

Temperamental surgency and emotion regulation as predictors of childhood social competence

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Abstract:

The primary aims of the current study were to longitudinally examine the direct relationship between children's temperamental surgency and social behaviors as well as the moderating role of children's emotion regulation. A total of 90 4.5-year-old children participated in a laboratory visit where children's temperamental surgency was rated by experimenters and children's emotion regulation abilities were assessed. The summer before entry into first grade, children's social behaviors with unfamiliar peers were observed in the laboratory and mothers completed a questionnaire about children's social behaviors. Supporting our hypotheses, results revealed that children high in temperamental surgency developed more negative peer behaviors, whereas children low in temperamental surgency were more likely to develop behavioral wariness with peers. Emotion regulatory behaviors were found to moderate the relation between temperamental surgency and aggression, where high-surgent children who showed high levels of social support seeking were less likely to be rated by their mothers as high in aggression. Furthermore, results revealed that low-surgent children who showed high levels of distraction/self-soothing were more likely to show behavioral wariness around unfamiliar peers, whereas high-surgent children who used more distraction/self-soothing behaviors were rated by their mothers as lower in social competence.

Keywords: Temperament | Surgency | Emotion regulation | Social competence | Childhood aggression | Behavioral wariness

Article:

Introduction

The development of social competence, frequently defined as children's ability to initiate and maintain effective interactions with their peers (Rubin, Bukowski, & Parker, 2006), is a fundamental task during early childhood and a robust predictor of later mental health as well as social and academic outcomes (e.g., Carlton and Winsler, 1999, Denham and Holt, 1993, Ladd et al., 1999). Temperament theory and research has proven to be important in identifying the

foundation of childhood social competence by showing that variation in children's temperamental predispositions may influence the processes that support or hinder socially competent behaviors (Eisenberg et al., 2000, Fox et al., 1995, Rubin et al., 2002). Although various temperament dimensions and types have been investigated for their role in the development of children's social competence, additional research is needed regarding the development of socially competent behaviors in children varying in their approach to novelty specifically. What little we do know is that although children who are high in approach are very sociable and display high levels of positive affect, they are also at risk for being rejected by their peers (Gunnar, Sebanc, Tout, Donzella, & van Dulmen, 2003) and developing externalizing behaviors, such as aggression and conduct problems (Berdan et al., 2008, Schwartz et al., 1996, Stifter et al., 2008a), that affect their social competence. On the other hand, children who are low in approach tend to display higher levels of shyness around peers (Kagan, 1999, Rubin et al., 2002) and lower levels of social competence (Fox et al., 1995), and they are at risk for developing internalizing behaviors (Biederman et al., 1993, Nilzon and Palmerus, 1998), such as anxiety, that limit their ability to interact effectively with their peers.

One mechanism that might explain these outcomes is the development of effective emotion regulation. Due to limits that are frequently placed on their attempts to approach aspects of their environment, children high in approach are more likely to experience high levels of anger/frustration (Derryberry and Reid, 1994, Rothbart and Bates, 2006, Rothbart et al., 2000). Likewise, children who are low in approach are characterized by high levels of negative reactivity (e.g., Garcia-Coll et al., 1984, Putnam and Stifter, 2005), which many believe puts them at risk for developing maladaptive behaviors later in childhood. It has been speculated that the pathways by which some children varying in their approach to novelty become socially well adjusted, whereas others develop maladaptive social behaviors, are through their ability to regulate negative emotions (e.g., Coplan et al., 1994, Polak-Toste and Gunnar, 2006, Rubin et al., 1995, Stifter et al., 2008a). This hypothesis has yet to be fully addressed in the literature and appears to be a promising line of research; thus, the current study aimed to longitudinally examine the contribution of children's temperamental approach and ability to regulate emotions to children's social competence.

Temperament and social competence

It is commonly agreed on by temperament theorists that children show distinctive responses when faced with novel situations and stimuli. Although there are different methodologies for measuring and labeling children varying in their levels of approach, children that are low in approach, typically identified as inhibited or low in temperamental surgency, are predisposed to display negative reactivity, wariness, and anxiety when presented with unfamiliarity (Garcia-Coll et al., 1984, Kagan, 1997). On the other hand, children who are more likely to approach novelty are typically labeled as uninhibited, exuberant, or high in surgency (e.g., Calkins et al., 1996, Garcia-Coll et al., 1984, Putnam and Stifter, 2005, Rothbart et al., 2001). Typically, these children are characterized as high in positive affect, activity level, and impulsivity and low in shyness and withdrawal. In the current study, children were measured on the continuous temperament trait of surgency.

Low-surgent children are more likely to display shy and socially withdrawn, or solitary, behavior in the face of familiar and unfamiliar peers during early and middle childhood (Burgess et al., 2003, Kagan, 1999, Kagan et al., 1987, Rubin et al., 2009, Rubin et al., 2002). Because these children avoid or withdraw from social situations that heighten their fear, they have been found to be lower in social competence (Fox et al., 1995) and are frequently reported to have more internalizing problems (e.g., Biederman et al., 1993, Nilzon and Palmerus, 1998). However, many inhibited children never develop internalizing behaviors and social difficulties, and it is still largely unknown why some inhibited children develop appropriate social behaviors, whereas others develop socially withdrawn behaviors and internalizing difficulties.

Fewer studies have investigated how high-surgent children interact with their peers than have investigated the relation between low-surgent children and social outcomes. Existing research indicates that high-surgent children are more frequently involved in group play with peers (Kochanska & Radke-Yarrow, 1992) and exhibit more sociable behaviors among unfamiliar peers in a laboratory setting (Rubin et al., 1995) and the classroom (Rimm-Kaufman & Kagan, 2005). Although these studies suggest that high-surgent children are more socially outgoing, it has also been found that they are at risk for developing aggression and subsequent peer rejection (Gunnar et al., 2003). In addition, high-surgent children are more likely to exhibit externalizing behavior problems (Berdan et al., 2008, Schwartz et al., 1996, Stifter et al., 2008a), suggesting that although children high in temperamental surgency are outgoing and sociable, such behaviors may put them at risk for maladaptive outcomes. Given the need for additional research to illuminate the conditions by which children varying in their levels of temperamental surgency develop positive or poor social behaviors, the current study aimed to investigate the direct pathways between temperamental surgency and later social behaviors.

