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Relation of Emotion-Related Regulation to Children's Social Competence: A Longitudinal Study

Tracy L. Spinrad

Department of Family and Human Development, Arizona State University

Nancy Eisenberg and Amanda Cumberland

Department of Psychology, Arizona State University

Richard A. Fabes and Carlos Valiente

Department of Family and Human Development, Arizona State University

Stephanie A. Shepard

Department of Psychology, Arizona State University

Mark Reiser

Department of Economics, Arizona State University.

Sandra H. Losoya and Ivanna K. Guthrie

Department of Psychology, Arizona State University

Abstract

The differential relations of children's emotion-related regulation (i.e., effortful control and impulsivity) to their personality resiliency, adult-rated popularity, and social competence were examined in children who were 4.5–7.9 years old and who were remeasured 2 years later. Parents and teachers reported on all constructs, and children's attentional persistence was observed. Structural equation modeling was used to test the mediating role of resiliency on the relations between regulation/control and popularity using two-wave longitudinal data. The results provide some evidence of the mediating role of resiliency in the relations between effortful control and popularity, provide some evidence of bidirectional effects, and also buttress the view that emotional regulation should be differentiated into effortful and reactive forms of control.

Keywords

emotion regulation; effortful control; impulsivity; popularity

Children's social functioning (including socially appropriate behavior and popularity) is increasingly being recognized as vital to children's success in a number of areas, such as how much children like school, school readiness, and academic achievement (Buhs & Ladd,

Correspondence concerning this article should be addressed to Tracy L. Spinrad, Department of Family and Human Development, Cowden Room 13, Arizona State University, Tempe, AZ 85287-2502. E-mail: tspinrad@asu.edu.

Stephanie A. Shepard is now at E. P. Bradley Hospital, Brown University School of Medicine.

Ivanna K. Guthrie is now in the Department of Psychology, Loma Linda University.

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2001; Ladd, 1990; Ladd & Coleman, 1997; Ladd, Price, & Hart, 1990). Moreover, children who have poor peer relationships are at risk for later social anxiety and antisocial behavior (Hymel, Rubin, Rowden, & LeMare, 1990; Parker & Asher, 1987; Rubin et al., 1995; Rubin, Hastings, Chen, Stewart, & McNichol, 1998). Given the importance of social competence for children's development, researchers need to better understand the factors that predict social competence in young children. Thus, in the present study, we examined whether different types of children's emotion-related regulation/control differentially predicted children's personality resiliency, adult-rated popularity, and socially appropriate behavior using two-wave longitudinal data in a sample of children including some at risk for adjustment problems.

Although the construct of emotion regulation has received considerable attention, there has been little consensus regarding its definition and conceptualization (Cole, Martin, & Dennis, 2004). Recently, Eisenberg and associates (Eisenberg & Morris, 2002; Eisenberg, Smith, Sadovsky, & Spinrad, 2004) and others (Derryberry & Rothbart, 1997) contributed to this debate by distinguishing between effortful control, the self-regulatory component of temperament, and less voluntary, reactive processes such as over-control or undercontrol. Effortful control has been defined as "the efficiency of executive attention, including the ability to inhibit a dominant response and/or to activate a subdominant response, to plan, and to detect errors" (Rothbart & Bates, 2006, p. 129). Effortful control involves the abilities to focus or shift attention as needed, as well as activational or inhibitory control (i.e., the abilities to activate or inhibit behavior as is needed, even when one does not want to do so; Rothbart & Bates, 2006; Schmeichel & Baumeister, 2004). Thus, effortful control processes can be used to regulate both emotion and behavior.

Whereas effortful control processes are thought to be under voluntary control (even if often used fairly automatically) and are considered to be involved in self-regulation, reactive overcontrol and undercontrol include relatively less voluntary processes. Examples of reactive overcontrol include behavioral inhibition (i.e., the tendency to be overcontrolled, timid, and constrained and lack flexibility) and generally rigid, constrained behavior (Block & Block, 1980; Derryberry & Rothbart, 1997). At the other extreme are impulsive approach behaviors, exemplified when the individual seems to be "pulled" toward situations without adequate reflection (Block & Block, 1980; Eisenberg, 2002). Whereas effortful control is believed to typically (if not always) predict positive social functioning and/or adjustment, extreme cases of reactive control (either overcontrol or undercontrol) are seen as more detrimental to children's development (Eisenberg & Morris, 2002). Although researchers have made this distinction in relation to adjustment (Eisenberg, Spinrad, et al., 2004), investigators have not tested the differential relations of effortful and clear-cut reactive control to children's socially appropriate behavior and adult-rated popularity. If effortful and reactive control are distinct, albeit related, processes, they would be expected to provide differential prediction of positive development, and consideration of both types of variables should increase the ability to predict positive social development.

Relations of Effortful Control and Reactive Control to Resiliency, Adult-Rated Popularity, and Socially Appropriate Behavior

As already noted, children's effortful control (or components of effortful control) and reactive control have been identified as important predictors of children's positive social behavior. Children who are high in effortful regulation are expected to be able to modulate their negative emotions and to be relatively competent at interacting with others. There is some evidence that measures of effortful control in children are related to the ability to manage anger reactions with peers (Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994), high levels of sympathy and prosocial behavior (see Eisenberg, Fabes, & Spinrad, 2006, for a review), and social competence and popularity (Eisenberg et al., 1993, 1995; Eisenberg, Valiente, Fabes, et al.,

2003). Thus, the ability to effortfully control attention and behavior may foster the skills needed to get along with others and to engage in socially constructive behaviors with peers, which should enhance liking by peers. On the other hand, for reversed reasons, children who are high in reactive undercontrol (i.e., impulsive) may tend to act out and behave in inappropriate ways (such as aggression or defiance). In particular, these children may respond to situations without thinking (Arsenio & Lemerise, 2004); therefore, impulsivity may be associated with lack of socially appropriate behavior and low popularity.

A related construct, personality (or ego) resiliency also is expected to be related to positive adaptation. Block and Block (1980) defined ego resiliency as “the dynamic capacity of an individual to modify his/her modal level of ego-control, in either direction, as a function of the demand characteristics of the environmental context” (p. 48). An individual who is high in resiliency would be expected to be able to flexibly adapt to changing circumstances in the environment or to stress, whereas individuals who are low in resiliency would tend to perseverate or become disorganized when dealing with change or stress, be inflexible, and/or have difficulty recouping after stressful events. Eisenberg, Guthrie, et al. (1997) proposed that the relations of effortful and reactive control (especially the former) to developmental outcomes may be mediated by individual differences in resiliency. Effortful control is likely to be associated with high resiliency because voluntary control is likely to foster flexibility in adapting to the context. As a consequence, resiliency may mediate the relation of effortful control to positive social functioning.

