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Associations Between Behavioral Inhibition and Children's Social Problem Solving Behavior During Social Exclusion

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Abstract

The current study examined the associations between the early childhood temperament of behavioral inhibition and children's displays of social problem-solving (SPS) behavior during social exclusion. During toddlerhood (ages 2-3), maternal report and behavioral observations of behavioral inhibition were collected. At age 7, children's SPS behaviors were observed during a laboratory social exclusion task based on the commonly used Cyberball game. Results showed that behavioral inhibition was positively associated with displayed social withdrawal and negatively associated with assertive behavior during the observed social exclusion task at 7 years of age. These results add to our understanding of inhibited children's SPS behaviors during social exclusion and provide evidence for the associations between toddler temperament and children's social behavior during middle childhood.

Keywords

Temperament; Behavioral Inhibition; Social Problem Solving; Social Exclusion

The ability to engage with peers in a socially competent manner is important for children's early social and academic adjustment (Ladd, 2005; Rubin, Bukowski, & Laursen, 2009; Walker & Henderson, 2012). One aspect of children's social competence that may influence adjustment is their ability to solve problems during challenging social interactions. Social problem-solving (SPS) skills are defined as the strategies used to achieve personal goals (e.g., strategies for getting peers to comply) during social situations (Rubin & Krasnor, 1983). SPS may be particularly difficult for behaviorally inhibited and shy children, since research suggests that they approach challenging situations more passively than their peers (Stewart & Rubin, 1995; Walker, Degnan, Henderson, & Fox, in press). Most studies examining the relations between temperament and SPS have used hypothetical interviews and those that used behavioral observations have focused on object struggle and cooperation tasks. Various other types of social problem situations that children encounter, such as social exclusion, may also be difficult for behaviorally inhibited children. Studies examining social exclusion using observational measures or laboratory tasks, typically do not examine

children's actual problem solving behavior (i.e., in the moment) because the excluder is not physically present. The purpose of the current study was to examine the longitudinal relations between behavioral inhibition in toddlerhood and SPS behavior during social exclusion at 7 years of age. To examine these relations, the computer-based Cyberball paradigm was modified to create a live social exclusion task in which children's actual SPS behaviors could be observed.

Temperament describes relatively stable, biologically based individual differences in the quality and intensity of children's emotional reactions (Rothbart & Bates, 2006). Behavioral inhibition refers to the temperamental tendency to experience fear and anxiety in response to novel social and nonsocial stimuli (Fox, Henderson, Marshall, Nichols, & Ghera, 2005; Kagan, Reznick, & Snidman, 1985) and shyness refers to fear and anxiety specifically in response to novel social situations (Coplan & Armer, 2007). Although behaviorally inhibited and shy children are motivated to interact with others, the fear and anxiety associated with novelty often results in social withdrawal (Crozier, 2000). Social withdrawal is defined as solitude that originates from factors internal to a child such as strong physiological reactions to novelty (e.g., shyness) and social disinterest, as opposed to solitude that results from being actively rejected by one's peers (Rubin, Coplan, & Bowker, 2009). Both behavioral inhibition and shyness are associated with right frontal EEG asymmetry in infants, children, and adults, suggesting that behaviorally inhibited infants and children, and shy adults may have a physiological disposition toward responding to stressful social situations with negative affect and social withdrawal (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001; Henderson, Marshall, Fox, & Rubin, 2004; Schmidt, 1999).

Socially withdrawn and shy children approach SPS situations more passively than their peers from toddlerhood through elementary school. Specifically, they are less likely to make initiations that require compliance from a peer and when they do make initiations, they are more likely to use subtle means to attain their goals during both structured and unstructured tasks (Stewart & Rubin, 1995; Walker et al., in press). One important direction for understanding the relations between behavioral inhibition and SPS is to examine whether inhibited children also display socially withdrawn behavior during *social exclusion*. Constructs closely related to behavioral inhibition, such as shyness and anxious solitude, are associated with risk for social exclusion as early as kindergarten and greater self-report of social anxiety, including negative evaluation from peers during middle childhood (Gazelle & Ladd, 2003; Henderson, 2010). Thus, it is important to examine behaviorally inhibited children's SPS behaviors during social exclusion in middle childhood as they may be a mechanism linking early temperament to later poor social interactions and risk for psychopathology. Specifically, social interactions during middle childhood may reflect styles of peer interaction that extend into adolescence (Rubin et al., 2009), suggesting the importance of examining SPS behavior and early predictors of SPS behavior during middle childhood. In the current study we developed an observational paradigm to directly observe children's responses to social exclusion in the laboratory to examine whether behavioral inhibition is also associated with passive-withdrawn SPS behaviors during social exclusion.