Emotion regulation as a predictor of social competence

In addition to the important role of children's temperamental predisposition in the development of social adjustment, much research has shown that children's ability to regulate emotions has vital effects on their capacity to engage in positive controlled behavior that promotes adaptive interactions with others (Calkins et al., 1999, Raver et al., 1999). Indeed, children's ability to flexibly control emotional arousal, or emotion regulation, is a central developmental task during childhood (Kopp, 1982, Thompson, 1994). Although the development of emotion regulation begins early in life, children's ability to regulate emotions continues to mature throughout the preschool years and into childhood as more multifaceted strategies of regulating their emotions are developed (Kopp, 1989). In particular, the preschool period marks continued development of self-awareness and important changes within children's social environment as networks begin to include peers within the school and neighborhood environments. The presence of these new situations gives children additional information regarding emotions, the social acceptability of emotions, and how to regulate arousal in given circumstances (Kopp, 1989).

Much existing research on the relationship between children's emotion regulation and social competence has relied heavily on parent and teacher reports of children's behaviors. Some investigations also have examined the behavioral strategies children use to modulate their emotions as one important approach to measuring children's emotion regulation (e.g., Calkins et al., 1999, Gilliom et al., 2002, Stifter and Braungart, 1995, Supplee et al., 2009), but a large

portion of this research has focused on the developmental periods of infancy and toddlerhood. In general, this literature on emotion regulation strategies has found that more active constructive behavioral strategies, such as active distraction, social support seeking, and information gathering, are related to positive and adaptive outcomes for children (Calkins and Johnson, 1998, Grolnick et al., 1996, Raver et al., 1999, Silk et al., 2006), whereas strategies that are passive and “primitive” in nature (e.g., self-soothing, avoidance) are commonly related to maladaptive child outcomes (Eisenberg et al., 1994, Stifter and Braungart, 1995). It has been hypothesized that passive strategies are less effective because they do not change the source of negative emotion but instead help children to regulate emotion in the current moment.

Temperament and emotion regulation in predicting social competence

Although much research has suggested that the development of successful emotion regulatory abilities is vital to all children, the influence of emotion regulation on the development of socially competent behaviors could depend on children’s ability to regulate the predominate emotion associated with their temperament. For example, although high-surgent children are predisposed to have many adaptive characteristics, such as exhibiting positive affect and being socially outgoing (Putnam and Stifter, 2005, Rothbart et al., 2001), they are also prone to anger (Rothbart et al., 2000), likely due to the limits imposed on their high approach behavior.

A good amount of research has found that unregulated anger is related to aggressive maladaptive social behaviors (e.g., Eisenberg et al., 1994, Gilliom et al., 2002, Rothbart et al., 1994). Indeed, even though a functionalist view of emotions proposes that anger motivates goal-oriented behavior and, therefore, can serve an adaptive purpose (Saarni, Mumme, & Campos, 1998), unregulated anger may generate aggressive and oppositional behaviors that negatively affect peer interactions and prevent socially adaptive problem-solving abilities. Thus, high-surgent children’s inability to regulate their propensity toward anger may put them at an escalated risk for negative social outcomes because their poor anger regulation may cause them to act inappropriately in social situations even though at other times they are highly positive (Polak-Toste & Gunnar, 2006). In support of this position, Stifter and colleagues (2008a) found that during a disappointing situation, exuberant children who displayed higher levels of negative emotion and lower levels of positive/neutral emotion were rated by their parents as having higher levels of externalizing and total problem behaviors than exuberant children who could regulate their emotional expression.

On the other hand, even though low-surgent children do not show high levels of approach and most likely react differently than high-surgent children in frustration-eliciting situations, this is not to say that low-surgent children do not experience negative emotions that require regulation. Indeed, at least one study found that low-surgent children displayed higher levels of negative emotion in a disappointing situation than high-surgent children (Stifter, Dollar, & Cipriano, 2011). Thus, the ability to regulate negative emotions is likely also very important for low-surgent children’s social adjustment (e.g., Coplan et al., 1994, Rubin et al., 1995).

The current study

This study addressed two goals. The first goal was to examine the direct relationship between temperamental surgency and children's social behaviors later in childhood. The existing literature shows that although high-surgent children are social with peers (Kochanska and Radke-Yarrow, 1992, Rimm-Kaufman and Kagan, 2005), they are also at risk for showing aggressive behaviors (Gunnar et al., 2003) and developing externalizing behavior problems (Berdan et al., 2008, Schwartz et al., 1996, Stifter et al., 2008a) that are likely to interfere with positive peer interactions. Therefore, we hypothesized that surgent children would be sociable with other children, but in a manner that would elicit negative reactions from their peers. Based on past studies, we also expected children higher in surgency to be rated as higher in aggression than children low in temperamental surgency. Low-surgent children were expected to be low in social competence, but for different reasons. Given the extant literature (Burgess et al., 2003, Rubin et al., 2002), it was hypothesized that children low in surgency would show higher levels of behavioral wariness with peers than high-surgent children.

As previously mentioned, high surgent children are prone to experience high levels of anger and unregulated anger is linked to maladaptive social behaviors. In addition, low surgent children are temperamentally inclined to show negative emotions that likely contributes to their lack of social competence. Thus, the second goal of the current study was to investigate children's emotion regulation abilities in a frustration-eliciting situation as a moderator between surgency and later social behaviors. In line with the existing literature regarding the adaptive role of active regulation strategies (e.g., Silk et al., 2006, Supplee et al., 2009), we hypothesized that highly surgent children who could use active, goal-oriented strategies (e.g., goal-directed behavior, social support seeking) to regulate their emotions in a frustrating situation would show fewer negative behaviors in the peer setting and be rated as lower in aggression by their mothers. In other words, it was hypothesized that highly surgent children would be successfully keeping their anger at a manageable level to accomplish their goal if they were able to show persistence (e.g., Thompson, 1994).

On the other hand, given low-surgent children's inclination toward negative reactivity and withdrawal, as well as their risk for developing behavioral wariness in social situations (Coplan et al., 1994, Rubin et al., 1995, Stifter et al., 2011), we hypothesized that children low in surgency who used passive emotion regulation strategies (e.g., self-soothing behaviors) instead of active independent strategies (e.g., goal-directed behavior) would show higher levels of behavioral wariness around unfamiliar peers. In other words, because low-surgent children likely need to up-regulate approach behaviors and show more assertive, goal-driven behaviors in the peer context, passive emotion regulation strategies are likely to perpetuate their inclination toward withdrawing from situations that are challenging and uncomfortable.