The relation of impulsivity to resiliency probably is more complex. Young children who are moderate in impulsivity would be expected to be relatively spontaneous and better able to deal with stress and approach new situations than are children who are overcontrolled or rigid, and thus, positive linear and quadratic relations might be expected. Consistent with this view, impulsivity tends to be positively related to resiliency in younger school children, although quadratic relations have been found using teacher reports (Eisenberg, Spinrad, & Morris, 2002) by the mid to late elementary school years (with moderate and high impulsivity being similarly, and more positively, related to resiliency than low impulsivity; see Eisenberg, Fabes, Guthrie, & Reiser, 2002).

Consistent with the view that resiliency mediates the relation between effortful control and positive social functioning, in a different sample, Eisenberg and colleagues (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Eisenberg, Guthrie, et al., 1997) found that resiliency mediates the relation of attentional control (an aspect of effortful control) to children's concurrent popularity and socially appropriate behavior. In a longitudinal follow-up of that same sample, resiliency mediated the differential relations of effortful and ego control (a measure that probably taps both reactive overcontrol and effortful control) to popularity; however, it did not mediate relations to socially appropriate behavior (Eisenberg, Valiente, Fabes, et al., 2003). It is important to note, however, that this investigation did not clearly differentiate between effortful and reactive control (as already noted, the measure of ego control was probably a confounded measure and included items such as “is planful, thinks ahead” which may reflect effortful control). Thus, it is still unclear whether resiliency will serve as a mediating variable when these constructs are more clearly differentiated. In addition, Cole and Maxwell (2003) recently argued that longitudinal designs allow for a more rigorous test of mediation and have provided a series of steps to optimally test mediation (even when only two waves of data are available). In this study, we have followed their suggestions for modeling using two-wave longitudinal data rather than testing mediational relations within each assessment.

It is also important to consider potential moderators in predicting children's positive social development. Specifically, we examined whether the relations between effortful control/impulsivity to resiliency and positive development differed for boys and girls. Because there

is little empirical support for moderation by sex (and we did not have specific hypotheses) in these relations, this goal was considered exploratory. In addition, because children in this study were sampled to include some children with at least borderline levels of problem behaviors (internalizing and externalizing problems), we also examined whether children who were at risk for problem behaviors might have stronger relations between effortful control and resiliency and social functioning. It is possible that when children are at risk for problem behaviors, their level of effortful control is especially important in predicting their resiliency or positive social functioning.

The Present Study

In the present study, we examined the relations of effortful control and impulsivity to children's resiliency, adult-rated popularity, and socially appropriate behavior in early childhood (ages 4.5 to just turning 8 years) and 2 years later (Eisenberg, Spinrad, & Morris, 2002; Eisenberg, Gershoff, et al., 2001; Eisenberg, Spinrad, et al., 2004). Using structural equation modeling (SEM) and two-wave longitudinal data, we examined the differential relations of temperamental effortful control and impulsivity to resiliency and socially appropriate behavior and adult-rated popularity. Because effortful control and reactive control recently have been disentangled in theoretical and empirical writings, previous work has not provided a strong test of the differential effects of constructs to positive social functioning. In prior work in this area, investigators distinguished between attentional and behavioral aspects of control (both of which have components of effortful control, as in Eisenberg, Fabes, et al., 2000; Eisenberg, Guthrie, et al., 1997) or differentiated between effortful control and ego control, although the latter is probably a confounded measure of both reactive overcontrol and effortful regulation (Eisenberg, Valiente, Morris, et al., 2003). In addition, we examined the relations of effortful regulation and reactive control to socially appropriate behavior and adult-rated popularity over time for fairly young children, as opposed to children who were in early adolescence (as in Eisenberg, Valiente, Fabes, et al., 2003, using a measure of ego control). It is important to understand social competence in young school children because early problems with peers predict later problems (Hymel, Rubin, Rowden, & LeMare, 1990; Kupersmidt & Coie, 1990; Ladd & Troop Gordon, 2003; Parker & Asher, 1987).

Our inclusion of substantial numbers of children with borderline or more extreme levels of problem behaviors is another unique feature of this study. It is quite possible that children's regulation has stronger links to social functioning in a sample including at-risk children (in part, due to greater variability than in a normative sample) and that in such a sample, these constructs may be more stable over time. Children with relatively high levels of adjustment problems at a young age often tend to remain high in adjustment problems (Coie & Dodge, 1998); analogously, they may exhibit stable patterns of low social competence.

We predicted that resiliency would mediate the relations of effortful control to socially appropriate behavior and adult-rated popularity and that the relation of impulsivity to popularity might also be mediated by resiliency. Specifically, both effortful control and impulsivity were expected to be positively related to resiliency, and high resiliency was predicted to relate positively with popularity and perhaps socially appropriate behavior (the latter might involve more compliance than flexibility). We also predicted a direct negative relation between impulsivity and socially appropriate behavior because impulsive children are likely to behave inappropriately (e.g., aggressively) in some situations, regardless of their resiliency. We examined whether these relations would be found over time, even when controlling for their prior standing on the constructs 2 years earlier. Although we expected the predicted evidence of mediation, it is also possible that the relations of effortful control or impulsivity to resiliency and to socially appropriate behavior and popularity are due merely to stability over time in temperamentally based impulsivity and effortful control, particularly in

a sample including children at risk for behavior problems. Finally, we examined moderation by sex of the child and by risk for problem behavior.

The procedures suggested by Cole and Maxwell (2003) to test mediation in SEM were used in the analyses. With this method, effortful control and impulsivity at Time 1 (T1) were used to predict resiliency and positive social development at Time 2 (T2) while controlling for prior levels of the constructs, and resiliency at T1 was used to predict popularity and social competence over time, above and beyond the autoregressive effects. This method is considered the most robust test of mediation using two-wave longitudinal data and has not been used previously when testing our predictions. In addition, we examined whether the expected patterns of relations were found within time and whether the indicators and paths were similar at the two ages.

Method

Participants

Participants were recruited through the local preschools and elementary schools, newspaper ads, and flyers that were placed at after-school programs and children's stores in a large metropolitan area in the Southwest. Because this project was part of a larger study examining the factors associated with risk for behavior problems, we used a selective screening procedure for inclusion in the study. Phone calls were made to all interested families and a parent, usually the mother, was administered the Child Behavior Check List (CBCL; Achenbach, 1991a, 1991b). Out of a pool of 315 children, we selected children who would be considered moderately or clearly at risk for either internalizing or externalizing behavior problems (i.e., T scores of ≤ 60). These children were matched as closely as possible with control children of the same sex and race, similar social class (using parental reports of education and occupation), and approximately the same age. Some families never came to the laboratory, so this method resulted in approximate matching [see Eisenberg, Cumberland, et al., (2001), for details on the sample].

