages. I decided to compute all major analyses separately by gender, given that gender differences have been shown in prior research in all of the main study variables.

Major Analyses Examining the Hypotheses
Hypothesis 1: Direct relations of ToM and SIP with aggressive/prosocial behavior. The first hypothesis predicted that ToM and the revenge goal would be correlated with physically aggressive behavior, that the revenge goal would be correlated with relationally aggressive behavior; and that ToM and the peace goal would be correlated with prosocial behavior. For the initial test of this hypothesis, a correlation matrix of all of the major study variables (i.e. ToM, the SIP goals, and aggressive/prosocial behaviors) was computed.

Because the measures of physical and relational aggression were dichotomized, hierarchical logistic regressions were used as a more stringent test of the direct relations of ToM and the revenge goal to physically aggressive and relationally aggressive behavior (controlling for age if needed).

Analyses were computed separately for teacher, self, and peer-reported physical and relational aggression. For each regression, the main study variables (i.e., theory of mind and the revenge goal) were entered in Step 1. This allowed for a test of the main effects of ToM and the revenge goal on physical and relational aggression. The relevant variables were entered as a block (i.e., ratings of both ToM and the revenge goal were entered in each regression). In total, six logistic regressions were computed for each gender, one for each of the following criterion variables: (1) teacher-rated physically aggressive behavior, (2) peer-rated physically aggressive behavior, (3) self-rated physically aggressive behavior, (4) teacher-rated relationally aggressive behavior, (5) peer-rated relationally aggressive behavior, and (6) self-rated relationally aggressive behavior. It was expected that ToM and the revenge goal would significantly predict physical aggression, and that the revenge goal would significantly predict relational aggression.

A test of the direct relations of ToM and the peace goal to prosocial behavior, controlling for age if needed, was computed using a series of hierarchical multiple regressions following the
guidelines of Cohen and Cohen (1975) and Holmbeck (2002). Analyses were computed separately for teacher-, self- and peer-reported prosocial behavior. For each regression, the main study variables (i.e., ToM and the peace goal) were entered in Step 1. This allowed for a test of the main effects of ToM and the peace goal on prosocial behavior. The relevant variables were entered as a block (i.e., ratings of both ToM and the peace goal were entered in each regression). In total, three regressions were computed for each gender, one for each of the following criterion variables: (1) teacher-rated prosocial behavior, (2) peer-rated prosocial behavior, and (3) self-rated prosocial behavior. It was expected that ToM and the peace goal would significantly predict prosocial behaviors.

**Hypothesis 2:** Moderating effects of SIP on relations between ToM and aggressive/prosocial behavior. The second set of hypotheses predicted that SIP goals would moderate the association between ToM and physical aggression, relational aggression, and prosocial behaviors. All predictor variables were centered to reduce multicollinerarity between predictor variables and interaction terms. The tests of these hypotheses were initiated in analyses described in the preceding paragraph. To test for interactions for physical/relational aggression, interaction terms were entered into step 2 of the logistic regression (ToM X revenge goal). To test interactions for prosocial behavior, interaction terms were entered into step 2 of the hierarchical regression (ToM X peace goal).

For physical and relational aggression, if significant interactions were found, post-hoc probing was examined following the procedures recommended by A. DeMaris, personal communication, May 6, 2009; June 11, 2009; Jaccard (2001); and Lottes, DeMaris, and Adler (1996). A hypothesized interaction is discussed herein to illustrate how this procedure is conducted. The assumption is made that physical aggression (PA) is significantly predicted by
the interaction of theory of minds skills (ToM) and the revenge goal (REV). First, two new conditional moderator variables would be created for the revenge goal: REV minus the standard deviation of REV = HIREV (HIREV = 0 when REV is one SD above the mean); and REV minus (the negative standard deviation of REV) = LOREV (LOREV = 0 when REV is one SD below the mean). Two new interaction terms would then be created: HIREV_ToM = HIREV x ToM and LOREV_ToM = LOREV x ToM. Two logistic regressions would then be computed, each with the ToM main effect, one of the conditional REV variables (HIREV or LOREV), and the new interaction term (HIREV_ToM or LOREV_ToM). One logistic regression generates the slope when REV is one SD above the mean and one generates the slope when REV is one SD below the mean. Zero would then be inserted for the conditional REV term, leaving the equation for the ToM term plus the intercept. These equations provide a test of the significance of the coefficient for the effect of ToM at 1 SD above and below mean levels of revenge. Predicted log odds of aggression are also calculated by substituting high (1 SD above the mean), medium (at the mean), and low (1 SD below the mean) scores on the revenge goal into the interaction equation. These are plotted to show the log odds of aggression at low, medium, and high scores on the revenge goal.

For prosocial behavior, if significant interaction terms were found, post-hoc probing was conducted following the procedures recommended by Aiken and West (1991) and Holmbeck (2002) because the prosocial outcome was a continuous score, not a dichotomized variable like the aggression variables. A hypothesized interaction is discussed herein to illustrate how this procedure is conducted. The assumption is made that prosocial behavior (PRO) is significantly predicted by the interaction of theory of minds skills (ToM) and the peace goal (PEACE). First, two new conditional moderator variables would be created: PEACE minus the standard
deviation of PEACE = HIPEACE (HIPEACE = 0 when PEACE is one SD above the mean); and
PEACE minus (the negative standard deviation of PEACE) = LOPEACE (LOPEACE = 0 when
PEACE is one SD below the mean). Two new interaction terms would then be created:
HIPEACE_ToM = HIPEACE x ToM and LOPEACE_ToM = LOPEACE x ToM. Two
regressions would then be computed, each with the ToM main effect, one of the conditional
PEACE variables (HIPEACE or LOPEACE) and the new interaction term (HIPEACE_ToM or
LOPEACE_ToM). One regression generates the slope when PEACE is one SD above the mean
and one generates the slope when PEACE is one SD below the mean. Zero would then be
inserted for the conditional PEACE term, leaving the equation for the ToM term plus the
intercept. A t-test would be computed on the significance of the ToM term for both high and low
PEACE, and graphs of the simple slopes would be drawn by inserting high and low values of
ToM into the equation.

Preliminary Analyses

Data Reduction

Correlations between Faux Pas and Accidental Kindness. A significant positive
correlation was found between the faux pas and accidental kindness vignettes ($r = .57, p < .001$),
using the methodology for calculating scores described by Baron-Cohen et al. (1999), which
involved averaging the number of stories each participant “passed.” A mixed pattern of
correlations (some significant, some not) between item means was found for the methodology
used by Banerjee and Watling (2005), which involved averaging scores on items across scales
(see Table 1). Therefore, the current study uses the methodology in Baron-Cohen et. al. (1999).
The combined ToM score was computed by averaging the means of the faux pas and accidental
kindness vignettes.
Correlations between SIP goals. The SIP goals of revenge and peace were significantly correlated ($r = -.38, p < .01$). Because different hypotheses are proposed for the two goals, these scores were not combined.

Correlations between aggressive and prosocial behaviors. There were some significant correlations found between the aggressive/prosocial behaviors across raters (see Table 2). These correlations ranged from $r = .05$ for peer- and self-rated relational aggression, to $r = .54$ for teacher- and peer-rated prosocial behavior. For the purpose of the current study, analyses were computed separately in order to be able to evaluate differences in raters and across behaviors.

Data Transformations

There were a few study variables that were skewed and therefore required transformation. The ToM variable was significantly negatively skewed. It was reverse-coded, so that higher scores indicated lower-functioning ToM. A log transformation was then used, resulting in the skewness being corrected.

Self-rated prosocial behavior was also negatively skewed. It was reverse-coded, so that higher scores indicated less prosocial behavior. A square-root transformation was used, resulting in the skewness being corrected.

Demographic Differences in Major Study Variables

Table 3 presents mean level comparisons of the major study variables by age and gender. Age differences were analyzed by comparing eight year olds to nine and ten year olds. These age groups were used because there were only a few ten year olds in the study. There were 32 eight year olds and 39 nine and ten year olds in the study.

In evaluating age and gender differences, $p < .01$ was used as the criterion for significance because of the large number of statistical comparisons in these preliminary analyses.
An ANOVA was computed to assess the association of age and gender with ToM. The results were not significant at the .01 level for age or gender: for age, $F(1, 69) = 6.65, p < .05$, for gender, $F(1, 69) = 1.59, p > .10$. A MANOVA was computed to assess the association of age and gender with the goals of revenge and peace. The overall MANOVA tests were not significant: for age, $F(3, 66) = .95, p > .10$, for gender, $F(3, 66) = 3.07, p < .10$. A MANOVA was computed to assess the association of age and gender with the criterion variables of teacher-, peer-, and self-rated physical aggression, relational aggression, and prosocial behavior. The results indicated a significant overall MANOVA effect for age: $F(10, 60) = 2.93, p < .01$, however, none of the univariate tests was significant at the .01 level. There was also a significant overall MANOVA effect for gender: $F(10, 60) = 2.44, p < .05$, and univariate tests revealed a significant gender difference for teacher-rated prosocial behavior: $F(1, 69) = 7.3, p < .01$, and for peer-rated physical aggression: $F(1, 69) = 7.52, p < .01$. Girls were rated as more prosocial than boys, and boys were rated as more physically aggressive than girls. There were also notable differences in the correlation patterns between the main study variables for boys and girls (see Tables 4 & 5). For age, because no significant age differences were evident in univariate tests, age was not controlled for in subsequent analyses. Given that previous research has demonstrated gender differences in the study variables, and that the current study has yielded similar results, all subsequent analyses were computed separately for boys and girls.