Past research studies have used various methods for measuring social exclusion and behaviors associated with being excluded. One way to measure social exclusion is to gather

teacher, parent, and/or peer report of social exclusion. For example, teacher report and peer nominations of social exclusion can be used to identify children that are typically excluded by peers (e.g., Gazelle & Rudolph, 2004; Gazelle & Druhen, 2009) or teacher report can be used as an outcome to examine constructs associated with social exclusion (e.g., Coplan, Prakash, O'Neil, & Armer, 2004). These measures typically assess whether children are excluded by peers rather than how they might respond to social exclusion. Hypothetical-reflective interviews are a common measure of SPS in which children are presented with a hypothetical story of social problems and asked what the story protagonist or they themselves would do if the story was about them. The benefit of this measurement approach is that responses can be assessed for a variety of problem situations (e.g., object struggles, social exclusion, and peer group entry) and information regarding how a child might respond to social exclusion is gathered. However, hypothetical interviews measure how children think about social situations and their knowledge of social scripts (i.e., what they *ought* to do in challenging situations) while behavioral observations measure how children actually behave in those situations (Rubin & Rose-Krasnor, 1992). Since these two measurement methods may yield different responses (i.e., children do not always do what they say they would do), it is important to observe children's SPS behaviors to understand how they actually respond to challenging social situations.

Another group of studies have conducted live assessments to induce feelings associated with social exclusion and peer rejection. For example, Erdley, Cain, Loomis, Dumas-Hines and Dweck (1997) conducted a study with fourth and fifth grade students. Each participant was told by an experimenter that a pen pal club from another state was looking for new members. The participant was informed that she or he would send a sample letter to a same-sex child at the other school, which would be sent through radio transmission. Once the participant sent their letter, the experimenter would wait for a response and then informed the participant that the representative at the other school was not sure if she or he would be part of the club. The experimenter then encouraged the child to send a second letter, which was always accepted by the representative at the other school. Results suggested that children who focused on a performance goal (i.e., seeking positive judgment and avoiding negative evaluation) during the task were more likely to react helplessly to social failure than children who focused on learning goals (i.e., improving social skills and developing peer relationships). They also found that children who believe their personality was non-malleable were more likely to select performance goals, particularly those that involve avoidance and minimizing risk, compared to children who believed personality was malleable (Erdley et al., 1997). This helpless style of responding to challenging social situations (i.e., avoiding negative evaluation, avoidance behavior, blaming failure on uncontrollable characteristics) may reflect the behaviors of socially withdrawn children (Erdley et al., 1997).

In another study, which took place at children's schools, the experimenter asked participants (mean age 8 years) to identify a friend in order to conduct an interview together (Gazelle & Druhen, 2009). Once the child nominated a friend, the experimenter asked an assistant to bring the friend to the assessment room. When the assistant returned to the room, he or she reported that the friend did not want to come to the room. The authors found that children nominated by peers as anxious solitary and excluded displayed more social helplessness,

reported feeling more rejected in anticipation of and in reaction to rejection, and displayed more upset affect during rejection than children scoring low on both anxious solitude and exclusion (Gazelle & Druhen, 2009). Furthermore, they found that children who were nominated by peers as anxious solitary and excluded showed greater cardiovascular reactivity in response to social rejection compared to children only rated high on anxious solitude. To alleviate feelings of rejection, the assistant later told the participant that he or she was not familiar with the school and thus asked the wrong child to come join them for the interview (Gazelle & Druhen, 2009). In sum, these paradigms allowed the researchers to measure whether a presumed rejection by a peer influenced their reactions to social rejection and whether these responses were associated with individual differences in motivational goals (Erdley et al., 1997) as well as affect, social helplessness, and cardiovascular reactivity (Gazelle & Druhen, 2009). However, these paradigms did not allow for the measurement of children's behavioral response to social rejection in front of the peer. To examine how children's SPS behavior in response to social rejection or exclusion, live assessment must be conducted in the presence of the excluder.

