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Temperament and Preschool Children's Peer Interactions

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Research Findings: The current study is an examination of children's temperament as a predictor of their interactions with peers in preschool, with a particular focus on children's regulatory temperament characteristics (i.e., inhibitory control and attentional focusing) as moderators of associations between shyness and interactions with peers. Participants were 40 children (19 boys) ages 3 to 5 years enrolled in 8 different preschools in a midwestern city in the United States. Temperament was assessed via parent report when children were approximately 3 years old, and peer interactions were assessed via observations of children during the preschool day (using the Individualized Classroom Assessment Scoring System; J. T. Downer, L. M. Booren, O. K. Lima, A. E. Luckner, & R. C. Pianta, 2010) when the children were 4 years old. Attentional focusing moderated the association between shyness and children's communication and conflict during peer interactions. Inhibitory control and attentional focusing were inversely related to peer conflict, and attentional focusing was positively related to sociability, communication, and assertiveness in peer interactions. Limitations of the current study and future directions are also discussed.

Practice or Policy: Teachers can facilitate young children's peer interaction by recognizing children's regulatory and reactive temperamental characteristics.

Young children's peer interactions in preschool are important for the development of their social, cognitive, academic, emotion regulation, and reciprocal communicative skills (Buhs & Ladd, 2001; Guralnick, Neville, Hammond, & Connor, 2007; Ladd, 2005). Children's interactions with peers are influenced by multiple factors, such as their social competence and prosocial actions, environmental settings, and temperamental characteristics (Eivers, Brendgen, Vitaro, & Borge, 2012; Pianta, La Paro, & Hamre, 2008).

Peer Interactions in the Preschool Years

Peer interactions in early childhood refers to the interactive and reciprocal exchanges between young children who share the same social context and relatively similar developmental

status (Ladd, 2005). Children can be affected by early peer interactions and friendships either negatively or positively (see Hartup, 1996, for a review). Some peer interactions can provide camaraderie that supports children, whereas others can result in conflict or damage to the bond of friendship (Hartup, 1996). For example, negative peer relations have been associated with aggressiveness, shyness, negative self-perception, and compliance problems for children (Ladd, Coleman, & Kochenderfer, 1997). In contrast, positive peer interactions in the preschool years can enhance children's school readiness as well as social competence, emotion regulation, and cognitive abilities (Bulotsky-Shearer et al., 2012; Justice, Petscher, Schatschneider, & Mashburn, 2011; Ladd, 2005; Ladd et al., 1997). For example, children who had positive interactions with peers in child care had better social and communicative skills with peers, were less aggressive, and showed more cooperative skills with peers in third grade (National Institute of Child Health and Human Development, Early Child Care Research Network [NICHD ECCRN], 2008).

Given the importance of peer interactions in early childhood for establishing a positive developmental trajectory, it is important to identify the child characteristics that may contribute to the quality of peer interactions. There is evidence that children's temperament characteristics are related to their interactions with peers (Eivers et al., 2012; Gleason, Gower, Hohmann, & Gleason, 2005; Sterry et al., 2010). For example, children with less reactive and more regulated temperaments tend to have higher quality peer interactions (Goldsmith, Aksen, Esgender, Smider, & Vandell, 2001; Rudasill, Niehaus, Buhs, & White, 2013). However, there has been limited work examining how reactive and regulatory temperament traits may work together to predict children's peer interactions. There is consistent evidence that children's regulatory temperament traits are linked to their academic and social outcomes in early childhood (Rothbart & Jones, 1998; Rudasill, 2011; Valiente et al., 2003). Thus, we expect children's regulatory temperament traits to mitigate the effects of reactive temperament traits during peer interactions. In this study, we focus on shyness as a reactive temperament trait that is particularly salient to children's social experiences (Rubin, Bowker, & Kennedy, 2009) and inhibitory control and attentional focusing as regulatory traits (Rudasill & Rimm-Kaufman, 2009). Given the growing evidence that children's regulation can be improved with targeted interventions (e.g., O'Connor, Cappella, McCormick, & McClowry, in press), this study is an important step toward identifying ways to promote positive peer interactions among children with more reactive temperament traits, particularly shyness.

Temperament and Peer Interactions

Temperament is a central characteristic that influences personality, emotionality, and social behaviors (see Eivers et al., 2012; Rothbart, 2011, for relevant review). *Temperament* is defined as relatively stable, *constitutionally* based individual differences in reactivity and self-regulation (Rothbart, 2011; Rothbart & Bates, 2006). *Constitutional* refers to the biological foundations of temperament that are structured by heredity and experiences (Rothbart & Bates, 2006).