**Main Analyses**

Correlations for boys are provided in Table 4. Correlations for girls are provided in Table 5. Correlation matrices for the overall sample are provided in Table 6.

*Results for Hypothesis 1*
Results for Hypothesis 1a: ToM and SIP goals predicting physical aggression. It was predicted that lower-functioning ToM skills would positively predict physical aggression. Hypothesis 1a also stated that the revenge goal would positively predict physical aggression. For the overall sample, endorsement of a revenge goal was positively correlated with teacher and peer-rated physical aggression ($r = .20-.27$). Endorsement of a goal of getting along with a focal peer (peace) was negatively correlated with self-ratings of physical aggression ($r = -.21$).

There were differing results when these correlations were computed separately for boys and girls. For boys, no significant correlations were found between SIP goals and physical aggression. For girls, endorsement of a revenge goal was positively correlated with teacher and peer-rated physical aggression ($r = .42-.47$). This means that, for girls with higher levels of a revenge goal, teacher and peers were more likely to report physical aggression. There was a trend in the same direction for self-ratings of physical aggression ($r = .30, p = .08$). In addition, for girls, endorsement of a goal of getting along with the focal peer (peace) was negatively correlated with self-ratings of both physical and relational aggression ($r = -.39$ and $-.40$).

Six hierarchical logistic regressions were computed in order to test for the unique contributions of ToM and the revenge goal in the prediction of physical aggression: boys’ teacher-, peer- and self-rated physical aggression and girls’ teacher-, peer-, and self-rated physical aggression. ToM and the revenge goal were entered into Step 1 (see Table 7). No significant relations were found between ToM and physical aggression for either gender. For girls, there were significant main effects for revenge on teacher- and peer-rated physical aggression, and a trend in the same direction for self-rated physical aggression. Girls with higher levels of the revenge goal were more likely to be rated as physically aggressive.
Results for Hypothesis 1b: ToM and SIP predicting relational aggression. It was predicted that ToM would be unrelated to relational aggression, and that the revenge goal would be positively related to relational aggression. For the overall sample, there was a significant correlation between ToM and peer-rated relational aggression ($r = .26$). This means that children with lower-functioning ToM were more likely to be rated by peers as relationally aggressive. For boys, there was a trend for ToM to predict teacher-rated relational aggression ($r = -.32$, $p = .06$). This means that boys with higher-functioning ToM skills were more likely to be rated by teachers as relationally aggressive. For girls, ToM was a significant predictor of peer-rated relational aggression ($r = .44$). This means that girls with lower-functioning ToM skills were more likely to be rated by teachers and peers as relationally aggressive.

For the overall sample, endorsement of a revenge goal was positively correlated with teacher and peer-rated relational aggression ($r = .21-.38$). Endorsement of a goal of getting along with a focal peer (peace) was negatively correlated with self-ratings of relational aggression ($r = -.20$).

There were differing results when these correlations were computed separately for boys and girls. For boys, no significant correlations were found between SIP goals and relational aggression. For girls, endorsement of a revenge goal was positively correlated with teacher and peer-rated relational aggression ($r = .43-.45$). This means that, for girls with higher levels of a revenge goal, teacher and peers were more likely to report relational aggression. In addition, for girls, endorsement of a goal of getting along with the focal peer (peace) was negatively correlated with self-ratings of both relational and physical aggression ($r = -.40$).

Six hierarchical logistic regressions were computed in order to test for the unique contributions of ToM and revenge to predicting relational aggression: boys’ teacher-, peer- and
self-rated relational aggression and girls’ teacher-, peer-, and self-rated relational aggression.

ToM and the revenge goal were entered into Step 1 (see Table 8). For boys, there was a trend for
ToM to be related to teacher-rated relational aggression, meaning that boys with higher-
functioning ToM were more likely to be rated as relationally aggressive by their teachers. For
girls, there was a significant relation between ToM and peer-rated relational aggression, in the
opposite direction of what was found for boys. In this case, girls with lower-functioning ToM
skills were more likely to be rated as relationally aggressive by their peers.

In terms of the revenge goal and relational aggression, the revenge goal was found to
positively predict teacher and peer-rated relational aggression for girls only. For girls, higher
levels of the revenge goal meant that they were more likely to be considered relationally
aggressive by their teacher and peers.

Results for Hypothesis 1c: ToM and SIP predicting prosocial behavior. It was predicted
that higher-functioning ToM skills and the peace goal would positively predict prosocial
behavior. ToM was not significantly correlated with prosocial behavior for either boys or for
girls. Endorsement of a goal of getting along with a focal peer (peace) was also not significantly
correlated with prosocial behavior. However, for girls, endorsement of a revenge goal was
negatively correlated with peer-rated prosocial behavior ($r = -.41$).

Six hierarchical regressions were computed to assess the unique contributions of ToM
and the peace goal to the prediction of prosocial behavior: boys’ teacher-, peer- and self-rated
prosocial behavior and girls’ teacher-, peer-, and self-rated prosocial behavior. ToM and the
peace goal were entered into Step 1 (see Table 9). ToM skills and the peace goal did not predict
aggressive/prosocial behavior for males or females.

Results for Hypothesis 2
Results for Hypothesis 2a: SIP moderating the relation between ToM and physical aggression. It was predicted that the revenge goal would moderate the relation between ToM and physical aggression such that there will be a significantly stronger association between ToM and physically aggressive behavior when the revenge goal is high, as compared to the association between ToM and physical aggression when the revenge goal is low. In order to test for moderation, six hierarchical logistic regressions were conducted: boys’ teacher, peer and self-rated physical aggression and girls’ teacher, peer, and self-rated physical aggression. As mentioned above, ToM and the revenge goal were entered into Step 1 (see Table 7). An interaction term of ToM X revenge was entered into Step 2 (see Table 7). No significant interactions were found for this hypothesis.

Results for Hypothesis 2b: SIP moderating the relation between ToM and relational aggression. It was predicted that there would be a positive association between ToM and relational aggression only when the revenge goal is high.

In order to test for moderation, six hierarchical logistic regressions were computed: boys’ teacher-, peer- and self-rated relational aggression and girls’ teacher-, peer-, and self-rated relational aggression. ToM and the revenge goal were entered into Step 1 (see Table 8). An interaction term of ToM X revenge was entered into Step 2 (see Table 8). There were no significant interactions for ToM X revenge predicting teacher-rated relational aggression. There was a significant interaction for ToM X revenge predicting peer-rated relational aggression for girls. There were trends for interactions for both boys and girls predicting self-rated relational aggression.

Follow-up analyses revealed that ToM had a significant effect on peer-rated relational aggression for girls at mean-level ratings of the revenge goal ($\beta = 63.06, \text{S.E.} = 27.50$). At mean
levels of revenge, having higher-functioning ToM decreased the odds of being rated as relationally aggressive by peers. ToM also had a significant effect on peer-rated relational aggression for girls at 1 SD above mean-level ratings of the revenge goal ($\beta = 107.5$, S.E. = 46.93). At high levels of revenge, having higher-functioning ToM decreased the odds of being rated as relationally aggressive by peers. There was not a significant effect at 1 SD below mean-level ratings of the revenge goal ($\beta = 18.62$, S.E. = 16.98). Thus, for low levels of revenge, ToM did not have an effect on peer-ratings of relational aggression. See Figure 2 for an illustration of the predicted log odds of peer-rated relational aggression for girls at high, medium, and low levels of revenge.

*Figure 2.* Interaction of ToM and SIP revenge predicting peer-rated relational aggression (girls)

Follow-up analyses for the trend for the ToM X revenge interaction for boys’ self-rated relational aggression revealed a trend at 1 SD above mean levels of the revenge goal ($\beta = -15.55$, S.E. = 9.20). At high levels of revenge, having higher-functioning ToM increased the odds of rating one’s self as relationally aggressive. The effect of ToM on self-ratings of relational aggression for boys at mean levels of revenge was not significant ($\beta = -6.14$, S.E. = 6.02). The effect of ToM on self-ratings of relational aggression for boys at 1 SD below mean revenge goals
was not significant ($\beta = 3.27, \text{S.E.} = 7.27$). Thus, at medium and low levels of revenge, ToM did not have an effect on self-ratings of relational aggression. See Figure 3 for an illustration of the predicted log odds of self-rated relational aggression for boys at high, medium, and low levels of revenge.

*Figure 3.* Interaction of ToM and SIP revenge predicting self-rated relational aggression (boys)

Follow-up analyses for the trend for the ToM X revenge interaction for girls’ self-rated relational aggression revealed that there was not a significant effect of ToM on relational aggression at high, medium, or low levels of relational aggression. The effect of ToM on self-ratings of relational aggression at mean levels of the revenge goal ($\beta = -7.57, \text{S.E.} = 9.31$) was not significant. The effect of ToM on self-ratings of relational aggression for girls at 1 SD above mean levels of the revenge goal ($\beta = -25.73, \text{S.E.} = 16.35$) was not significant. The effect of ToM on self-ratings of relational aggression for girls at 1 SD below mean levels of the revenge goal ($\beta = 10.60, \text{S.E.} = 10.59$) was also not significant. Because none of these standard values were significant, further analyses were computed to determine the effect of ToM on self-ratings of relational aggression at extremely high and low values of revenge (1.5 SD above and below...
the mean for revenge). These analyses revealed a significant trend in the effect of ToM on self-rated relational aggression at extremely high scores for revenge ($\beta = -34.82$, S.E. = 20.86), but not at extremely low scores on revenge ($\beta = 19.68$, S.E. = 14.22). These results indicate that, at extremely high scores on revenge, higher-functioning ToM increased the odds of rating one’s self as relationally aggressive. See Figure 4 for an illustration of the predicted log odds of self-rated relational aggression for girls at extremely high, high, medium, low, and extremely low levels of revenge.