One of the most commonly used measures of social exclusion is Cyberball (William & Jarvis, 2006). Cyberball is a virtual game in which the participant believes they are playing a game of catch with a ball online with others. After the participant plays for a while, they are excluded from play. In reality, the participant is not online or playing with others, the game is programmed to exclude the study participant or to examine whether the study participant excludes others. The task includes various options for experimental manipulation, such as the number of players, the speed and length of the game, and which player throws the ball to other players (William & Jarvis, 2006). Participants excluded during Cyberball report a more negative mood, feelings of less control, and a lower sense of belonging (Williams, Cheung, & Choi, 2000).

One limitation common to hypothetical interviews and the tasks described above is that they do not allow experimenters to observe how children actually respond to social exclusion because the individual excluding the participant is not physically present. Behavioral observations can be collected in the laboratory by experimentally creating an SPS situation and coding how the child responds to the situation or behaviors can be observed in a naturalistic setting (e.g., freeplay at school, play date at home). Observations in a naturalistic setting may be more difficult to collect since the observer must wait until an SPS situation presents itself in order to observe and code the child's behavior. In addition, SPS situations that naturally arise may be different for different children. One child may experience social exclusion whereas another child may engage in a toy struggle. Behaviors observed in the laboratory are beneficial in that every child is placed in the same type of SPS situation and therefore, the same coding scheme can be applied to every child's behavior.

In the current study, we used a live version of Cyberball with children and coded their SPS behaviors in response to being excluded from play with peers by an adult. This method allowed us to observe children's actual SPS skills in response to social exclusion. Another strength of the current study was the longitudinal design, allowing us to examine the associations between toddler temperament and SPS behavior during middle childhood, which may be a risk factor for the development of poor peer interactions and later

psychopathology. Poor social skills during middle childhood may continue into adolescence, suggesting the importance of examining the correlates of poor social behaviors during middle childhood earlier in development (e.g., toddler behavioral inhibition). Consistent with past studies of SPS in other contexts, we expected that behavioral inhibition measured during toddlerhood would be associated with the display of more passive and fewer assertive SPS behaviors during the observed social exclusion task at seven years of age.

Method

Participants

Participants included 171 children (76 boys, 95 girls) and their mothers, who came to the laboratory when children were two ($M = 2.19$, $SD = .21$), three ($M = 3.07$, $SD = .13$), and seven ($M = 7.66$, $SD = .23$) years of age. Sixty-six percent of children were White, 15% were African-American, 14% reported more than one race/ethnicity, 3% were Hispanic, and 2% were Asian. Fifteen percent of the children's mothers graduated from high school, 43% from college, and 36% from graduate school, while 5% completed a different type of educational program and 1% did not report their education.

Based on their infant temperament, 291 participants were originally selected to participate in a longitudinal study at the University of Maryland (see Hane, Fox, Henderson & Marshall, 2008). Of these, 171 had data on temperament in toddlerhood and SPS behaviors at age 7. There were no differences between children included in this study and those with missing data on sex, $\chi^2(1, N = 291) = .63$, $p = .43$; ethnicity, $\chi^2(1, N = 291) = .60$, $p = .44$; maternal education, $\chi^2(3, N = 289) = 1.73$, $p = .63$; 4-month temperament classification, $\chi^2(2, N = 291) = .90$, $p = .74$; or toddler behavioral inhibition, $t(266) = -.29$, $p = .77$.

