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Relations Among Mothers' Expressivity, Children's Effortful Control, and Their Problem Behaviors: A Four-Year Longitudinal Study

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Abstract

Longitudinal relations between mothers' expressivity, children's effortful control, and their problem behaviors were examined when children ($N = 181$) were 6.5–10 years old (T2) and again 2 (T3) and 4 (T4) years later. Mothers reported on their expression of positive and negative dominant emotion. Mothers and teachers reported on children's effortful control and externalizing and internalizing problem behaviors. In structural equation models, variables exhibited consistency over time. Further, the relation between mothers' expressivity (positive minus negative dominant emotion) at T2 and children's externalizing problems at T4 was mediated by T3 effortful control. The same process of mediation was significant for teacher- but not mother-reported internalizing problems. The results provide one explanation for how emotion-related socializing behaviors influence children's problem behaviors.

Keywords

mothers' expressivity; children's effortful control; problem behaviors

Over the past two decades, developmental and family theorists have argued that children's ability to regulate their emotions is an important contributor to their socioemotional development and that parenting plays a role in children's emotion regulation (Bornstein, 2002; Rothbart & Bates, 1998). However, this research is at an early stage, and many gaps remain. For example, although Rothbart and Bates (1998) discussed the importance of examining mediational processes involved among indices of parenting, children's regulation,

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and social functioning, doing so is not common place, and the longitudinal relations between these variables rarely have been examined. The purpose of the present study was to use three assessments (spanning 4 years) to extend concurrent findings of mediation (Eisenberg, Gershoff, et al., 2001) and to apply the longitudinal design Cole and Maxwell (2003) recently recommended to test whether children's effortful control (EC), a component of emotion-related regulation, mediates the longitudinal relations between mothers' expressivity in the family and children's externalizing and internalizing problem behaviors. A three-wave longitudinal study is better suited to test the hypothesized process of mediation than cross-sectional data, partly because it takes time for parenting processes to influence children's EC (processes involved in regulation) and problem behaviors. In this article, we examine the aforementioned relations in a sample of children (ages 6.5 to just turning 10 at the first assessment reported in this article) experiencing a range of problem behaviors.

Prediction of Children's Externalizing and Internalizing Problem Behaviors

It is clear that there is a genetic influence on children's problem behaviors (Coie & Dodge, 1998), but there is also evidence of an environmental effect. For example, in a twin study in which genetic effects were controlled (by comparing monozygotic twins), Caspi et al. (2004) found that the twin exposed to more maternal negativity and less warmth was prone to more behavior problems. Moreover, the large body of literature demonstrating relations between measures of parenting and children's problem behaviors, empathy, and social competence (see Coie & Dodge, 1998) suggests that parenting plays a role in the development of children's social functioning. Although there may be some direct relations between measures of parenting and children's problem behaviors, most are modest in magnitude (see Bornstein, 2002), and it is likely that a more precise understanding of children's problem behaviors can be achieved by considering mediating variables.

The premise that children's regulatory abilities mediate the relation between parenting and children's problem behaviors is consistent with the heuristic model advanced by Eisenberg, Spinrad, and Cumberland (1998). Eisenberg et al. hypothesized that there were at least four emotion-related socializing behaviors (ERSBs) that contribute to children's problem behaviors: parents' expression of emotion, discussion of emotion, reactions to children's emotions, and selection/modification of the child's situation. ERSBs are predicted to inhibit children's problem behaviors when they encourage learning and regulation and to contribute to problem behaviors when they are overarousing or distressing. Of importance, the relations between ERSBs and children's problem behaviors are hypothesized to be mediated by aspects of children's temperament/personality, including their regulatory abilities.

