

## **Exuberant and inhibited children: Person-centered profiles and links to social adjustment**

By: [Jessica M. Dollar](#), Cynthia A. Sifter, and Kristin A. Buss

Dollar, J. M., Stifter, C. A., & Buss, K. A. (2017). Exuberant and inhibited children: Person-centered profiles and links to social adjustment. *Developmental Psychology*, 53(7), 1222-1229. doi:10.1037/dev0000323

©American Psychological Association, 2017. This paper is not the copy of record and may not exactly replicate the authoritative document published in the APA journal. Please do not copy or cite without author's permission. The final article is available, upon publication, at: <http://dx.doi.org/10.1037/dev0000323>

### **Abstract:**

The current study aimed to substantiate and extend our understanding regarding the existence and developmental pathways of 3 distinct temperament profiles—exuberant, inhibited, and average approach—in a sample of 3.5-year-old children (n = 121). The interactions between temperamental styles and specific types of effortful control, inhibitory control and attentional control, were also examined in predicting kindergarten peer acceptance. Latent profile analysis identified 3 temperamental styles: exuberant, inhibited, and average approach. Support was found for the adaptive role of inhibitory control for exuberant children and attentional control for inhibited children in promoting peer acceptance in kindergarten. These findings add to our current understanding of temperamental profiles by using sophisticated methodology in a slightly older, community sample, as well as the importance of examining specific types of self-regulation to identify which skills lower risk for children of different temperamental styles.

**Keywords:** inhibition | exuberance | inhibitory control | attentional control | peer acceptance

### **Article:**

Temperament theory and research are often considered a promising avenue for understanding pathways toward children's psychological and social adjustment by highlighting that variation in children's temperament influences the processes that support or hinder adaptive developmental trajectories (Stifter & Dollar, 2016). Temperament is commonly conceptualized as reflecting constitutionally based, relatively stable individual differences in reactivity and regulation within the realms of affect, activity, and attention (Goldsmith et al., 1987). Within temperament research, there is a rich history of considering temperament dimensions, such as negativity and activity level, as well as temperamental styles, which result from a person-centered or typological method to studying children with similar patterns of temperamental traits (Garcia Coll, Kagan, & Reznick, 1984; Putnam & Stifter, 2005).

The existence of two temperamental styles, inhibited and exuberant children, is widely acknowledged. These distinct groups of children show different behaviors and emotions when faced with unfamiliarity and are at risk for developing behavioral and social difficulties (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001; Kagan, Reznick, & Snidman, 1987; Stifter,

Putnam, & Jahromi, 2008), albeit within different realms and due to varying processes. Although there is a long history regarding these two temperamental styles, a majority of this work has incorporated arbitrary cutoffs with extreme group membership or has focused on the existence and developmental trajectories of one temperamental style (i.e., inhibited) at a time; thus, additional research that examines both temperamental types and uses sophisticated methodology is needed. The goal of the current study was to substantiate the existence of these temperamental styles in a sample of 3.5-year-old children based on their tendency toward approach/withdrawal, activity level, positive and negative affect in novel situations using advanced person-centered, multivariate methodology. We also aimed to examine the interaction between children's temperamental styles and inhibitory and attentional control in predicting later peer acceptance.

Individual differences in children's reactions to novel stimuli as predictors of behavioral adjustment have been the focus of much research. The pioneering work of Jerome Kagan (e.g., Garcia Coll et al., 1984; Kagan et al., 1987) identified two subgroups of children, inhibited and uninhibited. When encountering unfamiliarity, inhibited children displayed high distress and low approach (Garcia Coll et al., 1984) and were more likely to develop internalizing behavior problems (Schwartz, Snidman, & Kagan, 1999). Uninhibited children, who are predisposed to approach and exhibit low negative affect in response to novelty (Garcia Coll et al., 1984), are at risk for developing externalizing behavior problems (Schwartz et al., 1996). Fox and colleagues (Fox et al., 2001; Calkins, Fox, & Marshall, 1996) expanded upon Kagan's work to include positive affect in response to novelty. Infants high in negative affect and activity were more likely to show later inhibited behavior, whereas infants displaying high positivity (not just low negativity) and high activity, which they called "exuberant," showed later uninhibited behavior (Calkins et al., 1996). Importantly, in both samples individuals were screened to include children representing the extreme behavioral profiles of inhibited and uninhibited/exuberant children and arbitrary cutoffs were used to create the distinct temperament groups.

More recently, person-centered methodology has been used to create temperament groups based upon toddlers' concurrent levels of positive and negative affect in addition to approach/withdrawal behavior (Putnam & Stifter, 2005). This use of the entire study sample, as opposed to an extreme group approach, allowed all children to be classified into a group. Using toddler behavior observed during laboratory tasks designed to elicit approach/withdrawal and emotional reactivity, Putnam and Stifter (2005) identified three temperament styles using cluster analysis: exuberant, inhibited, and low reactive. The exuberant children were high on approach and positive affect, whereas the inhibited children showed the lowest approach and the highest negative affect. The low-reactive children showed low positive and negative affect as well as moderate approach. Exuberant children from this study were most likely to exhibit externalizing problems at age 2 (Putnam & Stifter, 2005) and at age 4 (Stifter et al., 2008).

Although this was an important step in using person-centered methodology to identify temperament profiles, other person-centered methodologies, such as latent profile analysis (LPA), offer many advantages over traditional cluster techniques. For example, LPA uses a formal statistical model based on probabilities to classify cases (Muthén, 2004) and more appropriately handles missing data than traditional cluster techniques by assuming the data are Missing Completely at Random (MCAR), thereby allowing the model parameters to be informed by all cases (Little & Rubin, 1987). The goal of this study was to use LPA to substantiate and

extend research identifying the existence of three temperamental styles, inhibited, exuberant, and normative approach children.