The final sample at T1 included a parent (203 mothers and 11 fathers) and 214 children (96 girls [M age = 74.58 months, SD = 10.16] and 118 boys [M age = 72.58 months SD = 9.05]). The children were predominately non-Hispanic White (76%); 12% were Hispanic, 5% were Native American, 3% were African American, <1% were of Asian origin, and 3% were of mixed origin. (These percentages differ slightly from those in Eisenberg, Cumberland, et al., 2001, because we obtained data at T2 for a child who was missing ethnicity/race data at T1.) Sixty-eight percent of children came from two-parent households, 20% came from single-parent households, and 7% were in extended families (5% did not respond or reported "another household type"). Mean years of maternal and paternal education were 14.11 (SD = 2.49) and 14.06 (SD = 3.05), respectively (ranges = 7–20 years and 8–20 years; respectively, with 12 = high school and 16 = college). Primary caregivers (who provided the main questionnaire data) were 209 mothers and 5 fathers. Family income ranged from \$6,000 to \$160,000 (median \$35,000; also see Eisenberg, Cumberland et al., 2001; Eisenberg, Gershoff, et al., 2001).

Two years later, 193 children (90% of the T1 sample) and a parent (182 mothers, 3 grandmothers [henceforth treated as mothers], and 8 fathers) participated in a second assessment (T2; Eisenberg, Spinrad, et al., 2004; Eisenberg, Sadovsky, et al., 2005). The participants were 88 girls (M age = 7.72 years, SD = 0.84) and 105 boys (M age = 7.61 months, SD = 0.83); 66% were in two-parent families. The individuals who participated at both assessments were compared with those who were lost due to attrition on the T1 demographic and study variables. In comparison to families who had data at both time points, fathers in attrited families were less educated, $t(204) = 1.96, p = .05$. Children who had data at both time points were more likely to be White (77%) than those who did not (67%), $\chi^2(5) = 12.13, p < .$

03; Native Americans were especially likely to have been lost due to attrition. In addition, children in the 21 families who had no data at T2, compared with those with at least some data at T2, were rated as somewhat lower in effortful control by parents and teachers at T1, $t(208 \text{ and } 193) = 1.95 \text{ and } 2.09, p < .06 \text{ and } .03$, respectively, and as less resilient by parents, $t(209) = 2.37, p < .02$. Thus, the sample at T2 is less diverse and at-risk than that at T1.

Procedure

At both time points, children came with a parent to a laboratory on campus to participate in the experimental session (19 families at T2 participated only by mail). Early in the session, the parent was escorted to another room to complete a number of questionnaires. As part of a series of tasks, the child completed a puzzle task designed to assess effortful control/regulation (persistence). At the end of the session, the child was debriefed, and the participants were paid, and parents were asked to give permission for questionnaires to be sent to the child's teacher.

Measures

Parents and teachers completed measures of children's effortful control, impulsivity, resiliency, and socially appropriate behavior/popularity and problem behavior. Children participated in a task that provided a behavioral measure of effortful control.

Children's Effortful Control and Impulsivity—At each assessment, teachers and parents completed indices of effortful control and impulsivity from the Child Behavior Questionnaire (CBQ; Rothbart, Ahadi, Hersey, & Fisher, 2001). The CBQ was designed for parents' reports; thus, some items were dropped or modified slightly to make them appropriate for teachers. Three subscales were used to measure effortful control: attention shifting, attention focusing, and inhibitory control. The attention shifting scale initially consisted of 12 items for both parents and teachers assessing the child's ability to willfully move attention from one activity to the next (e.g., "Can easily leave off working on a project if asked"). Attention focusing was initially assessed with 10 items for parents and 9 for teachers indicating the child's ability to concentrate on a task when needed (e.g., "When drawing or coloring in a book, shows strong concentration"). Then one item each from the attention shifting (i.e., "Needs to complete one activity before being asked to start on another one") and attention focusing (i.e., "Has difficulty leaving a project she/he has begun") subscales were dropped for both parent and teacher reports because they lowered the alphas substantially. The inhibitory control subscale consisted of 13 items that assessed the child's ability to regulate his or her behavior (e.g., "Can lower his/her voice when asked to do so"). Alphas were .84 and .88 for parents and teachers, respectively, at T1 and .81 and .91 at T2.

Moreover, based on experts' ratings of whether items assessed temperament or adjustment, we corrected the scales based on what were considered to be overlapping items between these scales and problem behavior scales (see Eisenberg, Spinrad, et al., 2004). This procedure has been used in other studies to reduce confounding of measures of temperament and adjustment (see Lengua, West, & Sandler, 1998; Lemery et al., 2002). Specifically, 32 experts in the field of temperament and child psychopathology (24 faculty and 8 graduate students) who did not know how the data were to be used completed a questionnaire measure assessing how much each item reflected either temperament or adjustment problems (1 = *better measure of temperament*; 3 = *not a better measure of temperament or symptoms*; 5 = *much better measure of symptoms*). The mean rating for each item was calculated. Items rated as a better measure of the construct other than the construct intended were considered to be contaminated and were removed from the corresponding scale. Because problem behaviors often are partly reflected in lack of social competence and socially appropriate behavior, we assumed that items reflecting problem behaviors might also reflect low social competence. Based on experts' ratings, 2 of 11 items were excluded from the attention shifting subscale (i.e., "Sometimes has

a dreamy quality when others talk to her/him, as if she/he were somewhere else” and “Sometimes doesn't seem to hear me when I talk to her/him”) to remove overlap. Alphas at T1 and T2 for the corrected nine-item attention shifting scale were .80 and .79 for parents and .86 and .88 for teachers, respectively. Alphas for attention focusing at T1 and T2 (nine items for parents and eight for teachers) were .88 and .72 for parents and .85 and .82 for teachers. No items were excluded from the attention focusing and inhibitory control subscales.

Reports of attention focusing, attention shifting, and inhibitory control were significantly positively correlated within reporter at T1, $rs(207) = .37-.73$, $ps < .01$, for parents, and $rs(193) = .61-.78$, $ps < .01$, for teachers, and at T2, $rs(181) = .47-.71$, $ps < .01$, for parents, and $rs(178) = .57-.78$, $ps < .01$, for teachers. Thus, because all these variables are part of the construct of effortful control and to reduce the number of variables, we created separate composites for parents' and teachers' reports of effortful regulation by averaging the scores for attention shifting, attention focusing, and inhibitory control. In factor analyses, attentional control and inhibitory control have usually loaded together (e.g., Rothbart et al., 2001). Moreover, items related to attention shifting and focusing are considered to tap nearly the same construct (e.g., they are combined in the Early Adolescent Temperament Questionnaire, for example; Capaldi & Rothbart, 1992), and these scales have been significantly related in numerous U.S. samples (e.g., Eisenberg, Zhou et al., 2005) and have loaded on the same construct in confirmatory factor analyses in research with young children (Cumberland-Li, Eisenberg, & Reiser, 2004).