Observers' ratings of children's reaction to novel persons, shyness/fearfulness, activity level, and positive affect across two laboratory visits were used to create a measure of children's temperamental surgency at 4.5 years of age. In addition, children's negative affect and the behaviors they used to regulate their emotions during the Locked Box task, a frustration-eliciting situation, were observed. By accounting for both children's emotional reactivity and their putative emotion regulation behaviors, we aimed to provide a more robust measure of children's emotion regulation. Social behaviors were derived from an interaction with unfamiliar peers as well as maternal ratings of children's aggressive and socially competent behaviors prior to

entering first grade. These measures provided us with the opportunity to assess children's social behaviors in various settings using different raters.

Method

Participants

The sample used for the current investigation was part of two larger longitudinal studies investigating temperament, emotional expression, and emotion regulation from infancy (2 weeks) to 7 years of age. Participants were drawn from a nonurban area in the northeastern United States. A total of 90 children (43 girls and 47 boys) were re-recruited from these studies when children were preschoolers. This new sample of children participated in laboratory visits when the children were 4.5 and 5.5 years old and during the summer before children entered the first grade when they participated in a laboratory "peer visit." Mothers and fathers also completed questionnaires at each of these time points. The current investigation focused on two of these visits: the 4.5-year visit ($M = 55$ months, range = 53–63) and the peer visit ($M = 76$ months, range = 72–86). Families who were re-recruited to participate in the current sample were predominantly White, middle class, and highly educated. Paternal average age at the time of recruitment was 37.6 years (range = 25–50), and education level for fathers was 16.2 years (range = 12–28). Maternal average age at the time of recruitment was 35.1 years (range = 20–47), and education level for mothers averaged 15.6 years (range = 10–26). The highest percentage of families (32%) reported their average yearly income to be between \$50,000 and \$75,000. Of the original 90 participants, 81 participated in the peer visit. Those participants who did not take part in the follow-up peer visit did not differ from those who did participate on any of the 4.5-year measures used in the current study.

Procedures

The 4.5-year visit

Children visited the laboratory twice at 4.5 years of age, once with their mothers and once with their fathers, and participated in several tasks used to measure emotion regulation, receptive language, effortful control, parent-child interaction, and executive function (for additional details about the visit protocol see Stifter et al., 2008a). Parents also completed a number of questionnaires. The current study used the Locked Box task (described below) to measure emotion regulation. Preschoolers' temperament was assessed from experimenters' global observations of children's behavior across the two laboratory visits.

At one of the 4.5-year visits, children participated in the Laboratory Temperament Assessment Battery's (Lab-TAB) Locked Box task (Goldsmith et al., 1999, Goldsmith and Rothbart, 1993), which is designed to elicit anger or frustration from children by preventing them from being able to play with an attractive toy. In this task, a large clear box and a handheld video game were placed in front of the child. The experimenter showed the game to the child and then placed it in the box and locked it. The child was then given a ring of keys and shown how the key fit in the lock without actually unlocking it. The child was told that if he or she opened the box, he or she could play with the game. The experimenter left the room for 2 min, leaving the child with the

parent, who was given a questionnaire to complete and instructed that if the child asked for help, the parent should respond with one of several phrases such as “I can’t help you right now” and “Wait until I am finished with this.” After 2 min, the parent was called out of the room. After another 1 min, the experimenter returned to the room and explained that he or she had just found a key in his or her pocket and had the child try to unlock the box. After the box was opened, the child was allowed to play with the game.

The peer visit

Families were invited to come to the laboratory during the summer before children entered the first grade. During the visit, children interacted with three or four same-sex peers (playgroups were matched by sex). The procedure used during this peer visit was adapted from Rubin et al., 2002, Rubin et al., 1995. During the peer visit, children were introduced to one another and given a snack before engaging in the first free play. There were a variety of age-appropriate toys in the playroom such as Lego blocks, board games, books, Matchbox cars, and dolls. Children were told that they could play with the toys and then were left alone for 15 min. Afterward, children were asked to clean up the toys by placing them in a large plastic bin. A second free play was introduced after two other tasks not used in the current study (birthday speech and ticket sorting). During the second free play, children were allowed to play with the same toys as the first free play. However, 5 min into the free play, an experimenter entered the room and gave children a “special toy” (a small electronic game). After an additional 10 min, children were asked to clean up the toys. Finally, children were given “thank you” prizes for their participation.

Measures

Temperament

During both 4.5-year visits, two adult experimenters rated children’s temperament using the Observed Child Temperament Scale (OCTS; Stifter, Willoughby, & Towe-Goodman, 2008b). The scales included children’s activity level, reaction to novel persons, frustration, positive affect, compliance, shyness/fearfulness, task persistence, attachment behaviors, comprehension (understanding of instructions), and language production. At the end of the laboratory visit, the two experimenters came to an agreement and scored the child on each temperament scale. Experimenters were minimally trained on the application of the OCTS prior to their ratings in an effort to simulate conditions under which parents rate their children’s temperament (Stifter et al., 2008b).

For the purposes of the current study, four subscales (with descriptions and scoring ranges) related to temperamental surgency were used: *reaction to novel persons* (social responsiveness to examiners, 1–5), *shyness/fearfulness* (degree of fear of persons or situation, 1–9), *activity level* (amount of gross body movement, 1–9), and *positive affect* (level of happiness/positive mood, 1–9). The use of these four subscales was based on existing research on temperamental surgency (e.g., Rothbart et al., 2001). Ratings across the two visits were standardized and averaged (shyness reverse scored) to create the measure of temperamental surgency. The surgency scores across the two visits were positively related ($r = .55, p < .001$). Positive scores indicated greater observed surgency, and negative scores indicated less observed surgency.

