

Temperament and Externalizing Behavior : Social Preference and Perceived Acceptance as Protective Factors

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Temperament

The construct of temperament is commonly viewed as the basic organization of personality, which is observable as early as infancy and becomes elaborated over the course of development as the individual's skills, abilities, cognitions, and motivations become more sophisticated (Calkins & Degnan, 2006; Rothbart, Ahadi, & Evans, 2000; Rothbart & Bates, 2006; Shiner & Caspi, 2003). Although temperament is thought to influence the development and expression of personality characteristics, Rothbart and Bates (2006) qualified this relation with the assertion that temperament focuses on reactive and self-regulatory processes and is only one component of a child's developing personality.

A large body of research has focused on the role of temperament in predicting maladjustment such as externalizing behavior. Sanson, Prior, and Kyrios (1990), however, have argued that content overlap between temperament and measures of maladjustment may account for empirical findings. In contrast, Rothbart and Bates (2006) concluded that content overlap in measurement could not account for research findings. For example, the relation between temperament and behavior problems was not affected after removing items with similar content (Lemery, Essex, & Smider, 2002). A treatment-outcome study reached a similar conclusion, as the treatment resulted in decreased behavior problems without a change in temperament (Sheeber, 1995). Thus, examining the relation between temperament and behavior problems provides meaningful information, as temperament and behavior problems are unique constructs.

Although many categories of temperamental behavioral styles have been established with respect to childhood temperament, Rothbart and Putnam's (2002) temperamental dimensions have been the focus of many empirical studies. Rothbart's theory—which has been instrumental to the field and has guided much temperament research—conceptualizes temperament as structured into three broad clusters (Rothbart, 1988; Rothbart & Bates, 1998, 2006; Rothbart & Putnam, 2002). The three temperamental clusters identified using a measure of childhood temperament (the Child Behavior Questionnaire; CBQ; Rothbart & Putnam, 2002) are Surgency/Extraversion, Negative Affectivity, and Effortful Control. Surgency/Extraversion is characterized by high activity level, high-intensity pleasure seeking, low shyness, and impulsivity. Negative Affectivity

is characterized by sadness, discomfort, frustration, fear, and difficulty to soothe (Rothbart & Putnam, 2002). Finally, Effortful Control encompasses inhibitory control, attentional focusing, low-intensity pleasure, and perceptual sensitivity (Rothbart & Putnam, 2002).

Surgency/Extraversion, Negative Affectivity, and Effortful Control have been examined together and separately to understand the relation between temperament and behavior, with the majority of the research focusing on Negative Affectivity and Effortful Control. Negative Affectivity is thought to be a marker of emotional dysregulation that predisposes children to externalizing behavior problems (Oldehinkel, Hartman, de Winter, Veenstra, & Ormel, 2004; Rothbart, Ahadi, Hershey, & Fisher, 2001; Sanson, Hemphill, & Smart, 2004). Children with high Negative Affectivity become easily frustrated, which can lead to a pattern of anger, irritability, or aggression. In contrast, children with high Effortful Control are able to modulate their behavior and inhibit the dominant, impulsive response (Olson, Sameroff, Kerr, Lopez, & Wellman, 2005). Thus, these children have the ability to use attentional control and other coping strategies to monitor and adjust their behavior. As such, Effortful Control has been positively related to social competence and negatively related to externalizing behavior and anger among preschoolers (Blair, Denham, Kochanoff, & Whipple, 2004; Olson et al., 2005).

Although there are numerous studies linking Negative Affectivity and Effortful Control to behavior problems, there are relatively few studies examining Surgency/Extraversion. There is, however, some theoretical and empirical support for examining Surgency/Extraversion as a risk factor for the development of externalizing problems, including hyperactivity and aggression. Although children with moderate levels of Surgency/Extraversion could be characterized as outgoing and interested in their environment, children with high levels of Surgency/Extraversion could be characterized as highly active and constantly exploring their environment with disregard for rules and regulations on their behavior. This high approach tendency can result in frustration when goals are blocked, as evidenced by the relation between Surgency/Extraversion and frustration (Rothbart, Derryberry, & Hershey, 2000). For example, young children high on Surgency/Extraversion have been shown to use aggressive strategies to overcome barriers when seeking something perceived as highly rewarding (Rothbart & Putnam, 2002). Children with high levels of Surgency/Extraversion may have difficulty regulating their distress when faced with disappointment, resulting in acting out behavior. Moreover, these uninhibited or “exuberant” children are low on internalizing and reticence, which would presumably buffer against their acting out behavior (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001).

With respect to empirical research, Surgency/Extraversion has been found to predict aggression in preschool and early childhood (Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003; Rothbart et al. 2001) and externalizing behavior in early childhood (Mervielde, De Clercq, De Fruyt, & Van Leeuwen, 2005). Using a similar measure termed “social boldness,” Rimm-Kaufman et al. (2002) found this bold behavioral style was related to off-task kindergarten behavior. Likewise, the temperamental characteristic of high-intensity pleasure, which is one aspect of Surgency/Extraversion, has been related to the development of externalizing problems in preadolescence (Oldehinkel et al., 2004). Moreover, high activity level in middle childhood, which is another aspect of Surgency/Extraversion, was associated with attention-deficit/hyperactivity disorder, combined type (Bussing et al., 2003).

Despite evidence for a direct link between early temperamental Surgency/Extraversion and children's externalizing behavior, there are still many children who overcome risk factors associated with their temperament to become well adjusted (Maziade, 1994). Although the mechanisms are unclear, these children are presumably able to use other emotional, social, cognitive, and environmental resources to redirect their temperamental tendencies to engage in more appropriate behavior. Rothbart and Putnam (2002) suggested that a child's temperament as it interacts with the environment is likely a better predictor of developmental outcomes than temperament alone. Factors such as parenting and family stress have been examined (e.g., Paterson & Sanson, 1999; Maziade et al., 1990); however, the majority of these studies have focused on the preschool period when parents are typically the primary influence on their child's behavior. As children develop, other environments begin to exert more influence on children's behavior. In particular, as children enter kindergarten, the peer environment becomes increasingly important (Buhrmester, 1996). Peers may help highly active children recognize when their behavior is not acceptable, and conversely peers may help to reinforce appropriate behavior. Thus, the goal of this study is to better understand the role of the peer environment—specifically, peer acceptance (i.e., social preference) and perceived acceptance (i.e., a child's own rating of his or her acceptance)—as it relates to externalizing behavior in children who exhibit high Surgency/Extraversion.