*Figure 4.* Interaction of ToM and SIP revenge predicting self-rated relational aggression (girls)

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*Results for Hypothesis 2c: SIP moderating the relation between ToM and prosocial behavior.* It was predicted that there would be a stronger positive association between ToM skills and prosocial behavior when there is more endorsement of the peace goal, compared to the association between ToM skills and prosocial behavior when there are lower levels of endorsement of the peace goal. In order to test for moderation, six hierarchical logistic regressions were computed: boys’ teacher, peer and self-rated prosocial behavior and girls’
teacher, peer, and self-rated prosocial behavior. ToM and the peace goal were entered into Step 1 (see Table 9). An interaction term of ToM X peace was entered into Step 2 (see Table 9). Results revealed a significant interaction for ToM X peace for girls for teacher-rated prosocial behavior. Follow-up analyses based on Holmbeck’s (2002) described procedure revealed a significantly positive relationship between the effect of ToM on teacher-rated prosocial behavior when high levels of the maintaining relationships with the focal peer (peace) goal was endorsed ($\beta = -0.53$), and no significant relations for the effect of ToM on teacher-rated prosocial behavior when low levels of peace goals were endorsed ($\beta = 0.34$). These results show that, for girls with high endorsement of the peace goal, higher-functioning ToM was related to higher teacher-ratings of prosocial behavior (see Figure 5).

*Figure 5.* Interaction of ToM and SIP peace predicting teacher-rated prosocial behavior (girls)
CHAPTER IV: DISCUSSION

Given that aggressive behavior in children has been linked with negative outcomes and prosocial behavior with positive outcomes (Crick, 1996; Crick & Grotpeter, 1995), the current study sought to understand how two social cognitive factors (i.e., theory of mind and social information processing) were related to engaging in these behaviors. Theory of mind was deemed important because some researchers have postulated that aggressive children may not be deficient in ToM, but rather, may exhibit highly-skilled ToM (Sutton, Smith & Swettenham, 1999). The current study refined this hypothesis by examining whether higher- or lower-functioning ToM, paired with deficits in social information processing (i.e., focusing on getting revenge in social conflict situations), related to aggressive behavior. Because of social implications, it was important to understand not only the social cognitive processes that may be related to aggressive behavior, but also those that may be related to prosocial behavior. For this reason, ToM and the SIP goal of getting along with the focal peer also were examined for their relations to prosocial behavior.

Before the main goals of the current study were examined, preliminary analyses were conducted to address the following issues: (1) Are there gender differences in mean levels of the major study variables? (2) Are there age differences in mean levels of the major study variables? (3) What are the correlations among the raters of children’s aggressive and prosocial behavior? (e.g., are teacher-rated, peer-rated, and self-rated child physical aggression significantly correlated?)

After these preliminary issues were addressed, several research questions were posed: (1) What are the correlations of ToM and the SIP goal of revenge with prediction of teacher-, peer-, and self-rated child physical aggression? What are the independent contributions of ToM and the
SIP goal of revenge to the prediction of teacher-, peer-, and self-rated child physical aggression? (2) What are the correlations of ToM and the SIP goal of revenge with prediction of teacher-, peer-, and self-rated child relational aggression? What are the independent contributions of ToM and the SIP goal of revenge to the prediction of teacher-, peer-, and self-rated child relational aggression? (3) What are the correlations of ToM and the SIP goal of revenge with prediction of teacher-, peer-, and self-rated child prosocial behavior? What are the independent contributions of ToM and the SIP goal of peace to the prediction of teacher-, peer-, and self-rated child prosocial behavior? (4) What is the contribution of the interaction of ToM and the SIP goal of revenge to the prediction of teacher-, peer-, and self-rated child physical aggression? (5) What is the contribution of the interaction of ToM and the SIP goal of revenge to the prediction of teacher-, peer-, and self-rated child relational aggression? (6) What is the contribution of the interaction of ToM and the SIP goal of peace to the prediction of teacher-, peer-, and self-rated child prosocial behavior?

There were several findings of note in the current study. General preliminary findings for the sample are reviewed first. Next, results of the major research questions are explored. Finally, limitations, future directions, and conclusions are offered.

**Preliminary Findings**

Gender and age differences in the mean levels of the major study variables were explored. There were significant sex differences for some of the aggressive and prosocial variables. Specifically, boys were more often rated by peers as being physically aggressive, compared to girls. This is consistent with previous research on gender differences in this age group (see Underwood, 2003 for a review). Girls were rated as more prosocial by their teacher
than were boys, which is also consistent with previous research (e.g. Fabes & Eisenberg, 1996; as cited and presented in Eisenberg & Fabes, 1998).

There were no significant age differences in mean levels of the main study variables. Age differences have been found in previous research for all of the major study variables (i.e., ToM, SIP goals, and aggressive/prosocial behaviors). However, in the current study, there was a narrow age range, as most participants were either eight or nine years old. This likely accounts for the lack of significant age differences.

Correlations among teacher-, peer-, and self-ratings of child physical aggression, relational aggression, and prosocial behavior were examined (e.g., teacher-rated physical aggression and peer-rated physical aggression were examined to see if they correlated). There were significant correlations among raters (e.g., teacher- and peer-rated physical aggression; teacher- and peer-rated prosocial behavior), as well as non-significant correlations (e.g., teacher- and self-rated physical aggression; teacher- and self-rated relational aggression). Likewise, there were both overlaps and discrepancies in the results based on whether the criterion used was ratings of aggression/prosocial behavior provided by teachers, peers, or the participants themselves (these results will be further discussed in the review of the main analyses). Although no hypotheses were offered about these correlations, the results suggest that there are differences in opinion among raters, especially for relational aggression, and that it is important to view the major study findings in the context of these differences. The extent to which raters do not overlap could represent some unreliability in the measures (e.g., bias in self-report) or it could reflect real differences in the child’s behavior in different environments (e.g., teachers may not be in a position to observe aggression, since the classroom is such a controlled environment).
Previous research has shown some overlap as well as some differences among sources. Geiger, Zimmer-Gembeck, and Crick (2004) noted that, at least in terms of relational aggression, varying results are often due to the source of ratings of aggressive behaviors. Achenbach’s (1987) seminal work on cross-informant correlations demonstrated that different sources’ ratings of behavioral and emotional problems were correlated, but also that self-ratings were only modestly correlated with teacher-ratings ($r = .22$). Crick (1996) examined teacher-ratings and peer-nominations of physical and relational aggression and found that teacher-rated physical aggression was correlated .69 with peer-nominations for physical aggression. In the same sample, teacher-rated relational aggression was correlated .57 with peer-nominations for relational aggression. Using a sample of early adolescents, Pakaslahti and Keltikangas-Järvinen (2000) found that agreement rates for teacher- and peer-ratings of physical and relational aggression were higher than agreements rates between teacher- and self-rating and between peer- and self-ratings. This was also the case in the current study. Moreover, these researchers also found that the rates of agreement were higher across raters for physical aggression than they were for relational aggression. This appears to correspond to the current study, in that the correlation between the teacher- and peer-ratings of physical aggression were significant, but there was only a trend for the correlation between teacher and peer-ratings of relational aggression. In sum, raters appear to have different experiences (e.g., different opportunities to observe the behaviors in specific settings) with the participants’ aggressive and prosocial behaviors, and perhaps different biases and different levels of tolerance for the behaviors, but all types of ratings may prove useful in understanding relations between the study variables.

Hypothesis 1: Relations of ToM and SIP to Aggression/Prosocial Behavior

**Hypothesis 1a: ToM and SIP Predicting Physical Aggression**
Both ToM and the SIP goal of revenge were expected to relate to physical aggression. Higher-functioning ToM was hypothesized to increase the odds of being rated as physically aggressive, and high levels of revenge were hypothesized to increase the odds of being rated as physically aggressive. ToM was not found to relate to physical aggression. This is not consistent with Capage and Watson’s (2001) findings, but it does reflect findings for ToM in some samples (e.g., those where physical aggression is a symptom of a disruptive behavior disorder) (Buitelaar, van der Wees, Swaab-Barneveld, & van der Gaag; 1999; Hâppe, 1996; Sutton, Reeves, & Keogh, 2000). Capage and Watson’s (2001) sample consisted of preschool children. Perhaps delays in ToM are more likely to be associated with physical aggression for preschool children; problems later in childhood may be related to other factors. Issues such as emotional distress could be more relevant in understanding physically aggressive behavior for this age group; for example, those who were more distressed by social conflict situations were more likely to be considered physically aggressive (Crick, Grotpeter, & Bigbee, 2002).

The SIP goal of revenge was found to positively predict physical aggression only for girls. This finding is not consistent with previous research (e.g., Erdley & Asher, 1996; Delveaux & Daniels, 2000; Hughes et al., 2004), which found that revenge goals predicted physical aggression both for boys and for girls. The methodology of the current study may be one reason for these findings. A participant was considered to be physically aggressive by peer-ratings if any other students reported any amount of physical aggression for that participant. Boys were significantly more likely than girls to be rated by peers as physically aggressive using this method. It may be that, for boys, a mild level of physical aggression is more normative; indeed, many studies have shown that boys this age are generally more physically aggressive than girls (see Underwood, 2003 for a review). Therefore, the methodology of the current study
did not differentiate between boys who were aggressive on occasion and those who were frequently aggressive. Perhaps revenge is only related to moderate to high levels of physical aggression for boys; whereas for girls, engaging in any physical aggression is gender-atypical and signifies social cognitive deficits, in this case, wanting to get back at others in conflict situations.

