

Emotional self-regulation, peer rejection, and antisocial behavior: Developmental associations from early childhood to early adolescence

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ABSTRACT

This study examined relations among emotional self-regulation, peer rejection, and antisocial behavior in a sample of 122 boys from low-income families who participated in a summer camp and were followed longitudinally from early childhood to early adolescence. Emotional self-regulation strategies were coded in early childhood from a waiting task, measures of peer rejection were collected during middle childhood at the summer camp, and reports of antisocial behavior were obtained during early adolescence. Structural equation modeling was utilized to examine longitudinal relations among these constructs, with results supporting a negative association between use of active distraction and peer rejection and a positive association between peer rejection and antisocial behavior. Furthermore, an indirect effect of active distraction on antisocial behavior was found through peer rejection. Thus, adaptive self-regulation strategy use in early childhood demonstrated direct longitudinal relations with peer rejection and an indirect association with antisocial behavior in early adolescence. Results have implications for early prevention and intervention efforts to foster adaptive self-regulation of emotion and reduce risk for later social problems and delinquency.

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1. Introduction

Aggression and other forms of overt externalizing symptoms reach their peak between ages two and three. However, a small minority of children continue to show high levels of disruptive behavior problems across childhood (Shaw, Gilliom, Ingoldsby, & Nagin, 2003), and early conduct problems are associated with delinquency and mental health problems in adolescence (Moffitt, Caspi, Harrington, & Milne, 2002; Shaw & Gross, in press). Due in part to the personal, economic, and social toll that delinquency takes on individuals and society, predictors of antisocial behavior have received extensive examination. Perspectives on early-starting conduct problems have emphasized the interplay of child temperamental factors and context in the emergence and maintenance of these problems across childhood (Campbell, Shaw, & Gilliom, 2000; Shaw, Bell, & Gilliom, 2000). In line with a focus on individual and social mechanisms in the persistence of early-starting conduct problems from early childhood to early adolescence, the present study examined emotional self-regulation and peer rejection as precursors to early adolescent antisocial behavior.

The present study was also informed by a developmental psychopathology perspective on sensitive periods in development, which emphasizes that each stage of child development presents key tasks and challenges. A developmental psychopathology perspective suggests that deviations from normative processes at earlier stages of development increase the likelihood of psychopathology later in development (Sroufe, 1997). In early childhood, one key challenge is the attainment of self-regulation of

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emotion (Kopp, 1989), and difficulty with adaptive emotional self-regulation may portend later social and behavioral problems (e.g., Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002). In middle childhood, peer inclusion becomes a critical element of positive adaptation (Rose-Krasnor, 1997), and peer rejection indicates poor social adaptation and risk for antisocial behavior (e.g., Laird, Jordan, Dodge, Pettit, & Bates, 2001). Previous research has not simultaneously examined the influences of emotional self-regulation and peer rejection during developmental periods when normative deviations may be particularly salient for later adaptation. In the present study, we examined whether self-regulation strategies in early childhood predicted peer rejection in middle childhood and how these constructs were associated with antisocial behavior in early adolescence. Longitudinal data allowed examination of the central hypothesis that peer rejection would account for indirect relations between emotional self-regulation strategies in early childhood and antisocial behavior in early adolescence.

1.1. Emotional self-regulation in early childhood

Emotion regulation is a multi-faceted construct without a single, widely-accepted definition (Cole, Martin, & Dennis, 2004). At a broad level, emotion-related regulation can include attentional, cognitive, or behavioral attempts to manage internal states or the external expression of emotion (Eisenberg, Spinrad, & Smith, 2004). Because emotion regulation is a multi-faceted construct, numerous approaches exist to examine emotion regulatory processes, ranging from studies of the reflexive regulation of distress in infancy to the analysis of emotion dynamics in interpersonal interactions. An increasingly common approach to investigate emotion regulation involves structured observation of “self-initiated attempts to modulate negative emotion” (Cole et al., 2004, p. 325). This method to examine emotion regulation is particularly relevant during early childhood because it reflects the developmental importance and rapid growth of multiple levels of self-regulatory competence during the toddler and preschool periods (Calkins & Fox, 2002).

For example, self-regulatory attempts to focus, shift, or inhibit attention, behavior, and emotion increase during the toddler period when aggressive outbursts peak and caregivers are frequently needed to calm distressed toddlers (Kochanska, Murray, & Harlan, 2000; Kopp, 1989; Shaw et al., 2000). As children move into the preschool years, a growing proficiency with effortful control promotes increased use of adaptive self-regulation strategies and fewer behavioral problems (Kochanska et al., 2000). When confronted with a distressing event, young preschoolers are often able to actively distract themselves from distressing stimuli or focus on more pleasant aspects of the situation (Denham, 1998). However, children who are *unable* to master adaptive strategies for emotional self-regulation during the preschool period demonstrate numerous problematic outcomes, including impaired social competence and externalizing problems (e.g., Denham et al., 2003; Gilliom et al., 2002).