At the 7-year visit, target children were randomly paired with a control participant (a same-sex, same-age unfamiliar peer recruited from the community to serve as an interaction partner) to participate in various social activities. The pairing was random rather than based on temperament because the goal of this pairing strategy was to mirror the natural variation in peer interaction typical of school and other social settings. There were no differences between target children and control peers on age, $t(340) = -.61$, $p = .54$, sex, $\chi^2(1, N = 342) = .01$, $p = .91$, ethnicity, $\chi^2(1, N = 342) = .46$, $p = .50$, maternal education, $\chi^2(3, N = 340) = 1.71$, $p = .64$ or maternal report of shyness at 7 years using the shyness scale from the Children's Behavior Questionnaire¹, $t(340) = -.91$, $p = .36$.

Procedure

Maternal reports of temperament were collected when children were 2 and 3 years of age. Observations of children's behavioral inhibition were also collected at these ages during various tasks in the laboratory where children were presented with novel social and non-social stimuli. A composite measure of behavior inhibition was created based on maternal report and observations of behavioral inhibition and used to predict 7-year SPS, see Figure 1.

¹Maternal report of temperament was also collected at seven years of age. However, it was only used to compare target children and control peers and was not included in analyses to preserve the longitudinal design.

At 7 years of age, dyads consisting of one target child and one control child played a game of catch with an unfamiliar experimenter in the laboratory. This laboratory task was modeled after the Cyberball task (Williams & Jarvis, 2006). During the ball toss task, the experimenter always threw the ball to the control child, the control child to the target child, and the target child back to the experimenter. After a few minutes of play, the experimenter told the control child, in the presence of the target child, that now only they will play with the ball and to only throw it back to him or her, thereby excluding the target child. During exclusion, the experimenter played catch with the control child and engaged them in conversation using a set of preselected topics (i.e., school, favorite movies or books, and sports they play or like to watch). The unfamiliar experimenter was part of the task to ensure consistent implementation of the social exclusion (i.e., timing and tone of exclusion), practicality (e.g., difficulty recruiting extra children for each visit), and good ethics (e.g., avoid instructing children to exclude their peers). The target child was excluded for 60 seconds, at which time another experimenter knocked on the door. The experimenter playing catch excused him or herself stating that the other experimenter needed help with something outside the room and allowed the two children to play together for one to two minutes. Then, the experimenter returned to the room and told the target child they were sorry they did not get a chance to throw the ball with them before they had to leave the room and gave the target child the opportunity to play with him or her alone. Children's behaviors during the ball toss task were recorded from behind one-way mirrors and subsequently coded for SPS behaviors.

Measures

Behavioral inhibition—We used both parent report and behavioral observations of child temperament to identify child behavioral inhibition during toddlerhood. The Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith 1996), a 108-item parent report measure of temperament, was collected at 2 and 3 years of age. Of interest in the current study was the dimension of social fearfulness, which measures children's reactions to unfamiliar adults and contexts (Goldsmith, 1996). The TBAQ has been found to be a valid and reliable questionnaire for use with 16- to 36-month-old children (Goldsmith 1996). In the current sample, internal consistency was .85 and .88 for social fearfulness at 2 and 3 years of age, respectively.

Children's behavioral inhibition was observed and coded at 2 and 3 years of age during three episodes in which children were presented with unfamiliar persons and objects (Calkins, Fox, & Marshall 1996; Fox et al., 2001). During the stranger episode, an unfamiliar experimenter sat quietly in the room with the child and their mother and did not make any eye contact for 1 minute, played with a toy for 1 minute, and then invited the child to play for 1 minute. A toy robot, which makes unpredictable movements and sounds, was turned on and left in the room for two minutes during the robot episode. During the tunnel episode, the experimenter invited the child to crawl through a pop-up tunnel. For each episode, observers coded children's latency to vocalize, latency to approach/touch the stimuli, and duration of time spent in proximity to their mother. Observers double-coded 19% and 11% of total coded cases for 2- and 3-year observations, respectively. Inter-rater reliability (Intraclass

correlations) ranged from .72 to .98 ($M = .87$) for 2-year coding and .93 to 1.00 ($M = .98$) for 3-year coding.