**Hypothesis 1b: ToM and SIP Predicting Relational Aggression**

ToM had not been predicted to relate directly to relational aggression, but some interesting results were found in this regard. The results highlight the importance of considering gender differences and the person rating the behavior in drawing conclusions. For boys, higher-functioning ToM was related to an increased likelihood of being rated by one’s teacher as relationally aggressive. For girls, lower-functioning ToM was related to an increased likelihood of being rated by one’s peers as relationally aggressive. It appears, therefore, that boys’ teachers noticed boys who are more well-equipped at understanding others’ minds as being relationally aggressive, whereas girls’ peers noticed girls who were less well-equipped to understand others as being relationally aggressive. The finding for the boys appears to be consistent with Sutton, Smith, and Swettenham’s (1999) ideas about bullies, in that those who are skilled at ToM may be better able to target and injure others. Perhaps children are less hesitant to “tell” on a boy who is using relational aggression, but are more hesitant with girls, leading to teachers being unaware of the girls who are skilled at it. It is also interesting to note that teacher-ratings of relational aggression were quite similar between boys and girls, whereas most boys were rated by peers as being relationally aggressive (89%), compared only 66% of girls. Perhaps any effects of ToM on peer-rated relational aggression for boys were lost in this high endorsement rate, which does not distinguish the amount of relational aggression in which one is engaging.
In terms of the findings for peer-ratings and girls’ relational aggression, having lower-functioning ToM increased the odds of being rated as relationally aggressive, which runs counter to the finding for boys. Most previous research has not found a link between ToM and relational aggression (e.g., Baird & Astington, 2004; Sutton et al., 1999). Prior research used teachers as the raters of relational aggression; perhaps peers have a different perspective. Teachers may be less informed about some of girls’ subtle behaviors of relational aggression, whereas peers may have greater access. In addition, it may be that those girls who are socially unskilled are the ones who stand out to peers as relationally aggressive, and that those who are more skilled are able to avoid detection.

The SIP goal of revenge was predicted to relate to relational aggression in that higher levels of revenge were predicted to increase the odds of being rated as relationally aggressive. This was the case only for girls’ teacher- and peer-ratings. This is not consistent with two previous studies (Delveaux & Daniels, 2000; Hughes et al., 2004) that demonstrated that, for both boys and girls, revenge was linked with relational aggression. As noted above, almost all boys were rated by peers as being relationally aggressive (89%), so distinctions related to revenge may have been affected by this. The lack of findings for teacher-ratings of relational aggression and revenge for boys is more difficult to understand, and would need to be replicated.

_Hypothesis 1c: ToM and SIP Predicting Prosocial Behavior_

Both ToM and the SIP goal of peace were predicted to relate to prosocial behavior. Higher-functioning ToM was hypothesized to relate positively to ratings of prosocial behavior. High levels of the peace goal were hypothesized to relate positively to ratings of prosocial behavior. ToM was not found to rate significantly to ratings of prosocial behavior, which is not consistent with previous research (e.g., Baird & Astington, 2004; Capage & Watson, 2001;
Cassidy, et al., 2003; Watson et al., 1999). Many of the previous studies that found a link between ToM and prosocial behavior examined ToM by using first-order false belief tasks and had a sample of preschool/kindergarten children. Similar to the results for physical aggression, perhaps being developmentally advanced in ToM is only related to prosocial behavior at younger ages.

The SIP goal of getting along with the focal peer was not related to prosocial behavior. This does not correspond with prior findings (e.g., Delveaux & Daniels, 2000; Nelson & Crick, 1999). The lack of correspondence between studies may be due to methodological differences. Delveaux and Daniels’ (2000) study assessed self-reported prosocial behavior in response to vignettes; in other words, responses were closely tied to the goals that the participants endorsed. By contrast, in the current study, prosocial behavior was measured globally, and was not tied into the specific vignettes used to measure goals. Nelson and Crick’s (1999) study involved peer nominations, where only the most prosocial children were compared to a normative sample. Prosocial behavior was used as a continuous variable in the current study; participants were not grouped into “prosocial” and “nonprosocial” categories. Thus, it may be that the peace goal is tied to prosocial behavior when it is measured by vignettes or for those children who are especially prosocial, but not when a global, continuous measure of prosocial behavior is used.

Interestingly, the peace goal, which involves wanting to get along with the peer who is causing a social conflict situation, was found to correlate negatively with self-ratings of physical and relational aggression for girls. Thus, although in this study wanting to get along with the focal peer in a conflict situation was not related to being more prosocial, it was related to being less likely to be aggressive for girls. Perhaps those girls who care about getting along with the peer who is instigating conflict have better emotional control and therefore are less likely to act
aggressively. Along these lines, being distressed by conflict has been linked to being more likely to be aggressive (Crick, Grotpeter, & Bigbee, 2002).

Hypothesis 2: Interaction Effects of ToM and SIP to Predict Aggressive/Prosocial Behavior

Hypothesis 2a: ToM X SIP Revenge Predicting Physical Aggression

ToM and the SIP goal of revenge were expected to interact in such a way that there would be a stronger relation between ToM and physical aggression when revenge was high than when it was low. It was hypothesized that, at higher levels of revenge, lower-functioning ToM would relate to increased odds of being rated as physically aggressive. No significant interactions were found. There was a low endorsement of physical behaviors, especially for teacher- and peer-ratings (with the exception of peer-ratings of boys’ physical aggression, which was 71%). With this low (or, in the case of boys’ peer-rated physical aggression, high) endorsement of physical aggression, there may not have been an adequate distribution of the criterion variable, and findings may have been obscured by this.

Hypothesis 2b: ToM X SIP Revenge Predicting Relational Aggression

ToM and the SIP goal of revenge were predicted to interact in that there would only be a relation between ToM and relational aggression when revenge goals were high. The relation was hypothesized to be that, at high levels of revenge, higher-functioning ToM would increase the odds of being rated as relationally aggressive. For girls’ peer-ratings of relational aggression, an interaction was found, but it was in the opposite direction of this prediction. ToM was related to relational aggression only at mean and high levels of revenge, but it was related in such a way that higher-functioning ToM decreased the odds of being rated as relationally aggressive. In other words, when girls desired revenge, they were more likely to be rated by peers as relationally aggressive if they also had lower-functioning theory of mind. One possible
explanation for this is that peers may only be aware of those girls who are poorly skilled at relational aggression; those who are highly skilled may go undetected by the majority of their classmates. This explanation is further supported by findings about girls’ self-ratings of relational aggression (see below).

In contrast to the findings for girls’ peer-rated relational aggression, ToM and the SIP goal of revenge interacted to predict self-rated relational aggression in ways that were more consistent with the hypotheses of the current study. Specifically, there was a trend for the interaction of ToM and revenge to predict self-rated relational aggression both for boys and for girls. Follow-up analyses revealed that, for boys, there was a trend for a relation between ToM and self-rated relational aggression only at high levels of revenge; for girls, this occurred only at extremely high levels of revenge (1.5 standard deviations above the mean). The trend was in such a way that, at high/extremely high levels of revenge, having higher-functioning ToM increased the odds of rating oneself as relationally aggressive. Because these are trends, results should be interpreted cautiously. These findings may suggest that SIP goals, namely, revenge, differentiate those who are skilled at ToM and those who are not in terms of their relationally aggressive behaviors. Self-ratings were the only type of rating for which this finding was obtained, demonstrating that relational aggression may indeed be perceived differently by different raters. For girls, peer-ratings of relational aggression were highest for those with lower-functioning ToM and high revenge, whereas self-ratings were highest for those with higher-functioning ToM and extremely high revenge, showcasing the differences in perceptions of “relational aggression” between raters.

_Hypothesis 2c: ToM X SIP Peace Predicting Prosocial Behavior_
ToM and the SIP goal of peace were predicted to interact to predict prosocial behavior. A significant interaction was found for teacher-ratings of girls’ prosocial behavior. At high levels of peace only, having higher-functioning ToM was linked with increased prosocial behavior. This result, when viewed in the context of the result for self-ratings of relational aggression, demonstrates that having higher-functioning ToM does not guarantee a girl will use this ability to positive or to negative ends; instead, if a girl desires revenge in conflict situations, she may be relationally aggressive, whereas, if she wants to get along with the focal peer, she may be more prosocial.

Limitations

As this was one of the first studies to consider the joint role of theory of mind and aspects of social information processing skills in aggressive behavior, there are clearly limitations which might be addressed in future work. The current study had a small sample size, which may have made significant findings harder to detect. In addition, the population from which the sample was drawn was rural and mostly Caucasian; therefore, generalization to children from other demographic backgrounds is difficult.

Only one aspect of SIP (i.e., social goals) was examined in the current study. Although social goals were shown to have relations with ToM and aggressive/prosocial behavior in meaningful ways, SIP goals alone do not capture fully the range of SIP skills that are important for children. SIP skills such as interpretation of cues and response generation/decision also may relate to ToM and aggressive/prosocial behavior.

The level of analysis of the SIP goals was different from the level of analysis of the criterion variables. Ratings of goals were measured using hypothetical vignettes, whereas ratings of behavior were measured globally. Because SIP is thought to be an “online” process (Crick &
Dodge, 1994), it may be affected by the situation in which the person finds him/herself. Therefore, future studies that measure behavioral decisions that children make in the same manner as the goals they have may yield closer ties between SIP and criterion variables.

Low levels of physical and relational aggression were reported in the current sample by all reporters. This was addressed by dichotomizing those variables, but this could have produced a limited view of the actual aggressive behaviors. For example, a child who was infrequently or rarely aggressive was categorized in the same manner as a child who was frequently aggressive. It is possible that a sample with a larger distribution of aggressive behaviors, including perhaps a clinical sample, may have yielded more nuanced results. Alternatively, a more sensitive approach to measurement that captures more variability at the low end of aggressive behavior may also yield a greater range of aggressive behavior, and would allow for continued focus on normative development.