Relations Between Mothers' Expressivity and Children's EC

In this study, we focus on one ERSB, mothers' expressivity in the family, and children's EC, a component of temperament that seems likely to mediate the relations between mothers' expressivity and children's problem behaviors. Parental expressivity is defined as “the dominant style of exhibiting nonverbal and verbal expressions within a family” (Halberstadt, Cassidy, Stifter, Parke, & Fox, 1995, p. 95) and is considered a mechanism for socialization (see Eisenberg et al., 1998). For example, in Parke and Buriel's (2006) model of socialization, parents affect children not only through direct instruction and through providing opportunities but also through the nature of the interactions, including expressivity in the family. Most investigators examining the relations of mothers' expressivity to children's problem behaviors have considered positive expressivity (e.g., praising someone or demonstrating admiration) and negative dominant expressivity (e.g., displays of anger or hostility). Sometimes investigators have included measures of negative submissive expressions (e.g., sulking, crying, or expressing sorrow); however, there are fewer reasons to expect relations of such expressions

with children's EC and problem behaviors and findings in this regard are inconsistent (Eisenberg et al., 1998). Therefore, we focused on positive and negative dominant expressivity.

The proposed mediator, children's EC, has been defined by Rothbart and Bates (1998) as “the ability to inhibit a dominant response to perform a subdominant response” (p. 137). EC involves the effort or will to control or modulate dispositional reactivity. Children who are high in EC are believed to be able to voluntarily control their attention and behavior as needed. Consistent with definitions of temperament, EC is evident in the first years of life, appears to have a biological basis, and is relatively stable across situations and development (Goldsmith, Lemery, Buss, & Campos, 1999; Rothbart & Bates, 1998). EC is based on executive attention capacities and frequently is assessed with measures of attentional skills, persistence, and the ability to voluntarily inhibit or activate behavior (e.g., Kochanska, Murray, & Harlan, 2000; Rothbart, Ahadi, Hersey, & Fisher, 2001; Rothbart & Bates, 1998). The processes that EC includes (attentional and behavior control and persistence) are believed to be fundamental to children's emotion-related regulation and to modulate emotional reactivity and emotional behaviors such as aggression (Derryberry & Rothbart, 1997; Rothbart & Bates, 1998).

Although children's EC appears to have a heritable component (Goldsmith et al., 1999; Rothbart & Bates, 1998), there is also evidence of environmental influences on EC. For example, in a twin study, Goldsmith, Buss, and Lemery (1997) found that the environment contributed to the majority of the variance in 3- to 8-year-olds' parent-reported EC. This finding is consistent with those of Campos, Campos, and Barrett's (1989) and Thompson (1994) and with others' views that regulatory abilities are embedded in a network of social relationships and can be learned from others (Gottman, Katz, & Hooven, 1997).

There are a variety of reasons to expect mothers' expressivity to influence children's EC. First, children may be more motivated to process their parents' messages, internalize parents' requests for desirable behavior, and control their emotions and behaviors when their parents are positive and supportive rather than negative, particularly if the parents' negativity reflects anger and hostility (Dix, 1991; Grusec & Goodnow, 1994). Second, parents who express relatively high levels of positive rather than negative emotion in view of children typically model constructive ways to manage stress and relationships (Halberstadt, Crisp, & Eaton, 1999). In contrast, parents who expose their children to high levels of negative emotion model dysregulation and maladaptive interactions. Third, nonsupportive negative behavior by parents is associated with children's emotional reactivity and dysregulation (Carson & Parke, 1996; Eisenberg et al., 1991), which Hoffman (2000) has argued can disrupt the acquisition of socially appropriate behavior by undermining learning in evocative contexts. Moreover, high levels of arousal probably interfere with one's ability to focus and shift attention and perform higher order cognitive processes (Blair, 2002; Raver, 1996).

A fourth explanation is rooted in attachment theory. From this perspective, children who experience high levels of positive emotion and support from their parents are likely to develop a secure attachment and a parent-child relationship that promotes EC. This type of relationship is hypothesized to contribute to a working model that fosters adaptive interactions and social behavior (Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000; Cummings & Davies, 1996), as well as to constructive modes of self-regulation (especially emotion regulation; Cassidy, 1994). Consistent with this argument, researchers have found that securely attached children have higher levels of emotion understanding and experience less negative emotion than less securely attached peers (Kochanska, 2001; Laible & Thompson, 1998). There is also some longitudinal evidence linking attachment to later conduct problems (Coie & Dodge, 1998).