SPS—SPS behaviors displayed during the 60 seconds of exclusion were coded based on the coding schemes described by van Nieuwenhuijzen et al. (2005) and Joffe et al. (1990). Children's observed behavior was coded as one of the following categories: Aggressive, directly assertive, indirectly assertive, passive-redirect, or passive-withdrawal, see Table 1 for descriptions and examples. During the 60 seconds of exclusion, each time a child changed behavior from one category to another, a behavioral code was assigned. A global score was coded at the end of the task based on the behavior the child displayed most often during the 60 seconds of exclusion. Inter-rater reliability was determined with a team of two observers who double-coded 49% of total coded cases. Inter-rater reliability (kappa) was .88 for behaviors coded throughout the task and .72 for global SPS behavior. Only one child was coded as aggressive for their global SPS behavior, thus, this case was dropped due to the low frequency of displayed aggression.

Results

Behavioral Inhibition

A composite variable of behavioral inhibition was created by standardizing all temperament variables (i.e., maternal reports at 2 and 3 years and observations collected at 2 and 3 years) and computing the average ($M = -.01$, $SD = .77$) across the four variables to combine information from multiple methods during toddlerhood. The BI composite was created based on theory and confirmed through principal components analysis (eigenvalue = 2.04; loadings = .62 to .81). The behavioral inhibition composite variable was unrelated to child sex, $t(169) = .61$, $p = .55$; ethnicity, $F(1,169) = .37$, $p = .54$; or maternal education, $F(3,166) = .05$, $p = .99$. Therefore, demographic variables were excluded from further analyses.

Associations between SPS Behaviors during Exclusion and Global SPS Behavior

Based on the SPS behaviors displayed throughout the task, the total number of changes in behavior was calculated by summing the number of times each child changed from one behavior to another ($M = 4.49$, $SD = 2.35$, range = 1 to 12). Similarly, the total number of different SPS strategies each child displayed throughout the task was also created ($M = 2.55$, $SD = 0.95$, range = 1 to 5). The total number of changes in behavior and total number of different SPS strategies displayed were positively correlated ($r = .75$, $p < .001$), suggesting that children who displayed more changes in their behavior were also more likely to display a wider variety of SPS behaviors. We believe these variables reflect children's SPS flexibility.

Next, we examined whether the SPS flexibility variables were associated with the study variables. Behavioral inhibition was not correlated with the total number of SPS changes or the total number of different SPS strategies displayed (p 's $> .05$). However, the SPS flexibility variables were associated with the global SPS score. Specifically, results from two analyses of variance (ANOVAs) showed that children who displayed fewer total changes in behavior ($F(3,169) = 39.16$, $p < .001$) and fewer different types of SPS strategies

($F(3,169) = 32.36, p < .001$) were more likely to be coded as passively withdrawn for their global SPS score. These findings suggest that children who predominantly display passive-withdrawal during the task may be less flexible (i.e., less likely to try various and different types of SPS behaviors) during SPS situations, compared to children who predominantly display the other SPS behaviors.

Relations between Behavioral Inhibition and Global SPS Behavior

The categories of coded SPS behavior represent a range of approach/withdrawal behaviors, from aggression to passive-withdrawn behavior; therefore, SPS behavior was considered an ordinal categorical variable. Due to the categorical nature of the dependent variable, an ordinal logistic regression model was conducted using Stata version 11. The behavioral inhibition composite was included as the independent variable and the categorical global SPS behavior variable was the dependent variable. When analyzing an ordinal dependent variable, it is assumed that the relations between pairs of behaviors along the continuum are the same, which allows for all behaviors to be analyzed simultaneously in one ordinal logistic regression. The Brant Test (Brant, 1990) provided evidence that this assumption was not violated, $\chi^2(2) = 2.93, p = .23$.

