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Connections between preschoolers' temperament traits and social behaviors as observed in a preschool setting

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Abstract

A growing literature has focused on the role children's temperament traits play in social behavior, but associations have traditionally been explored through informant report. We utilized a longitudinal, observational approach to (a) examine how children's traits related to their social behaviors when aggregated across the school year; (b) explore how traits and social behavior relate to children's age and sex; and (c) test how prior traits predicted subsequent change in solitary, reticent, and social play, above and beyond mean-level change in play behavior over the course of the year. Fifty-three children were observed in their preschool classroom, where coders rated children's traits and social behaviors over the course of one school year (N = 26,673 observations). Results found positive age-related associations for positive emotionality (PE) and social play. In addition, aggregated traits explained a significant amount of the variance for every social behavior. Prior levels of lower PE, higher negative emotionality (NE), and higher effortful control (EC) predicted more subsequent time spent in reticent play, while NE and EC approached significance as predictors of solitary play. These results emphasize the role of early disposition on mean levels and rates of change in social behavior in a classroom.

KEYWORDS
effortful control, negative emotionality, peers, positive emotionality, preschool, social behavior, temperament, temperament traits

1 | INTRODUCTION

Temperament generally refers to individual differences in children's behavioral styles that are present early in life, are partially biologically based, and are stable across situations (Goldsmith et al., 1987; Sanson, Hemphill, & Smart, 2004; Shiner et al., 2012). Consensus is emerging to suggest that child temperament traits can be captured by a structure of

three higher-order traits, including negative emotionality, positive emotionality, and effortful control (hereafter, NE, PE, and EC, respectively; Shiner & Caspi, 2003). NE includes sadness, anger, fear, and/or general distress (Rothbart & Bates, 2006). PE (sometimes labeled extraversion) includes smiling, laughing, activity, approach tendencies, and/or sociability (Gartstein & Rothbart, 2003). Finally, EC refers to self-regulation, centered on response inhibition, attention, emotion regulation, and persistence at tasks (e.g., Kochanska, Murray, & Harlan, 2000). While PE and NE are typically orthogonal (e.g., Durbin, Klein, Hayden, Buckley, & Moerk, 2005), EC correlates positively with PE and negatively with NE.

Children's trait constellations may affect the types of behaviors they display and experiences they seek or avoid, which prompts a response from others that may facilitate or impede optimal social adjustment (Rubin, Wojslawowicz, Rose-Krasnor, Booth-LaForce, & Burgess, 2006). The preschool environment provides many children with an opportunity to spend time with peers and adult figures outside of their home, and work over the last two decades has sought to identify predictors of children's engagement and nonengagement with others (e.g., Rubin, Hymel, Mills, & Rose-Krasnor, 1991; Spinrad et al., 2004). In a preschool setting, children's social behaviors can be classified into several categories reflecting varying degrees of social engagement (i.e., Hanish, Martin, Fabes, Leonard, & Herzog, 2005; Martin & Fabes, 2001), including solitary play (playing alone), reticent behavior (unoccupied, defined wandering with a lack of focus or intent, or onlooking, defined as watching other children play without interacting), teacher-oriented behavior (involved in some interaction with the teacher with no peer interaction), parallel play (playing alongside peers in the same activity but not interacting with them), and social play (involved in an activity with one or more children). These early experiences in peer and teacher socialization are important to practice before formal schooling (e.g., Blair, Denham, Kochanoff, & Whipple, 2004), as social competence upon entering kindergarten predicts school readiness, positive attitudes toward school, and relationship qualities (Carlton & Winsler, 1999; Ladd, Birch, & Buhs, 1999).

2 | ASSOCIATIONS BETWEEN TEMPERAMENT TRAITS AND SOCIAL INTERACTIONS

Children's social and nonsocial play behaviors are theorized to have different temperamental underpinnings and functions (Coplan & Bullock, 2012; Coplan, Gavinski-Molina, Lagace-Seguin, & Wichmann, 2001; Eisenberg, Vaughn, & Hofer, 2009), thus impacting relationships with peers and broader adjustment (Rubin et al., 2006). Coplan and Bullock (2012) suggested that trait differences within children may prompt different consequences following specific social experiences, resulting in more or less subsequent engagement. For example, a child with high NE and low PE may differ in their response to peer exclusion than a child with low NE and high PE. In addition, children enter free play situations with different social motivations (e.g., approach or avoidance) as well as nonsocial motivations (i.e., desire for independent exploration) that can be differentially reinforced (Coplan & Bullock, 2012; Rothbart & Bates, 2006). Social play, which reflects approach behavior, has often been linked to higher PE, with higher trait PE linked to children's ability to initiate and maintain social connections (Coplan & Bullock, 2012). Reticent and parallel play can be characterized as a crossroads between playing with others and playing alone, driven by simultaneous approach and avoidance motivations (Coplan & Ooi, 2014; Coplan, Prakash, O'Neil, & Armer, 2004). Reticent behaviors in particular often co-occur with increased fear- and anxiety-related behaviors, reflecting higher NE (as reviewed in Coplan & Ooi, 2014). Solitary play, conversely, is increasingly conceptualized as positive and normative, and may be actively encouraged by teachers, perhaps because of the educational and constructive aspects of solitary play in contributing to learning (Coplan & Ooi, 2014; Ness & Farenga, 2007). While in some cases solitary play has been found to be related to shyness, peer exclusion, and negative peer interactions, it has generally been found to be unrelated to sociability levels (a component of PE), linked to lower NE and higher EC, and unrelated to measures of psychological maladjustment (Coplan & Ooi, 2014). Notably, most research linking these traits and social behaviors has relied on questionnaire methods to assess one or both constructs.

Spinrad et al. (2004) gathered parent and teacher reports of children's traits and observed preschoolers' positive affect and anger over the year, averaging their observations per semester. More solitary play was related to less positive affect, while more reticent play was related to less positive affect and less anger. Spinrad et al. (2004) also

examined relations between traits scores in the fall and change in behaviors from fall to spring, finding that higher reported EC was related to a decrease in solitary play while higher observed positive affect was unexpectedly related to an increase in solitary play. Higher positive affect as well as more anger were related to a decrease in reticent behavior, while higher EC was related to an increase in reticent behavior. These findings point to the importance of further understanding the role of prior traits predicting subsequent social behaviors.