A few investigators have provided initial support for the premise that mothers' expressivity (positive or negative) is related to their children's EC (or, more broadly, regulation). For example, Garner (1995) found that toddlers' self-soothing behaviors were positively related to mothers' reported expression of positive emotion and inversely related to their negative expressions. Consistent with these findings, Gottman et al. (1997) found that parents who were supportive of emotion expression and high in emotion coaching were likely to have well-regulated children. In a longitudinal study (Brody & Ge, 2001), parents who were high in nurturance and support had children high in teacher-rated regulation. In a cross-sectional study, Eisenberg, Gershoff, et al. (2001) found that children's reported and observed EC was positively related to parents' reported and observed positive expressivity (the reverse pattern was found for negative expressivity).

A large body of empirical data suggests that socializers' behaviors and beliefs are related to children's problem behaviors (Bornstein, 2002). However, like others, we have argued that it is useful to consider children's EC as a mediator of the relation between measures of ERSBs and children's problem behaviors. Thus, one would expect EC to predict externalizing and internalizing problem behaviors, because these problems often reflect or involve deficiencies in controlling emotion. It is not surprising that there are concurrent and longitudinal negative relations between children's EC (including observed measures of persistence) and their externalizing problems and sometimes internalizing problems (Brody & Ge, 2001; Eisenberg, Cumberland, et al., 2001; Eisenberg, Gershoff, et al., 2001; Kochanska & Knaack, 2003; National Institute of Child Health and Development (NICHD) Early Child Care Research Network, 2003; see Rothbart & Bates, 1998 for a review). Relations between children's EC and internalizing problems are less consistent than analogous relations for externalizing problems and may become weaker with age (Eisenberg et al., 2005; Lengua, West, & Sandler, 1998; Zahn-Waxler, Schmitz, Fulker, Robinson, & Emde, 1996). In addition, there is evidence that EC predicts problem behaviors even when controlling for children's negative emotionality (Eisenberg et al., 1996; Lengua & Long, 2002).

There are few reports of children's regulatory abilities mediating relations between ERSBs and measures of children's problem behaviors (or, more broadly, social functioning), but most data are cross-sectional. For example, in a concurrent study Eisenberg, Gershoff, et al. (2001) provided some support for the premise that children's EC mediates the relations between parents' ERSBs and children's problems behaviors and social competence. Although not tapping an ERSB per se, in a cross-sectional study involving 1,000 children, the relation between the quality of the home environment (e.g., the average of parents' sensitivity, cognitive stimulation, and quality of resources available to children) and children's social competence (and externalizing behaviors) was mediated by impulsivity but not EC (NICHD Early Child Care Research Network, 2003). In one of the few longitudinal studies, Eisenberg et al. (2003) found a similar pattern of cross-sectional findings, but in two-wave longitudinal analyses they found limited evidence of mediation at T2, while controlling for the influences at T1. In a longitudinal study involving three assessments (although all constructs were not measured at each time), Brody and Ge (2001) found some evidence for the role of children's regulation (which probably tapped constructs other than just EC) as a mediator between parents' nurturance/support versus negativity and a latent variable indicated by hostility, self-esteem, and depression.

In the present study, we estimate separate models for externalizing and internalizing problems because some data suggest that the strength of the relation between EC and these variables is different (Eisenberg, Cumberland, et al., 2001). More recently, Brody, Kim, Murry, and Brown (2003) found that the relations between involved parenting at Wave 3 and social and cognitive competence at Wave 4 were mediated by self-regulation at Wave 3. Brody et al.'s study is noteworthy in its four-wave longitudinal design and in its examining of indirect effects, but its

generalizability is limited because the sample comprised only African Americans from single-mother-headed families. In addition, Brody et al. predicted self-regulation from a concurrent measure of parenting (and did not control for prior levels of self-regulation). A goal of this study is to make a stronger case for mediation by predicting EC from prior levels of mothers' expressivity while controlling for early levels of EC.

This study further extends the literature by testing for the presence of reciprocal relations between mothers' expressivity and children's EC. Although scholars have posited that parenting might influence children's EC, which would then influence parenting, data on this topic are scant. In one study, Eisenberg et al. (1999) found that 6- to 8-year-old children's regulation predicted their mothers' punitive responses 2 years later, which in turn predicted children's regulation when they were 10-12 years old. The Eisenberg et al. study suggested that reciprocal relations might be present; however, it is not clear if such relations exist for mothers' expressivity. Although one may argue that such relations should exist based on the aforementioned study, it could also be predicted that mothers' expressivity, which might reflect a more stable aspect of parenting than specific reactions to children's behavior, would be less likely to be influenced by children's EC.