Emotion regulation

The Locked Box task of the Lab-TAB (Goldsmith and Rothbart, 1993, Goldsmith et al., 1999) provided a context to assess emotion regulation. This task was videotaped and coded off-line by trained research assistants who were blind to the child's temperament. Based on previous research (e.g., Calkins & Johnson, 1998), four putative regulatory strategies were coded: *goal-directed behavior* (the child used strategic or painful efforts to open the box), *social support seeking* (the child tried to get help from his or her parent or the experimenter), *distraction* (the child turned his or her attention away from attempting to open the box), and *self-soothing* (the child engaged in behaviors such as thumb sucking, rocking, and other automanipulative behaviors). The putative regulatory behaviors were coded in 10-s intervals. Reliability was assessed on 14% of the sample. Kappas were .90 for goal-directed behavior, .86 for distraction, .88 for social support seeking, and .84 for self-soothing.

Emotional reactivity was also coded from detailed transcriptions of the Locked Box task. First, children's verbalizations were transcribed from the videotapes. After the verbalizations were transcribed, the vocal affect associated with each verbalization made by children during the Locked Box task was coded for tone and content. Reliability for the vocal affect coding was assessed on 28% of the sample, and the kappa was .91 for children's negative vocalizations. In the current study, children's proportion of negative vocalizations was used as a covariate when analyzing children's regulatory abilities to control for variations in emotional reactivity.

Social behaviors

Laboratory peer play session. Both free play portions of the peer visit were used to measure how children behave and interact in a social situation with unfamiliar children. These tasks were videotaped and coded off-line by trained research assistants who were blind to the hypotheses of the study as well as the child's temperament.

Children's observed behaviors during the two peer free play sessions were coded with an adapted version of Rubin, 1989, Rubin, 2001 Play Observation Scale (POS). The POS was used to code social participation (unoccupied, onlooking, solitary play, parallel play, conversation, and group play) and the cognitive quality of play (functional, dramatic, and constructive play; exploration; and games with rules). Behaviors were coded every 10 s. Following previous research, the variables of reticence (unoccupied + onlooking/total number of intervals) and hovering, defined as onlooking behaviors at a very close proximity to the activity the focal child is watching, were aggregated to create a *behavioral wariness* variable. Reliability was assessed on 32% of the sample, and the kappas were .71 for reticence and .74 for hovering.

Children's successful and unsuccessful social initiations were coded using the Relational Coding Scheme (Root & Stifter, 2010), which was created specifically for this study. Here, 10-s intervals during the first and second free play sessions were coded for initiations and peer reactions to these initiations. Initiating interactions and whether the peer responded to them with positive/neutral or negative behavior were coded when the target child looked at and attempted to engage another child either behaviorally or verbally. *Initiating positive/neutral* was coded

when the peer responded in a positive manner with a positive or neutral expression. *Initiating negative* was coded when the peer used negative facial expressions, negative verbalizations, or no response to the interaction attempt. When the target child continued with an interaction regardless of whether he or she initiated it in the previous interval (e.g., listening to another child, participating in a game/activity), this was coded as maintaining and the code was dependent on the peer's response. *Maintaining positive/neutral* was coded when the peer responded to the maintenance of the interaction in a positive or neutral manner. *Maintaining negative* was coded if the peer responded to the maintenance in a negative manner (e.g., yelling in a negative tone, speaking with a negative expression). These codes were tallied, aggregated, and proportionalized by the total number of observations. Reliability was assessed on 22% of the sample. The kappas were .74 for maintaining positive/neutral, .80 for maintaining negative, .74 for initiating positive/neutral, and .85 for initiating negative.

Parent's checklist of children's peer relationships. At the peer visit, mothers completed an adapted version of this 24-item questionnaire (Dodge and Coie, 1987, Mize et al., 1995) assessing their children's peer relations, aggression, and social skills on a 5-point Likert scale (1 = *never*, 2 = *rarely*, 3 = *sometimes*, 4 = *usually*, 5 = *always*). The data from the sample were factor analyzed, and two composites were created: *aggression* (e.g., "My child starts fights with peers," "My child tries to get others to dislike a peer," $\alpha = .89$) and *social competence* (e.g., "My child gets along well with peers of the same sex," "My child is accepted by the peer group," $\alpha = .83$).

Data reduction

In an effort to reduce the number of study variables, several aggregates were formed based on previous research and the correlations among the study variables. In the Locked Box task, distraction and self-soothing behaviors were highly correlated ($r = .55, p < .001$). Because these behaviors theoretically are more emotion focused, rather than problem focused, and are strongly significantly correlated, a composite variable was created and is referred to hereafter as *distraction/self-soothing* behaviors. The other Locked Box variables (goal-directed behavior and social support seeking) were not significantly correlated with one another and, therefore, were left as separate moderating variables. In addition, several composite variables were created from the peer visit data. Based on previous research (e.g., Rubin et al., 1995), a *behavioral wariness* variable was created by summing standardized reticence and standardized hovering variables from the POS coding scheme. Finally, intercorrelations among the observed peer behaviors suggested aggregation. Initiating positive/neutral behaviors and maintaining positive/neutral behaviors were positively correlated ($r = .17, p < .05$), and initiating negative behaviors and maintaining negative behaviors were positively correlated ($r = .35, p < .01$), resulting in two dependent variables: *positive peer behaviors* and *negative peer behaviors*.

In sum, five dependent variables were examined in the analyses. There were three laboratory assessments of social behavior (behavioral wariness, negative peer behaviors, and positive peer behaviors) and two parent-rated assessments of social behavior (aggression and social competence).

Analysis of attrition and missing data

It is increasingly acknowledged by developmental researchers that using listwise deletion to exclude participants who do not have complete longitudinal data may unnecessarily limit power and potentially bias parameter estimates (Howell, 2007, Widaman, 2006). We chose to impute missing data for OCTS surgency, negative vocalizations, emotion regulation behaviors, and the five social behaviors (behavioral wariness, negative peer behaviors, positive peer behaviors, aggression, and social competence). We compared 4.5-year study variables (OCTS surgency, negative vocalizations, and emotion regulation behaviors) for families who completed all study assessments with those for families who failed to complete the peer visit and found no significant differences on any variable. In addition, to provide a more rigorous test, we used the Missing Value Analysis in SPSS to measure the pattern of missing data. This test revealed a nonsignificant Little's MCAR (missing completely at random) test, $\chi^2 = 38.39$, $df = 54$, $p > .10$, suggesting that missing data were likely missing at random. Therefore, following current recommendations in the literature for longitudinal data (Howell, 2007), we used multiple imputation for the missing data using the expectation/maximization likelihood treatment of missing data (i.e., the EM [expectation-maximization] algorithm). For the multiple imputations, 10 data sets were generated and the results were combined using a mean composite for each variable.