In line with an operational definition of emotion regulation that focuses on self-regulatory attempts to manage negative emotion, the present study examined behavioral strategies for regulating emotion in the context of a frustrating situation. Previous research has focused on specific self-regulation strategies that may be more or less adaptive in the immediate context and in relation to later adaptation (e.g., Silk, Shaw, Skuban, Oland, & Kovacs, 2006). For example, the ability to utilize self-regulatory strategies to delay gratification during a waiting task in preschool predicted social and academic competence during adolescence (Mischel, Shoda, & Peake, 1988). Specific emotional self-regulatory strategies may have unique implications for externalizing behaviors, including early-starting conduct problems that emerge in childhood (Calkins & Howse, 2004; Dishion & Patterson, 2006). In an earlier report using data from the present study, a tendency to focus on the desired object and less use of self-regulatory distraction during a frustrating waiting task at age 3.5 were associated with teacher reports of externalizing problems 3 years later (Gilliom et al., 2002). No prior research has examined specific self-regulation strategies in early childhood as predictors of antisocial behavior during early adolescence. However, a broad observational composite of self-control that included ratings of emotional reactivity and regulation at age 3 was related to antisocial behavior in adolescence and differentiated life-course-persistent from adolescent-limited antisocial behavior in the Dunedin study (Caspi, Henry, McGee, Moffitt, & Silva, 1995; Moffitt & Caspi, 2001).

1.2. Peer rejection in middle childhood

The role that school-age peer relationships play in pathways from emotional self-regulation in early childhood to antisocial behavior in adolescence also has yet to be elucidated. In particular, characteristics of peer relationships may account for indirect relations between earlier emotional self-regulation and later antisocial behavior, a hypothesis that is best examined with a longitudinal study.

Youngsters typically develop their first friendships during the toddler and preschool periods, but inclusion by peers takes on heightened significance during middle childhood as children increasingly make social comparisons based on shared feelings, values, and loyalty (Rose-Krasnor, 1997; Rubin, Bukowski, & Parker, 2006). Thus, a substantial portion of the empirical research on the developmental salience of peer rejection has been conducted during middle childhood. Middle childhood peer rejection predicts concurrent and later antisocial behavior (for a review, see Dodge, Coie, & Lynam, 2006), even after accounting for the effect of earlier externalizing problems (e.g., Laird et al., 2001).

Because peer rejection is a consistent risk factor for negative behavioral outcomes, there is an extensive literature examining its precursors. Children's adaptive self-regulation of emotion often occurs concomitantly with positive social adaptation and also serves as a buffer against peer rejection (Halberstadt, Denham, & Dunsmore, 2001; Hubbard & Dearing, 2004). Children who use more adaptive emotional self-regulation strategies in distressing situations are more likely to master the social skills necessary for effective social relationships (e.g., Fabes & Eisenberg, 1992). Conversely, children who have difficulty managing their negative

emotions are more likely to become disruptive in social interactions, leading to lower acceptance and more rejection by peers (Maszk, Eisenberg, & Guthrie, 1999). In support of these predictions, concurrent relations exist between constructive forms of emotional self-regulation and sociometric status, and between less adaptive emotional self-regulation and problematic peer relations during preschool, especially among boys (Eisenberg et al., 1993). Longitudinal studies have also confirmed relations between emotional self-regulation and peer relations over short periods (e.g., Maszk et al., 1999), but these associations have not yet been examined across a span of several years from early to middle childhood.

1.3. The present study

The present study was designed to investigate relations among emotional self-regulation strategies, peer rejection, and antisocial behavior in a sample of low-income boys who participated in a summer camp as part of a larger longitudinal study. The selection of emotional self-regulation and peer rejection as central constructs was guided by (a) their potential importance in the persistence of externalizing behavior problems from early childhood to early adolescence and (b) the developmental salience of these constructs in early childhood and middle childhood, respectively.