Peer Relationships as a Protective Factor

The role of the peer environment has been thought to be an important predictor of whether a child is able to successfully redirect at-risk characteristics to more positive behavior (Keogh, 2003). Although there is theoretical support for examining a supportive peer environment, the protective role of peers has not been examined as it relates to temperament. It is known, however, that having positive peer relationships is predictive of positive outcomes, including better social skills, better conflict-resolution skills (Newcomb & Bagwell, 1996), more cooperative behavior, less disruptive behavior (Coie, Dodge, & Coppotelli, 1982), and an overall positive self-concept (Vandell & Hembree, 1994). Furthermore, there are many deleterious outcomes linked to peer rejection, such as poor school adjustment (Ladd, Kochenderfer, & Coleman, 1997) and aggression during early and middle childhood (Dodge et al., 2003). Difficult temperamental characteristics have also been associated with peer rejection. For example, Gunnar et al. (2003) completed a path analysis that revealed that high preschool Surgency/Extraversion predicted classroom aggression, which in turn predicted peer rejection.

Despite the relation between temperament and peer relationships and the relation between peer acceptance (i.e., social preference) and later adjustment, the extent to which peer acceptance acts as a buffer against (i.e., moderates) early risk factors (i.e., difficult temperament) is not well established. Recent empirical evidence, however, does support the hypothesized protective effects of peer acceptance. For example, peer acceptance has been found to be a protective factor for early aggression, family adversity, and child maltreatment (Bolger, Patterson, & Kupersmidt, 1998; Criss, Pettit, Bates, Dodge, & Lapp, 2002; Prinstein & La Greca, 2004).

Perceived Acceptance

Although peer acceptance can be protective and peer rejection is a risk factor for later behavior problems, particularly for children with other individual and environmental risk factors, the rejected status group is heterogeneous (Boivin & Begin, 1989; Cillessen, van IJzendoorn, van

Lieshout, & Hartup, 1992), making the exploration of individual differences important. One such factor theorized to influence child behavior is children's interpretation of their acceptance (Bellmore & Cillessen, 2003; Cillessen & Bellmore, 1999; Furman, 1996; Hymel & Franke, 1985; Hymel, Franke, & Freigang, 1985). Self-perception theory dates back to Cooley's (1902) theoretical book, where he argued that self-perceptions stem from people's beliefs about how others view them, but these perceptions are not always accurate. As such, perceived and actual peer acceptance do not always coincide (Boivin & Begin, 1989; Hymel, Bowker, & Woody, 1993; Patterson, Kupersmidt, & Griesler, 1990). For example, rejected children tend to overestimate their acceptance, whereas popular and average children tend to underestimate their acceptance (Patterson et al., 1990). With respect to rejected status heterogeneity, aggressive–rejected children have less accurate perceived acceptance compared to nonaggressive–rejected children (Zakriski & Coie, 1996).

It is possible that rejected children have fewer social opportunities on which to base their perceived acceptance, making it difficult for these children to develop accurate perceptions (Cillessen & Bellmore, 1999); however, this doesn't fully explain why aggressive–rejected children are less accurate than nonaggressive–rejected children. Hughes, Cavell, and Grossman (1997) hypothesized that aggressive children have an inaccurately high perceived acceptance as a defensive mechanism against feeling bad about rejection, thus impeding their motivation and ability to improve their aggressive behavior. Likewise, Baumeister, Smart, and Boden (1996) theorized that aggressive children might be less likely to internalize negative feedback from peers—resulting in lowered and more accurate perceived acceptance—because it would threaten their high perceptions, resulting in ignoring potentially helpful behavioral feedback. Consistent with these assertions, an inflated perceived acceptance has consistently been found to relate to behavior problems in early and middle childhood (David & Kistner, 2000; Guerra, Asher, & DeRosier, 2004; Hughes, Cavell, & Grossman, 1997; Hymel et al., 1993).

Another proposed mechanism is that social cognitive deficits account for inaccurate perceptions and concurrently influence child behavior (Cillessen & Bellmore, 1999). Social information-processing deficits, and in particular hostile attribution biases, have been associated with aggressive behavior (Crick & Dodge, 1996). Moreover, peer rejection was related to the growth in aggression across elementary school, and this relation was partially mediated by social information-processing deficits (Dodge et al., 2003). The association between aggression and social cognitive deficits suggests that aggressive children may not perceive their environments accurately, which would hinder their ability to perceive feedback from peers about the appropriateness of their behavior. Whereas aggression and perceived acceptance have been examined as they relate to behavioral outcomes, these same mechanisms have not been examined with respect to temperament and perceived acceptance. Thus, one goal of the current study is to extend the literature on child perceptions by examining their relation to temperament and later behavioral functioning.

Research Goals and Hypotheses

Temperament is thought to be a general behavioral tendency that can be redirected on the basis of environmental circumstances (Rothbart & Bates, 2006). Understanding what factors can help a child redirect early, difficult temperamental characteristics to more appropriate behavior will add to the existing literature. Examination of protective factors over the transition to kindergarten

is particularly important due to the relative instability of behavior problems as compared to later ages (Campbell, 1997; Smith, Calkins, Keane, Anastopoulos, & Shelton, 2004). For example, Campbell (1997) found that about half of children continued to have behavior problems as they transitioned to school, and half improved. This study sought to examine the relation between the child's perceived acceptance and social preference as they moderate the relation between pre-kindergarten temperamental risk (i.e., Surgency/Extraversion) and kindergarten externalizing behavior.

Given that perceived acceptance and social preference are primarily based on interactions with peers at school, externalizing behavior exhibited in the classroom is the focus of the current study. In addition, there are theoretical reasons for examining gender differences, as the quality of peer relationships differs by gender. For example, girls have more social skills, fewer behavior problems, and more intimate friendships (Blyth & Foster-Clark, 1987; Criss et al., 2002; Smith et al., 2004). These relationship factors may allow peer acceptance to provide greater protective effects for girls. Moreover, empirical work supports differential protective effects based on the gender of the child (Crosnoe, Erickson, & Dornbusch, 2002; Formoso, Gonzales, & Aiken, 2000; Gerard & Buehler, 2004). Thus, gender differences are examined.