Although inhibited and exuberant children are at risk for maladjustment, not all of these children go on to develop later difficulties (Stifter & Dollar, 2016). In fact, studies have revealed only a modest association between behavioral inhibition and internalizing behaviors and social withdrawal, including some studies that do not find this relation (Schwartz, Snidman, & Kagan, 1996; Stifter et al., 2008). Furthermore, there are mixed findings regarding the developmental outcomes of exuberant children, especially within the social realm. In the limited work, surgent children, similar to exuberant children, are sometimes rated as high in peer rejection (Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003) and exhibiting negative peer behaviors (Dollar & Stifter, 2012), whereas others found that membership in a high-exuberance profile was associated with social competence, but only when children exhibited left-frontal EEG asymmetry (Degnan et al., 2011).

Recent evidence suggests that specific types of effortful control, attentional and inhibitory control, are important to consider. Attentional control is defined as the ability to voluntarily manage one's attention, whereas inhibitory control refers to the capacity to inhibit a dominant response in favor of a subdominant response (Rothbart, Ellis, Rueda, & Posner, 2003). There may be differential effects for specific types of effortful control in predicting later risk depending on the child's temperamental style. For instance, behavioral inhibition is positively associated with anxiety for children low in attentional control (White, McDermott, Degnan, Henderson, & Fox, 2011), whereas children in a high-stable-exuberance profile were more likely to engage in risk taking if they demonstrated low-attentional control; exuberance was unrelated to risk-taking propensity for children with high-attention shifting (Lahat et al., 2013). On the other hand, behavioral inhibition was positively associated with greater anxiety for children high in inhibitory control (White et al., 2011) and inhibitory control was not significantly associated with risk taking for exuberant children (Lahat et al., 2013).

The findings regarding the protective role of attentional control for inhibited children is not surprising. We, along with others (e.g., White et al., 2011), hypothesize that appropriate attentional control abilities may be especially important for inhibited children in order to regulate the negative emotions that they experience, especially in social situations. In other words, inhibited children who have better attentional control abilities are likely better able to effectively self-regulate their behavior and inclination toward fear in social situations, thereby better navigating themselves with peers. However, it is surprising that inhibitory control was not protective for exuberant children in the aforementioned studies. Given exuberant children's intense approach, impulsive and active behavior, it would be expected that the ability to inhibit these tendencies would lower the likelihood that they engage in risky and inappropriate behavior. However, the role of attentional and inhibitory control has not been considered as influencing inhibited and exuberant children's later social behavior and these associations may be outcome specific. We hypothesize that inhibitory control may help exuberant children to behave appropriately in social situations, thus increasing the likelihood that they are accepted by their peers. In order to test these hypotheses, the second aim was to examine the interaction between temperamental styles and inhibitory and attentional control in predicting kindergarten peer acceptance.

## The Current Study

The first goal of the current study was to confirm the existence of three distinct groups of children (inhibited, exuberant, average approach) varying on their levels of approach/withdrawal, activity level, positive and negative affect in novel situations. Importantly, we extend the current understanding regarding temperamental styles by using a full sample rather than taking an extreme-group approach, conducting advanced person-centered methodology (LPA), and considering the identification of three possible temperamental styles, not just one (i.e., inhibited) in the same study. The second aim was to examine the interaction between temperamental styles and inhibitory and attentional control in predicting kindergarten social adjustment as rated by both mothers and teachers.

## Method

### Participants

The current study used data drawn from a larger longitudinal study investigating socioemotional development from 2 years to school entry. Typically developing toddlers and their families were recruited from published birth announcements. The majority of the families were Caucasian (90.4%) and middle class (Hollingshead Index:  $M = 49.72$ ,  $SD = 10.72$ ). Initially, participants were oversampled for fearful children from 20-month screening questionnaires, consisting of the Infant–Toddler Social Emotional Assessment (ITSEA; Carter, Briggs-Gowan, Jones, & Little, 2003) and a six-item questionnaire inquiring about the child’s fearfulness in novel situations, which resulted in 63 fearful children and 62 nonfearful children ( $n = 125$ ) participating in a 2-year laboratory visit. When the children were 3.5 years old, the child and his or her parents participated in another laboratory visit. Thirty-seven of the original 125 families were unable to participate in the extra assessment due to schedule constraints. In order to balance the sample and have a sample covering the full range of temperament traits (inhibited, exuberant, and average approach), 36 additional children screened as exuberant (by using the 20-month ITSEA items, such as activity/impulsivity, inhibition to novelty) were added, resulting in 121 children for the 3.5-year laboratory visit. When children were 4 years old, mothers completed questionnaires assessing children’s development, and in the fall of the child’s kindergarten year, mothers and teachers completed the same questionnaires.

### Procedures

At 3.5 years, children came to the laboratory with their parents and completed emotion and behavioral tasks. Central to this study, children participated in Risk Room, a widely used task to assess approach/withdrawal (Goldsmith, Reilly, Lemery, Longley, & Prescott, 1994). In Risk Room, children were allowed to play in a room that contained a tunnel, stairs with a mattress, a balance beam, a large black box with painted eyes and a mouth opening, and a gorilla mask placed on a stand. Children could play as they liked while the mother sat in the room and was asked to remain uninvolved. After 3 min the experimenter returned and asked the child to interact with the objects. Mothers reported on children’s temperament when their children were 3.5 years of age. When children were 4 years old, mothers completed a questionnaire to assess

children's social and psychological adjustment. In the fall of the child's kindergarten year, the same measure was completed by the child's mother and teacher.

## Measures

### 3.5-year measures

Risk Room was coded using the traditional scoring from the Lab-TAB manual (Goldsmith et al., 1994). The following behaviors were coded when the child played freely with the toys: total time spent playing with each object (reverse scored), latency to touch first, second, and third objects, and total number of objects touched (reverse scored). Every 5 s the tentativeness of play (0 = *no tentativeness* to 3 = *maximum tentativeness*) was coded. These behaviors were used to create a wariness composite by standardizing each variable and creating an average. Activity level (1 = *no/extremely low activity* to 5 = *extremely high activity*) was coded every 5 s and averaged to create a mean activity score. Children's peak vocal tone and display of facial positive, negative, and neutral affect were coded in 5-s intervals. Positive and negative affect intensity was also scored (0 = *neutral affect* to 2 = *high positive/negative affect*). Approximately 15% of the sample was double coded. The kappas for tentativeness of play and activity were .76 and .79, respectively. The reliability for the timing variables was calculated as intraclass correlations (Snijders & Bosker, 1999), ranging from .81 to .94. Kappas for vocal and facial affect ranged from .75 to .91. The variables of wariness, activity, positive affect, and negative affect were used in the LPA to create children's temperamental profiles.