Lastly, the current study used a cross-sectional design. It is unknown based on the methodology used whether ToM and SIP goals precede the development of aggressive and prosocial behaviors. It could be that engaging in these behaviors over a period of time erodes ToM skills and positive SIP goals. Longitudinal and intervention data are needed to distinguish cause and effect.

Future Directions

There are many avenues that future research could take based on the findings of the current study. Future research could examine ToM with other methods in older age groups in order to examine the relations between the major study variables in this population. New methods of studying ToM in adolescent populations have recently been developed (e.g., Kaland et al., 2002), and there could be interesting findings in this age group, given the possible
intensification of gender differences and the widespread prevalence of relational aggression during adolescence (Underwood, 2003). It could be especially interesting to examine whether there are changes in the relation between ToM, the SIP goal of revenge, and peer-rated relational aggression for girls. In the current study, those who had lower-functioning ToM were more likely to be rated as relationally aggressive. As girls age, relationally aggressive behavior becomes more sophisticated but also more prevalent, so those who are highly skilled at it may stand more. Thus, in an adolescent population, higher-functioning ToM, in combination with revenge goals, may relate to relational aggression. Kaukiainen et al. (1999) found that peer-rated social intelligence was linked with peer-ratings of relational aggression in a young adolescent sample, perhaps it is during this time that such distinctions in ToM would appear, mirroring the current study’s findings for self-ratings of relational aggression.

Additional SIP skills could be examined in future research to examine whether they interact with ToM to predict aggressive and prosocial behavior. Perhaps the lack of findings regarding physical aggression, especially for boys, can be understood in this context. That is, it may be that difficulties with other aspects of SIP, such as hostile attribution bias and emotional distress at the interpretation of cues step of the SIP model, in combination with lower-functioning ToM, would be linked with physical aggression.

In addition to physical aggression, relational aggression, and prosocial behavior, verbal aggression could be examined. Sutton et al. (1999) found that verbal aggression related to social cognitive abilities, so there may be further relations for this type of aggression. Some researchers have postulated that physical aggression precedes verbal aggression, which, in turn, precedes relational aggression (Björkqvist, 2001). It may be that the children in the sample were
more verbally aggressive than physically or relationally aggressive, and that studying how ToM and SIP goals relate to verbal aggression in this age group could yield important results.

Given the differences found in teacher-, peer-, and self-ratings, future research could employ additional methods such as observation or qualitative methods to try to elicit a better understanding of the discrepancies among raters. Researchers have proposed novel methods such as “remote audiovisual recording” to capture moment-by-moment occurrences of relational aggression (Underwood, 2003). Systematic observation could be particularly useful in understanding relational aggression, given the conflicting results in the current study for peer- and self-rated relationally aggressive behavior, as well as the gender differences in results for relational aggression.

Experimental or observational situations in which aggressive or prosocial responses are elicited could prove useful, especially if they were combined with “on-line” measures of social information processing (Bierman, 2004). One possibility would be to use methodology from the field of family psychology, in which video recall is used (Welsh & Dickson, 2005). Participants would be videotaped during peer interactions, and then asked to report on their internal processes during the encounter, including intent attributions, goals, and response decisions in the situation.

Conclusions

The current study provides an initial examination of the relations between ToM, SIP goals, and aggressive/prosocial behavior in middle childhood. One important finding in the current study was the differences in results based upon who rated the behavior. Teachers, peers, and children themselves appear to have a differing awareness of aggression and prosocial behavior. Higher-functioning ToM by itself or in combination with SIP goals was related in predicted ways to teacher- and self-ratings of physical aggression/prosocial behavior, but, for
peer-rating, lower-functioning ToM was related to relational aggression. Further study of the impact of ToM on aggressive and prosocial behavior should take into account the rater of the behavioral measure. Because relational aggression is primarily a peer-directed social behavior, peer-ratings of relational aggression might be considered the “gold standard” of reporting. Although ToM was related to relational aggression in peer-ratings, and the SIP goal of revenge moderated this relationship, the findings were in the opposite direction of what was expected. Additional research is needed to determine if this finding is supported in other samples and in an adolescent population, where relational aggression becomes more pervasive and sophisticated. Significant results for physical aggression were limited to the SIP goal of revenge for girls, and should be understood in the context of the low levels of endorsement of physical aggression. Further examination of the relations between ToM and SIP goals to physical aggression in a more aggressive sample or with a measurement technique that captures more variation in mild physically aggressive behavior would be necessary before the conclusion that ToM is unimportant in understanding physical aggression in middle childhood can be drawn. Results indicate that ToM and SIP goals are especially relevant in understanding relational aggression, both for boys and girls. In some cases (e.g., girls’ peer-rated), low-functioning ToM, combined with high revenge goals, was linked with relational aggression, whereas, in other cases (boys’ and girls’ self-rated), high-functioning ToM, combined with high revenge goals, was linked with relational aggression. Replication of these findings in a clinical sample could help to clarify whether these are normative or non-normative differences and whether they place children at additional risk. For prosocial behavior, there was a significant interaction of ToM and the peace goal predicting teacher-ratings of girls’ prosocial behavior, but, given the exploratory nature of the current study, future replication of this finding is also needed in order to draw firm
conclusions about the nature of the relations between ToM, SIP goals, and prosocial behavior in middle childhood. In sum, there is evidence from the current study that ToM may indeed play a role in children’s aggressive and prosocial behavior, and that SIP skills may moderate this relations. Therefore, future study, with attention to gender and rater differences, is warranted, especially in understanding complex behaviors such as relational aggression.
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Kaland, N., Meller-Nielsen, A., Callesen, K., Mortensen, E., Gottlieb, D., & Smith, L.


Dear Parents,

I am a Ph.D. candidate at Bowling Green State University, in child clinical Psychology. I am writing to tell you about a study that I am conducting. The study is about children’s understanding of other people and how children make decisions about handling conflict. I am studying how children’s thoughts on these matters relate to their positive and negative social behaviors, such as helping and hurting peers. I am asking your permission for your child to participate in this study. **Children must be eight to ten years old to participate.**

If your child participates, he or she will complete a survey and an interview. 1) The survey would take place in your child’s classroom for one class period during the school day (about 45 minutes). The survey would be administered by myself and trained undergraduate students from BGSU. I will ask children about the positive and negative behaviors they and their peers do. Your child’s teacher will also provide feedback to us about the positive and negative social behaviors of the children who participate in the study. 2) The interview will also take place at your child’s school in a private setting for about 30 minutes. It will be about your child’s understanding of other people’s thoughts during social situations. Interviews will be conducted by myself and trained undergraduate students from BGSU. Every effort will be made to work with your child’s teacher to minimize the impact of the interview on classwork (i.e., not interviewing during a test), and children will be allowed to make-up any missed work.

**STUDENTS DO NOT HAVE TO COMPLETE THE SURVEY OR INTERVIEW IF THEY DO NOT WANT TO.** Not participating will not have any impact on your child’s grades or relationship to the school. Students can decide to participate and then change their mind later without penalty. Students’ responses to the survey and interview will be kept private by assigning an identification number to them. Students will NOT write their names anywhere on the survey. There will be one master list that has students’ names and identification numbers on it in order to match survey results with interview results. Only I will have access to this master list. The master list will be destroyed after data collection is complete and data have been entered into a computer. Children will receive a small incentive (i.e., pencils, stickers) for returning the consent form, whether or not they participate in the study. I am only interested in the responses of students as a group. No individual student’s responses will ever be revealed.

When I compile the results, I can prepare a report that will be shared with parents by the school. The results can be helpful in allowing us to learn more about how children think about social situations and how these thoughts relate to their social behaviors. Please let us know whether you would like your child to participate in this study by returning the attached form to your child’s teacher or by returning it to us in the envelope provided. If you have any questions, please call me, Sarah Martin, at (419) 372-2301, or my advisors at BGSU, Eric Dubow (419) 372-2556 or Dara Musher-Eizenman (419) 372 - 2948. In addition, if you have any concerns about the conduct of this study or your child’s rights as a research participant, you may contact the Chair of the Human Subjects Review Board at BGSU at (419) 372-7716, email at hsrb@bgsu.edu.

Please return the attached form by XX to let us know whether you would like your child to participate in this study. Thank you very much for your time and consideration.

Sincerely,

Eric F. Dubow, Professor  
edubow@bgsu.edu  
BGSU Dept. of Psychology

Dara Musher-Eizenman, Professor  
mushere@bgsu.edu

Sarah Martin, M.A.  
mbsarah@bgsu.edu
Students, Understanding Others, Making Decisions, and Social Behavior

Please return this form whether or not you want your child to participate in the survey and interview.

I have read the letter about the survey and interview being conducted by a graduate student from Bowling Green State University.

__________ I want my child to complete a survey and interview about his/her thoughts regarding social situations and how this relates to his/her social behaviors.

__________ I do not want my child to complete a survey and interview about his/her thoughts regarding social situations and how this relates to his/her social behaviors.

Child’s name (please print): ____________________________

Child’s age: ________________

Child’s gender: ___________________

Child’s grade: ________________

Child’s teacher: ___________________

Signature of parent or legal guardian: ____________________________________________

Thank you again for your time.
Hi, my name is Sarah Martin, and I’m a graduate student from Bowling Green State University. I am having students complete a research survey and an individual interview to help me learn more about how kids think in social situations. Kids from 8 to 10 years old can take part in this. Your honest opinions are very important to me. I would like you to fill out a survey and then talk with me privately so you can share your thoughts and opinions. The survey will take about 45 minutes. For some kids, the interview will be about 5 minutes, for other kids, it will take about 30 minutes to complete. Your teacher, your classmates, and you will be asked to share positive and negative things you do when you have problems getting along. You will get a small prize because your parents returned your permission form, and, by completing the study, you will be helping me learn about kids your age.