3 | CONTRIBUTIONS OF SEX, AGE, AND TIME

A meta-analysis by Else-Quest, Hyde, Goldsmith, and Van Hulle (2006) reviewed sex differences in traits from ages 3 through 13, with just 3.6% of the contributing effect sizes stemming from behavioral observations. Girls displayed higher EC than boys ($d = 1.01$), while boys had higher levels of PE. Through a multimethod design, Olino, Durbin, Klein, Hayden, and Dyson (2013) found that girls were higher in sociability and lower in NE and impulsivity, but only when assessed through laboratory measures. By contrast, girls had higher NE than boys (per maternal report) and lower sociability (per paternal report). Temperament might also predict social behaviors in different ways for boys as compared to girls; Blair et al. (2004) found that EC predicted social competence for boys, but not for girls.

Traits and social behaviors may also show normative developmental changes. In a laboratory task, 4-year-olds demonstrated less avoidance of new peers than 3-year-olds and were rated higher on inclinations to approach unfamiliar others (Stansbury & Harris, 2000). In a classroom setting, similar results were found, where older preschoolers were more likely to engage in social interactions and display initiative than younger preschoolers (Mendez, McDermott, & Fantuzzo, 2002).

In addition, social behaviors may change in frequency within a classroom milieu across the school year, distinct from age. For example, as familiarity with the school environment, peers, and teachers increases, social play may increase while solitary play may decrease, based on the reinforcing nature of positive social interaction (for a review, see Coplan & Arbeau, 2009). However, Spinrad et al. (2004) found that observed solitary and reticent behavior was higher in the spring semester than the fall. Furthermore, some research has argued that parallel play, traditionally thought to decrease across the preschool period, actually continues and instead changes form from less awareness of peers to increased mutual awareness of peers (e.g., Coplan & Arbeau, 2009).

4 | THE CURRENT STUDY

The present study sought to examine preschool children's observed temperament traits and social behaviors across a full school year. Children were observed in naturally occurring play and small group instruction situations in two age-based preschool classrooms. We had three primary aims. First, we tested how children's traits related to children's social behaviors when aggregated across the school year. We hypothesized that higher PE and higher EC would be related to more social play (Coplan & Arbeau, 2009; Coplan & Bullock, 2012). We also predicted that reticent behavior would be related to higher NE and lower PE (Coplan & Ooi, 2014; Spinrad et al., 2004). We did not make specific predictions for solitary, teacher-oriented, and parallel play, given mixed findings on the role of traits in solitary play (e.g., Coplan & Ooi, 2014; Spinrad et al., 2004) and a lack of prior research connecting traits to teacher-oriented and parallel play.

Second, we examined how temperament traits and social behavior related to child sex and age. We predicted that girls would have higher levels of EC than boys regardless of age, although due to conflicting prior findings we did not make specific sex-based predictions regarding PE or NE (Else-Quest et al., 2006; Olino et al., 2013). We also hypothesized that older age would be related to more social play (Mendez et al., 2002; Stansbury & Harris, 2000), less solitary play (Spinrad et al., 2004), higher PE (Mendez et al., 2002), and higher EC (Posner & Rothbart, 1998).

Third, we investigated how prior traits predicted subsequent change in solitary, reticent, and social play, above and beyond mean-level change in play behaviors over the course of the school year. Because we did not have prior evidence to suggest that traits may play a role in predicting parallel play, we restricted our analyses to investigate

mean-level change in parallel play. We modeled the shape of social behavior over time and then tested if prior traits predicted subsequent behavior. A recent study using these data found intraindividual change in traits across the school year and that this change was associated with the trait levels in children's friendship networks (Neal, Durbin, Gornik, & Lo, 2017). Here, we excluded teacher-oriented behavior from these analyses because we sought to examine social behaviors in nonhierarchical relationships between peers. Because Spinrad et al. (2004) found that solitary and reticent play increased from fall to spring, we tentatively hypothesized a linear increase in these behaviors. We did not hypothesize a direction for parallel play due to mixed prior findings (Coplan & Arbeau, 2009).

We hypothesized that lower prior PE, higher EC, and higher NE may predict subsequent increases in reticent behavior (Coplan & Ooi, 2014; Spinrad et al., 2004), and tentatively predicted that lower prior PE, lower EC, and higher NE would predict subsequent increases in solitary play (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Spinrad et al., 2004). Similarly, although we did not have a priori predictions about change in social play, we hypothesized that higher levels of PE would predict subsequent increases in social play, given the facilitative role high initiation and impulsivity as well as PE's links to peer competence and prosocial behavior (e.g., Coplan & Bullock, 2012).

5 | METHODS

5.1 | Participants and procedure

Participants were 53 children (29 boys) enrolled in two classrooms (3 year olds and 4–5 year olds) in a Midwestern university daycare facility. In the younger class, children's mean age was 41.74 months ($SD = 4.38$, range = 33–47 months) at the beginning of the school year; in the older class, children's mean age was 52.81 months ($SD = 3.63$, range = 45–59 months). The majority of children were identified by a parent as White ($n = 27$, 50.9%), with the remainder identified as Black ($n = 3$, 5.7%), Asian ($n = 4$, 7.5%), mixed-race or other race ($n = 8$, 15.1%), or parents declined to answer ($n = 11$, 20.8%). Forty-eight children were present over both semesters, while one child was present for only the fall semester and four children for only the spring semester. In the fall, 40.8% ($n = 20$) of children attended school full-time and 59.2% ($n = 29$) attended school half-time; in the spring semester, 36.5% ($n = 19$) attended school full-time and 63.5% ($n = 33$) attended half-time. One child changed attendance status over the course of the year (from full day to half-day), and one was excluded from all analyses due to being present for fewer than five observational periods.

Children were observed behind a one-way mirror over two consecutive semesters through 'scan' observations (Fabes, Shepard, Guthrie, & Martin, 1997; Hanish et al., 2005; Mize & Ladd, 1988; Pellegrini, Blatchford, Kato, & Baines, 2004). Research assistants observed each child for a certain period of time, rotating through a randomly ordered class list. Fourteen assistants coded social behaviors while a separate seven assistants coded temperament traits. Scans lasted 10 s for social behavior and one min for temperament traits. Observations happened most days school was in session from August to May of one complete school year. During these free play observations, teachers were not explicitly involved in play, but were present around the students to manage any behaviors that may arise. At times, teachers would be seated with students engaging in play or helping students engage in play, but teachers were not engaging in explicit instruction during these periods.

5.2 | Coding children's temperament traits

Temperament trait coding was based on a global coding system previously validated for rating individual differences in traits in a laboratory setting (see Durbin, Hayden, Klein, & Olino, 2007; as well as Durbin et al., 2005). Following each one min scan, the child was rated on engagement, activity level, anticipatory positive affect, initiative, sociability, compliance, attentional control, and impulsivity. A 4-point Likert scale was used to assess traits, with 0 = *very low*, 1 = *low to moderate*, 2 = *moderate to high*, and 3 = *very high*. Affective traits, including positive affect, sadness, anger, and fear were rated on a 5-point Likert scale based on the presence of facial, vocal, and bodily emotional expressions, with 0 = *this affect not displayed*, 1 = *1–2 fleeting instances*, 2 = *1–2 moderate instances*, 3 = *several moderate instances*,

4 = *2–4 high intensity instances, or sustained moderate intensity*, and 5 = *more than 5 high intensity instances, or sustained high intensity*.