Preschool children's temperamental characteristics indicating better regulation and less reactivity have predicted positive peer relations and friendship nominations in preschool-age children (Gleason et al., 2005; Valiente et al., 2003). Some researchers have examined temperament as a global concept, such as easy or difficult temperament (Szewczyk-Sokolowski, Bost, & Wainwright, 2005), whereas others have examined specific dimensions of

temperament, such as effortful control, shyness, soothability, and attentional focusing (Gleason et al., 2005; Rothbart, 2011; Valiente et al., 2003). For example, Szewczyk-Sokolowski et al. (2005) investigated relations among temperament, attachment, and peer acceptance in preschool children ages 36 to 74 months and found that a difficult temperament, operationalized as patterns of negative affect and unregulated behavior measured by mothers' reports, was not related to peer acceptance but was related to peer rejection. It was found that children who are not able to regulate their inappropriate behaviors may have difficulty with peer interactions.

Self-regulation refers to processes within an individual that regulate reactivity and is often conceptualized as effortful control (Rothbart, 1991). *Effortful control* is the capability to regulate and control one's emotions and behaviors and is more broadly considered a component of self-regulation (Rothbart, 2011). Effortful control develops rapidly between the ages of 2 and 7 years (Rothbart, 2011) and is typically conceptualized as comprising both inhibitory control and attentional focusing (Posner & Rothbart, 2000; Rudasill & Rimm-Kaufman, 2009). In a longitudinal study, Valiente et al. (2003) found that effortful control was negatively related to externalizing behaviors and positively predicted peer relations over time during the preschool years. Regulating emotions and inhibiting disruptive/aggressive behaviors in peer interactions helps children have more positive and friendly interactions with peers (Fabes et al., 1999). In contrast, children who are exposed to intense levels of negative emotions in their environments frequently tend to behave more impulsively and negatively and are less well regulated than children who are exposed to less negative emotional arousal (Rothbart, Ahadi, & Hershey, 1994).

Inhibitory control, one component of effortful control, refers to a child's ability to inhibit inappropriate behavior and replace it with appropriate behavior (Rothbart & Bates, 2006). Inhibitory control has been documented as a predictor of positive peer interactions in preschool-age children (see Sanson, Hemphill, & Smart, 2004), and it has also been associated with prosocial behaviors, such as comforting peers (Eisenberg et al., 2009; Rothbart & Bates, 2006). Children who were able to inhibit their inappropriate behaviors toward peers were more likely to be nominated as playmates by peers (Valiente et al., 2003). For example, observations and parent reports of inhibitory control by children from toddler to early school age were related to self-adaptation, rule orientation, and low egocentric and antisocial behaviors in response to an imaginary crisis (Kochanska, Murray, & Coy, 1997). Inhibitory control is likely to promote positive peer interactions when a child is shy by helping the child overcome the urge to become quiet or look away and instead interact positively. Likewise, for a child who is not at all shy (bold), inhibitory control may help the child suppress the tendency to interrupt or be intrusive in peer interactions.

Attentional focusing is an important mechanism of children's self-regulation (Posner & Rothbart, 2000; Rothbart, 2011; Rueda, Posner, & Rothbart, 2004) and refers to the ability to control, regulate, sustain, and shift attention as needed according to the social demands of the situation (Posner & Rothbart, 2000; Rueda et al., 2004). Attentional focusing, as a part of effortful control, is also associated with executive functions in that it influences working memory, planning, and organizing (Rothbart, 2011; Rueda et al., 2004). Several research studies have found that attentional focusing is a component of effortful control that helps children to regulate and sustain their relationships with others (e.g., NICHD ECCRN, 2009; Rudasill, 2011). In addition, preschool children who lacked control in attentional shifting were less socially competent with peers (C. Hughes, Dunn, & White, 1998), and several

other studies have shown links between sustaining attentional focus and social competence, including positive peer interactions (e.g., engaging peer group activities; Cole, Usher, & Cargo, 1993; NICHD ECCRN, 2003; Speltz, DeKlyen, Calderon, Greenberg, & Fisher, 1999). As with inhibitory control, attentional focusing is expected to promote positive peer interactions for children who are shy by enacting the resources needed for effectively assessing social situations to become comfortable more quickly.