If you fill out the survey, your answers will be PRIVATE. You will not write your name anywhere on the survey. There will be a list that has your name and a number that is on your survey/interview. It will be kept in a locked place, apart from your survey/interview answers. I need the list so that I can match your survey answers with your interview answers. Once I’ve done this, I will destroy the list and there will not be any way to know which survey/interview answers are yours. I will not single out any kid’s answers because I am interested in what kids as a group think about these questions.

You DO NOT have to fill out the survey or complete the interview if you do not want to. If you start, and then change your mind, you can stop at any time. Your decision will not affect your grades. Your teacher’s attitude toward you will not change. You can keep this form for yourself.

If you have any questions for us, please feel free to ask!

Also feel free to contact us at:

Sarah Martin
Eric Dubow, Professor
Dara Musher-Eizenman, Professor
Psychology Department
Bowling Green State University
Bowling Green, OH 43402
(419) 372-4501
Students, Understanding Others, Making Decisions and Social Behavior

Please fill this out if you want to participate.

I have read the letter about doing the survey and interview that a graduate student from Bowling Green State University is doing, and I want to complete the survey and interview.

Name: ________________________________
Age: __________________
Gender (are you a boy or a girl?): ______________
Grade: _______________
Teacher’s Name: __________________________

Thank you again for your time.
Appendix C

Teacher Consent Form

Dear Teacher,

I am a graduate student at Bowling Green State University, working on my Ph.D. in child clinical Psychology. The school administration at XXX has granted me permission to conduct a study at your school, and I am writing to tell you about it. The study is about how 8 – 10 year old children understand other people and make decisions about conflicts. We are interested in how these skills relate to children’s aggressive and prosocial behaviors (helping others, being kind). Our findings can help develop more effective interventions to reduce aggressive behavior and promote social competence.

The survey I have designed should take about 45 minutes to complete. I will ask children about the positive and negative behaviors they and their peers do. I will ask teachers to provide feedback on children’s positive and negative social behaviors in a brief survey (10 minutes) that can be completed while children fill out their survey. You will receive a small incentive for participation ($10 Walmart gift card). In addition, students will individually participate in a structured interview about their understanding of others. The interview will take about 30 minutes. All scheduling will be done in collaboration with you, to minimize the disruption to your class.

I will ask parents to give permission for their child to participate. In order to facilitate this, I will provide you with consent forms to send home to parents. I will also ask the students to give written assent, and I will have you fill out a consent form when I conduct the group survey in your classroom. Students’ responses to the survey and interview will be kept private by assigning an identification number to them. Children will receive a small incentive (i.e., pencils, stickers) for returned consent forms, regardless of whether their parents decide to allow them to participate or not. I am interested in the responses of students as a group, so no individual student’s responses will ever be revealed. The risks involved in this study are no greater than those encountered in daily life.

I am excited about the possibility of administering this survey and interview in your school. When I compile the results, we will prepare a report that can be shared with school administrators, teachers, and parents. The results can be helpful in allowing you to learn more about how children in your school think about social situations and in understanding how their thoughts relate to their aggressive and prosocial behaviors. If you have any questions, please call me, Sarah Martin, at (419) 372-2301, or my advisors at BGSU, Eric Dubow (419) 372-2556 or Dara Musher-Eizenman (419) 372 - 2948. In addition, if you have any concerns about the conduct of this study or your or your students’ rights as research participants, you may contact the Chair of the Human Subjects Review Board at BGSU at (419) 372-7716, email at hsrb@bgsu.edu.

I will call you soon to further discuss plans for collecting data in your classroom. Thank you very much for your time.

Sincerely,

Eric F. Dubow, Professor  Dara Musher-Eizenman, Professor  Sarah Martin, M.A.
edubow@bgsu.edu  mushere@bgsu.edu  mbsarah@bgsu.edu

BGSU Dept. of Psychology
Students, Understanding Others, Making Decisions and Social Behavior

Please fill this out if you want to participate.

I have read the letter about completing the teacher survey that a graduate student from Bowling Green State University is doing, and I want to complete the survey.

Name: ________________________________

School Name: __________________________

Grade Taught: _________________________

Thank you again for your time.
## Appendix D

### Demographic Questionnaire

**Directions:** I am going to read you a bunch of questions and I’d like you to follow along and fill in the answers.

<table>
<thead>
<tr>
<th>Please fill in the blank: I am ________________ years old.</th>
</tr>
</thead>
</table>

Circle the sentence that best describes you.

- I am a boy.
- I am a girl.
Appendix E

First and Second-Order False Belief Task

First-Order False Belief Task

Two dolls are introduced to the children, Sally and Anne. Children are first asked what each doll’s name is (Naming Question). Next, Sally placed a marble in her box and leaves the scene. Anne then takes the marble and hides it in her box. Sally then returns and the child is asked “Where will Sally look for her marble?” (Belief Question). Two control questions: “Where is the marble really?” (Reality Question) and “Where was the marble in the beginning?” (Memory Question).

Second-Order False Belief Task

This task is the same as the one above, except that when Sally leaves the room, she looks back through a keyhole while Anne is moving the marble. When Sally returns, the child is asked “Where does Anne think Sally will look for the marble?” (Belief Question). This question is only administered if the child passed the first-order false belief question.
All of the class took part in a story competition. Emma really wanted to win. While she was away from school, the results of the competition were announced: Alice was the winner. The next day, Alice saw Emma and said “I’m sorry about your story.” “What do you mean?” said Emma. “Oh nothing,” said Alice.
Writing Competition Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. Who won the story competition?

4. Did Alice realize that Emma hadn’t heard the results of the competition?

5. How does Emma feel now?

6. Did Alice want to make Emma feel [insert feeling from question 5]?
Lunchtime Story

Robert had just started at a new school. He said to his new friend, Andrew, “My mom is a cafeteria worker at this school.” Then Claire came over and said, “I hate cafeteria workers. They’re horrible.” “Do you want to come and play marbles?” Andrew asked Claire. “No” she replied, “I’m not feeling very well.”
Lunchtime Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. What job does Robert’s mom do?

4. Did Claire know that Robert’s mom was a cafeteria worker?

5. How does Robert feel now?

6. Did Claire want to make Robert feel [insert feeling from question 5]?
Angie had just moved into a new house. She went shopping with her aunt and bought a new rug for her bedroom. When she had just put it out, her best friend Mary came over and said, “Oh, that rug is so pretty, you don’t need to bother to get a new one. Angie asked, “Do you like the rest of my bedroom?”
New House Story

1. In the story, did someone say something that was a compliment?

2. What did they say that was a compliment?

3. What had Angie just bought?

4. Did Mary know the rug was new?

5. How does Angie feel now?

6. Did Mary want to make Angie feel [insert feeling from question 5]?
Mike was in one of the cubicles in the toilets at school. Joe and Peter were at the sink nearby. Joe said, “You know that new boy in the class, his name is Mike. Doesn’t he look really weird!” Mike then came out of the cubicles. Peter said, “Oh hello Mike, are you going to play football now?”
New Boy Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. Where were Joe and Peter when they were talking?

4. Did Joe know that Mike was in the cubicles?

5. How does Mike feel now?

6. Did Joe want to make Mike feel [insert feeling from question 5]?
Kim helped her mom make an apple pie for her uncle when he came to visit. She carried it out of the kitchen. “I made it just for you,” said Kim. “Mmm,” replied Uncle Tom, “That looks lovely. I love pies, except for apple, of course!”
Pie Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. What kind of pie had Kim made?

4. Did Uncle Tom know that the pie was an apple pie?

5. How does Kim feel now?

6. Did Uncle Tom want to make Kim feel [insert feeling from question 5]?
Billy had just started at a new school. He said to his new friend, Pat, “My mom is the new art teacher at this school. Then Ashley came over and said, “I love art class, the teacher is so nice.” “Do you want to come and play basketball?” Pat asked Ashley. “No” she replied, “I’m not feeling very well.”
School Story

1. In the story, did someone say something that was a compliment?

2. What did they say that was a compliment?

3. What job does Billy’s mom do?

4. Did Ashley know that Billy’s mom was the new art teacher?

5. How does Billy feel now?

6. Did Ashley want to make Billy feel [insert feeling from question 5]?
James bought Richard a toy airplane for his birthday. A few months later, they were playing with it, and James accidentally dropped it. “Don’t worry,” said Richard, “I never liked it anyway. Someone gave it to me for my birthday.”
Birthday Present Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. What did James give Richard for his birthday?

4. Did Richard remember James had given him the toy airplane for his birthday?

5. How does James feel now?

6. Did Richard want to make James feel [insert feeling from question 5]?
Sally has short blonde hair. She was at her Aunt Carol’s house. The doorbell rang. It was Mary, a neighbor. Mary said, “Hello,” then looked at Sally and said, “Oh, I don’t think I’ve met this little boy. What’s your name?” Aunt Carol said, “Who’d like a cup of tea?”

Neighbor Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. Whose house was Sally at?