The present study complements and also extends the work of Brody et al. (2003) by examining bidirectional processes, by using indices of problem behaviors, and by examining the mediational process as children progress into early adolescence (participants in Brody et al.'s studies were in early adolescence when they began their participation, and their outcomes were measures of academic and social competence). Examining the hypothesized relations across the transition to adolescence is important, given the different social and biological changes that occur during early adolescence. For example, the physical and psychological changes are likely to be associated with the experience of novel types of reactivity, and these changing systems seem to contribute to EC (Spear, 2000). Some of these changes are associated with increases in negative emotion and moodiness that are likely to place more demands on adolescents' regulatory abilities (Brooks-Gunn, Graber, & Paikoff, 1994; Buchanan, Eccles, & Becker, 1992; Larson & Asmussen, 1991; Larson, Csikszentmihalyi, & Graef, 1980; Larson, Giovanni, Richards, & Wilson, 2002). Finally, compared with work with younger children, there is less work on the relations between adolescents' EC and problem behavior and social competence, which is surprising given the rise in affective and behavioral disorders that occur during this developmental period (Farrington, 2004).

The Present Study

This study builds on the aforementioned concurrent and limited longitudinal findings by including three assessments and a more sophisticated design in which the longitudinal relations between mothers' expressivity, children's EC, and problem behaviors could be tested. In an effort to extend the current literature, we hypothesized that (a) mothers' expressivity, children's EC, and their problem behaviors would be consistent over 4 years and (b) that children's T3 EC would mediate the relation between T2 mothers' expressivity and T4 children's problem behaviors. We were less certain of whether T3 expressivity would predict T4 EC because EC becomes increasingly stable as children age (Posner & Rothbart, 1998), and the role of other socializers (especially peers) is likely to significantly increase as children age. We were not sure whether children's EC would predict mothers' expressivity across time or whether children's problem behaviors would predict mothers' expressivity. Although there is some limited evidence that children's regulation predicts later indices of mothers' reactions to children's emotions (Eisenberg et al., 1999), not all findings are consistent. Thus, after testing the hypothesized models, we estimated several alternative models, including a model in which we included paths from children's problem behaviors to mothers' expressivity.

Finally, we examined the role of children's sex, socioeconomic status (SES), and age as moderators of the hypothesized model. Although the relations of parents' expressivity to measures of children's social and emotional competence sometimes vary by the sex of the child, findings are not very consistent. Because moderation by sex was not present at the earlier assessments, we did not expect sex to moderate the models. Based, in part, on Smith and colleagues' (Smith, 2001; Smith & Walden, 2001) findings that the relations among measures of socialization, regulation, and competence in minority and lower SES samples are similar to those reported for higher SES families (also see Raver, 2002) and because we have not found SES to moderate similar models (Eisenberg, Gershoff, et al., 2001; Eisenberg et al., 2003), moderation by SES was not expected. Finally, although there are mean level changes in EC and problem behaviors as children age, we did not expect the interrelations to vary across age. Nonetheless, although we did not expect moderation, we tested whether sex, SES, and age moderated the hypothesized mediated relations.

Method

Participants

Children and their parents were involved in a 6-year longitudinal study; this analysis includes three assessments, spaced 2 years apart (Eisenberg, Cumberland, et al., 2001; Eisenberg, Gershoff, et al., 2001; Eisenberg et al., 2003). Participants were recruited through schools, newspaper ads, and flyers that were placed at after-school programs and preschools. To ensure that there was a range of children experiencing problem behaviors, the Child Behavior Checklist (CBCL) was administered to parents interested in the study (Achenbach, 1991). Because children who score >60 on this measure generally are at risk for a given type of problem behavior, all children with T scores of ≥ 60 on either internalizing or externalizing problems were chosen for participation. In addition, children who had T scores <60 on both the internalizing and externalizing scales were included in the sample and were matched as closely as possible with regard to sex, social class (using parental education and occupation), age, and race. Scores were continuous, so the children covered a range of scores; indeed, we have found that this sample does not have a higher level of externalizing problems than another sample from the same community (internalizing problems were not assessed in the normative sample).