Results

Means and standard deviations for all study variables are shown in Table 1. There were no gender-related differences in temperamental surgency, putative emotion regulatory behaviors, and social behaviors. Therefore, gender was not considered in subsequent analyses.

Intercorrelations were computed among all study variables prior to conducting our primary analyses (see Table 2). Of note, surgency was positively related to negative peer behaviors ($r = .29$, $p < .05$) and parent-rated aggression ($r = .23$, $p < .10$) and negatively related to behavioral wariness ($r = -.44$, $p < .001$). Positive peer behaviors was negatively related to behavioral wariness ($r = -.43$, $p < .001$). In addition, negative peer behaviors was negatively associated with children's goal-directed behavior ($r = -.28$, $p < .05$) and positively related to children's social support seeking behaviors ($r = .29$, $p < .05$), both in the Locked Box task. Negative vocalizations in the Locked Box task was negatively correlated with goal-directed behavior ($r = -.41$, $p < .001$) and positively related with distraction/self-soothing ($r = .44$, $p < .001$). Finally, goal-directed behavior was negatively associated with distraction/self-soothing behaviors ($r = -.72$, $p < .001$).

The goal of the current study was to test the moderating role of putative emotion regulation behaviors in a frustrating situation on the relation between temperamental surgency and children's later social behaviors. To test this relationship, multiple regression analyses were performed to examine the main effects of temperamental surgency and putative regulatory behaviors in the Locked Box task (goal-directed behavior, distraction/self-soothing, and social support seeking) as well as their interactions on our social behavior outcomes (negative peer behaviors, positive peer behaviors, behavioral wariness, aggression, and social competence). To avoid multicollinearity, predictor variables were centered and then multiplied to create interaction terms. In each model, temperamental surgency was entered into the first step. In the second step, children's negative vocalizations in the Locked Box task was entered as a control

variable, followed by the putative regulatory behavior in the third step. The two-way interaction between surgency and each regulation behavior was entered in the fourth step. Follow-up tests of significant interactions were probed such that relations between each putative emotion regulatory behavior and each social behavior were examined at low (-1 standard deviation), mean, and high ($+1$ standard deviation) levels of surgency, as set forth by Aiken and West (1991). There were 17 children who were at least 1 standard deviation below the mean of surgency and 16 children who were at least 1 standard deviation above the mean of surgency. The results for all regression analyses can be found in Table 3.

Table 1. Descriptive statistics for study variables.

	<i>M</i>	<i>SD</i>	Range
<i>4.5-Year variables</i>			
Observed surgency rating	0.00	2.78	-7.97-5.02
Observed goal-directed behavior	0.82	0.22	0.00-1.00
Observed distraction/self-soothing	0.05	0.10	0.00-0.70
Observed social support seeking	0.21	0.16	0.00-0.64
<i>Peer visit variables</i>			
Observed positive peer behaviors	0.55	0.28	0.02-0.98
Observed negative peer behaviors	0.04	0.04	0.00-0.15
Observed behavioral wariness	-0.07	1.27	-1.22-3.87
Parent-rated aggression	1.76	0.49	1.00-2.82
Parent-rated social competence	4.10	0.44	2.83-5.00

Table 2. Bivariate correlations among study variables.

	1	2	3	4	5	6	7	8	9
1. Surgency	–								
2. Goal-directed behavior	-.05	–							
3. Distraction/Self-soothing	-.09	-.72***	–						
4. Social support seeking	.17	-.19	-.02	–					
5. Observed positive peer behaviors	.09	.02	-.11	.08	–				
6. Observed negative peer behaviors	.29*	-.28*	.18	.29*	.01	–			
7. Observed behavioral wariness	-.44***	.02	.12	.06	-.43***	-.22	–		
8. Parent-rated aggression	.23 ⁺	-.09	-.12	-.10	.20	.10	-.26*	–	
9. Parent-rated social competence	-.04	.04	.03	.01	-.10	-.14	.05	-.35**	–

⁺ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3. Multiple regression analyses for study variables.

	<i>B</i>	<i>SE (B)</i>	β	<i>F</i>	<i>R</i> ²
<i>Observed negative peer behaviors</i>					
I. Goal-directed behavior				2.86	0.16*
Surgency	0.01 ⁺	0.00	0.22		
Negative vocalizations	0.01	0.02	0.10		
Goal-directed behavior	-0.04*	0.02	-0.26		
Surgency \times goal-directed behavior	-0.01	0.01	-0.12		
II. Distraction/self-soothing				2.71	0.15*
Surgency	0.01 ⁺	0.01	0.23		
Negative vocalizations	0.02	0.02	0.15		
Distraction/self-soothing	0.11*	0.05	0.34		
Surgency \times distraction/Self-soothing	0.04	0.02	0.27		
III. Social support seeking				3.09	0.17*
Surgency	0.01	0.01	0.14		
Negative vocalizations	0.02	0.01	0.15		