Four specific research questions were addressed in the present study:

1. Does early temperamental Surgency/Extraversion predict externalizing behavior (i.e., hyperactivity and aggression)?
2. What is the relation between perceived acceptance and social preference?
3. Do perceived acceptance and social preference interact with Surgency/Extraversion to predict externalizing behavior?
4. Are the protective effects of social preference and perceived acceptance similar for boys and girls?

Consistent with previous research, we expected that pre-kindergarten Surgency/Extraversion would predict kindergarten externalizing behavior. Furthermore, we expected perceived acceptance and social preference to be unrelated. They were expected, however, to interact with pre-kindergarten Surgency/Extraversion to predict kindergarten externalizing behavior. More specifically, we hypothesized that low social preference and high perceived acceptance (i.e., reporting an exaggerated perceived acceptance) in combination with high Surgency/Extraversion would be associated with higher hyperactivity and aggression. Finally, we expected that moderation would be stronger for girls.

Method

Participants

The current sample ($n = 399$) uses data from three cohorts of children who are part of an ongoing, longitudinal study that began when children were 2 years of age. The goal of the larger longitudinal study is to understand trajectories of externalizing behavior as they relate to children's social and emotional development. The current study focuses on children's peer relations as they relate to early temperament and later externalizing behavior. The goal for recruitment of all three cohorts was to obtain a sample of children with a range of behavior problems, some of whom were at risk for developing future externalizing behavior problems,

that was representative of the surrounding community in terms of race and socioeconomic status (SES). All cohorts were recruited through child day care centers, the county health department, and the local Women, Infants, and Children program. Potential participants for Cohorts 1 and 2 were recruited at 2 years of age (Cohort 1: 1994–1996; Cohort 2: 2000–2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992), which was completed by the mother to oversample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Children who received externalizing T-scores below 60 were also selected to ensure that a range of behavior problems was represented. A total of 307 children were selected.

Cohort 3 was initially recruited when infants were 6 months of age (in 1998) for their level of frustration on the basis of laboratory observation and parent report and followed through the toddler period (see Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mothers completed the CBCL at 2 years of age were included in the current study ($n = 140$). Of the entire sample ($N = 447$; 215 boys, 232 girls), 37% of the children were identified as being at risk for future externalizing problems ($T \geq 60$ on the CBCL; Achenbach, 1992). There were no significant demographic differences between cohorts with regard to gender, minority status (i.e., Caucasian vs. non-Caucasian), or 2-year SES.

The current study focused on the pre-kindergarten (pre-k) and kindergarten assessments. At the pre-k assessment, 399 families participated. Families lost to attrition included those who could not be located, had moved out of the area, declined participation, or did not respond to phone and letter requests to participate. At the kindergarten assessment, 365 families participated, including 4 who did not participate in the pre-k assessment.

Only participants with complete data for all variables of interest were included in analyses ($n = 200$; 90 boys). Because multiple assessments were conducted with mothers, children, teachers, and peers in multiple contexts (e.g., laboratory, classroom), complete data were not available for all participants. Data were missing because parents or principals did not give consent for the school assessment, schools were too far away to conduct a school assessment, teachers did not complete questionnaires, and families did not complete both the pre-k and the kindergarten laboratory assessments. The children with complete data for the current study were primarily from intact families (77%), and families were economically diverse, with Hollingshead (1975) scores ranging from 17 to 65 ($M = 43.96$). Sixty-five percent were European American, 29% were African American, 4% were biracial, and 2% were Hispanic. There were no significant differences between families who were and were not included in analyses in terms of gender, minority status, 2-year SES, or 2-year externalizing T-score. In addition, there were no significant differences between families who were and were not included in analyses in terms of the nine main variables examined. Similarly, there were no demographic or study variable differences for participants excluded due solely to missing data at the kindergarten assessment. Only 3 participants were excluded due solely to missing data at the pre-k assessment.

Although we oversampled for externalizing behavior problems at 2 years, the variables examined in the current study have a good distribution that seems to be representative of a community sample. For example, the average T-scores for hyperactivity and aggression were both

approximately at the 50th percentile according to the general norms presented by Reynolds and Kamphaus (2004), and both variables had a wide range of scores (see Table 1).

Table 1
Descriptive Statistics

Variable	<i>M</i>	<i>SD</i>	Minimum	Maximum
1. Pre-k CBCL Externalizing ^a	52.34	9.23	30.00	76.00
2. Pre-k Surgency/Extraversion ^a	4.76	0.62	2.88	6.61
3. Kindergarten social preference ^b	-0.01	0.95	-2.16	2.16
4. Kindergarten perceived acceptance ^c	3.03	0.65	1.33	4.00
5. Kindergarten BASC Hyperactivity ^d	47.91	9.99	34.00	85.00
6. Kindergarten BASC Aggression ^d	47.83	9.29	37.00	84.00
7. Kindergarten "fights" ^b	0.04	0.98	-1.81	2.92
8. Kindergarten "acts wild" ^b	0.04	0.96	-1.46	2.91
9. Kindergarten Surgency/Extraversion ^a	4.83	0.63	3.05	6.47

Note. *N* = 200. Pre-k = pre-kindergarten; CBCL = Child Behavior Checklist; BASC = Behavioral Assessment System for Children.

^a Mother report. ^b Peer report. ^c Child report. ^d Teacher report.

Procedures

Pre-k assessment

When children were approximately 4.5 years old, children and their mothers completed a battery of tasks and questionnaires in the laboratory. The measure of interest for this study was a questionnaire assessing temperament. Mothers also completed a measure of externalizing behavior at this visit that was used as a control variable.