Reactive undercontrol was measured with the impulsivity subscale of the CBQ that consists of 13 items tapping the child's tendency to act without thinking (e.g., “Sometimes interrupts others when they are speaking”). One item from the teacher-reported impulsivity subscale was dropped (i.e., “When eager to go outside, sometimes rushes out without putting on the right clothes”) because it substantially reduced the alpha at T2; no items were removed from this scale based on experts' ratings of overlap with measures of adjustment ($\alpha s = .81$ and .88 for parents and teachers, respectively, at T1 and .79 and .84 for parents and teachers, respectively, at T2).

Children's Personality Resiliency—To measure children's personality resiliency, parents and teachers completed an adapted version of the Block Q-Sort measure (Block & Block, 1980). By using clinicians' ratings obtained from the Blocks, (Eisenberg et al., 1996) selected items rated as reflecting resiliency; then items that most clearly reflected social skills or overt emotional expressions (based on the consensus of three experts) were dropped. The resiliency Q-Sort was reduced to 24 items and then one of these items was dropped because it substantially lowered the alpha (see Eisenberg et al., 1996, for details).

Because many of the 23 remaining items still may have overlapped with other constructs, an even “purer” version of the resiliency scale was obtained. Five faculty and five graduate students with relevant expertise who did not know how the data were to be used rated the 23 resiliency items as to how much they reflected “pure” resiliency, defined as flexible, adaptable behavior. Instructions were to rate each item based on how well it tapped resiliency (regardless of valence of the item; 1 = *not at all descriptive of resiliency* to 9 = *most descriptive of resiliency*; see Cumberland et al., 2004). Only the seven items that obtained a mean score of ≤ 7 were retained (e.g., “Can bounce back or recover after a stressful or bad experience,” “Freezes up when things are stressful, or else keeps doing the same thing over and over again”; $\alpha s = .68$ and .81 for parents and teachers, respectively, at T1 and .66 and .80 for parents and teachers, respectively, at T2).

Children's Socially Appropriate Behavior and Adult-Rated Popularity—To assess children's socially appropriate behavior and adult-rated popularity, parents and teachers completed a seven-item scale from an adapted version of Harter's perceived competence scale

for children (Eisenberg et al., 1993; Eisenberg et al., 1995; Eisenberg, Valiente, Fabes, et al., 2003; Harter & Pike, 1984). Parents completed items on a 4-point scale. Teachers rated items by indicating which of two opposing statements most described the child and then indicated whether the statement was “very true” or “sort of true.” Four items measured children's socially appropriate behaviors (my/this child is usually well behaved); α s = .78 and .89 for parents and teachers, respectively, at T1 and .76 and .87 for parents and teachers, respectively, at T2. Three items measured adult-reported popularity (“this child finds it hard to make friends” versus “for this child, it is pretty easy to make friends”). Alphas were .83 and .76 for parents at T1 and T2, respectively, and .93 and .91 for teachers at T1 and T2, respectively. Although peers' ratings of popularity would have been an ideal measure, the children attended too many schools to obtain peer ratings. In addition, peers' reports of children's sociometric status have been significantly and moderately related to adults' reports of their status, at least in the preschool and school years (e.g., Eisenberg et al., 1993; Eisenberg, Guthrie, et al., 1997).

Children's Observed Persistence (Effortful Control)—Children's persistence was also observed with the use of a puzzle box task (Eisenberg et al., 1996). Children were shown a 24 in. $\times$ 12 in. $\times$ 14 in. box that contained a puzzle with geometric-shaped pieces and had a clear Plexiglas back so that the child's hand movements could be observed. A cloth covered the front of the box and had sleeves that the children slipped their arms through. This cloth could be lifted up so that the child could cheat by looking at the puzzle. The experimenter told the children to assemble the puzzle without looking at it and that if they finished the puzzle within 5 minutes (or 4 minutes at T2), they would receive an attractive prize. The experimenter left the room during the puzzle task. Inter-rater reliabilities for persistence (based on 111 observations at T1 and 79 at T2) were .99 and .96 at T1 at T2, respectively (Pearson correlations). Proportion scores were computed by dividing the amount of time the child worked on the puzzle by the number of seconds the child was alone with the task (and had not finished it). Thus, the observed persistence proportion score represented the time the child persisted on the challenging task rather than being off task or cheating.

Children's Problem Behaviors—At T1, mothers and fathers completed the CBCL and teachers completed the Teacher's Report Form (Achenbach, 1991a) to assess children's problem behaviors. Reporters indicated from 1 (*never*) to 3 (*often*) whether items were indicative of the child's behavior. Two broad scales, internalizing problems and externalizing problems, were used. Based on the experts' ratings, four items were dropped for parent-rated internalizing problems and five items were dropped for teacher-rated internalizing problems, with alphas of .84 and .87 for parents' and teachers' reports of internalizing problems (see Eisenberg, Spinrad, et al., 2004). For externalizing problems, two items were dropped for parents and three were dropped for teachers, with alphas of .90 and .95 for parent and teacher externalizing problems.

Missing Data

Our data set contained some missing values, and our modeling assumes that the missing values are missing at random. The missing at random assumption means that missingness may be related to observed values for the variables in the data set, but it is unrelated to the unobserved missing values. We imputed missing values by using the expectation maximization algorithm available in the SPSS missing value module under the assumption of multivariate normality. With the imputed values, we had a “complete” data set with which to estimate the model.

Results

Relations of Child Sex and Age to the Major Variables

Imputed means and standard deviations for the major variables are presented in Table 1. Correlations were computed to examine the relations of age to socially appropriate behavior and popularity (relations of age to the various modes of effortful control, impulsivity, and resiliency can be found in Eisenberg, Spinrad, et al., 2004). At T1 and T2, age was not correlated with socially appropriate behavior or popularity.

MANOVAs (for teachers and parents) were performed to assess sex differences in the adults' reports of effortful control and resiliency, as well as in the adults' reports of social competence. Findings for adults' reports of regulation/control and resiliency at T1 are presented in Eisenberg, Cumberland, et al. (2001) and Eisenberg, Spinrad, et al. (2004) and are not reported here. The multivariate tests for regulation/control and resiliency at T2 were at least marginally significant for both parents' and teachers' reports, $ps < .05$ and $.01$, for parents and teachers, respectively. Briefly, girls were higher than boys on T2 parent- and teacher-rated effortful control, $ps < .04$ and $.01$, Cohen's $d = .29$ and $.68$ for T2 parents and teachers, respectively, and were lower than boys on T2 parent- and teacher-rated impulsivity, $ps < .01$ Cohen's $d = -.38$ and $-.44$ for parents and teachers, respectively. In addition, the multivariate tests for social competence were significant for T1 parents' and teachers' reports, $ps < .01$, and significant for T2 adults' reports, $ps < .05$ and $.01$ for parents' and teachers' ratings, respectively. Univariate tests indicated that girls were higher on socially appropriate behavior than were boys, $ps < .01$, Cohen's $d = .40$ and $.68$, for T1 parents' and teachers' reports, and $ps < .02$ and $.01$, Cohen's $d = .36$ and $.73$ for T2 parents' and teachers' reports.