The selection criteria resulted in the recruitment of 96 girls and 118 boys at Time 1 (T1) who were between the ages of 55 and 97 months ($M = 73.48$, $SD = 9.40$). Participants were predominately from working- and middle-class families (mean income was \$43,000, $SD = \$26,000$). At the first assessment, 76% were European American, 4% were African American, 13% were Hispanic American, 4% were Native American, 1% were Asian American, and 2% were classified as other. Of the original sample, 196 families completed data collection after the T1 assessment. Participants who dropped out of the study after the T1 assessment and did not complete any other assessments ($N = 18$) tended to persist longer on an observed measure of EC $t(210) = -3.03, p < .01$, but did not differ on any of the other variables included in the model, or on family income, ethnicity, or parents' education. Fifteen children were dropped from analyses because the father, and not the mothers, provided data on expressivity. Therefore, in this study, we present data from 81 girls and 100 boys who completed follow-up assessments. Of the 181 participants, 145 had complete data, an additional 23 completed data at two assessments, and an additional 13 completed data at one assessment.

Participants at Time 2 (T2) were 78% European American (76% at Time 3 [T3], 75% at Time 4 [T4]), 3% Native American (3%, 2%), 3% African American (4%, 2%), 10% Hispanic (11%, 13%), 1% Asian (1%, 1%), and 5% other (5%, 7%). The mean and median family income range was between \$40,000 and \$60,000 at T2, T3, and T4.¹ At each assessment approximately

70% of mothers and fathers had completed some college education. Participants received \$25 at the first assessment and \$30 at the other assessments for their participation.

Procedures and Measures

In most cases, the children and their mother completed the questionnaires at a university laboratory. When families moved out of state (<5% of families), data were received through the mail. Mothers completed measures of their own expressiveness in the family and their children's EC and problem behaviors. Children completed a puzzle task that assesses EC. Children's teachers completed measures assessing children's EC and problem behaviors (late in the same semester). Consent and assent were obtained before data collection.

Mothers' Expressivity—Mothers rated 24 items from Halberstadt's Self-Expressiveness in the Family Questionnaire (Halberstadt et al., 1995) (we dropped 6 items that were not recommended by Halberstadt for a short positive expressivity questionnaire) to report on their expression of positive emotion (e.g., “Praising someone for good work”) and negative dominant emotion (e.g., “Showing contempt for another's action”) in the family (see Table 1 for alphas on all measures; scoring ranged from 1 = *I rarely express the feeling* to 9 = *I frequently express the feeling*). The positive and negative dominant scales have related in expected directions to observed indices of emotion (Cassidy, Parke, Butkovsky, & Braungart 1992; Eisenberg, Gershoff, et al., 2001). To reduce the complexity of the longitudinal models (similar to work with mothers' positive and negative affect; Denham & Grout, 1993; Denham, Mitchell-Copeland, Strandberg, Auerbach, & Blair, 1997) and because the affective balance would be expected to be important for children's emerging EC and problem behaviors, we computed an affective balance composite by subtracting the negative dominant score from the positive score. This composite is henceforth referred to as mothers' expressivity.

Children's EC—Mothers' and teachers' reports of children's attention focusing (e.g., “When drawing or coloring in a book, shows strong concentration”), attention shifting (e.g., “Can easily shift from one activity to another”), and inhibitory control (e.g., “Can lower his/her voice when asked to do so”) were obtained using a modified version of the Child Behavior Questionnaire (Rothbart et al., 2001). Rating procedures similar to those of Lemery, Essex, and Smider (2002) were used to reduce potential overlap of items between the EC and problem behaviors scales. Specifically, items were rated by 32 experts in the field as aspects of temperament or child psychopathology. Each individual completed a questionnaire measure that assessed how much each item reflected either temperament or behavior problems (1 = *much better measure of temperament*; 3 = *not a better measure temperament or symptoms; substantial content for both*; 5 = *much better measure of symptoms than temperament*). The means of the experts' ratings for each item were calculated. Items that experts rated as a better measure of the construct not intended to be measured (e.g., an item designed to measure temperament rated as a better measure of problem behavior) were considered to be contaminated. Thus, temperament items receiving mean scores >3.00 and symptom items receiving scores <3.00 were removed from the corresponding scales. Specific items dropped are discussed in the sections on each measure (see Eisenberg et al., 2004).