Mothers completed the short form of the Child Behavior Questionnaire (CBQ-SF; Putnam & Rothbart, 2006). The CBQ-SF is a 94-item measure designed to assess children's temperament and rated on a 7-point Likert scale. In the current study, the Inhibitory Control (e.g., "Can easily stop an activity when s/he is told 'no'.") and Attentional Focusing (e.g., "When drawing or coloring in a book, shows strong concentration.") subscales were used as measures of inhibitory control and attentional control. Both scales consisted of six items and had acceptable reliabilities ( $\alpha = .65$ ,  $\alpha = .77$ ). It is important to note that attentional focusing, not attentional shifting, was examined in the current study and the CBQ attentional focusing variable does not reflect the same attentional control as indexed in an attention shifting task.

### 4-year and kindergarten measures

The MacArthur Health Behavior Questionnaire (HBQ; Armstrong & Goldstein, 2003) is a 172-item questionnaire that measures mental and physical health, and social and academic competence. Mothers completed the HBQ when their children were 4 years old and in the child's kindergarten year. Teachers also completed this measure in the fall of the child's kindergarten year. Central to this study, the Peer Acceptance/Rejection scale (eight items; e.g., "Has lots of friends at school") was rated on a 4-point scale (1 = *not at all like* to 4 = *very much like*) and calculated as averages of scores. Reliability for this scale was good ( $\alpha = .75$  to  $.82$ ). Mother report of children's peer acceptance/rejection at 4 years was used as a control variable in the analyses with mother report of children's peer acceptance/rejection in kindergarten as the dependent variable.

## Analysis of Attrition and Missing Data

The temperament profiles were created using LPA, which uses a maximum likelihood estimation procedure to handle missing data. The numbers of children who had data at the 3.5-year time point but no mother- or teacher-reported kindergarten data were 27 and 37, respectively. No significant differences were found when 3.5-year variables were compared with data from children who did not complete the kindergarten assessment and the missing value analysis revealed a nonsignificant MCAR test ( $\chi^2 = 3.41$ ,  $df = 6$ ,  $p = .76$ ). Therefore, missing peer acceptance data were imputed using multiple imputation (10 imputations).

## Results

Descriptive statistics and correlations are reported in Table 1. Analyses were conducted to test for potential associations between study variables, gender, and socioeconomic status (SES). No significant associations were found between SES and the study variables; thus, SES was not examined further. Gender differences emerged for children's inhibitory control; girls were reported as higher in inhibitory control than boys ( $t = -2.05$ ,  $p < .05$ ). Thus, gender was included as a control variable in the analyses.

**Table 1.** Descriptive Statistics and Bivariate Correlations Among Study Variables

Variable	1	2	3	4	5	6	7	8
1. RR wariness	—							
2. RR negative affect	.477***	—						
3. RR positive affect	-.50***	-.66***	—					
4. RR activity level	-.53***	-.66***	.54***	—				
5. Inhibitory control	-.08	-.06	.03	.01	—			
6. Attentional control	-.18*	-.19*	.18	.01	.49***	—		
7. Peer acceptance (MR)	.00	-.08	.04	.11	.20*	.25**	—	
8. Peer acceptance (TR)	-.10	-.03	.13	.09	.30***	.05	.10	—
Mean	-.01	.41	.44	2.23	4.73	4.76	3.72	3.74
SD	.70	.38	.32	.58	.77	.99	.28	.38

Note. RR = Risk Room; MR = mother report; TR = teacher report.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

LPA was used to substantiate the existence of three subgroups of children with similar patterns of wariness, activity, positive affect, and negative affect in Risk Room. LPA, a type of structural equation mixture modeling (Muthén, 2004), is similar to latent class analysis (Collins, Graham, Long, & Hansen, 1994), but uses continuous, rather than discrete, variables to identify groups of individuals with distinct profiles. This analysis was conducted using MPlus 7.4 (Muthén & Muthén, 1998–2012). Given that the primary aim was to create temperamental styles in a nonselected sample that represents a normative distribution of children showing varying temperament traits, it is important to note that the full scale was utilized for all behaviorally coded variables used to create the temperament profiles. Furthermore, all variables were normally distributed. To determine the optimal number of classes that best fit the data, a model with 2–5 profiles were fit to identify mutually exclusive and exhaustive subgroups of children with similar temperamental profiles. Determination of best model fit was evaluated with the following fit indices: Akaike information criterion, Bayesian information criterion (BIC), sample-size-adjusted BIC, and the adjusted Lo-Mendell-Rubin Likelihood Ratio Test (LMR-

LRT; Lo, Mendell, & Rubin, 2001). The model with the smallest BIC value and a significant LMR-LRT test, indicating that the addition of one more profile significantly improves model fit, was selected given its indication as the best model fit. In addition, theoretical and empirical justification, interpretability, and model parsimony were taken into account (Bauer & Curran, 2003; Jung & Wickrama, 2008; Muthén, 2004). Given that the lowest BIC value was combined with a significant LMR-LRT for the four-class model, this model was chosen as the best-fitting model (see Table 2).