In contrast to the regulatory dimensions of temperament, shyness is a reactive dimension that is associated with peer interactions in early childhood (Rubin et al., 2009). *Shyness* refers to withdrawal in response to novel situations and/or engagement with peer activities (Rothbart, 2011). As opposed to inhibitory control, which refers to a child's application of *effort* to inhibit behavior (such as resisting the urge to hit another child), shyness denotes a child's *natural tendency* to inhibit behavior (such as becoming quiet around peers). Young children who are high in shyness are more likely to be unpopular and rejected by peers because of their fear of approaching new situations and people (Dunn & Cutting, 1999; Rubin et al., 2009). For example, Dunn and Cutting (1999) observed shy preschool-age children (4 years old) and found that they were reluctant to verbally respond to peers. Given evidence that temperament is a correlate of preschool-age children's peer interactions, it is essential that experts gain a more fine-tuned understanding of how young children's temperament is related to their interactions with peers. Such understanding may help with identifying more effective interventions for children who are at risk for social difficulties because of their temperamental characteristics. In addition, it is important to understand how regulatory and reactive dimensions of temperament work together during peer interactions. Several empirical studies have examined regulatory and reactive temperament as predictors of peer interactions in early childhood (Gunnar, Tout, de Haan, Pierce, & Stansbury, 1997; Rudasill & Konold, 2008). For example, Gunnar et al. (1997) found that preschool children's reactive and regulatory temperamental characteristics were related to observed social behaviors and cortisol levels. Rudasill and Konold (2008) investigated interactions between attentional focusing, inhibitory control, and shyness as predictors of teacher-rated social competence in kindergarten through second grade (Rudasill & Konold, 2008). However, we are not aware of any study of interactions among attentional focusing, inhibitory control, and shyness as predictors of specific domains of peer interactions (such as sociability or conflict). Thus, in this study, we examined children's attentional focusing, inhibitory control, and shyness as predictors of children's peer interactions (peer sociability, communication, assertiveness, and conflict) assessed via observations during class time.

To address the knowledge gap related to how reactive and regulatory temperamental characteristics may be associated with peer interactions, and in particular how regulatory temperamental characteristics may moderate a reactive temperament characteristic (i.e., shyness), we addressed four research questions:

1. To what extent are children's inhibitory control and peer interactions associated? We hypothesized that inhibitory control would be positively associated with sociability, communication, and assertiveness and inversely associated with conflict.
2. To what extent are children's attentional focusing and peer interactions associated? We hypothesized that attentional focusing would be positively associated with sociability, communication, and assertiveness and inversely associated with conflict.

3. To what extent are children's shyness and peer interactions associated? We hypothesized that shyness would be inversely associated with peer sociability, communication, assertiveness, and conflict.
4. Do inhibitory control and attentional focusing moderate the association between shyness and peer interactions? We expected that higher inhibitory control and higher attentional focusing would moderate the relationship between shyness and peer interactions, such that higher inhibitory control and attentional focusing would suppress associations between shyness and peer interactions.

Method

Participants

Participants were 40 children (19 boys, 21 girls) enrolled in 13 classrooms from eight different preschools in a midwestern city in the United States. The majority (85%) of participating children were White, 5% were Latino, and 7.5% were multiracial. Children's ages ranged from 31 months to 57 months ($M = 45.67$ months, $SD = 5.19$ months) at Time 1 (Fall 2011) and ranged from 52 months to 69 months ($M = 57.43$ months, $SD = 3.88$ months) at Time 2 (Fall 2012). One third (33%) of children's parents finished 4-year college degrees, and 85% of the children's parents finished at least 1 year of college. The demographic information for this sample is provided in Table 1.

Data Collection Procedures

Children and teachers were recruited from eight preschool programs. Recruitment letters and consent forms were sent home to parents, and teachers received recruitment letters and consent forms at school. After consenting, parents were given a survey packet that was completed at home. Children whose parents granted consent were observed in their classroom for an hour on a day in late fall of the school year that was convenient for the teacher. Parents reported about children's temperament at Time 1, and observations of peer interactions were conducted at Time 2.

Peer interactions. A trained observer observed each child for four 15-min cycles comprising 10 min of observation and 5 min of scoring during one typical morning at Time 2. Each child was observed four times on the same day in different settings. Interrater reliability was conducted on 7.5% of the observations, which were simultaneously conducted by two observers. An interrater reliability analysis using the intraclass correlation (ICC) was performed to determine consistency among raters (Shrout & Fleiss, 1979). Interrater reliability was high both across cycles ($ICC = .96$) and across children ($ICC = .98$).

Measures

Demographic information. Parents completed a demographic questionnaire asking about the child's gender, age, and race; the language spoken at home; as well as the parent/primary caregiver's age, marital status, level of education, and family income.

Peer interactions. The Individualized Classroom Assessment Scoring System (inCLASS; Downer, Booren, Lima, Luckner, & Pianta, 2010; Vitiello, Booren, Downer, & Williford,

Table 1. Participants' Demographic Information

Characteristic	<i>n</i> (%)	Missing	<i>M</i>	<i>SD</i>	Range
Child characteristics					
Gender	40				
Male	19 (47.5)				
Female	21 (52.5)				
Age (months)	40				
Time 1	40		45.30	4.59	31–52
Time 2	40		57.43	3.88	52–69
Ethnicity	39	1			
White	34 (87.2)				
Latino	2 (5.1)				
Multiracial	3 (7.7)				
Family characteristics					
Parent's age	39	1	34.64	5.66	22–45
Parent's education	37	3			
1+ years of college	34	6	4.76	2.23	1–9
Marital status	38	2			
Married	30 (78.9)				
Divorced	2 (5.3)				
Single	6 (15.8)				
Spoken language	39	1			
English	37 (94.9)				
Dual language	2 (5.1)				
Family income	38	2			
\$5–\$15K	3 (7.9)				
\$15–\$25K	4 (10.5)				
\$25–\$35K	1 (2.6)				
\$35–\$45K	1 (2.6)				
\$55–\$65K	2 (5.3)				
\$65–\$75K	3 (7.9)				
\$75–\$85K	4 (10.5)				
\$85–\$95K	3 (7.9)				
>\$95K	17 (44.7)				