Kindergarten assessment

Approximately 1 year later, we obtained consent from the families to complete an assessment in the child's kindergarten classroom. Children were either 5 or 6 years old at the time of the kindergarten assessment. At this time, we obtained an assessment of the child's social status by interviewing peers in the classroom. This assessment did not take place until the children had at least 8 weeks in the classroom to become acclimated to their peers, and only children with parental consent were interviewed. Trained graduate and undergraduate students interviewed each child individually. The sociometric procedures used were a modified version of the Coie et al. (1982) original procedure. Instead of asking children to nominate three peers they "liked most" and "liked least," children were asked to give unlimited nominations for each category. This method allows for more reliable results and a reduction in measurement error (Terry, 2000). Furthermore, this increased precision can be achieved with fewer classmates than are needed for the limited-choice nominations (Terry, 2000). The mean rate of participation across classrooms was 84% (range = 68%–94%; number of reporters = 8–22), which is well within the acceptable range (Keane & Calkins, 2004). Sociometric data were collected in 158 classrooms for the current sample. The average number of students in a class was 20 (range = 10–27). Cross-gender nominations were permitted to increase the stability of measurement for the nominations to determine peer status. To ensure that the children had a good understanding of the questions, we asked them to go through several sample questions until they understood the task, and provided pictures of all of the participating children as visual prompts. Interviewers were trained to provide further information and more examples if the child did not seem to grasp the questions. In addition to sociometric nominations, teachers were also asked to fill out several questionnaires on the target child to assess the child's social, emotional, cognitive, and behavioral functioning in

the school setting. During the same year, when children were approximately 5.5 years old, mothers and their children were also asked to come back to the laboratory for another visit similar to the pre-k visit. Perceived peer acceptance and child temperament were measured at this time.

Measures

Pre-k externalizing behavior

Mother-reported pre-k externalizing behavior measured by the CBCL (CBCL 4-18; Achenbach, 1991) was used as a control variable in all regression analyses. The broadband Externalizing subscale was used as a parent-report measure of externalizing behavior problems. The minor subscales of Aggression (20 items) and Delinquency (13 items) make up the overall Externalizing subscale, including items such as “argues a lot” and “gets in many fights.” Each item was rated on a 3-point scale. The CBCL is widely used and has been found to be valid and reliable (Achenbach, 1991; Achenbach & Rescorla, 2001). One-week test–retest reliability was .93 (Achenbach, 1991). Cronbach's α (.88) for the Externalizing subscale in the current study was good.

Pre-k and kindergarten temperament

The measure that was used to predict externalizing behavior in kindergarten was maternal report of the child's pre-k temperament on the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, & Hershey, 1994). The CBQ was also administered at the kindergarten assessment as a control variable and to assess the stability of child temperament over time. The CBQ is a 195-item questionnaire, requiring mothers to rate their child's behavior on a 7-point Likert scale ranging from 1 = *extremely untrue* to 7 = *extremely true*. The broad temperamental dimension of Surgency/Extraversion was the focus of the present study. The score for Surgency/Extraversion was obtained by taking the mean of the following CBQ subscales (each 13 items): High Activity Level, High-Intensity Pleasure, Impulsivity, and Shyness, which was reverse-scored; Cronbach's α = .71 (pre-k), .69 (kindergarten); computed on the four subscales. Sample items included in the Surgency/Extraversion composite are “is full of energy, even in the evening” and “likes rough and rowdy games.”

Kindergarten sociometric nominations

A social preference score was obtained from the sociometric procedures. The total number of nominations for “like most” and “like least” were standardized to obtain two separate z scores, which were subsequently subtracted to compose a social preference score (z “like most” – z “like least” = social preference; Coie et al., 1982). Social preference was again standardized within classrooms after computing the difference score. Lower scores represented less likeability or overall peer status in the classroom, whereas higher scores represented greater likeability. This is a widely used technique for assessing a child's overall likeability or peer acceptance within the classroom (Jiang & Cillessen, 2005). In addition, standardized peer-nominated “fights” and “acts wild” were used as a peer report of child aggression and hyperactivity, respectively.

Kindergarten perceived acceptance

Perceived acceptance was measured by the Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (Harter & Pike, 1984) during the kindergarten assessment. This scale assessed children's perceptions of their peer acceptance, cognitive competence, physical

competence, and maternal acceptance. Perceived peer acceptance was the construct used for this study. Sample items for this subscale include “has lots of friends” and “gets asked to play by others.” A trained graduate student read each item out loud to the children while showing a corresponding picture. Each item was scored on a 4-point scale. The children were asked to decide which of two descriptors (e.g., “I have lots of friends” or “I don't have lots of friends”) applied more to them and to indicate whether that statement was “sort of true” or “really true.” The final perceived peer acceptance score was obtained by calculating the mean score for six questions pertaining to the child's perception of peer acceptance (Cronbach's $\alpha = .74$). This measure was found to be valid for children in preschool and kindergarten (Harter & Pike, 1984).

Kindergarten externalizing behavior

The outcome examined was teacher-reported externalizing behavior measured by the Behavioral Assessment System for Children–Teacher Rating Scale (BASC-TRS; Reynolds & Kamphaus, 1992). The BASC-TRS is a tool that is widely used for diagnostic assessment and is gender- and age-normed using standardized *t* scores. Teachers were asked to complete either the 2.5- to 5-year-old BASC-TRS (109 items; 71% of participants) or the 6- to 11-year-old BASC-TRS (148 items; 29% of participants), depending on the child's age at the time of the kindergarten assessment. The 6- to 11-year-old BASC-TRS has more items because it is assessing additional constructs. The Hyperactivity (2.5–5 BASC: 10 items; 6–11 BASC: 13 items; e.g., “acts out of control,” “cannot wait to take turn”) and Aggression (2.5–5 BASC: 12 items; 6–11 BASC: 14 items; e.g., “hits other children,” “bullies others”) subscales were used to assess two types of externalizing behaviors. The frequency of occurrence for each item was rated on a 4-point scale (*never, sometimes, often, almost always*). The internal consistency, reliability, and validity for the BASC-TRS have been well established (Reynolds & Kamphaus, 1992). Cronbach's α for the Hyperactivity (2.5–5 BASC-TRS, $\alpha = .91$; 6–11 BASC-TRS, $\alpha = .90$) and Aggression (2.5–5 BASC-TRS, $\alpha = .90$; 6–11 BASC-TRS, $\alpha = .92$) subscales in the current study were excellent.

Results

Overview

Analyses are presented in four steps. First, intercorrelations and descriptive statistics among the variables of interest are examined. Following this step, the interaction of pre-k Surgency/Extraversion with kindergarten social preference and kindergarten perceived acceptance is examined as it predicts kindergarten hyperactivity and aggression using two hierarchical linear regressions. Third, parallel hierarchical linear regressions are completed with kindergarten peer-nominated “acts wild” and “fights” as outcomes. Finally, in the fourth step, an additional model is presented to examine a competing hypothesis. Namely, the interaction between pre-k Surgency/Extraversion and kindergarten externalizing behavior (i.e., hyperactivity, aggression, “acts wild,” and “fights”) as it predicts social preference and perceived acceptance is examined. Significant interactions are further investigated according to methods outlined by Aiken and West (1991). To explore gender differences, we ran all regressions separately by gender. Prior to each analysis, all continuous main effects were centered based on means within gender before creating interaction terms.