In coding affect, raters were instructed not to make inferences regarding the child's subjective emotional state but instead on their observable expressions. Engagement was judged based on how interested the target child was in his/her task. Activity was assessed via the child's level and speed of movement. Anticipatory positive affect was determined by the child's positive affect in clear anticipation of an event that had not yet occurred. Initiative was based on the child's assertiveness in their interactions. Sociability was assessed by the child's energy and affiliation their engagement with peers and adults. Compliance was judged from the child's willingness to follow the instructions of teachers (not peers). Attentional control included both maintaining attention on a task as well as appropriately shifting attention based on environmental demands. Finally, impulsivity was determined by the child's lack of hesitation or behavioral control.

To better capture rare behaviors, coders were occasionally assigned to specifically watch for instances of negative affect by scanning the classroom to identify any child displaying negative affect and then code that child's behavior for the next minute. When no negative affect was occurring in the classroom after a 5-min scan, they would revert to the randomized lists of children to code. However, if an instance of negative affect occurred from another child, the research assistant would switch their attention to the instance of negative affect and observe the other child for 1 min.

A total of 11,309 temperament trait observations were collected over the school year, with an average of 213.38 observations per child ($SD = 95.54$, range = 54–400). For analyses using a temporal structure, a seven-wave structure was used, with the waves split between mid-August to October 15 ($n = 794$ observations), October 16 to November 15 ($n = 2{,}018$), November 16 to mid-December ($n = 1{,}262$), January ($n = 1{,}179$), February ($n = 2{,}429$), March ($n = 1{,}751$), and April to mid-May ($n = 1{,}876$).

Using these same data, Neal et al. (2017) conducted a principal components analysis with an oblimin rotation, which revealed a three-component solution utilized in the present study: PE (activity, sociability, impulsivity, positive affect, anticipatory positive affect), NE (sadness, fear, anger), and EC (engagement, initiative, compliance, attentional control). Intraclass correlation were computed on a subset of 907 observations for which two coders rated the same child, PE = 0.65, NE = 0.78, and EC = 0.80.

5.3 | Coding children's social behavior

Based on the procedures of Martin and Fabes (2001) and Hanish et al. (2005), observers indicated the dominant behavior of the target child during the 10 s observation (that is, only one behavior coded). These included solitary play (playing alone where the child is creating, constructing, or engaging in repetitive or dramatic play), reticent behavior (unoccupied or onlooking), teacher-oriented behavior (involved in some interaction with the teacher with no peer interaction), parallel play (playing alongside peers in the same activity but not interacting with them), rough/tumble play (engaged in physical action towards others in a playful or happy way, such as wrestling for fun), and social play (involved in an activity with one or more children). Due to few observations of rough and tumble play across the year ($n = 23$), this behavior was dropped. All analyses were performed with social behaviors transformed into proportions to account for differences in the number of times children were observed, which were primarily due full day vs. half day attendance status. Proportions were calculated as the number of times each child was observed in that behavior divided by the total number of times that child was observed. Means and standard deviations of the social behavior proportions (henceforth, 'social behaviors') are in Table 1.

A total of 15,364 observations were collected over the course of the school year, with an average of 289.89 observations per child ($SD = 121.62$, range = 84–528). For temporal analyses, the seven waves followed the dates stated above, with Wave 1 $n = 1{,}363$, Wave 2 $n = 3{,}349$, Wave 3 $n = 1{,}919$, Wave 4 $n = 1{,}860$, Wave 5 $n = 2{,}922$, Wave 6 $n = 1{,}952$, and Wave 7 $n = 1{,}999$.

Reliabilities were calculated by assigning two coders to watch the same child at the same time, and 1,087 social behavior observations (7.06%) were double-coded. Across observers, kappa statistics revealed an overall agreement

TABLE 1 Bivariate correlations among temperament traits and social behaviors with means, standard deviations, ranges, and reliability coefficients on the diagonal

	1.	2.	3.	4.	5.	6.	7.	8.
1. PE	0.82 (0.20) 0.49–1.27							
2. NE	−0.02	0.02 (0.02) 0.00–0.09						
3. EC	0.35*	−0.36**	1.86 (0.18) 1.48–2.30					
4. Solitary	−0.37**	0.06	−0.23	0.17 (0.04) 0.10–0.29				
5. Reticent	−0.47***	0.09	0.18	0.03	0.23 (0.06) 0.12–0.38			
6. Teacher-oriented	0.10	0.00	−0.42**	−0.01	−0.30*	0.26 (0.05) 0.17–0.44		
7. Parallel	−0.49***	−0.09	0.14	0.04	0.03	−0.40**	0.12 (0.04) 0.04–0.20	
8. Social	0.71***	−0.05	0.24†	−0.59***	−0.52***	−0.27†	−0.25†	0.22 (0.08) 0.05–0.36

Note. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. Temperament traits were rated on a 0–3 scale. Social behaviors have been calculated as proportions, with number of behaviors observed in that category divided by total number of observed behaviors. These descriptive statistics have been averaged across the school year.

level of 0.66, indicating good agreement (solitary $\kappa = 0.67$, reticent $\kappa = 0.63$, teacher-oriented $\kappa = 0.80$, parallel $\kappa = 0.53$, social $\kappa = 0.69$).

5.4 | Analytic approach

Connections between temperament traits and social behaviors were examined through zero-order correlations among the variables (collapsed across the entire school year) as well as hierarchical multiple regressions to determine whether children's traits could predict their social behaviors beyond age and sex. Hierarchical multiple regression analyses were conducted for each social behavior. In each, age and sex were entered in the first step, while PE, NE, and EC were entered as a block in the second step. For these analyses, observations were collapsed across the entire school year. For the third aim, we capitalized on the longitudinal nature of our observations to examine change over time through multilevel modeling (MLM) (Singer & Willett, 2003).

The MLM analyses were conducted in Hierarchical Linear Modeling (HLM) 7.0 with full maximum likelihood estimation and robust standard errors. Two levels were included in each model to account for the nesting of waves within children. Thus, level 1 variables contained time-varying observations within child (i.e., within-subject effects), while level 2 contained child-level variables (i.e., child sex, age, and classroom). For each type of play, a series of models were examined in order to quantify the overall degree of time-related change and describe the shape of change. Parameters that captured the shape of change across the entire sample were indicated by significant effects, while parameters that indicated the presence of individual differences across participants included significant variance components. We estimated variance components at the intercept and slope terms to determine the presence of within-subject effects and to test for individual differences in change over time.