We were particularly interested in the role that peer rejection plays in longitudinal relations between emotional self-regulation and antisocial behavior. Over a long period of study, deviation from developmental norms of early childhood would not necessarily directly predict maladjustment in early adolescence; rather, it might set the stage for developmental deviation leading to further maladjustment (Sroufe & Rutter, 1984). Thus, peer rejection was examined as a construct that could account for the indirect association between emotional self-regulation and antisocial behavior. Specifically, we examined whether specific emotional self-regulation strategies in early childhood were associated with rejection by peers during the summer camp in middle childhood. In turn, we examined whether peer rejection at the summer camp predicted antisocial behavior during early adolescence. To examine potential indirect relations between emotional self-regulation strategies and antisocial behavior, we determined whether the indirect pathway from emotional self-regulation to antisocial behavior through peer rejection met statistical criteria for an indirect effect. Given the long time-span between the early childhood and early adolescent assessments (7.5 to 8.5 years), the early childhood self-regulation strategies were not necessarily expected to be directly related to early adolescent antisocial behavior. However, we also examined whether direct relations were evident between these constructs. Early childhood behavior problems were controlled for in analyses examining relations among emotional self-regulation, peer rejection, and antisocial behavior to rule out the possibility that early-starting conduct problems accounted for relations among these constructs.

2. Method

2.1. Participants and procedure

Participants were 122 boys enrolled in a summer camp study (SCS) of participants in the larger Pittsburgh Mother and Child Project (PMCP; Shaw et al., 2003). The SCS was a sub-study of the larger PMCP that was designed to examine boys' peer relationships and behavior problems in a naturalistic setting; the SCS was not intended to represent an intervention or treatment or serve as an evaluation of any prior intervention. All 310 boys from the PMCP were invited to participate in the SCS. However, due to the time commitment needed to attend the two-week camp, only 145 of the 310 participated in the SCS. Boys' ages ranged from 8.2 to 10.7 years ($M = 9.5$, $SD = .55$) during the camp. Of the 145 SCS participants, 122 also had complete data available on early childhood emotional self-regulation strategies and were included in the analyses for the present study. Both the SCS and the larger PMCP were approved by the Institutional Review Board at the University of Pittsburgh, and participating primary caregivers provided informed consent.

The PMCP sample was originally recruited through Women, Infants, and Children (WIC) programs serving low-income families in the Pittsburgh metropolitan area (Shaw et al., 2003). At the initial PMCP assessment when boys were 18 months of age, the mean yearly income for families was approximately \$12,500 (range = \$2460 to \$48,000), and 59% of mothers reported that they did not pursue education beyond high school. Furthermore, the mean Hollingshead (1975) four-factor index of socioeconomic status was 23.35 ($SD = 9.29$; median = 21; range = 6 to 58), which represents the working class nature of the PMCP sample. Fifty one percent of boys in the PMCP sample were European American, 39% were African American, .3% were Hispanic, and 9% were from other ethnicities.

The PMCP involved regular laboratory and home visits during childhood and adolescence. For the present study, maternal reports of early childhood externalizing problems and emotional self-regulation strategies were measured during a PMCP assessment at age 3.5, peer rejection was measured during the SCS, and antisocial behavior was measured at a PMCP follow-up assessment at age 11 and/or 12. Antisocial behavior outcomes measured at ages 11 and 12 were considered to represent the "early adolescent" period based on recent definitions of the onset of adolescence (e.g., World Health Organization, 2002).

Boys included in the present analyses were compared with boys who were initially recruited into the PMCP but did not participate in the SCS or did not have complete emotional self-regulation data. *T*-tests revealed no significant differences on maternal education, family income, and initial socioeconomic status between boys included versus not included in the present analyses. Furthermore, there were no significant differences on the emotional self-regulation, peer rejection, and antisocial behavior measures used in the present study. However, boys included in the present analyses had higher maternal reports of externalizing problems at age 3.5 ($M = 26.37$, $SD = 12.14$) than other participants in the original PMCP study ($M = 23.17$, $SD = 11.03$; $t(280) = 2.31$, $p < .05$).

2.2. Measures

2.2.1. Early childhood externalizing problems

Maternal reports of child externalizing problems on the age 2/3 version of the Child Behavior Checklist (CBCL; Achenbach, Edelbrock, & Howell, 1987) were used to control for early behavior problems in predicting early adolescent antisocial behavior. Raw scores from the broad-band Externalizing factor were used rather than narrow-band scales based on the less differentiated nature of problem behavior in younger children. The Externalizing factor assesses aggressive and destructive behavior, and items on this factor include, “defiant,” “disobedient,” and “hits others.” Each item is rated on a three-point scale ranging from 0 (*not true*) to 2 (*very true or often true*).