The ordinal logistic regression examined the relation between behavioral inhibition and children's displayed SPS behavior during the observed social exclusion task. Results indicated that behavioral inhibition was associated with observed SPS behaviors, $b = -.41, SE = .19, z = -2.17, p = .030, CI_{95\%}$ from $-.78$ to $-.04$. For every one unit increase in behavioral inhibition, the log-odds of displaying the next higher category of SPS behavior decreased by .41. In other words, the odds of displaying passive-withdrawal were .44 times greater than displaying other behaviors for every one unit increase in behavioral inhibition. Specifically, the probability of children displaying passive-withdrawal increased as behavioral inhibition increased, the probability of children being directly and indirectly assertive decreased as inhibition increased, and the probability of displaying passive-redirect was similar across levels of inhibition, see Figure 2. These results demonstrate that toddlerhood behavioral inhibition was associated with individual differences in displays of SPS behaviors during an observed social exclusion task at 7 years of age.

Discussion

The current study sought to examine the relations between toddler behavioral inhibition and later SPS when children were excluded from play, with a sample of children selected based on their infant temperament. Results showed that behavioral inhibition was associated with displayed SPS behaviors during a social exclusion task, demonstrating that the task elicited meaningful differences in observed behaviors that were associated with measures of temperament from toddlerhood. Furthermore, the current study utilized a longitudinal design by examining relations between behavioral inhibition measured during toddlerhood and children's SPS behaviors at 7 years of age. These results shed light on inhibited children's social behaviors during social exclusion, which may be a mechanism linking behavioral inhibition to risk for later psychopathology and academic difficulties, as well as negative social experiences and poor peer relationships.

Children who were globally coded as displaying passive-withdrawal during the social exclusion task, displayed less SPS flexibility compared to children receiving a global code of the other SPS behaviors. These findings suggest that children who display withdrawn behaviors, may be less flexible during SPS. That is, they are less likely to try different types of SPS behaviors during the task. It has been suggested that a moderate amount of SPS flexibility may be the most adaptive response after social failure since changing SPS strategies may lead to success rather than using a strategy that already resulted in failure (Rubin & Rose-Krasnor, 1992). This suggests that limited flexibility during SPS may result in increased social failure. However, SPS flexibility was not associated with behavioral inhibition. These findings suggest that all children who display passive-withdrawal are less likely to change their behavior in reaction to the exclusion, regardless of their temperament. That is, children who withdrawal for reasons other than reactivity to novelty, such as social disinterest, may also display less flexibility during SPS.

During the social exclusion situation examined in the current study, assertive behavior was considered an adaptive way to enter the social situation after being excluded as these were positive behaviors coded separately from aggression. Displays of withdrawal, however, were not considered an adaptive response to social exclusion since avoiding the situation prevented the target child from engaging in the social interaction. Interestingly, behavioral inhibition, measured when children were 2- and 3-years of age, was associated with more withdrawn behavior and fewer assertive SPS behaviors during the social exclusion task at age 7. This pattern of behavior is consistent with studies documenting that inhibition is associated with a passive avoidant style of interaction and less socially competent and assertive behavior during challenging social situations with both familiar and unfamiliar peers (Burgess, Wojslawowicz, Rubin, Rose-Krasnor & Booth-LaForce, 2006; Rubin, Daniels-Bierness, & Bream, 1984; Stewart & Rubin, 1995; Walker et al., under review). Current study findings together with findings previously reported in the literature suggest that inhibited children respond to a variety of challenging social situations by withdrawing from the situation from toddlerhood through middle childhood. It has been suggested that socially withdrawn children may be cognitively capable of generating socially competent strategies to solve social problems, yet they may have difficulty translating these cognitions into effective behavioral responses (Rubin & Rose-Krasnor, 1992), resulting in more passive and less competent SPS. Wichmann, Coplan, and Daniels (2004) examined the social cognitions of socially withdrawn, aggressive, and comparison children (i.e., low in withdrawal and aggression) using a hypothetical-reflective measure of SPS. They found that withdrawn and comparison children generated comparable social goals; however, withdrawn children reported that they would be less likely to use assertive strategies and more likely to use avoidant strategies, compared to comparison and aggressive children (Wichmann, Coplan, & Daniels, 2004).