We first examined linear change in these play behaviors by comparing the unconditional means models to unconditional growth models. The former only includes an intercept term, while the unconditional growth model contains a slope parameter. We then sequentially tested for the presence of significant nonlinear effects through adding quadratic and cubic wave terms. After determining the best-fitting model for each play behavior, age, and sex were independently entered to ensure that the results were maintained when these level 2 covariates were included; in all analyses, the results remained the same and were removed in subsequent models. With two classrooms, we did not have sufficient power to nest children within classroom to model variance at the classroom level (i.e., a level-3 variable). Instead, to account for mean-level differences in the classrooms on outcome of interest, we included classroom in all models as a level-2 predictor of the overall level at the intercept (0 = older classroom, 1 = younger classroom).

Next, having established the presence of individual differences in social behavior trajectories, we turned to establishing predictors of these individual differences by testing whether prior traits predicted subsequent time spent in solitary, reticent, and social play above and beyond the effect of time. To do so, we simultaneously entered the grand-mean centered prior wave of trait variables as a level-1 predictor (representing the traits at the prior wave of assessment) with the best-fitting wave components identified in the previous step.

Change models were compared using the Deviance statistic and level-1 variance component, where a lower (e.g., more negative) Deviance and lower level-1 error variance component indicate a better-fitting model; because models that include prior waves (lagged variables) are not directly comparable to change models due to a loss of data at the first wave, only the variance component was examined (i.e., to determine whether the lagged model reduced the amount of unexplained variance in the model).

6 | RESULTS

6.1 | Connections between temperament traits and social behavior

Table 1 details the zero-order correlations between temperament traits and social behaviors, while Table 2 provides hierarchical multiple regression equations. Traits significantly predicted social behaviors above and beyond sex and age for all social behaviors.

TABLE 2 Hierarchical regression standardized beta values for sex, age, and traits as predictors of social behaviors

	Solitary play	Reticent behavior	Teacher-oriented	Parallel play	Social play
Model 1					
Sex β	−0.08	−0.30*	−0.09	0.21	0.20
Age β	−0.04	−0.36**	0.02	−0.38**	0.44**
Change in *F*	0.20	7.84**	0.22	5.27**	8.29**
R^2	0.01	0.46	0.01	0.17**	0.25**
Model 2					
Sex β	0.08	−0.23†	−0.16	0.33**	0.04
Age β	0.32	−0.13	−0.19	−0.02	0.03
PE β	−0.56**	−0.49**	0.47**	−0.70**	0.69***
NE β	−0.08	0.17	−0.62**	0.36**	−0.02
EC β	0.10	0.48**	−0.29*	0.10	−0.02
Change in *F*	3.93*	6.26**	7.29***	7.76***	8.43***
R^2	0.21*	0.46**	0.32***	0.45**	0.51***

Note. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. In the first model, child age and sex were entered as one block. In the second model, child age and sex were entered as the first block, with traits added in the second block. Model 2's R^2 value reflects the total amount of variance accounted for by the model, while the significance value reflects change over and above the first block.

The amount of variance explained by specific traits differed depending on the social behavior in question; see Table 2 for coefficient values. PE uniquely predicted less time spent in solitary play. For reticent behavior, PE, and EC were uniquely predictive, with lower levels of PE and higher levels of EC predicting more reticent behaviors. For teacher-oriented behavior, all three traits were unique predictors; higher NE and EC predicted less time engaged in teacher-oriented behavior, while higher PE predicted more time in teacher-oriented behavior. For parallel play, PE and EC were both predictors, with lower PE and higher EC predicting more parallel play. More social play was strongly predicted by higher PE. Overall, among the significant models, traits predicted between 21% (solitary play) and 51% (social play) of the variance in social behaviors.[1]

6.2 | Child age and sex contributions

We next examined how child sex and age at the beginning of the school year related to children's traits and social behaviors (see Table 1 for descriptive statistics). Children's age was positively correlated with PE, $r = .61$, $p < .001$, but was uncorrelated with NE or EC. An independent-samples *t*-test showed that boys ($M = 0.87$, $SD = 0.22$) expressed more PE than girls ($M = 0.76$, $SD = 0.22$), $t(51) = -2.26$, $p = .03$, $d = 0.50$, while boys and girls did not differ on NE or EC. The difference between boys and girls on PE was maintained even after accounting for child age, partial $\eta^2 = 0.08$, with a small-to-medium effect for both.

Older children engaged in fewer reticent behaviors, $r = -.39$, $p = .004$, and less parallel play, $r = -.36$, $p < .01$. Older children engaged in more social play, $r = .46$, $p = .001$. Independent-samples *t*-tests were run to determine if there were sex differences in social behaviors. Only reticent behaviors differed significantly, $t(51) = 2.55$, $p = .01$, $d = 0.71$, with girls ($M = 0.25$, $SD = 0.04$) engaging in unoccupied behaviors more often than boys ($M = 0.21$, $SD = 0.06$). These results remained the same after controlling for children's age.

6.3 | Change over time

Because our social behavior coding scheme was mutually exclusive, we were able to descriptively examine fluctuations in children's participation in different social behaviors when we split the school year across seven waves (see Figure 1). This visualization shows that each of these social behaviors occur reasonably often in the classroom, ranging from a low of 10% of the time (parallel play in Waves 6 and 7) to a high of 33% of the time (teacher-oriented behavior in Wave 4).