	<i>B</i>	<i>SE (B)</i>	β	<i>F</i>	<i>R</i> ²
Social support seeking	0.05 ⁺	0.03	0.23		
Surgency × social support seeking	0.01	0.01	0.17		
<i>Observed positive peer behaviors</i>					
I. Goal-directed behavior				0.36	0.02
Surgency	0.02	0.01	0.13		
Negative vocalizations	0.02	0.13	0.02		
Goal-directed behavior	0.04	0.17	0.03		
Surgency × goal-directed behavior	0.04	0.07	0.08		
II. Distraction/self-soothing				0.60	0.04
Surgency	0.01	0.01	0.11		
Negative vocalizations	0.07	0.13	0.08		
Distraction/self-soothing	-0.49	0.43	-0.20		
Surgency × distraction/self-soothing	-0.08	0.17	-0.08		
III. Social support seeking				0.38	0.02
Surgency	0.02	0.02	0.13		
Negative vocalizations	0.03	0.11	0.03		
Social support seeking	0.03	0.23	0.02		
Surgency × social support seeking	-0.05	0.07	-0.09		
<i>Observed behavioral wariness</i>					
I. Goal-directed behavior				2.75	0.15*
Surgency	-0.17**	0.06	-0.35		
Negative vocalizations	-0.48	0.51	-0.12		
Goal-directed behavior	-0.11	0.69	-0.02		
Surgency × goal-directed behavior	0.22	0.26	0.10		
II. Distraction/self-soothing				4.39	0.22**
Surgency	-0.15**	0.06	-0.31		
Negative vocalizations	-0.84	0.49	-0.22		
Distraction/self-soothing	-0.47	1.69	-0.04		
Surgency × distraction/self-soothing	-1.48*	0.68	-0.34		
III. Social support seeking				4.14	0.21**
Surgency	-0.21***	0.06	-0.43		
Negative vocalizations	-0.44	0.44	-0.16		
Social support seeking	2.00*	0.88	0.27		
Surgency × social support seeking	-0.19	0.28	-0.08		
<i>Parent-rated aggression</i>					
I. Goal-directed behavior				0.96	0.26
Surgency	0.05	0.03	0.24		
Negative vocalizations	-0.04	0.22	-0.03		
Goal-directed behavior	-0.18	0.30	-0.09		
Surgency × goal-directed behavior	-0.01	0.12	-0.02		
II. Distraction/self-soothing				1.22	0.08
Surgency	0.04	0.03	0.20		
Negative vocalizations	0.13	0.22	0.09		
Distraction/self-soothing	-0.27	0.79	-0.06		
Surgency × distraction/self-soothing	0.21	0.32	0.13		
III. Social support seeking				2.64	0.16*
Surgency	0.08**	0.03	0.37		
Negative vocalizations	0.06	0.19	0.04		
Social support seeking	-0.65	0.40	-0.21		
Surgency × social support seeking	-0.25*	0.13	-0.26		
<i>Parent-rated social competence</i>					
I. Goal-directed behavior				2.18	0.14 ⁺
Surgency	-0.02	0.02	-0.09		
Negative vocalizations	0.52	0.19	0.40		
Goal-directed behavior	0.37	0.26	0.20		

	<i>B</i>	<i>SE (B)</i>	β	<i>F</i>	<i>R</i> ²
Surgency × goal-directed behavior	0.02	0.10	0.03		
II. Distraction/self-soothing				4.81	0.26**
Surgency	-0.01	0.02	-0.05		
Negative vocalizations	0.42	0.18	0.32		
Distraction/self-soothing	-1.85**	0.63	-0.50		
Surgency × distraction/self-soothing	-0.81**	0.25	-0.54		
III. Social support seeking				1.70	0.11
Surgency	-0.01	0.03	-0.07		
Negative vocalizations	0.41	0.17	0.31		
Social support seeking	0.03	0.37	0.01		
Surgency × social support seeking	-0.07	0.12	-0.09		

+ $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Predicting social behavior in the laboratory

Negative peer behaviors

Of the four regression analyses testing the moderating effects of regulation on the relation between temperament and negative peer behaviors, two were significant. However, significant main effects in these analyses emerged only for observed negative peer behaviors, Locked Box goal-directed behaviors, and distraction/self-soothing.

Positive peer behaviors

The regression models with positive peer behaviors as the dependent variable were not significant. There were no significant main or interaction effects in any of the models.

Behavioral wariness

Of the four models tested with behavioral wariness as the dependent variable, two were significant. The regression model testing the moderating effects of children's distraction/self-soothing behaviors was significant with an R^2 of .22. A main effect was revealed for temperamental surgency in predicting children's behavioral wariness in a peer setting, $\beta = -0.31$, $t = -2.72$, $p < .01$. However, this effect was subsumed under a significant interaction effect for surgency and distraction/self-soothing behaviors, $\beta = -0.34$, $t = -2.18$, $p < .05$. Follow-up analyses of this interaction effect revealed that at low levels of surgency, distraction/self-soothing and behavioral wariness were significantly related, $\beta = 0.34$, $t = 2.24$, $p < .05$. As can be seen in Fig. 1, low-surgent children who showed high levels of distraction/self-soothing were more likely to show behavioral wariness around unfamiliar peers. At high levels of surgency, distraction/self-soothing and behavioral wariness were not significantly related.

The model examining social support seeking behaviors as the moderator was significant with an R^2 of .21. However, main effects emerged only for surgency and social support seeking.

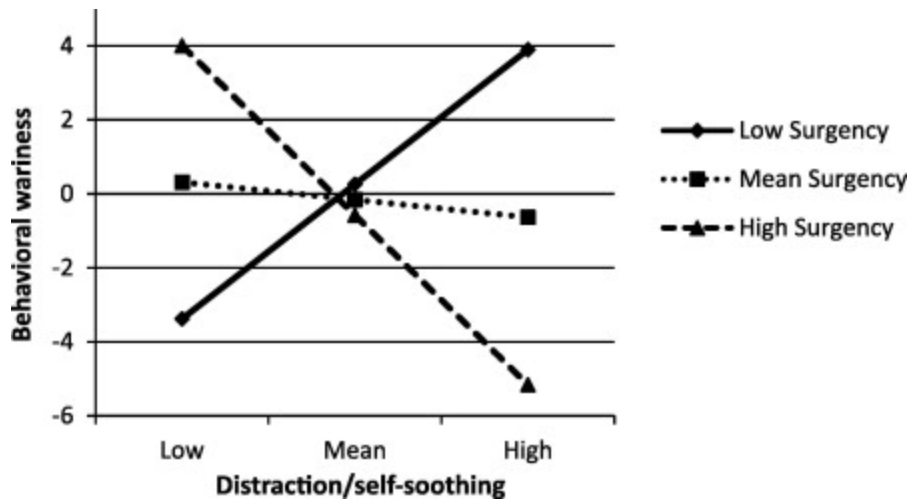


Fig. 1. Interaction of surgency and distraction/self-soothing predicting observed behavioral wariness.

Predicting parent-rated social behaviors

Aggression

Of the four regulatory behaviors tested, only the multiple regression analysis testing the moderating effects of social support seeking in the Locked Box task in the relation between surgency and aggression was significant with an R^2 of .16. A main effect for surgency was revealed, $\beta = 0.37, t = 2.79, p < .01$. However, this main effect was subsumed under a significant interaction effect for surgency and social support seeking behaviors in the Locked Box task, $\beta = -0.26, t = -2.00, p < .05$. Follow-up analyses of this interaction effect revealed that at high levels of surgency, social support seeking and aggression were significantly related, $\beta = -0.44, t = -2.56, p < .05$. As can be seen in Fig. 2, high-surgent children who showed high levels of social support seeking were less likely to be rated by their mothers as high in aggression. At low levels of surgency, social support seeking and aggression were not significantly related.