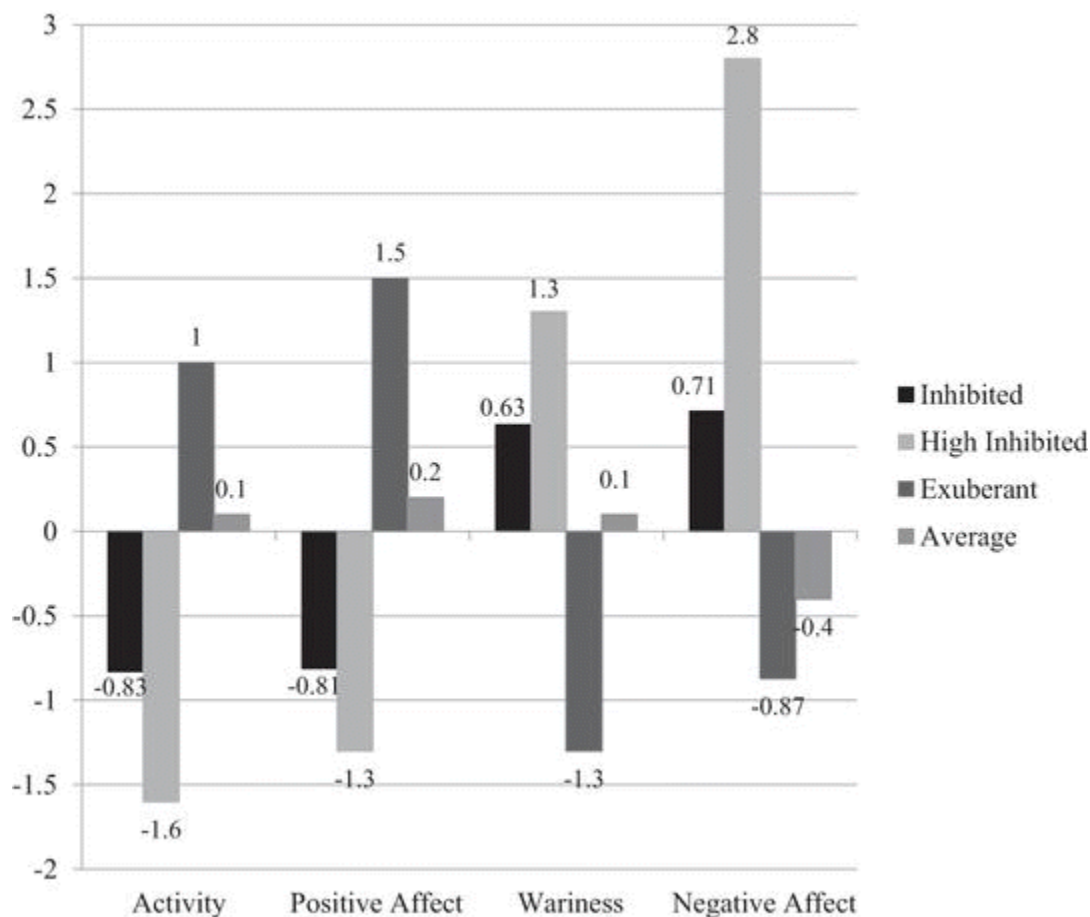
**Table 2.** 3.5-Year Latent Profiles of Risk Room Affect and Behavior

Class	AIC	BIC	Adj. BIC	Adj. <i>p</i> LMR LRT
2-class	512.94	549.29	503.45	.04
3-class	446.07	496.39	439.48	.03*
4-class	406.40	470.01	397.98	.04*
5-class <sup>a</sup>				

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; Adj. BIC = sample-size adjusted BIC; Adj. LMR LRT = adjusted Lo-Mendell-Rubin Likelihood-Ratio Test.

<sup>a</sup> Class 5 did not identify a fit.

\*  $p < .01$ .

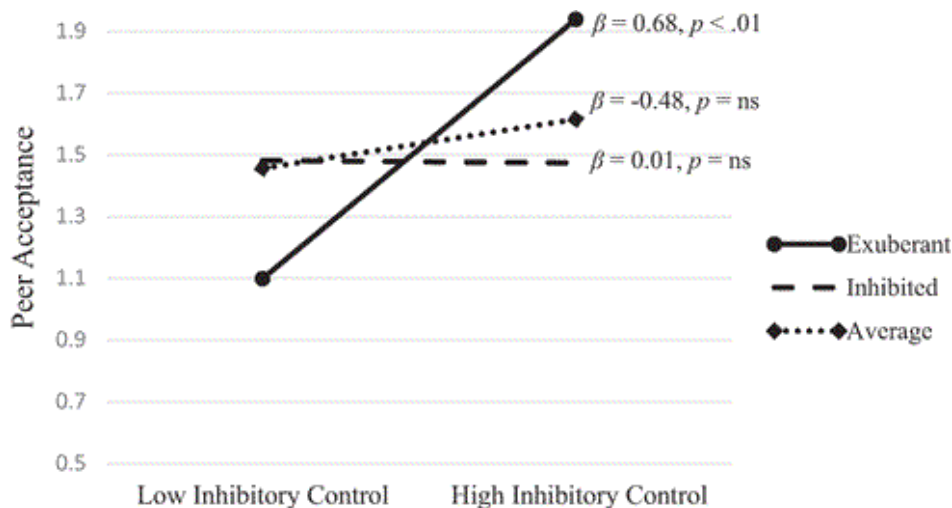


**Figure 1.** The 3.5-year profiles of temperament.

The first profile, Inhibited, characterized the children ( $n = 37$ ) who showed low activity and positive affect and high levels of wariness and negative affect (see Figure 1). The second profile,

High Inhibited, characterized the children ( $n = 6$ ) who showed very low activity and positive affect and very high wariness and negative affect. The third profile, Exuberant, distinguished the children ( $n = 28$ ) who showed high activity and positive affect and low wariness and negative affect. The fourth profile, Average Approach, characterized the children ( $n = 50$ ) who showed mean levels of activity, positive affect, wariness, and slightly lower than average levels of negative affect. Although the four-profile solution provided the best fit, due to the small number of children in the high-inhibited profile ( $n = 6$ ), and the similarity between the inhibited and high-inhibited profiles these profiles were combined.<sup>1</sup> This left three distinct temperament profiles: Inhibited, Exuberant, and Average Approach.