Correlation Analyses

Zero-order correlations of socially appropriate behavior and popularity with indices of effortful control, impulsivity, and resiliency using imputed data are presented in Table 2. In general, ratings of socially appropriate behavior were positively related to effortful control and resiliency and negatively related to impulsivity. Popularity was positively related to effortful control and resiliency but was usually not related to impulsivity. Of note, T1 effortful control consistently predicted T2 popularity and socially appropriate behavior, and T1 impulsivity was consistently negatively correlated with T2 socially appropriate behavior (but not popularity). T1 resiliency tended to be positively related to T2 positive social development, especially popularity.¹

Structural Equation Models

To determine whether effortful and reactive control offered differential prediction to children's resiliency and positive social functioning, we conducted a series of structural equation models. First, we computed a measurement model to determine whether effortful control and impulsivity were indeed distinct constructs. We then tested the equivalence of the loadings over time. In the next set of models, we tested the within-time relations and the equivalence of paths across time. Next, we examined the potential moderators of these within time relations (i.e., sex, age, and problem behavior risk). Finally, we computed a stringent test of mediation using Cole and Maxwell's (2003) suggestions for longitudinal mediation using SEM. These analyses tested mediation using two-wave longitudinal data while controlling for the initial levels of constructs over time. Mplus (Muthén & Muthén, 2002) was used to estimate the models.

¹Correlations among all variables are available upon request from Tracy L. Spinrad.

Measurement Models—We first tested a measurement model that included both T1 and T2 constructs. For effortful control, teacher- and parent-rated effortful control (the composite of attentional shifting, attention focusing, and inhibitory control) and persistence on the puzzle task were indicators. Teachers' and parents' ratings of impulsivity, resiliency, socially appropriate behavior, and popularity were the indicators of the other constructs. The model fit the data well, $\chi^2(121; n = 214) = 210.67, p < .01$; comparative fit index (CFI) = .97, root mean square error of approximation (RMSEA) = .06 (90% confidence interval [CI] = .05–.07), and all indicators loaded significantly on their respective constructs. We also examined the correlations among the latent constructs to determine whether effortful control was indeed distinct from impulsivity. Effortful control and impulsivity were negatively correlated, $r_s = -.73$ and $-.64$ for T1 and T2, respectively, indicating that these constructs were somewhat distinct. However, the correlations between effortful control and social competence were extremely high, $r_s = .92$ and $.93$ for T1 and T2, respectively, indicating that these may be redundant constructs. Thus, we chose to drop social competence from the models and to focus solely on predicting adult-rated popularity. Consequently, we conducted another measurement model with only four latent constructs at each age (effortful control, impulsivity, resiliency, and popularity). This model fit the data well, $\chi^2(80; N = 214) = 145.76, p < .01$; CFI = .96, RMSEA = .06 (CI = .05–.08), and all indicators significantly loaded on the constructs.

The Equivalence of Loadings Over Time—Next, because we were interested in comparing relations across time, we tested the factorial invariance of the model (to test whether the relations of the latent variables to the manifest variables were constant over time; Cole & Maxwell, 2003). In this test, we compared the measurement model described above (unconstrained model) to a model in which the T1 loadings of the various observed variables were constrained to be equal with their equivalent loadings on the T2 variables (constrained model). The comparison between the constrained and unconstrained model was not statistically significant, $\Delta\chi^2(5) = 3.65, p \geq .10$, indicating that the factor loadings were equal across waves. Thus, for all subsequent models, the loadings were set to be equal across time.

Within-Time Paths and the Equivalence of Paths Over Time—We computed two structural equation models, one in which we examined the relations among the constructs within time and a second to test the equivalence of the paths across time. In these models, we tested the relations of effortful control and impulsivity to resiliency and adult-rated popularity as well as concurrent mediation of the relations by resiliency (at both time points).

In the first model, to test the relations among the constructs within time, we included paths from effortful control and impulsivity to resiliency, and then from resiliency to popularity. We fully saturated the model by correlating all of the T1 latent constructs with all of the T2 latent constructs (their disturbances), allowing for 16 cross-time correlations. We also allowed latent variables of effortful control and impulsivity (or their disturbances) to correlate at each time. This model allowed us to test whether resiliency might mediate the relations of effortful control/impulsivity to positive social functioning within time point. Although concurrent models are relatively weak tests of mediation, such a model is useful for comparison with concurrent data in studies with related constructs.

Based on the modification indices, measurement errors of the study variables were allowed to covary within reporter (within time) and across time and were added to the initial models individually. However, errors for teacher reports were not allowed to covary across time (only within time) because teachers were not the same at both ages (Kenny & Kashy, 1992). Specifically, the errors of parental reports of effortful control, resiliency, popularity and child puzzle persistence were allowed to covary over time. Based on the modification indices, the errors of a number of parent-rated indicators were allowed to covary; these variances were between (a) effortful control at T1 impulsivity at T1 and T2 and popularity at T1, (b) resiliency

at T1 and impulsivity at T1, (c) popularity at T1 and resiliency at T1, and (d) effortful control at T2 and impulsivity at T1 and T2, resiliency at T1 and T2, and popularity at T1. In terms of teacher-rated indicators, only errors of teacher reports within time were allowed to covary because different teachers reported on the children at T1 and T2. These were between (a) effortful control at T1 and impulsivity and resiliency at T1, (b) resiliency at T1 and impulsivity at T1, (c) popularity at T1 and impulsivity and resiliency at T1, (d) effortful control at T2 and resiliency and popularity at T2, (e) resiliency at T2 and impulsivity at T2, and (f) popularity at T2 and impulsivity and resiliency at T2.

The model fit the data well, $\chi^2(92; N = 214) = 174.30, p < .01$, CFI = .96; RMSEA = .07 (CI = .05–.08); however, these results should be treated with caution because three standardized estimates (between effortful control and resiliency at both time points and between impulsivity and resiliency at T1) were ≥ 1 , undoubtedly due to high collinearity between effortful control and impulsivity (see Tables 3 and 4). We report these models for purposes of comparison with other studies testing the within-time relations, and these problems do not occur in models testing over time mediation (see below). In the model, there were significant loadings on the expected latent constructs (that were not preset to 1). At both T1 and T2, resiliency was positively predicted by both effortful control and impulsivity; popularity was positively predicted by resiliency. The constructs of impulsivity and effortful control were negatively correlated at both times. Impulsivity, effortful control, and resiliency all were at least marginally positively correlated over time (popularity was not significantly correlated over time). In terms of cross-time correlations, effortful control at T1 was significantly negatively correlated with impulsivity at T2, impulsivity at T1 was negatively correlated with effortful control at T2, resiliency at T1 was negatively correlated with effortful control at T2 and marginally positively correlated with popularity at T2, and popularity at T1 was positively correlated with effortful control at T2 (see Table 4).