2.2.2. Emotional self-regulation strategies

Emotional self-regulation was measured during a laboratory visit at age 3.5 years using the cookie task (Marvin, 1977). This delay of gratification task is intended to measure negative affect and regulatory skill by requiring that the child wait for a desirable outcome while in an environment lacking much stimulation. Boys were in a room that had been cleared of all toys while their mothers completed a series of assessment measures. After finding out from the mother about the child's preference for three different cookies, the mother was asked to keep a clear bag containing the cookie of choice in clear view but outside of her child's reach. This three minute procedure and similar brief delay of gratification tasks have been used extensively in previous research with toddlers and young preschoolers to observe child self-regulation strategies (e.g., Grolnick, Bridges, & Connell, 1996; Putnam, Spritz, & Stifter, 2002).

Self-regulation strategies were coded from videotapes of the cookie task by trained research assistants. A coding system was adapted from the work of Grolnick et al. (1996) where coders determined whether five strategies were present or absent during eighteen 10-second intervals. The five coded strategies were active distraction, passive waiting, information gathering, physical comfort seeking, and task focus. These codes were intended to be exhaustive, such that coders were required to select at least one code for each interval (see Gilliom et al., 2002 for more detail about the codes). Codes were also mutually exclusive because the coder judged the predominant strategy demonstrated by a given behavior using concrete descriptive examples from the coding manual. There was one exception: When a boy engaged in another regulatory strategy while maintaining physical contact with his mother, the boy received a code for two regulatory strategies (comfort seeking and the additional regulatory strategy). Coders were three graduate students in psychology (two Caucasian males and one Caucasian female), and these coders were unaware of the present study's hypotheses. One of these coders led the adaptation of Grolnick and colleagues' system for the PMCP sample and served as the master coder for inter-rater reliability calculations from 30 tapes. Percentage agreement with the master coder was excellent and ranged from 89–96%. Kappas ranged from .64 to .79.

The present study focused on two codes, active distraction and task focus, because they are most consistent with theoretical conceptualizations of important self-regulation strategies in coping with frustration. Active distraction, including purposeful attempts to focus attention away from the delay object (e.g., exploring the room, singing, engaging in fantasy play), suggests adaptive emotion regulation. Alternatively, focusing on the task (i.e. waiting for the cookie) demonstrates poor coping with the situation and correlates with increased anger and frustration (Gilliom et al., 2002). In support of their predictive validity, boys who focused on the cookie or other frustrating aspects of the waiting task and boys who utilized less active distraction demonstrated higher rates of externalizing problems based on teacher reports at age 6 (Gilliom et al., 2002). Although passive waiting was negatively associated with later externalizing problems, this approach to coping with frustration is less theoretically consistent with conceptions of adaptive self-regulation and subsequent externalizing behavior problems.

2.2.3. Peer rejection

Evaluations during the SCS were conducted to examine the boys' behavioral adjustment and peer relationships. Boys attended one of three sessions of the camp. Each session lasted for 10 days across a two-week period and consisted of separate groups of 10–12 boys. Each group was managed by two college undergraduates trained in behavioral management techniques. Each group was heterogeneous with respect to child age, and no more than two to three boys with elevated externalizing problems were in each camp group. Boys were placed in camp groups that did not include boys whom they had previously met. At the end of each week of camp, counselors completed behavioral rating forms, and camp group members completed sociometric ratings and nominations. For the present study, we used peer sociometric nominations and ratings from the second week of camp because ratings and nominations from the first week were likely to be comparatively less reliable.

Boys completed a sociometric interview at the end of the second week of the camp. The sociometric interview was completed in a group format, and the boys were reminded that answers should not be shared. For the nomination procedure (Coie, Dodge, & Copotelli, 1982), boys were given a sheet with pictures and names of camp group members. They were asked to list the three boys in their camp group that they “like most.” Then, they were asked to name the three boys in their group that they “like least.” From the nomination procedure, a social preference score was calculated for each group member. The boy's liked and disliked nominations were standardized based on the other scores in the boy's group. Then, the boy's standardized disliked score was subtracted from his standardized liked score creating a social preference score. The inverse of the social preference score was used to obtain a rejection nomination score where higher scores indicated more rejection by peers.

Sociometric ratings are often used in conjunction with nomination procedures to identify rejected children (e.g., Asher & Dodge, 1986). For the sociometric rating procedure in the present study, boys were asked to use a three-point scale (2 = *likes a lot*, 1 = *likes OK*, 0 = *doesn't like*) to rate each member of their camp group. A mean sociometric rating was calculated for each boy. The

mean sociometric rating was subtracted from 2 to obtain a mean rejection rating where higher scores indicated higher levels of peer rejection.