The second aim was to examine the interaction between temperamental styles and inhibitory and attentional control in predicting peer acceptance. Multiple regression analyses were conducted with children's kindergarten peer acceptance as the dependent variable. Separate models were conducted for inhibitory control and attentional control for both mother and teacher reports of peer acceptance. Mother- and teacher-reported peer acceptance were analyzed separately because they were not significantly correlated with one another. In analyses with mother-reported peer acceptance as the dependent variable, we controlled for earlier levels of children's peer acceptance to focus on the developmental change in this construct between preschool and kindergarten. In each model, gender, and 4-year peer acceptance if applicable, was entered into the first step as a control variable. Temperament profiles and inhibitory/attentional control were entered into the second step. The interaction between children's temperamental style and inhibitory/attentional control were entered into the third step. Dummy variables were created for the temperament profiles with the average approach group as the reference. Interaction terms were created by centering inhibitory/attentional control and multiplying it by the dummy variables. The simple effects of inhibitory/attentional control were examined across the three temperament groups at 1 *SD* above and 1 *SD* below the mean (Aiken & West, 1991).



**Figure 2.** Interaction of temperament profiles and inhibitory control predicting mother report of peer acceptance.

<sup>1</sup> The inhibited and high-inhibited profiles were not significantly different on positive affect, vigor of activity, or wariness, but they were different on negative affect ( $t = -7.95, p < .01$ ). Although the two profiles were significantly different on one variable, because of theoretical and statistical reasons, we chose to combine the inhibited and high-inhibited profiles.



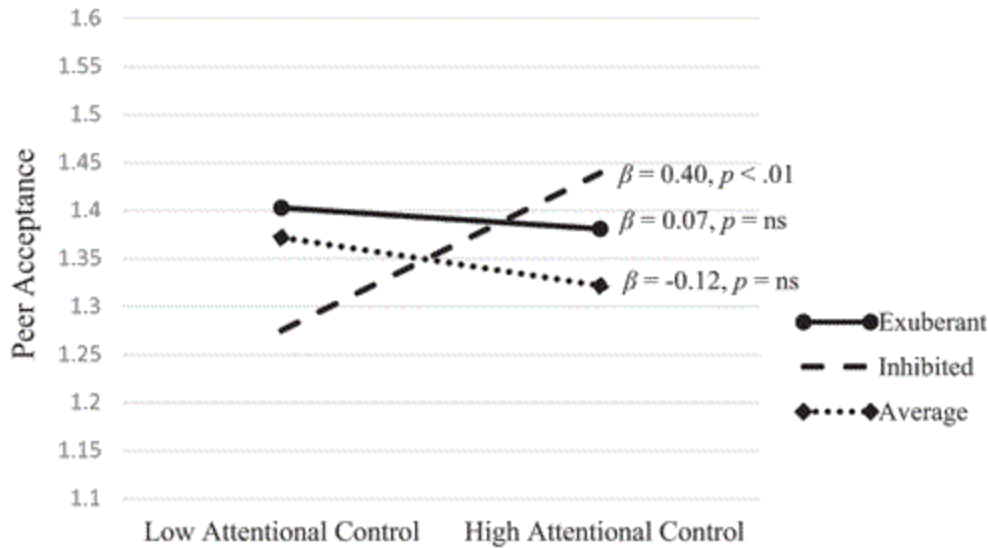
The first model revealed a significant interaction between children's temperament profiles and inhibitory control in predicting mother report of children's peer acceptance ( $\beta = 0.26, p < .01$ ; see Table 3). Follow-up analyses indicated that this relation was significant for exuberant children ( $\beta = 0.68, p < .01$ ). As inhibitory control abilities increased, exuberant children were rated by their mothers as higher in peer acceptance (see Figure 2).

**Table 3.** Multiple Regression Analyses for Study Variables

Variable	<i>B</i>	<i>SE (B)</i>	$\beta$	<i>t</i>
<b>Mother report of peer acceptance</b>				
Inhibitory control				
Gender	.05	.05	.09	.99
4-year peer acceptance	.27***	.08	.31	3.41
Inhibited	-.05	.06	-.09	.93
Exuberant	-.07	.06	-.10	-1.04
Inhibitory control	-.01	.05	-.04	-.27
Inhibited $\times$ Inhibitory Control	.08	.07	.13	1.13
Exuberant $\times$ Inhibitory Control	.25**	.10	.26	2.55
Attentional control				
Gender	.06	.05	.10	1.10
4-year peer acceptance	.22***	.08	.25	2.90
Inhibited	-.03	.06	-.05	-.53
Exuberant	-.06	.06	-.09	-.91
Attentional control	.01	.04	.03	.18
Inhibited $\times$ Attentional Control	.11*	.06	.22	1.83
Exuberant $\times$ Attentional Control	.05	.07	.08	.76
<b>Teacher report of peer acceptance</b>				
Inhibitory control				
Gender	.11	.09	.15	1.30
Inhibited	.08	.10	.10	.81
Exuberant	.22*	.10	.26	2.20
Inhibitory control	.18*	.08	.36	2.34
Inhibited $\times$ Inhibitory Control	.05	.13	.05	.36
Exuberant $\times$ Inhibitory Control	-.30*	.14	-.28	-2.16
Attentional control				
Gender	.16	.09	.21	1.80
Inhibited	.13	.10	.17	1.32
Exuberant	.21*	.10	.26	2.06
Attentional control	-.04	.07	-.10	-.53
Inhibited $\times$ Attentional Control	.20*	.10	.30	1.96
Exuberant $\times$ Attentional Control	-.07	.10	-.11	-.73