There were no contaminated items in the attention focusing or inhibitory control scales. However, experts rated 2 of 11 items in the attention shifting scale as better measures of psychopathology (“Sometimes has a dreamy quality when others talk to her/him, as if she/he were somewhere else” and “Sometimes he/she doesn't seem to hear me when I talk to her/him”). Therefore, these 2 items were dropped from the original scale. Mothers' reports of

¹The data from this study are from the second, third, and fourth waves of a longitudinal study. Therefore, to be consistent with other published articles, we refer to T2, T3, and T4.

attention shifting were positively correlated with their reports of attention focusing and inhibitory control, and attention focusing was positively related to inhibitory control, at T2, $r_s(168) = .47, .70, \text{ and } .63$, respectively, $ps < .001$, at T3; $r_s(151) = .49, .73, \text{ and } .67$, $ps < .001$; and at T4, $r_s(149) = .51, .74, \text{ and } .72$, $ps < .001$. Teachers' reports of these variables exhibited a similar pattern at T2, $r_s(154-165) = .53, .79, \text{ and } .73$, $ps < .001$; at T3, $r_s(129-146) = .65, .77, \text{ and } .76$, $ps < .001$; and at T4, $r_s(133-136) = .69, .77, \text{ and } .80$, $ps < .001$. Therefore, the scales were averaged within reporter to form composite mother- and teacher-reported measures of children's EC at each assessment.

An observed index of EC was obtained at T2 and T3 during the laboratory visit. Persistence was observed while children completed a puzzle: the puzzle was inside a box with a clear Plexiglas back and a cloth-covered front that had sleeves to allow children to reach and touch the puzzle without being able to see it. The puzzle consisted of large, wooden shapes that fit into individually shaped spaces (e.g., a diamond-shaped piece fit into a diamond-shaped space). Children could move the cloth to cheat, but the experimenter told the child to assemble the puzzle without looking at it and that they could receive a prize if they were able to complete the task "as fast as you can." A timer was set for the allotted time (4 min) and placed in front of the child so he or she would know how much time was left. After providing directions, the experimenter left the room (Eisenberg, Gershoff, et al., 2001). The time a child persisted (timed by observers in a different room) divided by the total time spent on the box was used in the analyses.

Children's Problem Behaviors—Each child's mother completed the CBCL, and his or her teacher completed the Teacher Report Form (Achenbach, 1991). Based on the expert ratings, three items for teacher-rated aggression (items concerning being loud, talking too much, and being easily frustrated) and two items for mother-rated aggression were dropped due to overlap with EC. Externalizing behaviors were measured by the sum of 29 mother-reported items and 30 teacher-reported items (coded 0–2). The anxious/depressed, withdrawn, and somatic complaints subscales were used to assess internalizing behaviors. Based on the expert ratings, three items from the withdrawn subscale for mother and teacher were deleted (items concerning being slow-moving, preferring to be alone, and being shy). Two items from the anxious/depressed scale for teachers (items concerning self-consciousness and feeling hurt when criticized) and one item for mothers (an item concerning self-consciousness) were also deleted. Internalizing problems were measured by the sum of 27 mother-reported items and 30 teacher-reported items.²

Results

First we examined sex differences in the measures and the interrelations of our study variables with children's age. Second, we examined the zero-order relations among the variables. Third, we used structural equation modeling (a) to test our hypothesis that children's EC mediates the relations between mothers' expressivity and children's problem behaviors, (b) to test for reciprocal relations between mothers' expressivity and children's EC across time, and (c) to test whether children's problem behaviors predicted mothers' expressivity. We also examined the potential moderating effects of children's sex, SES, and age.

²A reviewer noted that EC and externalizing problem behaviors might reflect one, rather than two, constructs. To address this issue we ran measurement models in which we estimated two factors at each assessment (EC and the externalizing problem behaviors). A two-factor model fit the data well, $\chi^2(43) = 56.12, ns$, CFI = 0.98, RMSEA = .041, whereas a one-factor model (e.g., allowing the indices of EC and externalizing to load on one factor) did not fit the data as well, $\chi^2(55) = 117.68, p < .001$, CFI = 0.94, RMSEA = .079. These models support the notion that EC and externalizing problem behaviors are related, but distinct, constructs.