2.2.4. Antisocial behavior

Self, parent, and teacher reports were used in the PMCP to provide a multi-rater approach to the measurement of antisocial behavior. Youth completed an adaptation of the Self-Reported Delinquency (SRD) measure at the age 11 and 12 PMCP visits (Elliott, Huizinga, & Ageton, 1985). The SRD assesses the context and frequency of offending and examines overt, covert, destructive, and nondestructive offenses. The SRD is a widely used self-report assessment of delinquency with good psychometric properties. Thirty three items pertain to the youth's report of his involvement in antisocial activities. These items include, "have you taken something from a store without paying for it?" and "have you been sent home from school for bad behavior?" Each item is rated on a 3-point scale, with response choices including 0 (*never*), 1 (*once/twice*), and 2 (*more often*).

For the present study, a composite score was created by summing 23 of 33 items pertaining to delinquent and antisocial acts. Ten items were excluded due to base rates of less than 2% at either the age 11 or age 12 assessments (e.g., items pertaining to sniffing glue and purse snatching). The composite score demonstrated good internal reliability ($\alpha = .78$ at age 11 and age 12). For boys who completed both the age 11 and 12 assessments, the mean of the age 11 and 12 SRD composite scores was used to index antisocial behavior. For all other boys, the composite score from a single time point (either age 11 or age 12) was used to index antisocial behavior.

Maternal reports of boys' antisocial behavior were obtained from the Child Behavior Checklist (CBCL; Achenbach, 1991). In addition, the participating primary caregiver and her son were asked to nominate one teacher who knew the boy best to provide ratings on the Teacher Report Form (TRF) version of the CBCL. Both the CBCL and TRF contain a Delinquent Behavior scale, and items on the 11-item CBCL version include, "lying or cheating," "runs away from home," and "steals at home." Similar item content exists on the 9-item TRF version of the scale, and each item is rated on a 3-point scale ranging from 0 (*not true*) to 2 (*very true or often true*). The CBCL and TRF Delinquent Behavior scales demonstrated good internal reliability at age 11 ($\alpha = .71$ for the CBCL and $\alpha = .85$ for the TRF) and at age 12 ($\alpha = .75$ for the CBCL and $\alpha = .80$ for the TRF). For each measure, a delinquent behavior score was calculated from the mean of the raw sum scores at the age 11 and 12 assessments, or from a single assessment if data at both time points was not available.

3. Results

3.1. Analysis plan

Study hypotheses were examined with structural equation models. Following inspection of means, standard deviations, and intercorrelations, structural equation models were evaluated in AMOS to examine direct and indirect relations among study constructs. Early childhood externalizing problems and emotional self-regulation strategies (active distraction and task focus) were examined as individual manifest indicators, and the multiple indicators of peer rejection (sociometric nominations and sociometric ratings) and antisocial behavior (self-, parent-, and teacher-reports) were used to create latent constructs. Overall model fit was examined with multiple fit indices including Chi-square, RMSEA, CFI, and TLI, and individual paths in the model were tested for statistical significance. Lastly, the Sobel (1982) test was used to evaluate the hypothesized indirect relation between emotional self-regulation strategies and antisocial behavior through boys' rejection by peers.

3.2. Descriptive statistics

Table 1 presents descriptive statistics for the 122 boys included in the present study. The mean of 10.43 for active distraction indicates that this self-regulation strategy occurred in over half of the 18 coding intervals. The ranges for active distraction and task focus were 1 to 18 intervals and 0 to 17 intervals respectively, and the range and standard deviation for each strategy supports variability in strategy use for this sample. For the variables presented in Table 1, there were no significant group differences when comparing non-minority (i.e. European American; $n = 57$) to ethnic minority boys ($n = 65$), with $p > .05$ for all t -tests. Thus, ethnicity was not included in subsequent analyses.

Table 1

Means and standard deviations for study variables.

Variable	Mean	SD
Active distraction	10.43	5.13
Task focus	4.75	4.61
Externalizing problems: CBCL raw score at 42 months	26.37	12.14
Peer rejection: Nominations	.04	1.73
Peer rejection: Ratings	.82	.46
Antisocial behavior: SRD sum score	3.43	2.74
Antisocial behavior: CBCL delinquent behavior sum score	2.18	2.30
Antisocial behavior: TRF delinquent behavior sum score	2.43	2.66

Note. CBCL = Child Behavior Checklist, SRD = Self-Reported Delinquency, TRF = Teacher Report Form.

Table 2
Intercorrelations among variables.