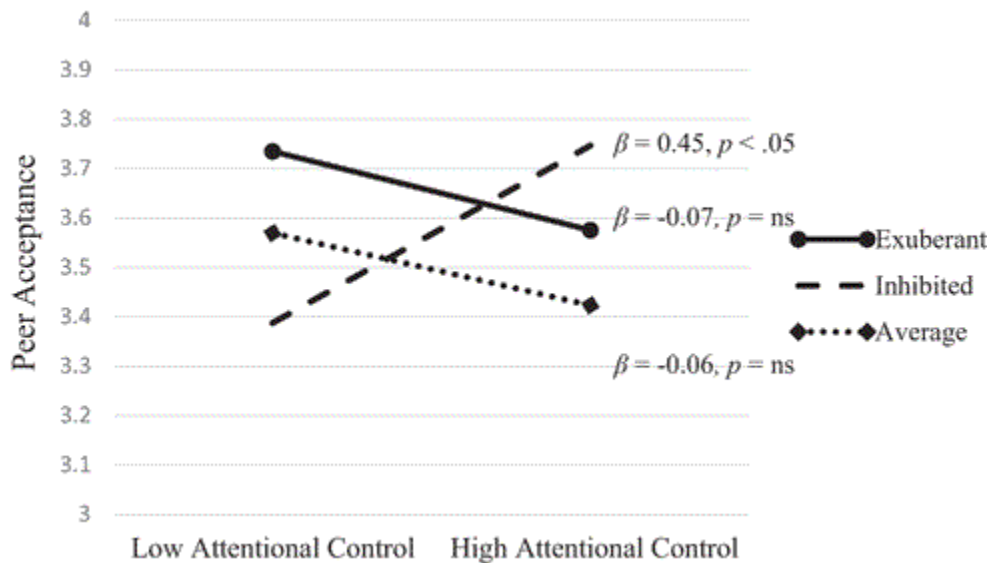
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

The second model revealed a significant Temperamental Style  $\times$  Attentional Control interaction in predicting mother report of children's peer acceptance ( $\beta = 0.22, p < .05$ ). Follow-up analyses showed that this relation was significant for inhibited children ( $\beta = 0.40, p < .01$ ). As levels of attentional control increased, inhibited children were rated as higher in peer acceptance by their mothers (see Figure 3).



**Figure 3.** Interaction of temperament profiles and attentional control predicting mother report of peer acceptance.

The following two models tested the interaction between temperamental styles and inhibitory/attentional control in predicting teacher report of peer acceptance. The first model revealed significant main effects for temperamental styles and inhibitory control. Exuberant children and children high in inhibitory control were rated as showing greater peer acceptance by their kindergarten teachers. In addition, a significant Exuberant × Inhibitory Control interaction ( $\beta = -0.30, p < .05$ ) emerged; however, follow-up analyses revealed that this interaction was not significant when probed ( $\beta = -0.25, p > .10$ ).



**Figure 4.** Interaction of temperament profiles and attentional control predicting teacher report of peer acceptance.

The results of the second model showed the same significant main effect for exuberant temperament as the previous model. Also, a significant Temperamental Style × Attentional

Control interaction emerged ( $\beta = 0.20, p < .05$ ). Follow-up analyses showed that this relation was significant for inhibited children ( $\beta = 0.45, p < .05$ ). As levels of attentional control increased, inhibited children were rated as higher in peer acceptance by their teachers (see Figure 4).

## Discussion

There is a long history of empirical and theoretical work on the developmental trajectories of children varying in their temperamental styles, especially inhibited children. Although most research used arbitrary cutoffs as part of an extreme group approach, recent advances in developmental methodology provide the opportunity to substantiate and extend our understanding of temperamental styles using person-centered, multivariate methodology. As hypothesized, results from the current study revealed three groups of children, inhibited, exuberant, and average approach, based on 3.5-year-old children's approach/withdrawal (as reflected in the wariness composite), activity, and positive and negative affect in a novel situation.

Although in many respects these results confirm existing findings, there are also valuable differences that should be highlighted. First, this study used LPA to create the temperamental profiles, whereas the extant work largely used an extreme-group approach (e.g., Fox et al., 2001) or cluster analysis (Putnam & Stifter, 2005). A central premise of LPA is that it assumes that person-oriented subgroups can be created such that members of a specific subgroup are more similar to each other than to members of a different subgroup (Bergman & Magnusson, 1997). LPA is considered to be superior to other variable-centered grouping and traditional cluster techniques in that it utilizes continuous indicators to create the latent profile solutions within a proper statistical model, as opposed to using arbitrary cutoffs to distinguish between and define subgroups in the population (Bergman & Magnusson, 1997). The current study also used data from slightly older children than most existing work. Given the evidence of these three temperament types in a slightly older group, future work should examine the extent to which these classifications map onto the temperament types as derived from extreme groups cutoffs, as well as if the groups identified by different methodologies have the same developmental implications in terms of biological reactivity and risk for psychopathology.

Most existing work on inhibited and exuberant children's developmental pathways has focused on their risk for developing behavior problems (e.g., Stifter et al., 2008; White et al., 2011). Yet, these differing temperamental proclivities put them at risk for difficulties within the social realm, as well. Previous research suggests that inhibited children are more likely to develop social withdrawal (Fox et al., 2001), likely lowering their social competence. The scant research on social outcomes for exuberant children suggests they may be at risk for peer rejection, although there is additional work showing that membership in a high-exuberance profile was associated with social competence, but only when children exhibited left-frontal EEG asymmetry (Degan et al., 2011). Results from the current study showed that exuberant children are higher in peer acceptance as rated by their kindergarten teachers, thus adding to the mixed literature regarding social adjustment for exuberant children. Given the sociable and sometimes positive nature of exuberant children, it makes sense that teachers rate these children as being highly accepted by their peers. Furthermore, because exuberant children are often found to be at risk for developing externalizing behaviors, being accepted by one's peers may be an important way in which the

likelihood that they develop problematic behaviors is reduced. This is an interesting empirical question for future work.