4. Did Mary know that Sally was a little girl?

5. How does Sally feel now?

6. Did Mary want to make Sally feel [insert feeling from question 5]?
All of the class took part in a poetry competition. Jamie really wanted to win. While she was away from school, the results of the competition were announced: Jamie was the winner. The next day, Katie saw Jamie and said, “That’s great about your poem.” “What do you mean?” said Jamie. “Oh nothing,” said Katie.
Poetry Story

1. In the story, did someone say something that was a compliment?

2. What did they say that was a compliment?

3. Who won the poetry competition?

4. Did Katie realize that Jamie hadn’t heard the results of the competition?

5. How does Jamie feel now?

6. Did Katie want to make Jamie feel [insert feeling from question 5]?
Mrs. West, the teacher, had something to tell her class, “One of the boys in our class, Simon, is very seriously ill,” she said. The class was very sad and was sitting quietly when a little girl, Becky, arrived late. “Have you heard my new joke about sick people?” she asked. The teacher said to her, “Sit down and get on with your work.”
Schoolroom Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. What did the teacher tell the class at the beginning of the story?

4. Did Becky know that Simon was sick?

5. How does the class feel now?

6. Did Becky want to make the class feel [insert feeling from question 5]?
Tim was in a restaurant. He spilt his coffee on the floor by accident. Jack was another person in the restaurant, standing by the cash register waiting to pay. Tim went up to Jack and said, “I’m terribly sorry, but I’ve spilt my coffee. Would you be able to mop it up?”
Coffee Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. Where did the story take place?

4. Did Tim know Jack was a customer?

5. How does Jack feel now?

6. Did Tim want to make Jack feel [insert feeling from question 5]?
John was in one of the cubicles in the toilets at school. Sam and Eddy were at the sinks nearby. Sam said, “You know that new boy in the class—you know, his name is John. Doesn’t he look cool!” John then came out of the cubicles. Eddy said, “Oh, hi John. Are you going to play football now?”
New Kid Story

1. In the story, did someone say something that was a compliment?

2. What did they say that was a compliment?

3. Where were Sam and Eddy when they were talking?

4. Did Sam know that John was in the cubicles?

5. How does John feel now?

6. Did Sam want to make John feel [insert feeling from question 5]?
Jill had just moved into a new apartment. She went shopping with her mom and bought some new curtains. When Jill had just put them up, her best friend Lisa came over and said, “Oh, those curtains are horrible, I hope you’re going to get some new ones.” Jill asked, “Do you like the rest of my bedroom?”
New Apartment Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. What had Jill just bought?

4. Did Lisa know that the curtains were new?

5. How does Jill feel now?

6. Did Lisa want to make Jill feel [insert feeling from question 5]?
Party Story

Helen’s mom was having a surprise party for Helen’s birthday. She invited Nicky and said, “Don’t tell anyone, especially Helen!” The day before the party, Nicky and Helen were playing together and Nicky ripped her new dress. “Oh!” said Nicky, “I was going to wear this to your party.” “What party?” said Helen. “Come on,” said Nicky, “Let’s go and see if my mom can mend the tear.”
Party Story

1. In the story, did someone say something that they should not have said?

2. What did they say that they should not have said?

3. Who was the surprise party for?

4. Did Nicky remember the party was a surprise?

5. How does Helen feel now?

6. Did Nicky want to make Helen feel [insert feeling from question 5]?
Kate helped her mom make a chocolate cake covered in icing for her neighbor Richard when he came to visit. She carried it out of the kitchen. “I made it just for you,” said Kate. “Mmm,” replied Richard, “That looks lovely—I love cake, especially chocolate cake!”
Cake Story

1. In the story, did someone say something that was a compliment?

2. What did they say that was a compliment?

3. What kind of cake had Kate made?

4. Did Richard know that the cake was chocolate?

5. How does Kate feel now?

6. Did Richard want to make Kate feel [insert feeling from question 5]?
Appendix G

SIP Goals

Directions: I’m going to tell you about some situations that might possibly happen to you and your classmates. Although these situations are not real, I would like you to think about each one very carefully, and imagine that these things have really happened to you. Then I am going to ask you what your goals would be in each situation. I’m going to read all the questions out loud, so please try to follow along, and please do not work ahead. Does anyone have any questions?

Project Story

At school one day, you are working on a science project with another kid. Just when you are almost done with your half of the project, the other kid says, “I don’t like this.” Then the kid throws your half of the project away. Imagine that this has really happened.

1. How much would you want the following things to happen? For each choice, circle the number that fits the best for you.

<table>
<thead>
<tr>
<th>I would...</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>A lot</th>
<th>A whole lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Want to get along with this classmate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Want to make sure that the other kids in my class like me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Want to get back at the kid for what they just did to me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Want to get the project back and finish it.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. Not want to let the kid boss me around.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
**Party Story**

You are in the bathroom one day after recess. While you are in the there, two kids from your class come in and start talking to each other. You hear one of the kids invite the other one to a birthday party. The kid says everyone in the class is invited except for you. Imagine that this has really happened.

1. **How much would you want the following things to happen?** For each choice, circle the number that fits the best for you.

<table>
<thead>
<tr>
<th>I would...</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>A lot</th>
<th>A whole lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Not want to let the kid push me around.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Want to get to go to the party.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Want to get back at the kid for what they just did.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Want to get along with this classmate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. Want to make sure that my other classmates will like me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
# Seat Story

At lunch one day, you are looking for a place to sit. You walk over to a table with one empty seat left. Just as you are about to sit down, another kid comes over and says, “I want this seat.” Then the kid sits down in your spot. Imagine that this has really happened.

1. **How much would you want the following things to happen?** For each choice, circle the number that fits the best for you.

<table>
<thead>
<tr>
<th>I would…</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>A lot</th>
<th>A whole lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Want to make sure that the other kids at lunch will like me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Want to get a seat and start eating.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Want to get along with this classmate.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Not want to let the kid boss me around.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. Want to get back at the kid for what they just did.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### Lunch Story

You are at lunch one day and looking for a place to sit. You see kids you know at a table across the room. The kids are laughing and talking to each other and they look like they are having a good time. You go over to their table, sit down, and say hi to everyone. The kids look right at you, roll their eyes, and don’t say anything to you. After a few seconds, the kids start talking to each other, but no one talks to you at all.

Imagine that this has really happened.

1. **How much would you want the following things to happen?** For each choice, circle the number that fits the best for you.

<table>
<thead>
<tr>
<th>I would…</th>
<th>Not at all</th>
<th>A little</th>
<th>Somewhat</th>
<th>A lot</th>
<th>A whole lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Want to talk to the kids.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>b. Not want to let the kids boss me around.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>c. Want to get back at the kids for what they just did.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>d. Want to get along with these classmates.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>e. Want to make sure that the other kids in the class will like me.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Peer Rating Form

Peer Rating
Please read the sentence below and then circle the number beside each classmate’s name that best describes how often they do the following behavior.

How often does each classmate try to get others to dislike the person he/she is mad at, shut others out of the group, and say bad things behind others’ backs?

<table>
<thead>
<tr>
<th>Never</th>
<th>Not often</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child X</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Never</th>
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<th>Sometimes</th>
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<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child Y</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Please read the sentence below and then circle the number beside each classmate’s name that best describes how often they do the following behavior.

How often does each classmate try to cheer others up, say nice things to others, and work things out calmly when they have a problem with someone?

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Not often</th>
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<tbody>
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<td>4</td>
<td>5</td>
</tr>
<tr>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
Please read the sentence below and then circle the number beside each classmate’s name that best describes how often they do the following behavior.

**How often does each classmate hit, kick and shove others?**

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Not often</th>
<th>Sometimes</th>
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<tbody>
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<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Child Y</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
### Teacher Rating

Please read the sentence below and then circle the number beside each of your student’s names that best describes how often he/she does the following behavior.

How often does each child try to get others to dislike the person he/she is mad at, shut others out of the group, and say bad things behind others’ backs?

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<thead>
<tr>
<th></th>
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<td>4</td>
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</table>
Please read the sentence below and then circle the number beside each of your student’s names that best describes how often he/she does the following behavior.

How often does each child try to cheer others up, say nice things to others, and work things out calmly when they have a problem with someone?

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</table>
Please read the sentence below and then **circle the number beside each of your student’s names that best describes how often he/she does the following behavior.**

**How often does each child hit, kick and shove others?**

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<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
## Appendix J
### Self-Rating Form

**Directions:** We would like to know how often you act in certain ways toward other students. Please circle the choice that says how often YOU do each of the things.

<table>
<thead>
<tr>
<th>How often do you tell others’ secrets?</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Pretty Often</th>
<th>Very Often</th>
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<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
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</tbody>
</table>

How often do you work things out calmly when you have a problem with someone?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you hit others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you put down others’ hair or clothing?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you help others with their schoolwork?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you shut others out of the group?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you kick others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you become friends with another classmate as a kind of revenge?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you do nice things without being asked?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you write notes where others are put down?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you share with others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you ignore others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you shove others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you gossip about the person you are angry at?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you say nice things to others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you tell bad or false stories about others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you take things from others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you plan secretly to bother others?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you go out of your way to be nice to someone?

|                                      | 1     | 2      | 3         | 4            | 5          |

How often do you push others down to the ground?