Variable	1	2	3	4	5	6	7
1. Active distraction							
2. Task Focus	-.50**						
3. Externalizing (42 months)	.00	.02					
4. Peer rejection: nominations	-.26**	.19*	.14				
5. Peer rejection: ratings	-.25**	.13	.24**	.74**			
6. Antisocial behavior: SRD	-.08	.10	.20*	.17 ^a	.18*		
7. Antisocial behavior: CBCL	-.15 ^a	.16 ^a	.36**	.28**	.29**	.38**	
8. Antisocial behavior: TRF	-.13	.07	.21*	.47**	.47**	.51**	.56**

Note. CBCL = Child Behavior Checklist, SRD = Self-Reported Delinquency, TRF = Teacher Report Form.

^a $p < .10$, * $p < .05$, ** $p < .01$.

Table 2 presents intercorrelations between the variables. Not surprisingly, the self-regulation strategies were negatively correlated with each other. Neither regulation strategy was significantly correlated with concurrent externalizing problems. Active distraction was negatively correlated with rejection nominations and ratings, and task focus was positively correlated with rejection nominations but not ratings. Neither regulation strategy was correlated with the indicators of antisocial behavior, except for marginally significant correlations with maternal reports of boys' antisocial behavior. There was a significant positive correlation between the nomination and rating indicators of peer rejection. Both indicators of peer rejection were positively correlated with maternal and teacher reports of antisocial behavior, and rejection ratings were positively correlated with self-reports of antisocial behavior. Robust bivariate correlations also existed between the indicators of antisocial behavior.

3.3. Model estimation

Structural equation models were examined with AMOS 5.0 (Arbuckle, 2003). All 122 boys had peer rejection and emotional self-regulation data, but a small percentage of the boys were missing a portion of the antisocial behavior data. Specifically, 2%, 2%, and 21% of the 122 boys were missing antisocial behavior data from self report, maternal report, and teacher report, respectively. These missing data were estimated using full information maximum likelihood procedures in AMOS.

The model presented in Fig. 1 was created to examine developmental predictors of antisocial behavior. This model included two early childhood self-regulation strategies, active distraction and task focus, and maternal reports of externalizing problems in early childhood as exogenous variables. The model also included two measures collected during the camp, sociometric rejection nominations and sociometric rejection ratings, to create a peer rejection latent construct. Lastly, the model included self, maternal, and teacher reports of antisocial behavior to create an antisocial behavior latent construct.

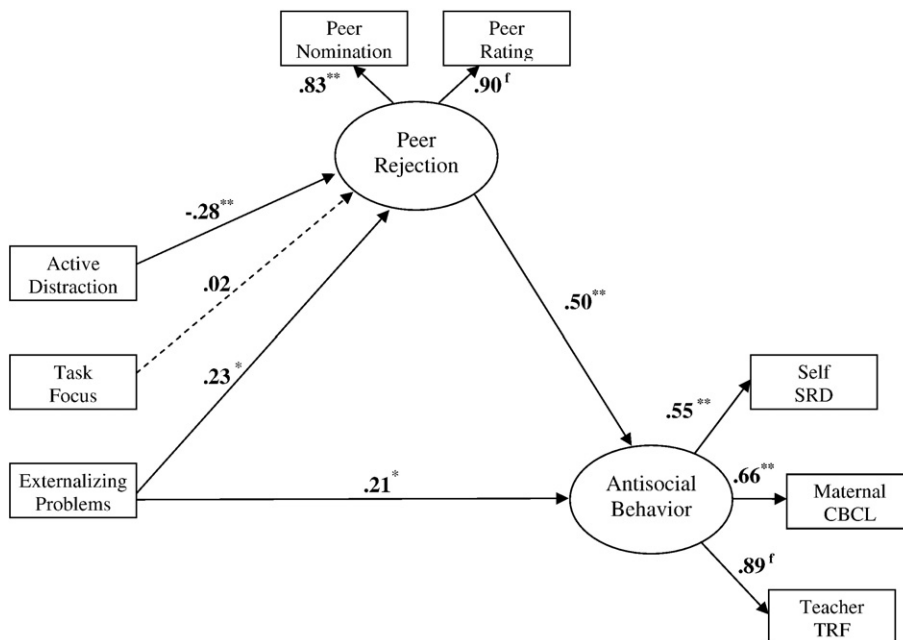


Fig. 1. Model of relations among emotional self-regulation strategies, peer rejection, and antisocial behavior. Note. Standardized path coefficients and loadings are presented in the figure. $\chi^2(15) = 17.73$, RMSEA = .04, CFI = .99, TLI = .97. ^f = fixed path. * $p < .05$, ** $p < .01$.