2012) was used to measure children's peer interactions and behaviors. The inCLASS is an observational instrument used to measure children's engagement with teachers, peers, and tasks in preschool classrooms. The instrument yields scores in three domains: Teacher Interactions, Peer Interactions, and Task Orientation. In the current study, we used data from only the Peer Interactions domain, which has four dimensions: peer sociability, peer communication, peer assertiveness, and peer conflict. Peer sociability includes behaviors such proximity seeking, shared positive affect with peers, cooperation and social awareness, and popularity/acceptance with peers. Children's peer communications were scored based on the extent to which children initiated communication and sustained conversations with peers and used speech for varied purposes (e.g., comments, request, social, and practical). Peer assertiveness includes initiation and leadership behaviors. Finally, peer conflict includes instances of aggression, negative affect directed toward peers, attention seeking, and confrontation. All dimensions were scored using a 7-point Likert scale, where 1 = *low* and 7 = *high*. For the present study the internal consistency of the

Peer Interactions domain was good ($\alpha = .75$). Prior to conducting observations in classrooms, observers attended a 2-day inCLASS workshop and were trained to 80% reliability with an expert observer.

Children's temperament. Children's temperament was measured via parent report on the Children's Behavior Questionnaire (CBQ; Putnam & Rothbart, 2006; Rothbart et al., 1994). The CBQ is a 195-item questionnaire measuring 15 dimensions of temperament for children ages 3 to 8 years. Parents completed a shortened version of the CBQ reflecting seven temperament dimensions (activity, anger, approach, fear, shyness, attentional focusing, and inhibitory control). For the current study, only data for the inhibitory control, attentional focusing, and shyness dimensions of the CBQ were used. With the current sample, internal consistency values were $\alpha = .74$ for attentional focusing (e.g., "When drawing or coloring in a book shows strong concentration"), $\alpha = .75$ for inhibitory control (e.g., "Can easily stop an activity when s/he is told 'no'"), and $\alpha = .84$ for shyness (e.g., "Acts shy around new people"). These values are consistent with those from previous research using the CBQ (Rothbart, Ahadi, Hershey, & Fisher, 2001). Parents rated their children's temperament on 7-point scale ranging from 1 = *extremely untrue of your child* and 7 = *extremely true of your child*.

Data Analysis

Data were analyzed with SPSS Version 21 software. The Peer Interactions domain was computed by calculating a sum of the mean scores for each of the component dimensions (sociability, communication, assertiveness, conflict). Peer conflict scores were reverse scored as recommended in the inCLASS manual (Downer et al., 2010). Hierarchical regression analyses were used to test models predicting Peer Interactions; each peer interaction component was analyzed in a separate model. Interaction terms were derived by computing standardized z scores to center the data and then multiplying the z scores for the two variables (Aiken & West, 1991). For example, to create an interaction term for inhibitory control and shyness, we calculated the z scores of inhibitory control and shyness and then multiplied them to create the interaction term (Inhibitory Control \times Shyness). Because individual children were observed in classrooms, dummy codes were created for each classroom to control for any classroom effects in regression analyses (Stockburger, 1998). Given our relatively small sample size, we conducted a sensitivity analysis and determined that we were able to detect R^2 change values of .268 or greater 80% of the time (Faul, Erdfelder, Lang, & Buchner, 2007).

Children's age and gender were not correlated with any of the independent and dependent variables; therefore, they are not presented in tables and were not included as control variables in the regression analyses.

Results

Correlations Between Temperament and Peer Interactions

To examine the first three hypotheses, we calculated bivariate correlations among the temperament and peer interaction variables (see Table 2). We hypothesized that more inhibitory

Table 2. Descriptive Statistics, Means, Standard Deviations, and Correlations

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Inhibitory control	4.94	0.78	—						
2. Shyness	3.66	1.29	-.01	—					
3. Attentional focusing	4.65	0.91	.51**	-.21	—				
4. Peer sociability	3.97	0.99	.18	-.12	.34*	—			
5. Peer communication	3.80	1.26	.19	-.23	.37*	.73**	—		
6. Peer assertiveness	2.84	1.09	.13	-.19	.36*	.85**	.61**	—	
7. Peer conflict ^a	7.64 ^b	1.99 ^b	-.31*	-.37**	-.29*	.07	.12	.15	—

a. The non-reversed peer interaction–conflict score was used for correlations.

b. Reversed scores were used for descriptive statistics.