|                                      | 1     | 2      | 3         | 4            | 5          |
| How often do you say bad things behind others’ backs? | 1 | 2 | 3 | 4 | 5 |
| How often do you pull at others? | 1 | 2 | 3 | 4 | 5 |
| How often do you say nice things to someone who isn’t your friend? | 1 | 2 | 3 | 4 | 5 |
| How often do you say you are going to hurt others? | 1 | 2 | 3 | 4 | 5 |
| How often do you say good things to other people about classmates or teachers? | 1 | 2 | 3 | 4 | 5 |
| How often do you say to others “Let’s not be with him/her?” | 1 | 2 | 3 | 4 | 5 |
| How often do you try to cheer others up? | 1 | 2 | 3 | 4 | 5 |
| How often do you try to get others to dislike the person you are angry with? | 1 | 2 | 3 | 4 | 5 |
| How often do you help other kids who are being picked on? | 1 | 2 | 3 | 4 | 5 |
An alternative data analysis method was also conducted. Continuous measures of physical and relational aggression were examined; the measures were transformed using a loglinear transformation, and hierarchical regressions were conducted. There were significant findings for revenge goals to positively predict teacher- and peer-rated physical and relational aggression for girls. There was also a trend for boys’ higher-functioning theory of mind to positively predict teacher-rated relational aggression, and for boys’ revenge goals to positively predict self-rated relational aggression. Lastly, there was a trend for girls’ theory of mind and revenge goals to interact to predict self-rated relational aggression. Using this data analytic strategy did not change the general results of the study; most of the results were the same. A few of the significant results that were found using the logistic regression method were not found, but there were no changes in the direction of findings. However, using this approach, all of the measures of teacher-, peer-, and self-rated physical and relational aggression were still skewed, with the exception of teacher-rated relational aggression. Thus, this data analysis method was not interpreted in the current study.
Table 1

*Correlations Between ToM Subscales (N = 70)*

<table>
<thead>
<tr>
<th></th>
<th>FP Detection(^a)</th>
<th>C Detection(^a)</th>
<th>FP Fact(^b)</th>
<th>C Fact(^b)</th>
<th>FP Logic(^c)</th>
<th>C Logic(^c)</th>
<th>FP Feeling(^d)</th>
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<th>FP Purpose(^e)</th>
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\(^a\)Detecting the faux pas/accidental kindness (C = compliment). \(^b\)Correctly answering the factual question about the story. \(^c\)Knowing that the actor was unaware of an important piece of information. \(^d\)Correctly identifying the recipient’s emotion. \(^e\)Knowing that the actor did not say the faux pas/accidental kindness statement on purpose. **\(p < .01\), *\(p < .05\), +\(p < .10\).
Table 2

Correlations of the Criterion Variables (N = 70)

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*Self-rated prosocial behavior is reverse-coded; higher scores indicate less prosocial behavior.

**p < .01, *p < .05, + p < .10.
Table 3

Means and Standard Deviations of Major Study Variables by Gender and Age (N = 70)

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Males (n = 35)</th>
<th>Means (SD)</th>
<th>Females (n = 35)</th>
<th>Means (SD)</th>
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<th>Means (SD)</th>
<th>9-10 year olds (n = 39)</th>
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a Significant gender difference at p < .01.
Table 4

*Correlations Among the Major Study Variables for Boys (n= 35)*

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<th>Revenge</th>
<th>Peace</th>
<th>Tea-PS</th>
<th>Peer-PS</th>
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<th>Peer-RA</th>
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*TOM is reverse-coded; higher scores indicate lower-functioning theory of mind skills. Self-rated prosocial behavior is reverse-coded; higher scores indicate less prosocial behavior. **p < .01, *p < .05, + p < .10.*
Table 5

Correlations Among the Major Study Variables for Girls (n= 35)

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</tbody>
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TOM is reverse-coded; higher scores indicate lower-functioning theory of mind skills. Self-rated prosocial behavior is reverse-coded; higher scores indicate less prosocial behavior.

**p < .01. *p < .05. + p < .10
### Correlations Among the Major Study Variables for the Overall Sample (N = 70)

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<thead>
<tr>
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<th>ToM</th>
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<th>Peace</th>
<th>Tea-PA</th>
<th>Tea-RA</th>
<th>Tea-Pro</th>
<th>Peer-PA</th>
<th>Peer-RA</th>
<th>Peer-Pro</th>
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<td>-.18</td>
<td>.36**</td>
<td>.29*</td>
<td>-.29*</td>
<td>.12</td>
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<td>.44**</td>
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<td>-.52**</td>
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<td>.29*</td>
<td>.30*</td>
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<td>.29*</td>
<td>.30*</td>
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</tbody>
</table>

*aToM is reverse-coded; higher scores indicate lower-functioning theory of mind skills.*

*bSelf-rated prosocial behavior is reverse-coded; higher scores indicate less prosocial behavior.*

**p < .01. *p < .05. +p < .10.
Table 7
Hierarchical Logistic Regression Results: ToM and SIP Predicting Teacher-, Peer-, and Self-Rated Physical Aggression

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Boys (n = 35)</th>
<th>Girls (n = 35)</th>
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<tbody>
<tr>
<td></td>
<td>β (Step),</td>
<td>β (Step),</td>
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<tr>
<td></td>
<td>(S.E.)</td>
<td>(S.E.)</td>
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<tr>
<td></td>
<td>Odds Ratio</td>
<td>Odds Ratio</td>
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<tr>
<td>Step 1:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theory of Mind&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1.80 (4.81)</td>
<td>7.44 (9.40)</td>
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<tr>
<td>Revenge Goal</td>
<td>.11 (.25)</td>
<td>1.18 (.54)*</td>
</tr>
<tr>
<td>χ² (Step)</td>
<td>χ² (2) = .37</td>
<td>χ² (2) = 6.47*</td>
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<tr>
<td>Step 2:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOM X Rev</td>
<td>-.35 (3.27)</td>
<td>-.488 (11.57)</td>
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<tr>
<td>χ² (Step)</td>
<td>χ² (1) = .01</td>
<td>χ² (1) = .19</td>
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<table>
<thead>
<tr>
<th>Predictors</th>
<th>Boys (n = 35)</th>
<th>Girls (n = 35)</th>
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</thead>
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<td>β (Step),</td>
<td>β (Step),</td>
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<td>(S.E.)</td>
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<td>Odds Ratio</td>
<td>Odds Ratio</td>
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<tr>
<td>Step 1:</td>
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<td></td>
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<tr>
<td>Theory of Mind&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-3.47 (5.31)</td>
<td>1.36 (8.06)</td>
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<tr>
<td>Revenge Goal</td>
<td>-.24 (.28)</td>
<td>1.13 (.46)*</td>
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<tr>
<td>χ² (Step)</td>
<td>χ² (2) = 1.30</td>
<td>χ² (2) = 8.20*</td>
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<tr>
<td>Step 2:</td>
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<td>TOM X Rev</td>
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<td>χ² (Step)</td>
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<table>
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<th>Predictors</th>
<th>Boys (n = 35)</th>
<th>Girls (n = 35)</th>
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<td>Step 1:</td>
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<tr>
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<td>.67 (.39) +</td>
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<td>χ² (2) = 3.12</td>
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<tr>
<td>Step 2:</td>
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<tr>
<td>TOM X Rev</td>
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<td>-25.40 (16.41)</td>
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<td>χ² (Step)</td>
<td>χ² (1) = 2.48</td>
<td>χ² (1) = 5.44*</td>
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<sup>a</sup>TOM is reverse-coded; higher scores indicate lower-functioning theory of mind skills.

**p < .01. *p < .05. + p < .10
Table 8
Hierarchical Logistic Regression Results: ToM and SIP Predicting Teacher-, Peer-, and Self-Rated Relational Aggression

Teacher-Rated Relational Aggression

<table>
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<th>Boys (n = 35)</th>
<th>Girls (n = 35)</th>
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<td>β (Step), (S.E.)</td>
<td>Odds Ratio</td>
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<td>Step 1:</td>
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<td></td>
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<tr>
<td>Theory of Mind&lt;sup&gt;a&lt;/sup&gt;</td>
<td>-9.83 (5.31) &lt;sup&gt;+&lt;/sup&gt; 0</td>
<td>7.02 (8.29) 1123.72</td>
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<td>3.64</td>
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<tr>
<td>χ² (Step)</td>
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Peer-Rated Relational Aggression

<table>
<thead>
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<th>Girls (n = 35)</th>
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<tbody>
<tr>
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<td>β (Step), (S.E.)</td>
<td>Odds Ratio</td>
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<tr>
<td>Step 1:</td>
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<td></td>
</tr>
<tr>
<td>Theory of Mind&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.72 (7.80) 2.05</td>
<td>32.92 (15.79)*</td>
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Self-Rated Relational Aggression

<table>
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<td></td>
</tr>
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<td>Theory of Mind&lt;sup&gt;a&lt;/sup&gt;</td>
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<td>TOM X Rev</td>
<td>-6.63 (4.01) &lt;sup&gt;+&lt;/sup&gt; .001</td>
<td>-18.54 (10.36) &lt;sup&gt;+&lt;/sup&gt; 0</td>
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<tr>
<td>χ² (Step)</td>
<td>χ² (1) = 3.11 &lt;sup&gt;+&lt;/sup&gt;</td>
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</table>

<sup>a</sup>TOM is reverse-coded; higher scores indicate lower-functioning theory of mind skills.

**p < .01. *p < .05. <sup>+</sup>p < .10
Table 9
Hierarchical Regression Results: ToM and SIP Predicting Teacher-, Peer-, and Self-Rated Prosocial Behavior

Teacher-Rated Prosocial Behavior

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<td>.05</td>
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<td>$F (2, 32) = .55$</td>
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Peer-Rated Prosocial Behavior

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<td>.05</td>
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<td>-.07</td>
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<tr>
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Self-Rated Prosocial Behavior$^b$

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<th>Females (n = 35)</th>
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<tr>
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<td>-.27</td>
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<tr>
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<tr>
<td>$F$ (Step)</td>
<td>$F (3, 31) = .57$</td>
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</tr>
</tbody>
</table>

$^a$TOM is reverse-coded; higher scores indicate lower-functioning theory of mind skills. $^b$Self-rated prosocial behavior is reverse-coded; higher scores indicate less prosocial behavior.

**$p < .01$. $^*p < .05$. $^*p < .10$