A path was included from each early childhood exogenous variable to the peer rejection construct to test our hypothesis that each self-regulation strategy in early childhood would predict peer rejection while simultaneously accounting for the other strategy and early childhood externalizing problems. Paths were also included from early childhood externalizing problems and the peer rejection construct to the antisocial behavior construct to test the hypothesis that peer rejection would predict a key indicator of early adolescent maladjustment while accounting for stability in behavior problems from early childhood to early adolescence. Given the small and non-significant bivariate correlations between the self-regulation strategies and measures of antisocial behavior, direct paths were not included from the self-regulation strategies to the antisocial behavior construct.

Model fit was tested with multiple indices. The Chi-square goodness of fit index tests exact model fit, and a nonsignificant Chi-square value supports model fit. There are also a number of relative fit indices. The Root Mean Square Error of Approximation (RMSEA) is one such measure of relative fit, and RMSEA values below .06 support good model fit (Hu & Bentler, 1999). Two other statistics, the Comparative Fit Index (CFI) and the Tucker–Lewis Index (TLI) measure the absolute fit of the model in comparison to the absolute fit of a null (baseline) model, and values above .95 for the CFI and TLI indicate good model fit (Hu & Bentler, 1999). The model demonstrated excellent model fit, with $\chi^2(15) = 17.73$, RMSEA = .04, CFI = .99, and TLI = .97.

The standardized coefficients for paths specified in the model are presented in Fig. 1. Based on the factor loadings, the model supported peer nominations and ratings as elements of a peer rejection latent construct and self, maternal, and teacher reports as elements of an antisocial behavior latent construct. The model also supported direct paths from active distraction and early childhood externalizing problems to peer rejection and direct paths from early childhood externalizing problems and peer rejection to antisocial behavior. However, the direct path from task focus to the peer rejection construct was nonsignificant.

To more closely examine the developmental relations between early childhood emotional self-regulation and antisocial behavior in early adolescence, we evaluated the indirect effect of active distraction on the antisocial behavior construct with the Sobel (1982) test (see Sobel, 1987 for a description of this test using coefficients from structural equation models). This method gives a significance statistic for the indirect effect of a predictor on an outcome through an intermediate variable. The Sobel procedure uses the unstandardized path coefficients and their standard errors for the direct effect of the predictor (active distraction) on the intermediate variable (peer rejection) and the direct effect of the intermediate variable (peer rejection) on the dependent variable (antisocial behavior) to test the significance of the indirect effect. The results of the Sobel test indicated that active distraction had a significant indirect relation with antisocial behavior, $z = -2.14$, $p < .05$. In addition, the Sobel test indicated that early childhood externalizing problems had a significant indirect relation with antisocial behavior through peer rejection ($z = 2.28$, $p < .05$) in addition to the direct effect between these constructs.

4. Discussion

The present findings support developmental associations among an adaptive emotional self-regulation strategy (active distraction), peer rejection, and antisocial behavior. Specifically, less use of active distraction during a frustrating task in early childhood predicted greater peer rejection in middle childhood. In turn, rejection by peers in middle childhood predicted antisocial behavior in early adolescence. Furthermore, an indirect effect of active distraction on antisocial behavior through peer rejection was supported. The indirect effect suggests that although the use of active distraction in early childhood is not directly associated with antisocial behavior in early adolescence, this self-regulation strategy is associated with antisocial behavior through its prediction of peer rejection. Importantly, these direct and indirect effects were supported while simultaneously accounting for the stability in behavior problems from early childhood to early adolescence.

Boys who utilized less active distraction during a frustrating task in early childhood were more likely to be rejected by their peers in middle childhood, supporting a developmental psychopathology perspective on deviations from normative development in early and middle childhood. This finding also strengthens previously supported relations between aspects of children's regulatory competence and their social adjustment (e.g., Denham et al., 2003). The inability to adaptively orient attention away from a frustrating situation may herald similar difficulties with the regulation of anger in social contexts. Over time, the inability to adaptively regulate anger and frustration may become bothersome to peers, leading to negative exchanges and rejection (Maszk et al., 1999). However, not all previous research that has examined active distraction during early childhood in relation to concurrent or later indices of social competence has supported the above assertion (Calkins, Gill, Johnson, & Smith, 1999; Gilliom et al., 2002).

Peer rejection during a summer camp was associated with antisocial behavior in early adolescence and accounted for the indirect effects of active distraction on antisocial behavior. Peer relationships have been associated with young adolescents' involvement in delinquent behavior in previous research (see Dodge et al., 2006 for a review). In the present study, peer rejection was measured while boys attended a summer camp, and boys had little previous contact with the other boys in their camp groups. As a result, our findings provide strong evidence for the importance of peer rejection during middle childhood as a predictor of antisocial behavior because the boys did not have a history of negative relationships with their peers at camp. Also, as boys presumably had little contact with their fellow campers upon completion of camp, the longitudinal prediction to antisocial behavior can be more purely attributed to peer rejection rather than other peer group factors associated with antisocial behavior (e.g., peer contagion).