Emotion, in addition to cognition, influences social information processing during challenging social situations (Lemerise & Arsenio, 2000), suggesting that the experience of negative emotion and perhaps children's inability to appropriately regulate that emotion during challenging social situations may influence their social behavior. It is possible that for inhibited children, the experience of fear, anxiety, and distress in unfamiliar or challenging social situations may lead to emotional flooding (Ekman, 1984; Rubin et al.,

1984; Thompson & Calkins, 1996), which may interfere with their ability to enact socially competent responses during SPS with peers (Fox et al., 2005). When faced with a threatening situation, behaviorally inhibited and anxious individuals have an attention bias to threat where they experience difficulty disengaging from threatening stimuli (Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van Ijzendoorn, 2007; Pérez-Edgar et al., 2011). Furthermore, behavioral inhibition is associated with social withdrawal in early childhood and adolescence when they show a concurrent attention bias toward threat (Pérez-Edgar et al., 2010; Pérez-Edgar et al., 2011). Therefore, challenging social situations with peers and adults may be perceived as threatening by behaviorally inhibited children, resulting in withdrawal to alleviate the negative emotions they experience during social interaction.

Learned helplessness may also moderate the relation between behavioral inhibition and SPS behavior. For example, Gazelle and colleagues have found associations between anxious solitude, social exclusion and learned helplessness (Gazelle & Druhen, 2009; Gazelle & Rudolph, 2004). During a peer rejection task in school, children rated as anxious solitary and excluded by peers were found to display more socially helpless behavior than children rated low on both anxious solitude and peer exclusion (Gazelle & Druhen 2009). Examining trajectories of social approach in anxious solitary children, Gazelle and Rudolph (2004) found that anxious solitary fifth and sixth graders were rated higher on social helplessness during the first assessment. They examined socially helpless behavior over two additional time points, each six months apart. The authors found that children rated by teachers as anxious solitary and excluded by peers, were also rated as showing slightly higher levels of socially helpless behavior over time. However, anxious solitary children who were not excluded by peers showed significantly less helpless behavior over time (Gazelle & Rudolph, 2004). These findings may suggest that anxious solitary children who are not experiencing negative peer interactions (e.g., social exclusion) may not have their fears about social interactions confirmed, resulting in social approach; while solitary anxious children who are also excluded may have their fears confirmed and thus continue to show maladaptive social behavior during challenging social situations (Gazelle & Rudolph 2004). In addition, rejection sensitivity may also be associated with the relations between temperament and social exclusion. That is, anxious expectations of rejection in the fall of sixth grade are associated with increased social withdrawal and social anxiety in the spring of sixth grade (London, Downey, Bonica, & Paltin, 2007). Thus, it is possible that rejection sensitivity moderates the relations between temperament and SPS behavior. However, little is known about the associations between behavioral inhibition and rejection sensitivity. It is possible that behaviorally inhibited children who also have anxious expectations of rejection by peers may display socially withdrawn and avoidant behaviors during challenging peer social situations. Future studies should examine the role of both learned helplessness and rejection sensitivity in the relations between early temperament and poor SPS behaviors with peers.

Interestingly, behavioral inhibition was not related to displays of passive-redirecting behavior. Children coded as engaging in redirecting behavior would distract themselves from the difficult social situation by focusing their attention on a different task, which for some children may be a way of coping with distress (Henderson et al., 2004). That is, some children were able to shift attention away from threat and engage in a positive activity.

Attention shifting may be an adaptive way to regulate the negative emotions associated with threat (Eisenberg, Smith & Spinrad, 2011). In fact, the flexible allocation of attention and the ability to shift attention serves as a protective factor for behaviorally inhibited and shy children, decreasing the risk for the development of anxiety (Henderson, 2010; White, McDermott, Degnan, Henderson, & Fox, 2011). Furthermore, attention shifting and self-distraction are associated with social competence (Eisenberg, Smith & Spinrad, 2011). Perhaps behaviorally inhibited children with the ability to shift attention away from threat may show competent SPS behaviors, while those who do not develop this attention shifting ability will be more likely to withdraw from social interaction. Perhaps passive-redirecting behavior may be an adaptive and protective behavior for all children, regardless of their temperament, at least in the current context. That is, during real life experiences of social exclusion, children that can redirect their attention from the negative social experience and engage in a different activity may have better outcomes than children who continue to focus and ruminate on the experience of exclusion. Future studies could examine whether attention shifting is indeed protective for all children and whether it also moderates the relations between behavioral inhibition and SPS behavior.