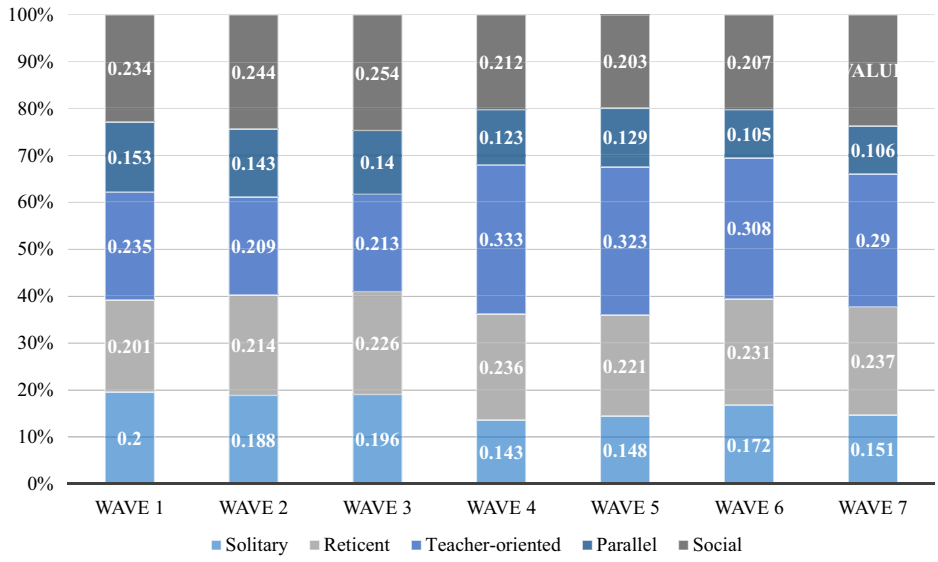

FIGURE 1 Proportions of mean social behaviors at each wave

Using the MLM model-building approach detailed above, the best-fitting shape of each social behavior over time was modeled; see Table 3 and Figures 2 and 3. Solitary play was best represented by a significant linear decline, while reticent play was best modeled through a trend-level linear increase. Parallel play emerged as decreasing linearly across the year, and social play was best modeled cubically, first increasing from the beginning of the year and then decreasing across the remainder of the year after the holiday break.

Next, prior traits were added simultaneously to determine if the effect of the prior wave's trait constellation predicted within-person change in solitary, reticent, and social play over and above the effect of time. While prior waves did not predict change in social play, prior waves of NE and EC approached significance as negative predictors of subsequent solitary play, indicating that lower NE and lower EC predicted more trend-level subsequent solitary play. All three traits were uniquely predictive of subsequent reticent play, with lower PE, higher NE, and higher EC predicting more time spent in reticent play; see Table 4.

7 | DISCUSSION

This investigation was guided by three primary goals: (a) to examine how traits examined in aggregate were linked to children's engagement in social behaviors; (b) to assess the contributions of age and sex to children's temperament traits and social behaviors; and (c) to test if prior traits predicted subsequent changes in social behavior above and beyond the shape of the behavior over time.

7.1 | Connections between temperament traits and social behavior

When explored cumulatively across the year, aspects of temperament traits and social behaviors were interrelated. Specifically, higher EC related to lower levels of teacher-oriented behavior, which is perhaps surprising given that children higher in EC might make more dutiful, attentive students. However, as most observations occurred during free play, it is possible that students who were less well-regulated received more attention from the teacher for behavior management reasons. Contrary to Spinrad et al. (2004), higher PE was related to less solitary play, while higher PE was related to less reticent play, in line with Spinrad et al. (2004), as well as less parallel play. In line with our predictions, higher PE was strongly related to social play (Mendez et al., 2002; Stansbury & Harris, 2000). Given that sociability is an aspect of both constructs, a high correlation between the two would be expected. However, these two measures

TABLE 3 Model building with effects of wave on solitary, reticent, parallel, and social play

	Intercept coeff (SE)	Classroom	Wave coeff (SE)	Wave^2 coeff (SE)	Wave^3 coeff (SE)	Deviance (# est. param.)	Wave coeff variance component	Wave^2 coeff variance component	Level-1 variance component
Solitary	0.16 (0.01)***	0.02† (0.01)				−684.80 (4)			0.0072
Solitary	0.19 (0.01)***	0.02† (0.01)	−0.01 (0.003)**			−700.80 (7)	0.0001**		0.0064
Reticent	0.21 (0.01)***	0.04* (0.02)				−733.31 (4)			0.0057
Reticent	0.19 (0.01)***	0.03* (0.01)	0.005 (0.002)†			−746.40 (7)	0.0001**		0.0052
Parallel	0.11 (0.01)***	0.03*** (0.01)				−769.66 (4)			0.0053
Parallel	0.15 (0.01)***	0.04*** (0.01)	−0.01 (0.002)***			−788.26 (7)	0.00002*		0.0049
Social	0.25 (0.01)***	−0.07*** (0.02)				−637.52 (4)			0.0071
Social	0.27 (0.02)***	−0.06*** (0.02)	−0.003 (0.003)			−654.08 (7)	0.0003***		0.0058
Social	0.31 (0.02)***	−0.07** (0.02)	−0.03 (0.01)*	0.003 (0.001)*		−665.04 (11)	0.001†	0.00001†	0.0055
Social	0.22 (0.04)***	−0.07** (0.02)	0.07 (0.04)*	−0.03 (0.01)*	0.002 (0.001)**	−676.46 (12)	0.001†	0.00001†	0.0051

Note. $^{\dagger}p < .10$. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

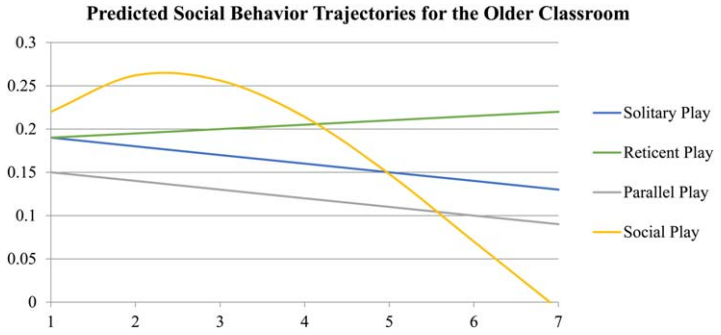

FIGURE 2 Predicted trajectories for the older classroom

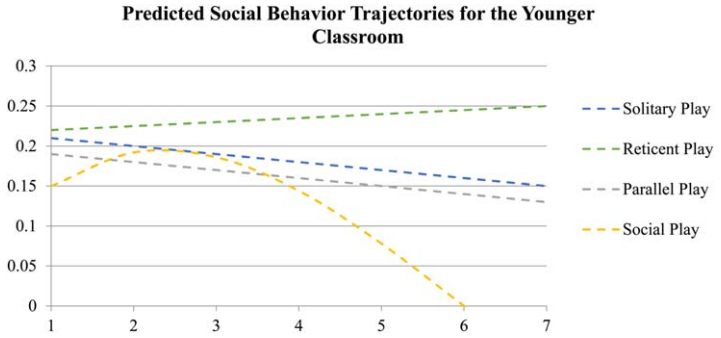

FIGURE 3 Predicted trajectories for the younger classroom

were coded by separate teams of coders, indicating that their overlap is due to shared behavioral markers across the traits used by each set of coders to infer individual differences in PE and social play. While social play is necessary for being considered at least moderately sociable, higher levels of sociability would be indicated by more than the presence of social play, such as the level of enthusiasm directed at the social interaction, the degree of warm and engaged social presence the child conveys, and the child's talkativeness.