Descriptive Statistics and Intercorrelations

Descriptive statistics for the study variables are presented in Table 1. The skewness values for all variables were less than or equal to 1.1. A multivariate analysis revealed that there were no

significant differences among the outcome variables in terms of minority status, $F(4, 195) = 1.36, p = ns$. There were, however, differences in terms of gender, $F(4, 195) = 33.43, p < .000$. Namely, girls had lower “fights” (girls: $M = -0.38, SD = 0.69$; boys: $M = 0.55, SD = 1.05$; Cohen's $d = -1.05$) and “acts wild” (girls: $M = -0.42, SD = 0.67$; boys: $M = 0.60, SD = 0.97$; Cohen's $d = -1.22$) scores. Bivariate correlations also indicated that there were no significant effects of SES on the variables of interest. Intercorrelations among the study variables are presented in Table 2. As expected, pre-k Surgency/Extraversion was positively associated with kindergarten externalizing behavior. It is also noteworthy that Surgency/Extraversion is a highly stable construct across the pre-k and kindergarten assessments ($r = .81, p < .001$). There was no association between kindergarten social preference and kindergarten perceived acceptance. There was, however, a negative association between kindergarten social preference and kindergarten externalizing behavior (i.e., hyperactivity, aggression, “acts wild,” and “fights”) and a positive association between kindergarten perceived acceptance and kindergarten externalizing behavior (i.e., hyperactivity, aggression, and “acts wild”).

Table 2
Correlations Among Variables

Variable	1	2	3	4	5	6	7	8	9
1. Pre-k externalizing	—								
2. Pre-k surgency	.25***	—							
3. K social preference	-.18*	-.21**	—						
4. K perceived acceptance	.03	.07	.00	—					
5. K hyperactivity	.24**	.34***	-.31***	.32***	—				
6. K aggression	.30***	.20**	-.38***	.25***	.65***	—			
7. K “fights”	.20**	.22**	-.47***	.12	.26***	.35***	—		
8. K “acts wild”	.08	.29***	-.39***	.16*	.50***	.38***	.61***	—	
9. K surgency	.18*	.81***	-.21**	.16*	.35***	.24**	.22**	.30***	—

Note. $N = 200$. Pre-k = pre-kindergarten; K = kindergarten.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Regressions Predicting Kindergarten Hyperactivity and Aggression

One hypothesis of the current study was that kindergarten social preference and perceived acceptance would moderate the association between pre-k Surgency/Extraversion and kindergarten externalizing behavior. To examine this question, we completed four hierarchical linear regressions with standardized betas and change in R^2 for each step presented in Table 3. The dependent variables for the regression analyses were kindergarten teacher-reported hyperactivity and aggression. Regressions were computed separately for boys and girls. Pre-k parent-reported externalizing behavior and kindergarten Surgency/Extraversion were entered in the first step as control variables. Step 2 included the main effects for pre-k Surgency/Extraversion, kindergarten social preference, and kindergarten perceived acceptance. Step 3 included the following interactions: Pre-k Surgency/Extraversion \times Kindergarten Social Preference, Pre-k Surgency/Extraversion \times Kindergarten Perceived Acceptance, and Kindergarten Social Preference \times Kindergarten Perceived Acceptance. Finally, Step 4 included the three-way interaction combining pre-k Surgency/Extraversion, kindergarten social preference, and kindergarten perceived acceptance.

Table 3
Hierarchical Regressions Examining Social Preference and Perceived Acceptance As Moderators Between Pre-K Surgency/Extraversion and Kindergarten Behaviors

Predictor	Kindergarten outcomes							
	Hyperactivity		Aggression		"Acts wild"		"Fights"	
	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys
Step 1	(.16***)	(.14**)	(.08*)	(.19***)	(.09**)	(.07*)	(.02)	(.15***)
Pre-k CBCL Externalizing	.10	.16	.16 [†]	.27**	.06	-.12	-.01	.21*
K Surgency/Extraversion	.02	.12	.07	.16	.29*	-.02	.09	.02
Step 2	(.16***)	(.11**)	(.14**)	(.15**)	(.19***)	(.21***)	(.14**)	(.28***)
Pre-k Surgency/Extraversion	.26 [†]	.09	.01	-.01	-.16	.23	-.09	.05
K Social Preference	-.20*	-.21*	-.31**	-.30**	-.37***	-.43***	-.39***	-.51***
K Perceived Acceptance	.30**	.24*	.21*	.22**	.16 [†]	.04	.10	.10
Step 3	(.07*)	(.03)	(.01)	(.01)	(.09**)	(.04)	(.09*)	(.01)
Pre-k Surgency × K Social Preference	-.16*	.05	-.03	-.02	-.15 [†]	.08	.14	-.04
Pre-k Surgency × K Perceived Acceptance	.19*	.19 [†]	.08	.07	-.04	.18 [†]	-.17 [†]	.05
K Social Preference × K Perceived Acceptance	-.08	-.08	-.01	-.07	-.26**	-.09	-.29**	-.12
Step 4	(.00)	(.02)	(.00)	(.01)	(.03*)	(.00)	(.00)	(.01)
Pre-k Surgency × K Social Preference × K Perceived Acceptance	-.06	.14	-.06	.12	-.18*	.00	-.07	.10
Total R ²	.39***	.30***	.23**	.36***	.40***	.32***	.25**	.45***

Note. *N* = 200. Standardized β presented in each column. Δ *R*² for each step appears in parentheses. Pre-k = pre-kindergarten; K = kindergarten; CBCL = Child Behavior Checklist.

[†] *p* < .10. * *p* < .05. ** *p* < .01. *** *p* < .001.

When kindergarten teacher-reported hyperactivity was examined as the outcome of these steps, the main effects for kindergarten social preference and perceived acceptance were significant predictors. These main effects, however, were qualified for girls only by significant two-way interactions between pre-k Surgency/Extraversion and kindergarten social preference and between pre-k Surgency/Extraversion and kindergarten perceived acceptance. The overall hyperactivity model explained 39% of the variance for girls and 30% of the variance for boys.