Importantly, the direct associations between temperament styles and later adjustment are modest and sometimes nonexistent (Stifter et al., 2008) and the mixed findings are likely due to the fact that developmental tasks are usually accomplished between the time at which temperamental profiles are identified and when children engage in social situations and develop behavioral difficulties. Thus, another aim of the current study was to examine the association between children's temperamental styles and later social adjustment while also considering the role of specific types of effortful control inhibitory control and attentional control. Support was found for the importance of considering both temperamental styles and inhibitory and attentional control in predicting children's later social adjustment, although the findings differed slightly according to the rater of children's peer acceptance. Specifically, as exuberant children's inhibitory control increased at 3.5 years old, mothers rated them as higher in peer acceptance in kindergarten. Given that exuberant children are impulsive and active, the ability to inhibit these tendencies likely promotes their capacity to behave in a socially appropriate manner with their peers. Interestingly, this association was not found in analyses considering teacher-reported peer acceptance; rather teachers rated all exuberant children as more likely to exhibit high peer acceptance. Although it would be preferable for the findings to be consistent across reporters, convergence across reporters is often relatively low; not because of low validity or reliability in the informants' reports, but because different informants may observe unique behaviors, some behaviors may be situation specific, or the behavior of interest, such as peer acceptance, varies across situations (e.g., Achenbach, McConaughy, & Howell, 1987). As such, it is currently considered the "gold standard" to collect information from multiple informants when examining children's behavior (e.g., Renk, 2005). It is understandable that teachers and parents have differing experiences to consider when rating a child's social behaviors, both of which are interesting and valid. However, additional work is needed substantiating the association between inhibitory control and peer acceptance for exuberant children.

We also found converging evidence for the importance of attentional control in predicting social adjustment for inhibited children. Inhibited children with better attentional control abilities at 3.5 years were rated as higher in kindergarten peer acceptance. Importantly, this finding was revealed in analyses considering both mother and teacher reports of children's peer acceptance. These findings support the notion that although inhibited children may have difficulties with peers because they find social situations to be fear inducing, the ability to control their attention may help them to regulate their behavior and fear in social situations that are challenging.

Our findings are seemingly different from those of similar studies (Lahat et al., 2013; White et al., 2011), which found only attentional control to improve outcomes for both inhibited and exuberant children. However, it is important to note that both the outcomes of interest and the manner in which inhibited and exuberant children were identified differed significantly between these studies and the current investigation. Previous work examined children high/low in either behavioral inhibition or exuberance, whereas the current study identified children as inhibited, exuberant, or neither (average approach). In addition, we considered peer acceptance as the outcome of interest, whereas other studies examined internalizing and risk-taking behaviors. Finally, we used a maternal-report measure of attentional focusing in the current study, which is

different from attentional control indexed on an attention-shifting task; thus, our findings may not parallel those of other studies given the differences in the attentional control measures. Taken together, these studies suggest that it is important to consider the specific types of effortful control when predicting social adjustment for children of varying temperamental styles, as well as the possibility that differing mechanisms lower the risk of distinct developmental outcomes.

Although the current study has numerous strengths, there are a few notable limitations. First, this sample was homogeneous and the generalizability is limited to a low-risk, predominantly White sample. In addition, we only had access to measures of children's attentional focusing, not attentional shifting. Additional work should consider the interaction between temperamental styles and both forms of attentional control in predicting peer acceptance. Finally, in the current study we were not able to assess the stability of the temperamental styles or inhibitory/attentional control abilities from age 3.5 to 5. Because of this, we cannot rule out the possibility that attentional control, inhibitory control, or both predict temperamental discontinuity (i.e., inhibited or exuberant children with strong regulatory abilities at 3.5 years old are more likely to show more average approach behaviors by age 5) or that temperamental styles can influence inhibitory/attentional control abilities (Henderson, Pine, & Fox, 2015), instead of our leading interpretation that these regulatory abilities assist children to negotiate their temperamental predispositions to lead to a more adaptive social outcome. Thus, future research should examine the bidirectional relations between temperamental styles and inhibitory/attentional control, as well as assessing if regulatory abilities influence the stability of temperamental styles.

The current study provides additional evidence for the existence of distinct temperamental profiles of children. In addition, important evidence that specific forms of self-regulation are vital in reducing risk for children varying in their temperamental styles was provided. These findings have important implications for specific forms of self-regulatory development across early childhood, as they begin to interact with peers on a more regular basis and enter the formal school environment.

**Acknowledgement:** This research was supported in part by a grant from the National Institute of Mental Health awarded to Kristin A. Buss (MH075750), with cofunding from Pennsylvania State University's Social Science Research Institute to Cynthia A. Stifter and Kristin A. Buss. We thank the families who participated in this study. We also express great appreciation to the research assistants who worked so diligently on this project.

**Note:** Nancy Eisenberg served as the action editor for this article.—E.F.D.

## References

- Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and emotional problems: Implications of cross-informant correlations for situational specificity. *Psychological Bulletin*, *101*, 213–232. 10.1037/0033-2909.101.2.213
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.

- Armstrong, J. M., Goldstein, L. H., & the MacArthur Working Group on Outcome Assessment. (2003). *Manual for the MacArthur Health and Behavior Questionnaire (HBQ 1.0)*. Pittsburgh, PA: University of Pittsburgh, MacArthur Foundation Research Network on Psychopathology and Development.
- Bauer, D. J., & Curran, P. J. (2003). Distributional assumptions of growth mixture models: Implications for overextraction of latent trajectory classes. *Psychological Methods, 8*, 338–363. 10.1037/1082-989X.8.3.338
- Bergman, L. R., & Magnusson, D. (1997). A person-oriented approach in research on developmental psychopathology. *Development and Psychopathology, 9*, 291–319. 10.1017/S095457949700206X
- Calkins, S. D., Fox, N. A., & Marshall, T. R. (1996). Behavioral and physiological antecedents of inhibited and uninhibited behavior. *Child Development, 67*, 523–540. 10.2307/1131830
- Carter, A. S., Briggs-Gowan, M. J., Jones, S. M., & Little, T. D. (2003). The Infant–Toddler Social and Emotional Assessment (ITSEA): Factor structure, reliability, and validity. *Journal of Abnormal Child Psychology, 31*, 495–514. 10.1023/A:1025449031360
- Collins, L. M., Graham, J. W., Long, J. D., & Hansen, W. B. (1994). Crossvalidation of latent class models of early substance use onset. *Multivariate Behavioral Research, 29*, 165–183. 10.1207/s15327906mbr2902\_3
- Degnan, K. A., Hane, A. A., Henderson, H. A., Moas, O. L., Reeb-Sutherland, B. C., & Fox, N. A. (2011). Longitudinal stability of temperamental exuberance and social–emotional outcomes in early childhood. *Developmental Psychology, 47*, 765–780. 10.1037/a0021316
- Dollar**, J. M., & Stifter, C. A. (2012). Temperamental surgency and emotion regulation as predictors of childhood social competence. *Journal of Experimental Child Psychology, 112*, 178–194. 10.1016/j.jecp.2012.02.004
- Fox, N. A., Henderson, H. A., Rubin, K. H., Calkins, S. D., & Schmidt, L. A. (2001). Continuity and discontinuity of behavioral inhibition and exuberance: Psychophysiological and behavioral influences across the first four years of life. *Child Development, 72*, 1–21. 10.1111/1467-8624.00262
- Garcia Coll, C., Kagan, J., & Reznick, J. S. (1984). Behavioral inhibition in young children. *Child Development, 55*, 1005–1019. 10.2307/1130152
- Goldsmith, H. H., Buss, A. H., Plomin, R., Rothbart, M. K., Thomas, A., Chess, S., . . . McCall, R. B. (1987). What is temperament? Four approaches. *Child Development, 58*, 505–529. 10.2307/1130527
- Goldsmith, H. H., Reilly, H. H., Lemery, K. S., Longley, S., & Prescott, A. (1994). *Manual for the Preschool Laboratory Temperament Assessment Battery (Lab-TAB)*. Unpublished manuscript, University of Wisconsin—Madison.