While past research has found that higher levels of NE is linked with adult-reported greater peer rejection and lower social competence (e.g., Eisenberg et al., 2000), NE was not significantly correlated with children's social behaviors; notably, NE did emerge as a significant predictor when the effect of other traits were controlled for, such as in predicting fewer teacher-oriented behaviors. We also know from other work with this sample that children with higher levels of NE were less likely to be chosen as social play partners (Neal et al., 2017); thus, it could be that children on average in the sample displayed low levels of NE while engaging in a variety of social behaviors, and children with higher levels of NE experienced social difficulties not in their overall level of social behaviors but instead on their peer networks. That is, children with higher levels of NE may engage in social play at similar rates to children with lower levels of NE, but may be less successful in establishing friendship ties over time.

TABLE 4 Subsequent solitary and reticent behavior predicted by prior traits

	Intercept coeff (SE)	Classroom	Wave coeff (SE)	Prior PE coeff (SE)	Prior NE coeff (SE)	Prior EC coeff (SE)	Deviance (# est. param.)	Wave coeff var. component	Level-1 var. component
Solitary	0.17 (0.02)***	0.04 (0.02)*	−0.005 (0.005)	0.03 (0.03)	−0.24 (0.13)†	−0.05 (0.03)†	−606.21 (10)	0.0001*	0.0058
Reticent	0.21 (0.02)***	0.01 (0.01)	0.002 (0.004)	−0.10 (0.02)***	0.44 (0.15)**	0.09 (0.02)***	−678.48 (10)	0.0001*	0.0043

Note. †$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$. Traits were grand-mean centered.

Compared to past work in early childhood, these preschoolers spent more time in reticent play (10–20% in prior samples vs. 20–24% here) and less time in solitary play (20–45% in prior samples vs. 14–20% here; Coplan & Ooi, 2014). Overall, children's temperament traits were able to predict between 21 and 51% of the variance in social behaviors, above age and sex, when traits and social behaviors were aggregated across time. PE emerged as a significant predictor of every social behavior. All three traits were predictors of teacher-oriented behavior, while PE and EC were uniquely predictive in parallel and reticent play. The trait constellations and their varying contributions in predicting social behaviors range from more obvious (e.g., PE for social play) to less (e.g., all three traits for teacher-oriented), prompting further questions about how children's predispositions affect their interactions with their surroundings.

7.2 | Child age and sex contributions

While the meta-analysis by Else-Quest et al. (2006) found the largest trait divergence between boys and girls on EC, the current study failed to find this difference. Because the meta-analysis was largely based on parent report, it may be that parents hold sex-stereotyped bias. In addition, children's age in months was only positively related to PE, despite our prediction that EC would be related to age (Posner & Rothbart, 1998). Free play time in preschool may place fewer demands for regulation on children, especially cognitive regulation (e.g., sustained attention), thus resulting in no apparent differences in age.

For social behavior, a higher degree of social play was related to a lower degree of solitary play, reticent play, and teacher-oriented behavior. Interestingly, more time spent engaging in teacher-oriented behavior was related to less time in reticent play. Older children also spent less time in reticent and parallel play and more time in social play, which fits well with developmental expectations (e.g., Mendez et al., 2002; Stansbury & Harris, 2000); however, it is surprising that levels of teacher-oriented behaviors do not decrease with age as children become more independent. The content of teacher-oriented behaviors may be changing (e.g., disciplinary vs. playful). The only sex difference found indicated that, even after controlling for age, girls spent more time in reticent play than boys. Because the social behavior categories were quite broad (e.g., did not separate for types of social play that may be more sex-stereotyped, such as more active and less active play), additional research may be necessary to determine what qualities are unique to reticence that may distinguish boys and girls.

7.3 | Change over time

We found that solitary play decreased and reticent play increased across the year, while Spinrad et al. (2004) found increases in both behaviors. We also found that parallel play decreased linearly over time. Other researchers have suggested that each of these behaviors, on average, decrease from age 3 to 5 (Blurton-Jones, 1972). In our sample, social play demonstrated a cubic effect of time; on average, the decrease in social play occurred following winter break, suggesting that reentry to the classroom after time away may have an effect on children's social play tendencies.

For solitary and reticent play, traits from the prior wave were significant or trend-level predictors of subsequent engagement in these types of play. Higher prior levels of EC and NE predicted less time spent in solitary play on a trend level. This time-sensitive analysis echoed Spinrad et al.'s (2004) finding that higher reported EC in the fall was associated with decreases in solitary play from fall to spring. More subsequent reticent play was predicted by prior higher levels of NE and EC as well as lower levels of PE; similarly, Spinrad et al. (2004) found that higher levels of reported EC and lower levels of observed PE in the fall were related to increases in reticent play. EC may have a complex association with reticence; in a sample using maternal report, Eggum-Wilkens, Reichenberg, Eisenberg, and Spinrad (2016) found that separate components of EC differentially relate to shyness, such that inhibitory control operates differently than attention shifting in predicting shyness trajectories. In addition, children's reticence has been found to relate to trait behavioral inhibition (Degnan et al., 2014), which can overlap with EC in its inclusion of inhibitory control and attention shifting as aspects of controlled attention processing (Henderson, Pine, & Fox, 2015). Early behavioral inhibition, including these aspects of controlled attention processing, may relate to early bias in information processing

that increase risk for later anxiety concerns (Henderson et al., 2015). Thus, the connection between EC and reticent behaviors represents an important area of continued investigation.

Contrary to the current study, Spinrad et al. (2004) found higher levels of NE predicted less, not more, time spent in reticent play. It is possible that the analysis type (i.e., modeling with seven waves vs. correlational analyses with 2-time point difference scores) influenced this finding, as this association appeared only in our lagged prediction and not in our zero-order correlations or aggregated regression equations. Indeed, while only PE had a negative relation with solitary play in both the zero-order correlations and the aggregated regression analysis, prior PE did not emerge as a significant predictor of subsequent time spent in solitary behavior; instead, only EC emerged. Reticent play demonstrated a similar pattern, with only PE demonstrating a negative zero-order correlation and aggregated predictive ability; however, in our temporal analyses, all three traits emerged as meaningful predictors. Contrary to our hypothesis, no traits significantly predicted change in social play. It is notable that traits were better able to predict nonsocial behaviors than social behaviors over time. Concurrent trait levels, rather than prior levels, may be a driving force in children's social play, demonstrating a more reciprocal relationship (e.g., more social involvement prompting higher displays of positive affect and engagement, which may in turn prompt continued high involvement in such play). For nonsocial play, trait constellations may have an additive quality over time, reinforcing and fortifying nonengagement.