The significant two-way interactions were explored following methods outlined by Aiken and West (1991). The first two-way interaction was depicted in Figure 1 by plotting the regression of hyperactivity (*y*) on pre-k Surgency/Extraversion (*x*) as a function of two values of social preference, *Z*_L and *Z*_H (i.e., one standard deviation below the mean, one standard deviation above the mean). Unstandardized *B* was used to calculate the regression lines. From the graph it is apparent that children with low social preference scores have the steepest slope across different levels of pre-k Surgency/Extraversion. The highest kindergarten hyperactivity score was among children with high pre-k Surgency/Extraversion and low kindergarten social preference. Similar to the first interaction, the second two-way interaction was depicted in Figure 2 by plotting the regression of hyperactivity (*y*) on pre-k Surgency/Extraversion (*x*) as a function of two values of perceived acceptance, *Z*_L and *Z*_H. The graph shows that hyperactivity varies at different levels of pre-k Surgency/Extraversion only in the context of high kindergarten perceived acceptance.

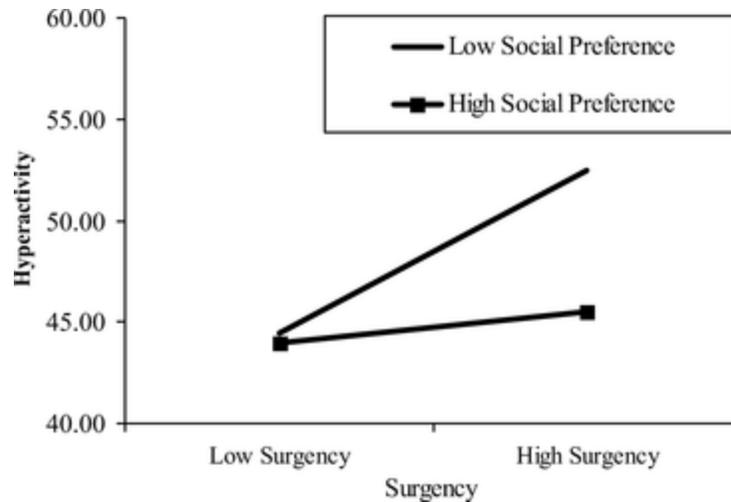


Figure 1. The interaction between pre-kindergarten Surgency/Extraversion and kindergarten social preference as it predicts girls' kindergarten hyperactivity.

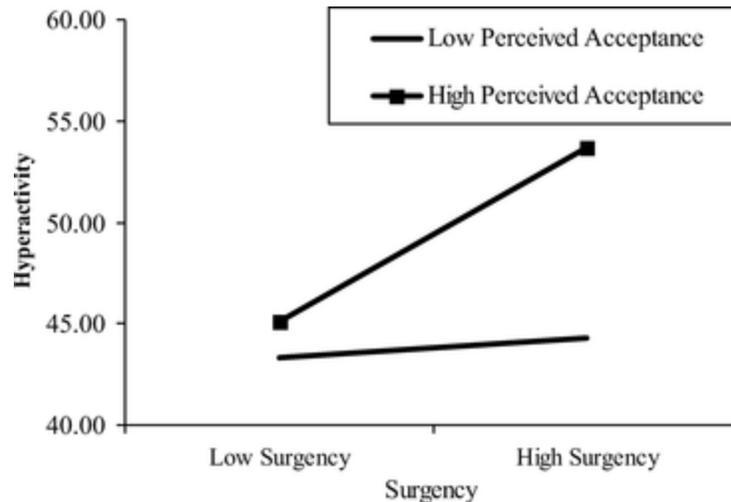


Figure 2. The interaction between pre-kindergarten Surgency/Extraversion and kindergarten perceived acceptance as it predicts girls' kindergarten hyperactivity.

The next step was to determine whether the slopes of the lines plotted in Figures 1 and 2 were different from zero, as outlined by Aiken and West (1991). For the first graph, two new variables were created, Z_{cvh} and Z_{cvi} , such that each variable reflected the social preference score minus Z_H and Z_L , respectively. The cross-product of each new variable with pre-k Surgency/Extraversion (x) was computed. Finally, hyperactivity was regressed on pre-k Surgency/Extraversion, the conditional values of social preference (i.e., Z_{cvh} , Z_{cvi}), and each cross-product in two separate regression analyses. The resulting t tests for the betas indicated the slope for low social preference was significantly different from zero, $B = 5.56$, $\beta = .38$, $t(106) = 2.00$, $p < .05$, but the slope for high social preference was not significantly different from zero, $B = -0.37$, $\beta = -.03$, $t(106) = -0.15$, $p = ns$. To test the lines in Figure 2, we computed similar analyses using conditional values of perceived acceptance. Results revealed the slope for high perceived acceptance was significantly different from zero, $B = 7.24$, $\beta = .49$, $t(106) = 2.81$, $p < .01$, whereas the slope for low perceived acceptance was not, $B = 0.13$, $\beta = .01$, $t(106) = 0.05$, $p = ns$.

When kindergarten aggression was examined as the outcome (Table 3), the main effects of kindergarten social preference and perceived acceptance were again significant predictors for boys and girls. In contrast to the regression examining hyperactivity, there were no significant two-way or three-way interactions when predicting aggression. The overall aggression model explained 23% of the variance for girls and 36% of the variance for boys.

Regressions Predicting Kindergarten “Acts Wild” and “Fights”

To confirm the results presented with kindergarten teacher-reported hyperactivity and aggression, we examined kindergarten peer nominations of “acts wild” and “fights” as additional measures of hyperactivity and aggression. The steps entered in the previous regressions were identical to the steps entered when “acts wild” and “fights” were examined as outcomes (Table 3).