Mediated effects were calculated using the procedures outlined by MacKinnon (see MacKinnon, 1994; MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) and using normal *z*s-score significance levels. Resiliency significantly mediated the relations between effortful control and popularity, as well as between impulsivity and popularity at T1, *z*s = 3.54 and 3.44, *ps* < .01, and at T2, *z*s = 3.74 and 3.61, *ps* < .01.

In the second model, we compared the relations across the two time points by constraining the paths with their equivalent path over time and individually testing the equivalence of each path using nested chi-square analyses. Findings showed that all of the paths were comparable across time.

Moderation by Sex, Age, or Problem Behavior—We computed Box's *M*s (a test for the equality of covariances) to initially test for possible differences in the patterns of relations. Median splits were conducted on age (median = 73 months). Box's *M* indicated that neither sex nor age moderated the relations at either time.

Box's *M*s were also computed to test for differences in the patterns of covariation for children higher and lower in internalizing or externalizing problems. Because externalizing problems were correlated among all three reporters, *r*s(212) = .35 to .66, *ps* < .01, we computed a composite of children's externalizing problems and created a group of children who were high and low in externalizing problems. In addition, we created a composite of internalizing problems based on mothers' and fathers' reports, *r*s(212) = .43 [teachers' report was only weakly related to mothers' and fathers' reports, *r*s(212) = .18 and .13, *ps* < .01 and .08]. The Box's *M*s indicated that internalizing and externalizing problems might moderate the relations at T2, Box's *M*s = 75.74 and 78.52, *F*s(45, 147649; 45, 147649) = 1.61 and 1.67, *ps* < .01 for internalizing and externalizing problems, respectively. We did not test moderation using

product variables in SEM because such analyses are recommended only with very large samples (Jöreskog, 1998); thus, we tested moderation using multigroup models in SEM. In these models, we first constructed a fully constrained model in which the concurrent paths were constrained to be equal for children low and high in internalizing or externalizing problems. Neither externalizing problems nor internalizing problems was found to moderate the relations in multigroup SEM.

Test of Mediation Over Time—Although mediation was found within time, these tests do not account for stability in the constructs over time. Thus, a more stringent test of mediation using two time points proposed by Cole and Maxwell (2003) was used to test whether effortful control and impulsivity at T1 predicted children's resiliency 2 years later and to test whether resiliency at T1 predicted children's popularity over time, above and beyond the autoregressive effects. This test is considered an optimal test of mediation with only two time points, although three points in time are preferable to two points (Cole & Maxwell, 2003). Included in the longitudinal model were (a) the autoregressive paths (i.e., paths predicting a latent construct from its prior level), (b) the cross-time paths from T1 effortful control and impulsivity to resiliency at T2, from T1 resiliency to popularity at T2, and (c) correlations among all of the latent constructs (or their disturbances) within T1 and within T2. We first correlated all of the errors from all of the parent-reported measures across time and also correlated errors for child puzzle persistence at the two times (so as not to lead to inflated stabilities). Modification indices suggested adding two paths: one from impulsivity at T1 to popularity at T2 and a second from popularity at T1 to impulsivity at T2. We also allowed the errors of a number of parent-rated indicators to covary (most were the same as in the previous model); these variances were between (a) effortful control at T1 and impulsivity at T1 and T2 and popularity at T1, (b) resiliency at T1 and impulsivity at T1, (c) popularity at T1 and resiliency at T1, (d) effortful control at T2 and impulsivity at T1 and T2, popularity at T1 and resiliency at T2, and (e) resiliency at T2 and impulsivity at T1. In terms of teacher-rated indicators, only errors of teacher-reports within time were allowed to covary. These variances were between (a) effortful control at T1 and resiliency, impulsivity, and popularity at T1, (b) popularity at T1 and resiliency at T1, (c) effortful control at T2 and resiliency and popularity at T2, and (d) popularity at T2 and resiliency at T2.

This model fit the data well, $\chi^2(97, N = 214) = 187.49, p < .01$, CFI = .95; RMSEA = .07 (CI = .05–.08); see Table 5. As can be seen in Figure 1, in this model, T2 resiliency was predicted by T1 effortful control (but not by impulsivity), and T2 popularity was predicted by T1 resiliency and low T1 impulsivity. T2 impulsivity was positively predicted by T1 popularity after controlling for the initial level of the constructs. All of the autoregressive paths except resiliency were significant and positive (resiliency was not stable over time). At T1, the construct of impulsivity was positively correlated with resiliency at T1. T1 popularity was positively correlated with resiliency at T1 and effortful control at T1. Effortful control and impulsivity were negatively correlated within T1 (but not within T2).

We also attempted to examine cross-directional paths in the model by computing a model that tested whether popularity at T1 predicted effortful control, impulsivity, and resiliency at T2, and resiliency at T1 predicted effortful control and impulsivity at T2 (the model would not converge when all paths were included going in both directions). The fit of this model was also good; $\chi^2(94, N = 214) = 204.64, p < .01$, CFI = .94; RMSEA = .07 (CI = .06–.09). The results of this model showed a significant positive path from popularity to impulsivity (as was seen in the prior model) and also a significant positive path from popularity at T1 to resiliency at T2. To determine whether the path from popularity at T1 to resiliency at T2 might be found in the previous longitudinal mediation model, we added the path; however, it was not significant in that model. Thus, it appears that the most consistent cross-directional path was from popularity at T1 to impulsivity at T2.

Discussion

Researchers have acknowledged the importance of children's early positive social functioning for children's later outcomes, but relatively little work has focused on the differential prediction of young children's emotion-related regulation/control processes and resiliency to adult-rated popularity, and no one has tested these relations over time using the strongest test of longitudinal mediation. The results of this study indicate that, at least in a sample of children including some at risk for behavior problems, resiliency was predicted by earlier effortful control, and adult-rated popularity was predicted by children's resiliency, even after controlling for the initial level of the constructs. Although only two waves of data were available for this study, these results point to the possibility that resiliency mediates the relations of effortful control to children's popularity over time. These findings also offer support for the notion that children's effortful and reactive control should be differentiated. Moreover, in the strongest test of mediation, effortful control provided prediction to resiliency, which in turn, predicted children's popularity.

One important finding from this study was that effortful and reactive control could be empirically distinguished and differentially predicted children's resiliency/popularity. As expected, these constructs were negatively correlated; but the correlation is not so large as to indicate that these two constructs were the same construct. Indeed, in our longitudinal models, the finding that effortful control (but not impulsivity) predicted children's later resiliency also provides evidence of discriminant validity. Moreover, the unique relations of these constructs to children's adjustment has been found in other work (see Eisenberg, Spinrad, et al., 2004).