Limitations and Future Directions

Using an observational task allowed us to measure children's SPS behavior during an actual social exclusion situation. However, one limitation of the current method was that the active person excluding the target child was an unfamiliar adult, as opposed to an unfamiliar or familiar peer. One of the difficulties of having children as the active excluder is that you have to train confederates. Indeed, Cyberball was also originally conceptualized as a live face-to-face task yet was created as a computer game to make for a more efficient task that does not require training confederates (Williams & Jarvis, 2006). Training of children as confederates also brings into question ethical concerns of training children to exclude other children from play. Therefore, we felt it was necessary to have the experimenter present and part of the task in order to socially exclude the target child from play. Despite this, findings suggest that using a live observational measure of Cyberball was feasible to collect and code, and elicits meaningful individual differences in children's behavior that are consistent with the prior temperament-SPS literature.

In addition, the current study was conducted with a sample of children selected based on their infant temperament. While behavioral inhibition shows moderate continuity, there is also discontinuity in displays of temperament over time, particularly among unselected samples (see Degnan & Fox, 2007). Therefore, future studies should identify the mechanisms (e.g., attention bias, rejection sensitivity) that may differentially result in poor and competent SPS behavior in behaviorally inhibited children. Lastly, findings from the current study indicate that early temperament was associated later SPS behavior during middle childhood and other studies have found that shyness was concurrently associated with social anxiety during middle childhood (Henderson, 2010) and that SPS is a mechanism linking shyness to academic skills in early elementary school (Walker & Henderson, 2012). These findings suggest that childhood temperament and SPS behavior may be risk factors for later social and academic difficulties and psychopathology. Therefore, future studies should examine whether SPS behavior during middle childhood

mediates the relations between early behavioral inhibition and adolescent academic achievement, psychopathology, and social interactions and relationships.

Conclusion

Behavioral inhibition, measured during toddlerhood, was associated with more passive-withdrawal and less assertive behavior during a live laboratory social exclusion task during middle childhood. These results, together with previous literature, show that early behavioral inhibition is associated with the display of social withdrawal across various types of problem situations during early and middle childhood and may be particularly important since SPS competence mediates the relations between temperament and academic skills during early childhood (Walker & Henderson, 2012). It appears that for highly behaviorally inhibited children, feelings of anxiety and distress during challenging social situations may lead to an attention bias to threat which results in social withdrawal to alleviate negative emotions. Prevention and intervention efforts may be designed to teach behaviorally inhibited children to reduce the fear and distress they experience during SPS situations to allow them to enact more competent and assertive behavior.

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Figure 1.

The current study utilized a composite measure of behavioral inhibition, which included maternal report and behavioral observations during toddlerhood, to examine the associations between early behavioral inhibition and SPS behavior at 7 years of age.

Figure 2.

Predicted probabilities of observing SPS behaviors during the laboratory social exclusion task across levels of behavioral inhibition. As expected, as inhibition increased, the predicted probability of children displaying passive-withdrawal increased while direct and indirectly assertive behavior decreased. The probability of displaying passive-redirect was similar across levels of behavioral inhibition.

Table 1

Descriptions and Examples of SPS Behavioral Coding.

Behavior	Coding Definition & Examples
Passive-Withdrawal	Child withdrew and did not respond to the situation.
Example:	Hovering or staring into space without any attempt to be noticed or included.
Passive-Redirect	Child directed attention elsewhere or found a new activity to engage in.
Example:	Singing or dancing while not paying attention to others playing the ball game.
Indirectly Assertive	Child stayed involved in the situation, but did not directly stand up for him or herself.
Example:	Interjecting into the conversation between the experimenter and peer.
Directly Assertive	Child stood up for him or herself while remaining in positive contact with others.
Example:	“Why can’t I play?” or “Let’s play monkey in the top!”
Aggression	Physical, verbal, or relational aggression or some form of retaliation.
Example:	Teasing or mocking the peer or experimenter.