Similar to the regression examining teacher-reported hyperactivity, kindergarten social preference significantly predicted kindergarten peer-nominated “acts wild.” These main effects were qualified for girls only by a significant three-way interaction among pre-k Surgency/Extraversion, kindergarten social preference, and kindergarten perceived acceptance. The model accounted for 40% of the variance for girls and 32% of the variance for boys. The significant three-way interaction was explored following methods outlined by Aiken and West (1991), similar to the graphing procedures presented in the previous section. From the graph it is apparent that girls with inflated perceived acceptance (i.e., high perceived acceptance, low social preference) have the highest “acts wild” scores (Figure 3). In contrast, having accurately high perceived acceptance (i.e., high perceived acceptance, high social preference) appears to serve as a protective factor for girls with high pre-kindergarten Surgency/Extraversion, as these children have the lowest “acts wild” scores.

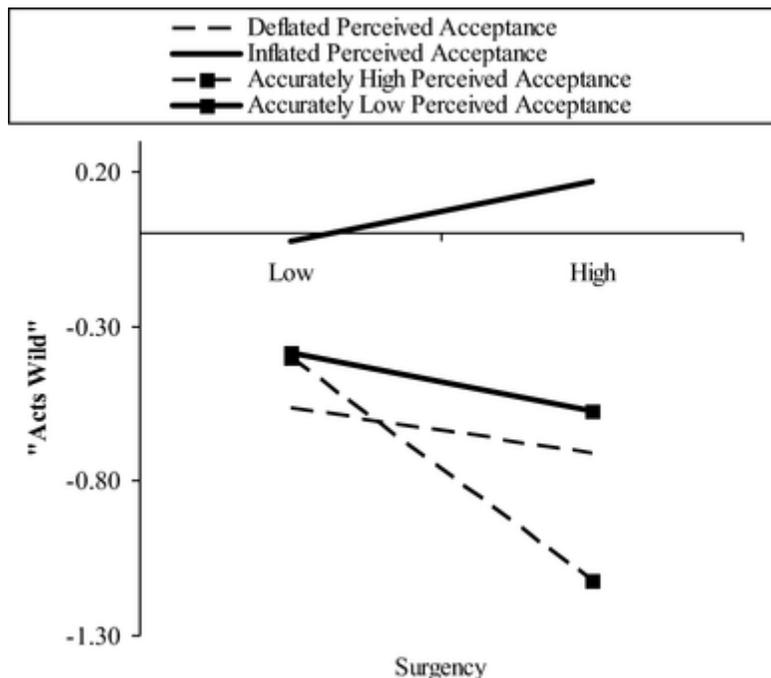


Figure 3. The three-way interaction with pre-kindergarten Surgency/Extraversion, kindergarten social preference, and kindergarten perceived acceptance as it predicts girls' kindergarten "acts wild."

The next step was to determine whether the slopes of the lines plotted in Figure 3 were different from zero. Analyses were similar to those presented in the previous section and followed guidelines outlined by Aiken and West (1991). The resulting t tests for the betas indicated that only the slope for girls with accurately high perceived acceptance was marginally different from zero, $B = -0.42$, $\beta = -.40$, $t(102) = -1.93$, $p < .06$.

Similar to the regression predicting aggression, the main effect of kindergarten social preference significantly predicted kindergarten peer-nominated "fights" (Table 3). For girls, the interaction between kindergarten social preference and kindergarten perceived acceptance significantly predicted "fights," with girls reporting inflated perceived acceptance having the highest "fights" scores. When all steps were included, 25% of the variance in "fights" was explained for girls and 45% of the variance was explained for boys.

Competing Hypothesis

Given that the moderators (i.e., social preference and perceived acceptance) and outcome variables (i.e., hyperactivity, aggression, "acts wild," and "fights") were assessed during the same year, it could be argued that the kindergarten externalizing behaviors examined moderate the relation between pre-k Surgency/Extraversion and kindergarten peer acceptance (i.e., social preference and perceived acceptance) instead of peer acceptance moderating the relation between Surgency/Extraversion and externalizing behavior. To test this competing hypothesis, we computed two separate hierarchical linear regressions for girls only because the previous analyses revealed interactions for girls but not for boys. Kindergarten social preference was the dependent variable for the first regression, and kindergarten perceived acceptance was the dependent variable for the second regression. Pre-k parent-reported externalizing behavior and kindergarten Surgency/Extraversion were entered in the first step as control variables. Pre-k Surgency/Extraversion, kindergarten hyperactivity, and kindergarten "acts wild" were included in Step 2. Both two-way interactions between pre-k Surgency/Extraversion and the kindergarten externalizing behaviors were entered in Step 2. Results revealed the main effect for kindergarten "acts wild" significantly predicted kindergarten social preference, $\beta = -.33$, $t(102) = -3.11$, $p < .01$, and the main effect for kindergarten hyperactivity significantly predicted kindergarten perceived acceptance, $\beta = .33$, $t(102) = 2.92$, $p < .01$. None of the two-way interactions were significant. Thus, externalizing behavior did not moderate the relation between pre-k Surgency/Extraversion and kindergarten peer acceptance (i.e., social preference and perceived acceptance).

Discussion

The goal of this study was to examine possible moderating factors in the relation between pre-k Surgency/Extraversion and kindergarten externalizing behavior. In particular, the role of kindergarten perceived acceptance and kindergarten social preference as protective factors were of interest. Consistent with previous literature, pre-k mother-reported temperamental Surgency/Extraversion was positively associated with kindergarten teacher-reported externalizing behavior (i.e., hyperactivity, aggression) and kindergarten peer-nominated

externalizing behavior (i.e., “acts wild,” “fights”). That is, children who were identified by mothers in pre-k as being highly active were at risk for exhibiting behavior problems in the kindergarten classroom. Children who are very active and have a high approach tendency continue to exhibit these exuberant behaviors, at times in a maladaptive manner, and exhibit anger, frustration, and aggression when their goals to explore are blocked. Given the highly active and at times aggressive nature of children high on Surgency/Extraversion, it is not surprising that these children were less well liked by their peers, evidenced by the negative correlation between pre-k Surgency/Extraversion and kindergarten social preference.

It is noteworthy that there was not a significant correlation between social preference and perceived acceptance, indicating that children's perceptions do not always coincide with peer nominations of their behavior. Brown and Kafer (1994) found that there was a dramatic increase in self-awareness around age 7 or 8. The kindergarteners in our sample were reporting perceived acceptance prior to this time, resulting in a greater range in the extent to which children's perceptions correlated with peer nominations. Some children may exaggerate their acceptance to self-protect against negative feedback from peers, consistent with the theory Hughes et al. (1997) proposed to explain the inflated perceived acceptance of aggressive children. Conversely, the exaggerated perception may also make it less likely that children would internalize negative peer feedback, as it would be inconsistent with their perceptions. On the other end of the spectrum, children who report low perceived acceptance may have internalizing difficulties, which accounts for their low perceived acceptance scores and may also buffer against externalizing difficulties.