In terms of the patterns of relations, we found in the longitudinal mediation model (the strongest test of mediation using longitudinal data in SEM) that resilient children were better at effortfully modulating their behavior and attention 2 years earlier. There also was a relation between resiliency and adult-rated popularity over the 2 years. Children who are flexible and who can bounce back from stress are likely to be accepted by peers. Indeed, a similar pattern of findings was also found in a recent study by Eisenberg, Valiente, Fabes, et al. (2003) in which resiliency predicted acceptance by peers in a normative school sample.

We did not find relations of impulsivity to resiliency in the longitudinal mediation model. The fact that impulsivity did not predict resiliency over time does not mean that impulsivity is not an important predictor. Inspection of the within-time paths indicates that resiliency mediated the relations between both effortful control and impulsivity to popularity. Thus, bouncing back from stress may require at least some degree of spontaneity, lack of rigidity, and/or motivation to approach new contexts, people, and objects (Eisenberg, Spinrad, & Morris, 2002). Moreover, in the longitudinal model, there was a direct negative path from impulsivity at T1 to popularity at T2. Thus, children who are undercontrolled, although sometimes resilient, may be viewed by their peers as inappropriate and immature (and in turn, they may be relatively unliked). We also found that popularity at T1 predicted higher levels of impulsivity at T2. In this case, it is possible that children who are seen as popular may learn to display increased levels of spontaneity and flexibility and may learn to increasingly approach new situations. On the basis of correlations, it appears that this finding may be due only to parent-reported popularity; thus, some degree of social desirability bias may have played a role in these findings. Moreover, because this model controls for level of effortful control when predicting impulsivity, the relations between popularity at T1 and impulsivity at T2 are controlling for low effortful control and thus may be tapping relatively pure spontaneity apart from the lower effortful control associated with impulsivity. In addition, this finding supports examining bidirectional relations among constructs of temperament/control and social outcomes.

These findings should be compared to findings by Eisenberg, Valiente, Fabes, et al. (2003), in which relations from reactive control (but not effortful control) to resiliency and social functioning were obtained across time, despite controlling for temporal stability in the variables over time. The present findings differ from those of Eisenberg, Valiente, Fabes, et al. (2003) for at least three reasons. First, the measure of reactive control differed between the two studies. In the present study, impulsivity, as opposed to ego control, was measured. Impulsivity may have a strong biological or temperamental basis, and, thus, we expected (and found) relatively high stability in this construct over time. Moreover, the construct of ego control (including items such as, "is planful, thinks ahead") may be somewhat more overlapping with effortful control than is impulsivity. Second, in the present study, we included some children with behavior problems. Children who show signs of internalizing and externalizing (or both) problems at an early age may exhibit different stability in effortful control and/or reactive control over time, which can affect findings in longitudinal models. Finally, in the prior study, the more rigorous test of mediation was not used. Although stability of the constructs was controlled in the prior study, only the within-time relations were tested (not the across-time relations).

In the concurrent models in which relations within time were constrained to be equal across time, we found that the relations among effortful control, impulsivity, resiliency, and popularity were similar within time. The concurrent models also demonstrate that the pattern of relations within time were consistent with the possibility of mediation of the effects of regulation/control on adult-rated popularity. However, concurrent data can only demonstrate possible patterns of relations and cannot provide a compelling test of causal relations. In comparing the cross-sectional and longitudinal analyses, we found that impulsivity predicted resiliency only in the cross-sectional analysis; this finding suggests that once initial levels of the constructs are controlled, effortful control (but not impulsivity) accounts for change in resiliency. As children's effortful control abilities increase with age, it is possible that the overt effects of impulsivity may decrease. That is, children who gain more effortful control skills may learn to manage some of their reactive tendencies over time. Another important consideration is that in the longitudinal model, the T2 correlations among the constructs were nonsignificant. This finding indicates that the relations at T2 (e.g., between effortful control and resiliency) are accounted for by correlations at T1 and the stability of the variables across time. Thus, it is possible that the relations between regulation/control and children's popularity may be set by a fairly young age.

Of interest, we found high correlations between the constructs of effortful control and social competence, suggesting that these constructs may be redundant. The zero-order correlations among the constructs also ranged from .39 to .80. It is not surprising that these constructs are correlated because children who are seen as well regulated are likely to be well behaved, as has been found in a number of other studies (Eisenberg, Gershoff, et al. 2001; Eisenberg, Valiente, Fabes, et al., 2003). Perhaps adults have difficulty differentiating between these two measures, and future researchers should rely on other reports (such as peers') of social competence.

Among the strengths of this study are the use of SEM, the use of multiple measures and reporters, and the longitudinal design. However, we did not include a large minority population and a large percentage of very low socioeconomic status families; thus, caution should be taken in generalizing these findings to children living in poverty or minority children. In addition, this study focused on the temperamental/personality correlates of positive social behaviors; however, there is evidence that children's social contexts (i.e., parents, peers, and schools) also play an important role in the development of effortful control and social competence. Another issue in this study was that we relied on adults' reports of popularity. Because peer-rated data were not available in this study, it would be useful to examine the relations of effortful control

and resiliency to peer-rated social status in future work. Finally, Cole and Maxwell (2003) suggested that the optimal test of mediation involves at least three time points. Although our test of mediation is considered optimal with only two waves of data, our mediational analyses should be considered as producing results that are merely consistent with the hypothesis that resiliency mediates the relations of effortful control and impulsivity to quality of social functioning.

Despite its limitations, this study establishes the importance of differentiating effortful and reactive undercontrol (i.e., impulsivity) when examining children's popularity. In addition, the findings suggest that personality resiliency may mediate the relations of effortful control to popularity over time and that effortful control and impulsivity may relate to popularity over time through their stability across time. Although we obtained some (albeit not strong) evidence of across-time relations, our power may have been rather weak for testing such relations given the high stability of most of the constructs over time. Finally, the findings in this study are consistent with the conclusion that children's temperamental characteristics are important for predicting resiliency and that temperament and personality play important roles in understanding children's positive social functioning.

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Figure 1. Longitudinal mediation model with standardized estimates for significant paths. Solid lines represent significant paths/correlations; dashed lines represent hypothesized but nonsignificant paths. Double-headed arrows indicate correlations between latent variables, EC = effortful control; IMP = impulsivity; RES = resiliency; POP = popularity. * $p < .05$. ** $p < .01$.