Neither emotional self-regulation strategy measured at age 3.5 demonstrated direct relations with antisocial behavior in early adolescence. There are multiple explanations for the non-significant direct relation between these constructs. The time span

between the measurement of emotional self-regulation strategy use and antisocial behavior was 7.5 to 8.5 years. Previous findings from the PMCP (Gilliom et al., 2002) and other research groups (e.g., Cole, Zahn-Waxler, & Smith, 1994) support concurrent and short-term longitudinal relations between emotional self-regulation and externalizing problems, but few studies have linked early measures of emotional self-regulation to antisocial behavior during adolescence (for an exception, see Moffitt & Caspi, 2001). A long-term longitudinal study, covering the late preschool and school-age periods, leaves a tremendous amount of room for other ‘third variables,’ proximate to children’s environments, to exert a closer influence on antisocial behavior in early adolescence. In the present study, peer rejection in middle childhood was selected as one such variable based on its developmental salience in middle childhood and the theoretical links between emotional self-regulation and social competence. The significant indirect effect of active distraction on antisocial behavior through peer rejection suggests that the inability to utilize this adaptive regulation strategy during early childhood may lead to poor peer relationships and set the stage for delinquent behavior in early adolescence. Because active distraction and early adolescent antisocial behavior were not directly related, the significant indirect effect does not meet traditional definitions of mediation (e.g., Baron & Kenny, 1986). However, a recent assertion by Shrout and Bolger (2002; also see Collins, Graham, & Flaherty, 1998) supports relaxing Baron and Kenny’s requirement to first establish a direct relation between a predictor and an outcome for distal processes and when theory supports an indirect effect. Based on the present study, there is support that the relation among active distraction, peer rejection, and antisocial behavior is a process that unfolds across childhood and early adolescent development. However, it is important to note that the self-regulation strategies also were not correlated with concurrent maternal reports of externalizing problems in early childhood.

4.1. Limitations

There are a few notable limitations of the present study. First, the sample was restricted to boys from lower income families in urban communities. Different results may have been obtained had the sample included females, children from a wider variety of socioeconomic backgrounds, or different geographic regions of the United States (e.g., rural, suburban). Keeping this limitation in mind, our sample was selected because children from lower socioeconomic groups are at greater risk of developing behavior problems, and boys are at particularly high risk for the development of serious delinquent behavior.

Another limitation was the measurement of emotional self-regulation based entirely on the child’s behavior during a brief task. Although other methods to assess emotional self-regulation would have been beneficial, similar brief delay of gratification tasks of self-regulation demonstrate remarkable predictive validity to later indicators of self-regulatory competence and social functioning (Eigsti et al., 2006; Mischel et al., 1988). Nonetheless, the brief observational task represents the relatively narrow definition of emotional self-regulation used in the present study, and it does not provide a complete picture of the wide range of emotion regulatory processes that may reflect adaptation in early childhood and across the lifespan. Furthermore, active distraction requires multiple levels of self-regulatory competence, including attentional and behavioral regulation in addition to direct regulation of emotion.

4.2. Future directions and implications

Our results support early intervention to prevent behavior problems. Programs should include components that address adaptive self-regulation of emotion during early childhood. Children may especially benefit if programs include instruction on adaptive means to use distraction when confronted with distressing situations. Successful programs may help to prevent later social difficulties for children who develop adequate emotional self-regulation skills. Early childhood prevention programs that address children’s understanding and management of emotions exist (e.g., Domitrovich, Cortes, & Greenberg, 2007), and some of these programs have specifically evaluated emotional self-regulation following program implementation with positive results (Izard et al., 2008). Future preventive intervention research should examine outcomes longitudinally to determine whether changes in self-regulatory skills prevent the emergence of difficulties with peers in middle childhood. Furthermore, active distraction should be examined as a specific emotional self-regulatory mechanism of intervention effects.

Similarly, programs to promote peer relationships and prevent behavior problems in middle childhood should consider child emotional self-regulation as one factor that may contribute to peer rejection. In addition to instruction in social skills and other cognitive-behavioral techniques, children with social difficulties may also need assistance to adaptively cope with frustration in social contexts. Furthermore, inclusive social environments that successfully reduce the negative sequelae of peer rejection may decrease the likelihood that young adolescents will engage in antisocial behavior.

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