* $p < .05$, one-tailed ; ** $p < .01$, one-tailed

control and attentional focusing and less shyness would be associated with higher scores for sociability, communication, and assertiveness and lower scores for conflict. Children's inhibitory control and shyness were negatively correlated with peer conflict ($r = .31$, $p = .02$; $r = .37$, $p = .009$, respectively). Children's attentional focusing was positively correlated with peer sociability ($r = .34$, $p = .01$), peer communication ($r = .37$, $p = .01$), and peer assertiveness ($r = .36$, $p = .01$) and negatively correlated with peer conflict ($r = .29$, $p = .03$).

Temperament and Peer Interactions

Next we conducted a series of hierarchical regression analyses in which peer interactions (e.g., sociability, communication, assertiveness, conflict) were regressed on temperamental variables (attentional focusing, inhibitory control, and shyness) and all two-way interaction terms between temperament variables (e.g., Attentional Focusing \times Shyness). Analyses were completed in three blocks. The first block contained dummy codes for the 13 classrooms in which the children were located. Main effects were entered in the second block, and two-way interaction terms were entered in the third block. Results are presented in Table 3. Because classroom effects were not a focus of this study, coefficients resulting from the first block are not presented. The two-way interaction of inhibitory control and attentional focusing (IC \times AF) as an effortful control was tested regressing children's peer interactions. There was no significant association between effortful control (IC \times AF) and peer interactions ($p > .05$).

Peer sociability. In Block 2, classroom dummy codes and children's temperament (inhibitory control, attentional focusing, and shyness) accounted for 47% of the variance in children's peer sociability scores, $F(16, 22) = 1.20$, $p = .34$, $R^2 = .47$. The third block included the temperament interaction terms and explained 9% of additional variance in peer sociability, $F(19, 19) = 1.27$, $p = .30$, $R^2 = .56$. However, none of the temperament main effects or interaction terms significantly predicted children's scores for peer sociability (see Table 3).

Peer communication. In Block 2, classroom dummy codes and children's temperament accounted for 43% of the variance in children's peer communication scores, $F(16, 22) = 1.05$,

Table 3. Summary of Hierarchical Regression Analyses for IC, S, AF, IC × AF, IC × S, and AF × S Predicting PI (*N* = 38)

Variable	PI—Sociability			PI—Communication			PI—Assertiveness			PI—Conflict		
	<i>B</i>	<i>SEB</i>	β	<i>B</i>	<i>SEB</i>	β	<i>B</i>	<i>SEB</i>	β	<i>B</i>	<i>SEB</i>	β
Block 2												
IC	-.09	.24	-.09	-.27	.31	-.21	-.09	.28	-.09	-.03	.08	-.09
AF	.42	.21	.43	.50	.28	.40	.44	.25	.41	-.08	.07	-.20
S	-.14	.19	-.14	-.44	.26	-.35	-.11	.23	-.10	-.19	.06	-.46*
Total <i>R</i> ²			.47			.43			.41			.66
<i>R</i> ² Δ			.15			.22			.12			.13
<i>F</i>			1.20			1.05			0.94			2.70*
Block 3												
IC × AF	-.22	.22	-.29	-.17	.27	-.18	-.29	.26	-.36	-.06	.07	-.18
IC × S	-.19	.29	-.21	-.49	.37	-.42	-.24	.34	-.24	-.11	.09	-.29
AF × S	.32	.19	.34	.60	.24	.50*	.34	.22	.33	.14	.06	.37*
Total <i>R</i> ²			.56			.58			.51			.74
<i>R</i> ² Δ			.09			.15			.10			.08
<i>F</i>			1.27			1.40			1.04			2.93*

IC = inhibitory control; S = shyness; AF = attentional focusing; PI = peer interactions.
 **p* < .05

p = .44, *R*₂ = .43. In the third block the interaction terms explained 15% of additional variance, *F* (19, 19) = 1.40, *p* = .23, *R*₂ = .58. The interaction between attentional focusing and shyness was significantly related to children's peer communication (β = .50, *t* = 2.45, *p* = .02). To understand the nature of the interaction, we plotted the association between children's shyness and peer communication at two levels of attentional focusing: high (1 *SD* above the mean) and low (1 *SD* below the mean; Aiken & West, 1991). This is displayed in Figure 1. Simple slopes analyses showed that the slope for shyness on peer communication when attentional focusing was high was not significantly different from zero (*t* = 0.48, *p* = .64); however, when attentional focusing was low, the slope for shyness on peer communication was significantly different from zero (*t* = 4.08, *p* < .001). Thus, when attentional focusing is high, children's shyness is unrelated to their communication with peers. However, when attentional focusing is low, shyer children display less peer communication than their less shy peers.