7.4 | Limitations and implications

Despite many observations over time, by utilizing only one university-affiliated preschool, results should be considered carefully in terms of generalizability. Teachers play an important role in determining allowable social behaviors as well as the overall climate of the school. Other preschools may have more displays of physical aggression or rough-and-tumble play, which were virtually nonexistent in our sample, or higher levels of NE (e.g., prompted by more instances of aggression or less supervision from higher student–teacher ratios). Furthermore, children's cultural backgrounds may lead to differences in traits (Chen, Yang, & Fu, 2012), which we did not have sufficient power to examine. Finally, while 1,994 observations were double-coded for inter-rater reliability, this represents 7.5% of the 26,673 total observations, below the typical range. Live-coding observations with large coding teams presents challenges, such as lower reliability for some social behaviors (e.g., parallel play) and an inability to increase reliability observations after the fact. Future researchers should be mindful of notable training time; in the current study, coders were trained for a full semester prior to official data collection (i.e., spring of the prior school year).

Because this study was strictly observational, we did not have the control permitted in a laboratory setting. Future studies might consider combining longitudinal classroom observation with parent reports and/or laboratory assessments to compare children's temperament traits across the environments. While parent reports are criticized for providing less direct evidence of children's temperament traits and laboratory assessments critiqued for their staged tasks (e.g., Majdandžić & Van Den Boom, 2007, but see Lo, Vroman, & Durbin, 2015), combining evidence from behavioral observation with informant reports would allow researchers to better understand how the same child might operate in a variety of contexts.

These findings also carry implications for preschool teachers. Given that children enter preschool with meaningful and reliable individual differences (Dyson, Olino, Durbin, Goldsmith, & Klein, 2012), these differences impact the ways in which children interact with their environment, especially important others. Our findings indicate that certain individual differences predict less time engaged with others. In particular, children who display lower levels of PE spend less time interacting with teachers and engaging with peers in social play across the year. These children may benefit from additional teacher-led interaction facilitation. In addition, acknowledging the pull that certain children might have for teachers' attention, such as those who demonstrate these high levels of PE, might help to appropriately distribute time and energy; our results indicated that children with higher levels of NE spend less time engaged with teachers, which seems counter-intuitive to children's needs.

In conclusion, children's temperament traits as assessed observationally in a preschool setting are differentially related to the types and frequencies of social behaviors in which children engage. These findings contribute to the literature emphasizing the role of individual differences during this important preschool period.

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NOTE

[1] A few of the unique trait predictors that emerged did not have zero-order correlations with the corresponding social behavior; therefore, suppression effects were examined. When controlling for age and sex, the partial correlations between traits and social behaviors did not emerge, whereas controlling for the other traits led to the emergence of the connections found in the regression equations (e.g., the unique contribution of PE in predicting less parallel play and more teacher-oriented behavior in our regression equations became apparent in partial correlations after controlling for NE and EC). It is of note that the unique variance of each trait (i.e., that not overlapping with the other traits) seems even more important to social behaviors after accounting for age, sex, and the contributions of the other traits.

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REFERENCES

Blair, K. A., Denham, S. A., Kochanoff, A., & Whipple, B. (2004). Playing it cool: Temperament, emotion regulation, and social behavior in preschoolers. *Journal of School Psychology*, *42*, 419–443. https://doi.org/10.1016/j.jsp.2004.10.002

Blurton-Jones, N. (1972). Categories of child-child interaction. In: N. B. Jones (Ed.), *Ethological studies of child behavior* (pp. 97–127). London: Cambridge University Press.

Carlton, M. P., & Winsler, A. (1999). School readiness: The need for a paradigm shift. *School Psychology Review*, *28*, 338–352.

Chen, X., Yang, F., & Fu, R. Culture and temperament. In M. Zentner & R. Shiner (Eds.), *Handbook of temperament New York*., NY: Guilford Press; 2012. pp. 462–478.

Coplan, R. J., & Arbeau, K. A. (2009). Peer interactions and play in early childhood. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Social, emotional, and personality development in context. Handbook of peer interactions, relationships, and groups* (pp. 143–161). New York: Guilford Press.

Coplan, R. J., & Bullock, A. (2012). Temperament and peer relationships. In M. Zentner & R. Shiner (Eds.), *Handbook of temperament* (pp. 442–461). New York, NY: Guilford Press.

Coplan, R. J., Gavinski-Molina, M. H., Lagace-Seguin, D. G., & Wichmann, C. (2001). When girls versus boys play alone: Nonsocial play and adjustment in kindergarten. *Developmental Psychology*, *37*(4), 464.

Coplan, R. J., & Ooi, L. (2014). The causes and consequences of playing alone in childhood. In R. J. Coplan, & J. Bowker (Eds.), *A handbook of solitude: Psychological perspectives on social isolation, social withdrawal, and being alone* (pp. 111–128). New York, NY: Wiley-Blackwell.

Coplan, R. J., Prakash, K., O'Neil, K., & Armer, M. (2004). Do you "want" to play? Distinguishing between conflicted shyness and social disinterest in early childhood. *Developmental Psychology*, *40*(2), 244.

Degnan, K. A., Almas, A. N., Henderson, H. A., Hane, A. A., Walker, O. L., & Fox, N. A. (2014). Longitudinal trajectories of social reticence with unfamiliar peers across early childhood. *Developmental Psychology*, *50*(10), 2311.

Durbin, C. E., Hayden, E. P., Klein, D. N., & Olino, T. M. (2007). Stability of laboratory-assessed temperamental emotionality traits from ages 3 to 7. *Emotion*, *7*, 388–399. https://doi.org/10.1037/1528-3542.7.2.388

Durbin, C. E., Klein, D. N., Hayden, E. P., Buckley, M. E., & Moerk, K. C. (2005). Temperamental emotionality in preschoolers and parental mood disorders. *Journal of Abnormal Psychology*, *114*, 28–37. https://doi.org/10.1037/0021-843X.114.1.28

Dyson, M. W., Olino, T. M., Durbin, C. E., Goldsmith, H. H., & Klein, D. N. (2012). The structure of temperament in preschoolers: A two-stage factor analytic approach. *Emotion*, *12*(1), 44.

Eggum-Wilkens, N. D., Reichenberg, R. E., Eisenberg, N., & Spinrad, T. L. (2016). Components of effortful control and their relations to children's shyness. *International Journal of Behavioral Development*, *40*(6), 544–554.

Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: Their role in predicting quality of social functioning. *Journal of Personality and Social Psychology*, *78*(1), 136.