Table 1

Imputed Means and Standard Deviations of Study Variables by Child's Sex

Variable	Total		Girls		Boys	
	M	SD	M	SD	M	SD
Parent/mother ratings T1						
Effortful regulation	4.40	0.74	4.59	0.59	4.25	0.82
Impulsivity	4.54	0.83	4.44	0.87	4.63	0.80
Resiliency	6.14	1.24	6.09	1.25	6.17	1.24
Socially appropriate behavior	3.09	0.66	3.23	0.56	2.98	0.71
Popularity	3.29	0.68	3.30	0.65	3.28	0.71
Internalizing problems	9.71	6.58	9.28	5.67	10.06	7.24
Externalizing problems	15.38	9.07	13.61	7.75	16.81	9.81
Teacher ratings T1						
Effortful regulation	4.87	0.99	5.14	0.92	4.65	0.99
Impulsivity	4.13	1.14	3.90	1.02	4.32	1.20
Resiliency	6.54	1.32	6.56	1.29	6.52	1.34
Socially appropriate behavior	3.17	0.78	3.44	0.61	2.95	0.83
Popularity	3.15	0.76	3.20	0.78	3.12	0.73
Internalizing problems	4.37	4.93	4.41	5.44	4.34	4.51
Externalizing problems	8.51	10.12	5.82	8.17	10.69	11.03
Observed persistence	0.55	0.30	0.62	0.28	0.50	0.31
Parent/mother ratings T2						
Effortful regulation	4.50	0.74	4.61	0.65	4.40	0.79
Impulsivity	4.46	0.81	4.30	0.84	4.60	0.75
Resiliency	6.13	1.20	6.18	1.19	6.10	1.21
Socially appropriate behavior	3.15	0.63	3.27	0.50	3.05	0.71
Popularity	3.24	0.66	3.30	0.61	3.19	0.69
Teacher ratings T2						
Effortful regulation	4.77	1.01	5.13	0.90	4.48	1.00
Impulsivity	4.16	0.99	3.93	1.00	4.35	0.95
Resiliency	6.48	1.39	6.68	1.33	6.32	1.41
Socially appropriate behavior	3.13	0.76	3.42	0.63	2.90	0.78
Popularity	3.04	0.80	3.11	0.78	2.97	0.81
Observed persistence	0.67	0.28	0.71	0.27	0.64	0.28

Note. T1 = Time 1; T2 = Time 2.

Correlations Between Adults' Reports of Socially Appropriate Behavior and Popularity and Adults' Reports of Regulation, Impulsivity, and Resiliency and Observed Persistence at T1 and T2

Variable	T1				T2			
	Parent report		Teacher report		Parent report		Teacher report	
	Social app	Popularity	Social app	Popularity	Social app	Popularity	Social app	Popularity
T1 variables								
Parent effortful reg	.72	.43	.47	.28	.63	.39	.43	.19
Parent impulsivity	-.38	.09	-.34	-.03	-.38	-.01	-.38	-.13
Parent resiliency	.24	.37	.08	.05	.19	.28	.03	-.01
Teacher effortful reg	.41	.23	.75	.40	.41	.32	.58	.29
Teacher impulsivity	-.31	.04	-.58	.03	-.31	-.09	-.44	-.09
Teacher resiliency	.07	.16	.23	.43	.05	.19	.14	.25
Persistence	.25	.15	.22	.14	.25	.12	.27	.17
T2 variables								
Parent effortful reg	.55	.34	.41	.25	.72	.36	.39	.19
Parent impulsivity	-.30	.17	-.35	.06	-.42	.05	-.28	.02
Parent resiliency	.29	.31	.19	.19	.35	.34	.13	.10
Teacher effortful reg	.46	.14	.51	.27	.51	.28	.80	.48
Teacher impulsivity	-.23	.19	-.38	-.04	-.24	.04	-.40	.07
Teacher resiliency	.18	.13	.28	.31	.24	.26	.54	.52
Persistence	.13	.03	.24	.17	.21	.07	.29	.25

Note. T1 = Time 1; T2 = Time 2. Social app = socially appropriate behavior; effortful reg = effortful regulation composite. $rs > |.12|, p < .10$; $rs > |.14|, p < .05$; $rs > |.18|, p < .01$.

Table 3
Estimated Parameters for Observed Variables of Concurrent Mediation Model

Variable	Unstandardized loading	SE	Standardized loading T1/T2
Effortful control			
Parent effortful control	1.00	0.00	0.68/0.64
Teacher effortful control	1.52**	0.13	0.79/0.73
Persistence	0.19**	0.04	0.32/0.32
Impulsivity			
Parent impulsivity	0.70**	0.06	0.68/0.68
Teacher impulsivity	1.00	0.00	0.72/0.80
Resiliency			
Parent resiliency	0.85**	0.14	0.35/0.43
Teacher resiliency	1.00	0.00	0.38/0.44
Popularity			
Parent popularity	1.00	0.00	0.74/.72
Teacher popularity	0.96**	0.11	0.64/0.55

Note. Loadings were constrained to be equal across time. T1 = Time 1; T2 = Time 2.

**
 $p < .01$.

Table 4
Parameter Estimates for Concurrent Mediation

Variable	Unstandardized estimate	SE	Standardized estimate
Time 1 Paths			
EC → Resiliency	1.42**	0.27	1.45
Impulsivity → Resiliency	0.67**	0.14	1.10
Resiliency → Popularity	0.77**	0.16	0.77
Time 2 Paths			
EC → Resiliency	1.48**	0.27	1.15
Impulsivity → Resiliency	0.62**	0.12	0.81
Resiliency → Popularity	0.73**	0.14	0.95
Cross-time correlations Time 1 × Time 2			
EC × EC	0.23**	0.04	0.96
EC × Impulsivity	-0.28**	0.05	-0.73
EC × Resiliency	-0.08**	0.02	-0.34
EC × Popularity	0.06**	0.02	0.26
Impulsivity × EC	-0.25**	0.05	-0.60
Impulsivity × Impulsivity	0.67**	0.09	1.02
Impulsivity × Resiliency	0.05	0.04	0.13
Impulsivity × Popularity	-0.03	0.04	-0.06
Resiliency × EC	0.04	0.03	0.12
Resiliency × Impulsivity	-0.03	0.04	-0.05
Resiliency × Resiliency	0.08 [†]	0.05	0.25
Resiliency × Popularity	-0.04	0.04	-0.13
Popularity × EC	-0.02	0.02	-0.09
Popularity × Impulsivity	-0.04	0.03	-0.09
Popularity × Resiliency	0.07 [†]	0.04	0.27
Popularity × Popularity	0.01	0.04	0.02

Note. EC = effortful control.

[†]
 $p < .10$.

**
 $p < .01$.

Table 5
Estimated Parameters for Observed Variables for Longitudinal Mediation Model as Seen in Figure 1

Variable	Unstandardized loading	SE	Standardized loading T1/T2
Effortful control			
Parent effortful control	1.00	0.00	0.67/0.64
Teacher effortful control	1.47**	0.13	0.72/0.72
Persistence	0.17**	0.04	0.29/0.30
Impulsivity			
Parent impulsivity	0.69**	0.06	0.69/0.68
Teacher impulsivity	1.00	0.00	0.75/0.81
Resiliency			
Parent resiliency	0.74**	0.14	0.37/0.44
Teacher resiliency	1.00	0.00	0.48/0.49
Popularity			
Parent popularity	1.00	0.00	0.76/0.73
Teacher popularity	0.92**	0.11	0.62/0.53

Note. Loadings were constrained to be equal across time. T1 = Time 1; T2 = Time 2.

**
 $p < .01$.