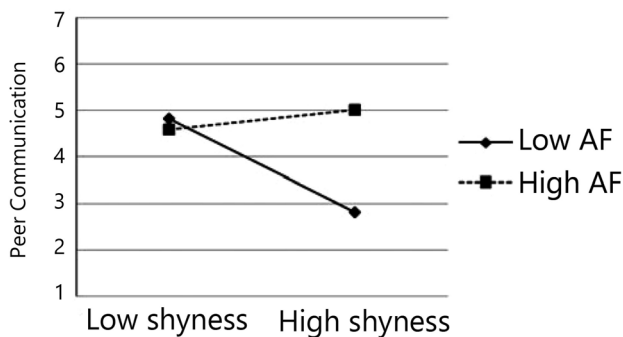


Figure 1. Attentional focusing (AF) and shyness predicting peer communication.

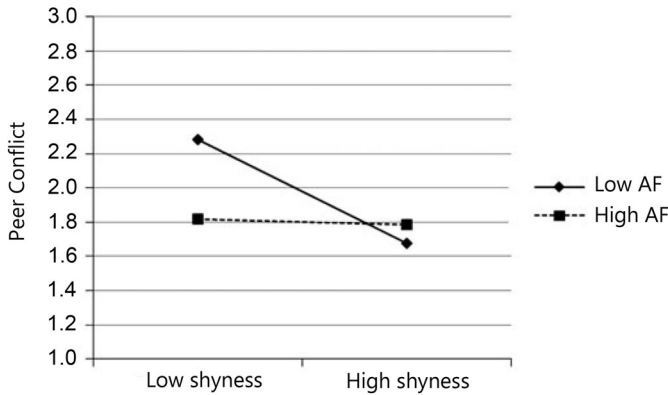


Figure 2. Attentional focusing (AF) and shyness predicting peer conflict.

Peer assertiveness. In Block 2, classroom dummy codes and children's temperament accounted for 41% of the variance in children's peer assertiveness scores, $F(16, 22) = 0.94, p = .54, R^2 = .41$. In the third block the interaction terms explained 10% of additional variance in peer assertiveness, $F(19, 19) = 1.04, p = .46, R^2 = .51$. None of temperament and interaction terms significantly predicted children's peer assertiveness (see Table 3).

Peer conflict. In Block 2, classroom dummy codes and children's temperament accounted for 66% of the variance in children's peer conflict scores, $F(16, 22) = 2.70, p = .01, R^2 = .66$. In Block 2, shyness was significantly related to peer conflict ($\beta = .46, t = 2.90, p = .008$). In the third block, the interaction terms explained 8% of additional variance in peer conflict, $F(19, 19) = 2.93, p = .01, R^2 = .74$. The interaction between attentional focusing and shyness predicted children's peer conflict ($\beta = .37, t = 2.34, p = .03$). To understand the nature of the interaction, we plotted the association between children's shyness and peer conflict at two levels of attentional focusing: high (1 *SD* above the mean) and low (1 *SD* below the mean; Aiken & West, 1991). This is displayed in Figure 2. Simple slopes analyses showed that the slope for shyness on peer conflict when attentional focusing was high was not significantly different from zero ($t = 0.38, p = .71$); however, when attentional focusing was low, the slope for shyness on peer conflict was significantly different from zero ($t = 5.62, p < .001$). Thus, when attentional focusing is high, shyness is unrelated to peer conflict. However, when attentional focusing is low, lower levels of shyness are related to more peer conflict.

Discussion

In this study, we examined the relationship between preschool children's temperament and peer interactions, with a specific focus on the interplay of parents' reports of children's temperamental shyness, inhibitory control, and attentional focusing and observations of children's interactions with peers in the classroom. Three main findings emerged, and each is discussed in turn.

First, attentional focusing appeared to buffer children's risk of poor peer interactions due to high shyness. Specifically, attentional focusing moderated the relation between shyness

and peer communication and conflict, such that at low levels of attentional focusing (1 *SD* below the mean) higher shyness was associated with less peer communication. However, at higher levels of attentional focusing (1 *SD* above the mean), shyness was unrelated to peer communication. Attentional focusing also moderated the association between shyness and peer conflict. At low levels of attentional focusing, lower shyness was associated with more peer conflict, but at higher levels of attentional focusing, shyness was unassociated with peer conflict. These findings are consistent with previous research (NICHD ECCRN, 2003, 2008) showing that lower levels of sustaining and inhibiting attentional control were associated with lower social competence (consisting of communication skills in peer interactions) and more externalizing behavior. Similarly, Rudasill and Konold (2008) found that attentional focusing was associated with more assertiveness with peers for shyer kindergarten children. However, for less shy children, attentional focusing was unrelated to assertiveness. Taken together, these results suggest that when equipped with abilities to attend to environmental cues, children may be better able to modulate their behavior to match the demands of the situation. That is, a shy child who is higher in attentional focusing may be able to use this skill to effectively recognize and understand social situations and, thus, feel more comfortable engaging in peer interactions. Likewise, a bold child who is higher in attentional focusing may be able to use this skill to recognize social cues and respond in ways that lessen the likelihood of peer conflict.