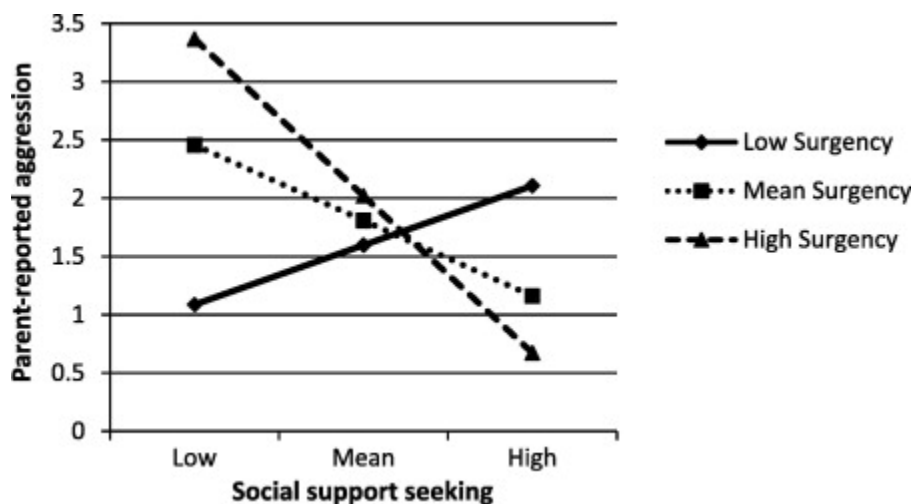


Fig. 2. Interaction of surgency and social support seeking predicting parent-reported aggression.

Social competence

Finally, we ran models testing whether regulatory behaviors moderated the relation between surgency and parent-reported social competence, and only the model with distraction/self-soothing was significant with an R^2 of .26. Results revealed a significant main effect for distraction/self-soothing, $\beta = -0.50$, $t = -2.91$, $p < .01$. However, this main effect was subsumed under a significant interaction effect for surgency and distraction/self-soothing in the Locked Box task, $\beta = -0.54$, $t = -3.19$, $p < .01$. Follow-up analyses revealed that at high levels of surgency, there was a significant relation between distraction/self-soothing and social competence, $\beta = -1.10$, $t = -3.40$, $p < .001$. As can be seen in Fig. 3, highly surgent children who used more distraction/self-soothing behaviors in the Locked Box task were rated by their mothers as lower in social competence. The relation between distraction/self-soothing and social competence was not significant at low levels of surgency.

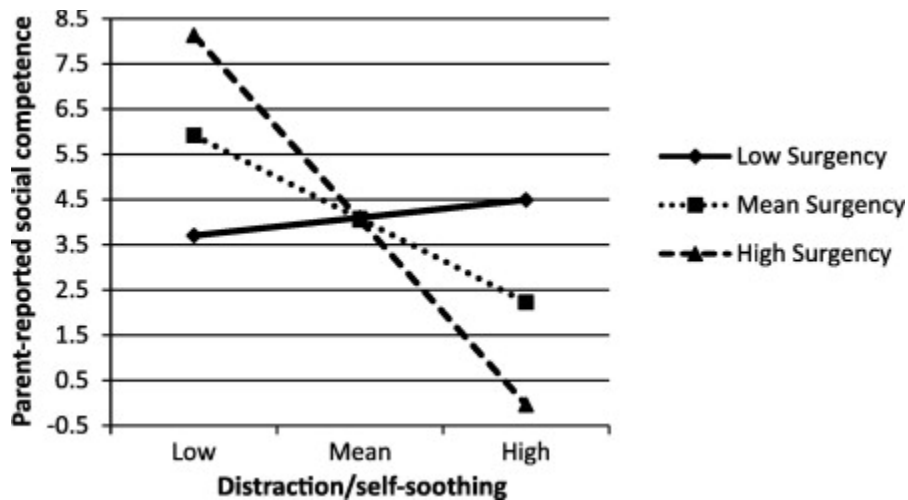


Fig. 3. Interaction of surgency and distraction/self-soothing predicting parent-reported social competence.

Discussion

There is a scarcity of research investigating the role of temperamental surgency and emotion regulation in the development of adaptive/maladaptive social behaviors with peers. Furthermore, existing research on the relationship between children's emotion regulation and social competence has relied heavily on parent and teacher reports of children behaviors, and developmental research on the strategies that children use to regulate their emotions has focused largely on infants and toddlers. To fill this gap, the current study investigated temperamental surgency and the strategies that children use to regulate their emotions to predict multiple measures (observational and parent report) of children's social behaviors. Our goals were to examine longitudinally the relationship between temperamental surgency and children's behaviors among their peers and whether children's emotion regulation moderated this relationship.

Existing research has shown that although high-surgency children are very social with peers (Kochanska and Radke-Yarrow, 1992, Rimm-Kaufman and Kagan, 2005), they are also at risk for showing aggressive behaviors, being less well liked by their peers, and developing externalizing behavior problems (Berdan et al., 2008, Gunnar et al., 2003, Stifter et al., 2008a). Our results support and extend this research. Corroborating with existing research that high-surgency children are at risk for developing maladaptive behaviors, children high in surgency were more likely to show negative peer behaviors and were rated as higher in aggression than low-surgency children. Yet, the finding with negative peer behaviors is also consistent with the research showing that these children are sociable (e.g., Kochanska and Radke-Yarrow, 1992, Rimm-Kaufman and Kagan, 2005) given that the construct of negative peer behaviors was composed of both children's initiations and maintaining social interactions with peers. Thus, the positive relation between surgency and negative peer behaviors found in the current study provides support for both sets of existing findings regarding high-surgency children's social behaviors; they do frequently approach unfamiliar peers, which is consistent with the findings that high-surgency children are sociable, but they interact with peers in a manner that is received in a negative light, which may be why they experience more peer rejection. Given the impulsive, and at times intense, aggressive nature of these children, it is possible that the style of their interactions with others is not appealing to many children. Importantly, our findings suggest that the development of certain emotion regulation strategies may explain the link between high surgency and aggressive behaviors in young children.