Eisenberg, N., Vaughn, J., & Hofer, C. (2009). Temperament, self-regulation, and peer social competence. In K. H. Rubin, W. M. Bukowski, & B. Laursen (Eds.), *Handbook of peer interactions, relationships, and groups* (pp. 473–489). New York, NY: Guilford Press.

Else-Quest, N., Hyde, J. S., Goldsmith, H. H., & Van Hulle, C. A. (2006). Gender differences in temperament: A meta-analysis. *Psychological Bulletin*, *132*, 33–72. https://doi.org/10.1037/0033-2909.132.1.33

Fabes, R. A., Shepard, S. A., Guthrie, I. K., & Martin, C. L. (1997). Roles of temperamental arousal and gender-segregated play in young children's social adjustment. *Developmental Psychology*, *33*, 693.

Gartstein, M. A., & Rothbart, M. K. (2003). Studying infant temperament via the revised Infant Behavior Questionnaire. *Infant Behavior & Development*, *26*, 64–86.

Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., … McCall, R. B. (1987). Roundtable: What is temperament? Four approaches. *Child Development*, *58*, 505–529.

Hanish, L. D., Martin, C. L., Fabes, R. A., Leonard, S., & Herzog, M. (2005). Exposure to externalizing peers in early childhood: Homophily and peer contagion processes. *Journal of Abnormal Child Psychology*, *33*, 267–281.

Henderson, H. A., Pine, D. S., & Fox, N. A. (2015). Behavioral inhibition and developmental risk: A dual-processing perspective. *Neuropsychopharmacology*, *40*(1), 207.

Kochanska, G., Murray, K. T., & Harlan, E. T. (2000). Effortful control in early childhood: Continuity and change, antecedents, and implications for social development. *Developmental Psychology*, *36*, 220–232. https://doi.org/10.1037/0012-1649.36.2.220

Ladd, G. W., Birch, S. H., & Buhs, E. S. (1999). Children's social and scholastic lives in kindergarten: Related spheres of influence? *Child Development*, *70*, 1373–1400. https://doi.org/10.1111/1467-8624.00101

Lo, S. L., Vroman, L. N., & Durbin, C. E. (2015). Ecological validity of laboratory assessments of child temperament: Evidence from parent perspectives. *Psychological Assessment*, *27*, 280.

Majdandžić, M., & Van Den Boom, D. C. (2007). Multimethod longitudinal assessment of temperament in early childhood. *Journal of Personality*, *75*, 121–168.

Martin, C. L., & Fabes, R. A. (2001). The stability and consequences of young children's same-sex peer interactions. *Developmental Psychology*, *37*, 431–446.

Mendez, J. L., McDermott, P., & Fantuzzo, J. (2002). Identifying and promoting social competence with African American preschool children: Developmental and contextual considerations. *Psychology in the Schools*, *39*, 111–123. https://doi.org/10.1002/pits.10039

Mize, J., & Ladd, G. W. (1988). Predicting preschoolers' peer behavior and status from their interpersonal strategies: A comparison of verbal and enactive responses to hypothetical social dilemmas. *Developmental Psychology*, *24*, 782–788. https://doi.org/10.1037/0012-1649.24.6.782

Neal, J. W., Durbin, C. E., Gornik, A. E., & Lo, S. L. (2017). Codevelopment of preschoolers' temperament traits and social play networks over an entire school year. *Journal of Personality and Social Psychology*, *113*, 627–640.

Ness, D., & Farenga, S. J. (2007). *Knowledge under construction: The importance of play in developing children's spatial and geometric thinking*. Lanham, MD: Rowman & Littlefield Publishers.

Olino, T. M., Durbin, C. E., Klein, D. N., Hayden, E. P., & Dyson, M. W. (2013). Gender differences in young children's temperament traits: Comparisons across observational and parent-report methods. *Journal of Personality*, *81*, 119–129. https://doi.org/10.1111/jopy.12000

Pellegrini, A. D., Blatchford, P., Kato, K., & Baines, E. (2004). A short-term longitudinal study of children's playground games in primary school: Implications for adjustment to school and social adjustment in the USA and the UK. *Social Development*, *13*, 107–123.

Posner, M. I., & Rothbart, M. K. (1998). Summary and commentary: Developing attentional skills. In J. Richards (Ed.), *Cognitive neuroscience of attention: A developmental perspective* (pp. 317–323). Mahwah, NJ: Lawrence Erlbaum Associates.

Rothbart, M. K., & Bates, J. E. (2006). Temperament. In R. L. W. Damon, & N. Eisenberg (Eds.), *Handbook of child psychology: Social, emotional, and personality development* (6th ed., Vol. *3*, pp. 465–501). New York: Wiley.

Rubin, K. H., Hymel, S., Mills, R. S., & Rose-Krasnor, L. (1991). Conceptualizing different developmental pathways to and from social isolation in childhood. In D. Cicchetti & S. L. Toth (Eds.), *Rochester symposium on developmental psychopathology* (Vol. *2*, pp. 91–122). Hillsdale, NJ: Erlbaum.

Rubin, K. H., Wojslawowicz, J. C., Rose-Krasnor, L., Booth-LaForce, C., & Burgess, K. B. (2006). The best friendships of shy/withdrawn children: Prevalence, stability, and relationship quality. *Journal of Abnormal Child Psychology*, *34*, 139–153.

Sanson, A., Hemphill, S. A., & Smart, D. (2004). Connections between temperament and social development: A review. *Social Development*, *13*, 142–170.

Shiner, R., & Caspi, A. (2003). Personality differences in childhood and adolescence: Measurement, development, and consequences. *Journal of Child Psychology and Psychiatry*, *44*, 2–32. https://doi.org/10.1111/1469-7610.00101

Shiner, R. L., Buss, K. A., McClowry, S. G., Putnam, S. P., Saudino, K. J., & Zentner, M. (2012). What is temperament now? Assessing progress in temperament research on the twenty-fifth anniversary of Goldsmith et al. (1987). *Child Development Perspectives*, *6*, 436–444. https://doi.org/10.1111/j.1750-8606.2012.00254.x

Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford: Oxford University Press.

Spinrad, T. L., Eisenberg, N., Harris, E., Hanish, L., Fabes, R. A., Kupanoff, K., ... Holmes, J. (2004). The relation of children's everyday nonsocial peer play behavior to their emotionality, regulation, and social functioning. *Developmental Psychology*, *40*(1), 67.

Stansbury, K., & Harris, M. L. (2000). Individual differences in stress reactions during a peer entry episode: Effects of age, temperament, approach behavior, and self-perceived peer competence. *Journal of Experimental Child Psychology*, *76*, 50–63. https://doi.org/10.1006/jecp.1999.2541

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