Second, we found that children's attentional focusing was related to more sociability and assertiveness in peer interactions. These results are consistent with previous research (NICHD ECCRN, 2009) showing that children with higher attentional focusing were able to maintain and sustain peer relationships better than children with less attentional focusing skills (Rueda et al., 2004; Ruff & Rothbart, 1996; Speltz et al., 1999). Consonant with our finding that attentional focusing was protective for children at risk for more negative peer interactions due to low or high shyness, the positive associations between attentional focusing and peer sociability and assertiveness provide further traction to the concept that attentional focusing can be protective and promotive for children's social success (Eisenberg, Smith, Sadovsky, & Spinrad, 2004; Qing et al., 2007; Rueda et al., 2004).

Third, inhibitory control was negatively related to peer conflict. This finding is similar to reports from previous research showing that preschool-age children who were capable of inhibiting inappropriate behaviors were involved in more positive peer interactions and fewer antisocial behaviors with peers (Fabes et al., 1999; Valiente et al., 2003). Children with the ability to control and/or regulate unacceptable behavior during peer interactions are likely to be equipped to respond positively or prosocially to peers' behaviors and avoid conflict with peers (Fabes et al., 1999; Sterry et al., 2010). Consistent with these results is evidence that children with aggressive and unregulated behaviors are not well received by peers during peer interactions (Estell et al., 2008; Ladd et al., 1997; Sebanc, 2003). Indeed, longitudinal research shows that an individual's ability to control behavior has multifaceted benefits for downstream outcomes, including not just success in social interactions but also good health, financial well-being, and an absence of risky or criminal behavior (Moffitt, Poulton, & Caspi, 2013). At the same time, inhibitory control did not emerge as consistently as attentional focusing as a main effect or moderator of peer interactions. It is possible that the ability to attend to the social environment is more crucial for successful social interactions than is the ability to inhibit inappropriate behavior, particularly for peer interactions that require positive initiations with peers (assertiveness, communication).

It is vital to note that although teachers did not report on children's temperament or peer interactions, the teacher identifiers (dummy codes) explained the largest portion of the variance in children's peer interactions. This is consistent with the notion of the teacher as creator of the social milieu of the classroom (wielding an "invisible hand"; Farmer, McAuliffe Lines, & Hamm, 2011), thus indirectly shaping the nature of interactions between children (Luckner & Pianta, 2011). Indeed, there is evidence that teachers' perceptions of children are related to children's interactions with peers (e.g., J. N. Hughes & Chen, 2011; Mercer & DeRosier, 2008; Rudasill et al., 2013). For example, Mercer and DeRosier (2008) found that teacher preference and peer rejection were bidirectionally associated across third and fourth grades. Thus, children's poor relationships with teachers may promote more problematic interactions with peers; at the same time, children who have problems with peer interactions may be regarded by teachers or interact with teachers negatively. As stated by Farmer and colleagues (2011), "It appears that teachers' and students' interactions become synchronized in ways that support students' problematic behavior patterns" (p. 248).

Results reported here provide a more fine-tuned understanding of how young children's temperament is related to their interactions with peers. Such understanding may help researchers to develop and use temperament-informed interventions, such as INSIGHTS into Children's Temperament (INSIGHTS; McClowry, Snow, & Tamis-LeMonda, 2005) for children who are at risk for social difficulties because of their temperamental characteristics. INSIGHTS is a temperament-based, social-emotional skills intervention for children, teachers, and parents; the purpose is to support children's social competence, as well goodness of fit in the academic environment, by teaching children and the adults in their lives about the role of temperament in behavior, reactions, and interactions (McClowry et al., 2005; O'Connor et al., in press). INSIGHTS improves children's academic and social skills and is particularly beneficial for shy children (O'Connor et al., in press). Considering intervention programs such as INSIGHTS, the current study provides additional support for the contention that children's temperament is important for understanding and facilitating children's positive peer interactions.

Implications

Findings from this study suggest that supporting children's attentional skills may promote more positive peer interactions, particularly for children who are very high or low in shyness. Teacher training programs should include instruction regarding individual differences in children's temperament so that teachers have a greater understanding of how temperament unfolds in children's peer interactions and in the classroom more broadly and how some temperament characteristics (such as attentional focusing) may be protective for children with higher levels of more adverse characteristics. Findings from this study also add to accumulating evidence of the utility of the inCLASS (Downer et al., 2010) for observing children's interactions in school settings. Research on children's peer interactions often uses either sociometric data or teacher-rated measures of behavior (e.g., Estell et al., 2008; Gleason et al., 2005). Children's perceptions about friendship and peers may be different from how they actually behave in peer interactions, and because teachers interact with children frequently in preschool classroom settings, teacher reports of children's peer interactions may reflect teachers' preferences for certain characteristics or personalities (Ladd & Profilet, 1996). Therefore, using this structured tool can help researchers investigate children's peer interactions more objectively. For this reason, we used the observational tool to reduce reporter bias on children's peer interactions.