Given high-surgency children's sociability and predisposition for positive affect, it is important to understand the mechanism by which some high-surgency children develop appropriate social behaviors, whereas others develop aggressive behaviors that put them at risk for being rejected by their peers. In the current study, we examined the ability to regulate emotions, specifically anger/frustration because this emotion is more likely to occur in high-surgency children given that their inclination to approach their environment is frequently blocked. Our results revealed that whereas high-surgency children were more likely to be rated as high in aggression by their mothers, the likelihood was higher for those who did not employ social support seeking behaviors to regulate their anger. Although social support seeking is not always considered a sophisticated form of emotion regulation, this finding corroborates existing research conducted by Kochanska and colleagues (Kochanska, 1995, Kochanska, 1997, Kochanska et al., 2007) regarding the importance of a positive reciprocal parent-child relationship for high-surgency children. More specifically, Kochanska and colleagues have shown that surgency fearless children develop better and more adaptive skills, such as behavioral and moral self-regulation, within the context of a warm secure relationship with their mothers (Kochanska, 1995, Kochanska, 1997, Kochanska et al., 2007). Thus, it may be that the highly surgency children in the current study who were comfortable and secure enough to seek help from their parents when feeling frustrated were better able to regulate their anger and, therefore, to show lower levels of aggression later in childhood. It is probable that with time these high-surgency children will continue to internalize the emotion regulation strategies that their parents teach them in a safe reliable parent-child relationship, promoting more adaptive socially competent behaviors such as low aggression, as suggested by our findings.

Results from the current investigation also indicate that, contrary to some existing research (e.g., Raver et al., 1999), distraction and self-soothing behaviors are not always beneficial forms

of emotion regulation for children and their effect on social competence depends on children's levels of temperamental surgency. In the current study, low-surgent children who displayed distraction and self-soothing behaviors during a frustration task were at an escalated risk of showing behavioral wariness with their peers later in childhood compared with the low-surgent children who used low levels of distraction/self-soothing. Similarly, an increased level of distraction/self-soothing behaviors for high-surgent children was related to lower levels of parent-rated social competence.

Although counterintuitive at first, these findings might best be explained by the negative correlation found between goal-directed behaviors and distraction/self-soothing. Children who frequently employed the strategies of distraction and self-soothing were not persisting at the task. Goal-directed behaviors are most appropriate in this situation because children who are able to stay on-task and persist toward their goal of obtaining the toy are likely to be regulating their anger/frustration. Although distraction and self-soothing are effective forms of regulation in other contexts (e.g., a delay task), results from the current study suggest that these strategies are ineffective in a goal-directed context and may reflect the inability to regulate in other situations such as in the peer context. For low-surgent children who are low in approach and may lack goal-directed motivation in this context, the use of distraction/self-soothing behaviors might perpetuate their inclination to employ similar low-approach passive behaviors around unfamiliar peers later in childhood. Yet, if low-surgent children learn to "up-regulate" their goal-driven approach behaviors in order to regulate their negative emotions, they may be at a lower risk for showing withdrawn hovering behaviors around their peers.

Findings from the current study also suggest that the use of distraction/self-soothing behaviors is not advantageous for highly surgent children to employ in goal-oriented situations. For these children who are high in approach, the use of distraction/self-soothing in this context may indicate that they are giving up and becoming overwhelmed with anger/frustration. In summary, these results suggest that although the use of distraction could be adaptive in many situations (i.e., when the goal is not obtainable such as in a delay task), children's use of distraction/self-soothing in a goal-directed situation like the one presented in the Locked Box task does not appear to be appropriate; instead, results from the current investigation suggest that goal-directed forms of behavior are most adaptive in this type of situation regardless of temperament.

Although we did not find that the importance of goal-directed behavior in the Locked Box task in predicting social behaviors varied according to children's level of surgency, a main effect emerged between goal-directed behavior and negative peer behaviors observed in the laboratory setting. This finding indicates that regardless of children's level of temperamental surgency, the ability to employ goal-directed behavior by staying focused on the task at hand is related to fewer negative social behaviors among unfamiliar peers. Seeing that emotion regulation is frequently defined as processes assisting in modifying emotional reactions in order to accomplish one's goals (e.g., Thompson, 1994), it is not surprising that children who were able to persist in the task and show higher proportions of goal-directed behavior displayed fewer maladaptive peer behaviors later in childhood. Indeed, although anger does motivate goal-oriented behavior (Cole, Michel, & Teti, 1994), if children are unable to keep their anger at manageable levels, it is unlikely that they will be able to persist in a goal-oriented task. Furthermore, this inability to regulate anger may also be evident in later interactions with their peers. It is also important to

note that a large majority of children were able to show goal-directed behavior in this situation, whereas children employed a much lower proportion of distraction/self-soothing. Based on the findings of this study, it is encouraging that many children were engaging in adaptive emotion regulation skills, as suggested by the large proportion of goal-directed behavior.

Although this study adds greatly to the existing literature by examining a body of research that is understudied, it is not without limitations. First, our sample was homogeneous, and the generalizability of the current study's findings is limited to a low-risk, predominantly White sample. Another limitation is that the observational ratings of temperamental surgency were measured when children were 4.5 years of age, and consequently it is possible that children's behaviors are a product of both their temperamental disposition and their environment. Future research should examine the role of temperamental surgency earlier in development as a predictor of children's later social behaviors. Finally, although measuring regulation during a frustration task may be more consistent with the developmental tasks for children high in surgency, it might not tap into emotion regulation skills of low-surgent children who are characterized by fear and anxiety. Future research should examine fear regulation and its role in the relation between surgency and social behaviors later in childhood.

In conclusion, the current study adds to the growing literature that highly surgent children are at risk for developing aggressive behaviors and being rejected by their peers even though at other times they are highly positive and sociable. The current investigation also shows that highly surgent children's ability to use certain emotion regulation strategies to manage their high levels of anger/frustration puts them at a lower risk of developing maladaptive peer behaviors later in childhood. Finally, although the use of distraction and self-soothing is advantageous in certain emotion-eliciting situations, the results of the current study suggest that within the context of a goal-driven situation, the use of these behaviors puts children at increased risk for developing maladaptive peer behaviors consistent with their level of surgency.

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