- Gunnar, M. R., Sebanc, A. M., Tout, K., Donzella, B., & van Dulmen, M. M. (2003). Peer rejection, temperament, and cortisol activity in preschoolers. *Developmental Psychobiology*, *43*, 346–368. 10.1002/dev.10144
- Henderson, H. A., Pine, D. S., & Fox, N. A. (2015). Behavioral inhibition and developmental risk: A dual-processing perspective. *Neuropsychopharmacology*, *40*, 207–224. 10.1038/npp.2014.189
- Jung, T., & Wickrama, K. A. S. (2008). An introduction to latent class growth analysis and growth mixture modeling. *Social and Personality Psychology Compass*, *2*, 302–317. 10.1111/j.1751-9004.2007.00054.x
- Kagan, J., Reznick, J. S., & Snidman, N. (1987). The physiology and psychology of behavioral inhibition in children. *Child Development*, *58*, 1459–1473. 10.2307/1130685
- Lahat, A., Degnan, K., White, L., McDermott, J., Henderson, H., Lejuez, C., & Fox, N. (2013). Temperamental exuberance and executive function predict propensity for risk taking in childhood. *Development and Psychopathology*, *25*(Special Issue 1), 275–275. 10.1017/S0954579412001022
- Lamm, C., Walker, O. L., Degnan, K. A., Henderson, H. A., Pine, D. S., McDermott, J. M., & Fox, N. A. (2014). Cognitive control moderates early childhood temperament in predicting social behavior in 7-year-old children: An ERP study. *Developmental Science*, *17*, 667–681. 10.1111/desc.12158
- Little, R. J., & Rubin, D. B. (1987). *Statistical analysis with missing data*. New York, NY: Wiley.
- Lo, Y., Mendell, N. R., & Rubin, D. B. (2001). Testing the number of components in a normal mixture. *Biometrika*, *88*, 767–778. 10.1093/biomet/88.3.767
- Muthén, B. O. (2004). Latent variable analysis: Growth mixture modeling and related techniques for longitudinal data. In D. Kaplan (Ed.), *Handbook of quantitative methodology for the social sciences* (pp. 346–368). Newbury Park, CA: Sage. 10.4135/9781412986311.n19
- Muthén, L. K., & Muthén, B. O. (1998–2012). *Mplus user's guide* (7th ed.). Los Angeles, CA: Author.
- Putnam, S. P., & Rothbart, M. K. (2006). Development of short and very short forms of the Children's Behavior Questionnaire. *Journal of Personality Assessment*, *87*, 102–112. 10.1207/s15327752jpa8701\_09
- Putnam, S. P., & Stifter, C. A. (2005). Behavioral approach-inhibition in toddlers: Prediction from infancy, positive and negative affective components, and relations with behavior problems. *Child Development*, *76*, 212–226. 10.1111/j.1467-8624.2005.00840.x
- Renk, K. (2005). Cross-informant ratings of the behavior of children and adolescents: The 'gold standard'. *Journal of Child and Family Studies*, *14*, 457–468. 10.1007/s10826-005-7182-2

- Rothbart, M. K., Ellis, L. K., Rueda, M. R., & Posner, M. I. (2003). Developing mechanisms of temperamental effortful control. *Journal of Personality, 71*, 1113–1144. 10.1111/1467-6494.7106009
- Schwartz, C. E., Snidman, N., & Kagan, J. (1996). Early childhood temperament as a determinant of externalizing behavior in adolescence. *Development and Psychopathology, 8*, 527–537. 10.1017/S0954579400007252
- Schwartz, C. E., Snidman, N., & Kagan, J. (1999). Adolescent social anxiety as an outcome of inhibited temperament in childhood. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*, 1008–1015. 10.1097/00004583-199908000-00017
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multivariate analysis: An introduction to basic and advanced multilevel modeling*. Thousand Oaks, CA: Sage.
- Stifter, C. A., & **Dollar**, J. M. (2016). Temperament and developmental psychopathology. In D. Cicchetti (Ed.), *Developmental psychopathology: Vol. 4. Risk, resilience, and intervention* (3rd ed., pp. 546–607). Hoboken, NJ: Wiley.
- Stifter, C. A., Putnam, S., & Jahromi, L. (2008). Exuberant and inhibited toddlers: Stability of temperament and risk for problem behavior. *Development and Psychopathology, 20*, 401–421. 10.1017/S0954579408000199
- White, L. K., McDermott, J. M., Degnan, K. A., Henderson, H. A., & Fox, N. A. (2011). Behavioral inhibition and anxiety: The moderating roles of inhibitory control and attention shifting. *Journal of Abnormal Child Psychology, 39*, 735–747. 10.1007/s10802-011-9490-x