The findings of the current study highlight the importance of children's temperament in their peer interactions in preschool. These findings are informative for educational practice and research. Positive peer interactions established and maintained in the preschool years are vital to the foundation of children's later development throughout the lifespan (Guralnick, 1993; Ladd, 2005). Temperament has been identified as a contributor to children's peer interactions (Fabes et al., 1999; Sterry et al., 2010); therefore, helping teachers and parents recognize children's temperamental characteristics may facilitate better social experiences for children. Teachers make classroom management decisions about children's small-group activities, task engagement, and social interactions by taking children's temperament characteristics into account (McBryde, Ziviani, & Cuskelly, 2004; Pullis & Cadwell, 1982). For example, Pullis and Cadwell (1982) found that as children with more difficult temperaments (e.g., high reactivity and low adaptability) became involved in activities, teachers' use of monitoring increased. From this perspective, results from the current study may help teachers identify children who may need support during peer interactions to facilitate the formation of protective, supportive, and/or nourishing peer relations. Specifically, children who are very shy may benefit from teachers' monitoring and support for decreasing social anxiety and guiding more positive social interactions with peers.

Academic achievement in preschool years is related to teachers' instructional support, behavior management, and emotional support (Pianta et al., 2008). Knowing children's individual temperamental characteristics may help teachers to individualize educational support for specific children with certain temperament characteristics (Keogh, 2003). Thus, the current study sheds light on the importance of teachers' support for children's use of temperamental characteristics (attentional focusing in the current study) in their peer interactions. Given the importance of peer interactions for children's success in school, collaborative peer interactions in preschool can establish a positive pattern in which children begin to support each other's learning (Gordon, 2005).

Investigating more finely grained dimensions of temperament as predictors of peer interactions during preschool may help researchers understand the extent to which different temperamental characteristics work together in children's peer interactions (Gleason et al., 2005; Parker-Cohen & Bell, 1988; Valiente et al., 2003). Children's reactive temperamental characteristics (e.g., shyness) work with regulatory temperamental characteristics (e.g., attentional focusing) in children's social relationships (Rudasill & Konold, 2008). In support for this perspective, in the current study we found that attentional focusing was protective for children's peer interactions, buffering the negative associations between high shyness and peer communication and between low shyness and peer conflict. Teacher educators could apply this understanding of the interaction between reactive and regulatory temperamental characteristics to help preservice teachers build skills to buffer reactive temperamental characteristics with regulatory temperamental characteristics. This approach focuses on building children's existing skills to foster better social interactions and connects teachers' expectations and children's temperamental behaviors to promote positive classroom experiences (Keogh, 2003).

Limitations and Future Directions

A strength of this study is the use of inCLASS observations of individual children's behavior to measure peer interactions, thus reducing the problems associated with teacher report

of multiple children and mono-method bias in which teachers or parent reports are used to measure the same or similar constructs. However, several limitations should be noted. First, the sample size of this study was small and not diverse in terms of ethnicity or family socioeconomic characteristics. It is possible that some null findings were due to the relatively small sample size rather than a lack of associations between variables. For example, although there was a statistically significant interaction between attentional focusing and shyness in predicting peer communication, the overall model was not significant, and this was likely an artifact of the relatively low level of power to detect effects. The small sample size also restricted testing of the three-way interaction between inhibitory control, attentional focusing, and shyness on children's peer interactions because of limited degrees of freedom (Jaccard & Turrisi, 2003). Future studies with larger and more diverse samples may have more power to estimate relationships among variables that could not be studied here, such as gender and socioeconomic status. Second, although observations of children occurred in different settings (e.g., in the classroom, on the playground, at lunch) and at different times across the school day, all observations of peer interactions occurred on a single day. Because children may behave differently from day to day, this work could be extended by using observations of the children over multiple days or across multiple times during the school year to obtain information on the interactions between length of time in school and children's peer interactions. Third, only parent-rated temperament was used in the current study. Researchers have reported that parents and teachers rate children's temperamental characteristics differently (Rudasill et al., 2014; Goldsmith, Rieser-Danner, & Briggs, 1991; Jewsuwan, Luster, & Kostelnik, 1993; Spooner, Evans, & Santos, 2005) in part because of children demonstrating different behaviors in different contexts, such that displays of temperament-based behavior are likely quite different at home and at school (Peters-Martin & Wachs, 1984). Therefore, the next steps could be to examine both parent and teacher ratings of temperament as predictors of peer interactions, which may deepen understanding of the association between temperament and peer interactions. Finally, other components of reactive temperament, such as negative emotionality, were not examined in this study. Future work could extend our findings by investigating the modulating effects of inhibitory control and attentional focusing on associations between children's negative emotionality and their peer interactions.

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