Consistent with our hypothesis, pre-k Surgency/Extraversion interacted with kindergarten social preference and kindergarten perceived acceptance when predicting peer-nominated “acts wild” for girls only. Girls with inflated perceived acceptance (i.e., high perceived acceptance, low social preference) had the highest “acts wild” scores regardless of early surgency. Whereas the high perception could be the result of a defensive mechanism (Hughes et al., 1997), it has also been theorized that social information-processing deficits could be implicated. Children who have difficulty understanding their social worlds would be less equipped to accurately perceive, internalize, and modify behavior based on behavioral feedback from peers. Moreover, children who are rejected and are not expressing awareness of this rejection may be less motivated to change their negative behavior when presented with feedback because of their denial of the problematic behavior. This denial is consistent with a study examining peer status and attribution biases that found rejected children were more likely to attribute their social failures to external causes (Crick & Ladd, 1993). Similarly, children in an inpatient psychiatric unit who had high self-esteem were more likely to report fewer interpersonal problems compared to children with moderate self-esteem despite being more likely to be rejected by peers (Perez, Pettit, David, Kistner, & Joiner, 2001). With respect to motivation, Guerra et al. (2004) found that aggressive children with self-blaming attributions were more likely to have a decrease in aggression over time compared to aggressive children with peer-blaming attributions.

In addition, the three-way interaction revealed that having an accurately high perceived acceptance (high perceived acceptance, high social preference) was a protective factor for girls exhibiting high Surgency/Extraversion. Girls who are accepted by peers have more social opportunities to learn and develop social skills through modeling, practice, and behavioral

feedback (Price, 1996). These social skills would include learning that externalizing behavior, such as being inappropriately active, is not tolerated by peers. When children have a more difficult temperament, they may be able to learn appropriate ways of displaying their behavior so that it is not disruptive by mimicking their peers' self-regulatory strategies. The results from this study showed that girls who recognize their high social preference are able to lower their disruptive social behavior, suggesting that recognition of peer status facilitates the learning process. Moreover, girls who are able to accurately recognize their peer status may have other social cognitive skills that also serve as protective factors.

The three-way interaction predicting “acts wild” was partially corroborated by two significant two-way interactions when predicting girls' teacher-reported hyperactivity. Namely, surgency interacted with kindergarten social preference and with kindergarten perceived acceptance. Follow-up analyses revealed that having low social preference and high perceived acceptance resulted in the highest levels of hyperactivity when the child had high, pre-kindergarten Surgency/Extraversion. It will be important to examine similar models with a larger sample to determine if the three-way interaction predicting hyperactivity was not significant due to a lack of power.

It is also noteworthy that Surgency/Extraversion was moderated by social preference and perceived acceptance for girls only. Perhaps peer acceptance was found to be a protective factor for girls only because young girls have better social understanding than boys (Dunn, Brown, Slomkowski, Tesla, & Youngblade, 1991). Therefore, girls may be better equipped to notice and incorporate behavioral feedback from peers, which would bolster the protective effects of increased social interactions.

There are several novel features of this study. First, multiple reporters were used to reduce reporter biases when examining the relation between factors. As such, parent report was used to measure the predictor variable of child temperamental Surgency/Extraversion, peer and self report were used to assess peer acceptance, and teacher report and peer nominations were used to assess the outcome of externalizing behavior. In addition to multiple reporters, this study employed a longitudinal design to assess the effects of early temperamental risk on later behavior problems. The longitudinal design, in addition to controlling for pre-k behavior problems and kindergarten Surgency/Extraversion, helped us to understand developmental pathways linking pre-k temperament to kindergarten behavior problems.

There are also several important implications that result from this study. Although temperament is related to behavior problems in the classroom, there are many environmental factors that allow children to express themselves in a prosocial manner. One such protective factor is the peer environment. In addition to peer nominations, the child's perception of that environment is also valuable information. This study provides evidence that environmental fit can offer a good opportunity for children to appropriately manage their behavior.

Although the findings support the protective effects of perceived acceptance and social preference, several limitations should be considered. First, the presence of perceived acceptance and social preference were shown to be moderators in the relation between Surgency/Extraversion and externalizing behavior; however, low perceived acceptance and high

social preference could be markers of other individual factors that are facilitating the protective effects. For example, children with high perceived acceptance and low social preference may have fewer social skills, which may account for the exacerbated relation between Surgency/Extraversion and externalizing behavior for this group. However, in a similar study that looked at the protective effects of peer acceptance, neither social information processing nor child temperament fully explained the moderating effects (Criss et al., 2002). Second, the moderator and outcome variables were all measured during the kindergarten year. As such, the possibility that externalizing behavior could also be a moderator in the relation between Surgency/Extraversion and peer acceptance was considered. This interaction was not found to be significant, providing support for the model that was presented. Finally, our measures of peer-nominated and self-reported acceptance did not allow for a specific measure of accuracy. Namely, we were unable to establish if children accurately identified the peers who nominated them for the “liked most” and “liked least” categories. Instead, we used a global measure of perceived acceptance; therefore, we were unable to determine if children with inflated perceived acceptance were inaccurate in the perceptions of acceptance at the dyadic level.

Future research could examine whether children with low perceived acceptance are more likely to experience internalizing symptoms such as depression or anxiety. The specific mechanisms that account for the protective effects of perceived acceptance and social preference could be examined. Looking at early predictors of consistent and inconsistent perceptions could also help shed light on mechanisms of the protective effects. In addition, the role of children's perceived acceptance as a moderator for other relations should be explored.

The present study suggests that peers can provide remedial support for children exhibiting high Surgency/Extraversion prior to kindergarten. Similar to findings of previous research, we found that high social preference buffers against early temperamental risk for hyperactivity. Although peers can act as a protective factor, the story is not complete without also considering children's perceptions of their peer status. Girls who exhibited inflated perceived acceptance had the highest levels of peer-nominated “acts wild” scores, whereas having an accurately high perceived acceptance acted as a protective factor for girls' early Surgency/Extraversion.

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