Descriptive Analyses

Table 1 contains the means and standard deviations for the variables. To examine sex differences in the T2, T3, and T4 measures, we computed separate MANOVAs for mother- and teacher-reported measures. Although the multivariate effect (Hotellings T s) was nonsignificant for mother-reported measures at T2 and at T3, it was significant at T4, $F(4,136) = 3.00, p < .05$. At T4, mothers rated girls higher in EC than boys, $F(1,139) = 10.25, p < .01$. There were significant multivariate effects for the teacher-reported data, $F_s(3,163; 3,144; \text{and } 3,134) = 6.42, 8.10, \text{and } 10.27, p_s < .01$ for T2, T3, and T4, respectively. At T2, teachers rated girls higher in EC and lower in externalizing problems than boys, $F_s(1,165) = 14.01 \text{ and } 7.93, p_s < .01$. The same pattern emerged at T3, $F_s(1,146) = 16.68 \text{ and } 7.40, p_s < .01$, and at T4, $F_s(1,136) = 30.11 \text{ and } 10.75, p_s < .01$. Mean levels of observed EC did not differ by sex.³

Children's age was positively related to T2 and T3 mother-reported internalizing problems and T3 observed EC, $r_s(170, 160, 141) = .23, .19, \text{and } .22, p_s < .01, .05, \text{and } .01$; no other relations with age were significant. At T2, SES (the average of standardized measures of income and parents' education; NICHD Early Child Care Research Network, 2005) was positively related to teacher-reported EC and negatively related to teacher-reported externalizing problems, $r_s(165) = .26 \text{ and } -.20, p_s < .01$. At T4, SES was positively related to teacher-reported EC, $r_s(133) = .34, p_s < .01$, and negatively related to mother- and teacher-reported externalizing problems and teacher-reported internalizing problems, $r_s(139, 133, 133) = -.29, -.31, \text{and } -.24, p_s < .01$.

Relations Among the Constructs

Concurrent correlations among the T2 variables are presented in Table 2. The concurrent correlations among the T3 and T4 variables are presented in Table 3. As expected, at each assessment there were concurrent positive relations between mothers' expressivity and their reports of children's EC and between mothers' expressivity and teacher-reported children's EC at T3. In addition, mothers' expressivity was also negatively related to their reports of children's externalizing problem behaviors at each assessment and internalizing problem behaviors at T3 and T4 only. At each assessment, there were also significant negative relations between mother- and teacher-reported EC and mother- and teacher-reported externalizing problem behaviors. Negative relations between EC and internalizing problem behaviors tended to be significant only within reporter.

Correlations between the T2 and T3 variables and between T4 variables and T2 or T3 variables, are presented in Tables 4 and 5, respectively. All constructs, except teacher-reported internalizing, exhibited significant within-construct consistency across time. Mother-reported EC was also related to teacher-reported EC across time. A similar pattern was found for children's externalizing, but not internalizing, problem behaviors. Consistent with the proposed process of mediation (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002), T2 mothers' expressivity was positively related to T3 mother- and teacher-reported EC. In turn, four correlations between the measures of T3 EC and reports of externalizing problems at T4 were significant. There were two significant relations between T3 EC (parent-reported, teacher-reported, or observed) and T4 mother- and teacher-reported children's internalizing problem behaviors.

³Although mother and teacher reports of externalizing problem behaviors were significantly related (see Tables 2-5), mothers reported higher levels of both externalizing and internalizing problem behaviors than teachers reported. This finding is consistent with the extant literature (Stanger & Lewis, 1993) and may stem from mothers' having more opportunities to view children's problem behaviors than teachers.

Tests of Mediation

We used Muthén and Muthén's (1998) Mplus structural equation modeling program and its maximum likelihood method estimate to account for missing data to test our hypothesis that the relation between T2 mothers' expressivity and T4 children's problem behaviors was mediated by children's EC at T3. The variables did not exceed the cutoffs for skewness, kurtosis, and outliers identified by West, Finch, and Curran (1995). According to Cook's (1977) distance, there were no multivariate outliers.

Externalizing Problem Behaviors—To avoid having a low participant-to-parameter ratio, we created composite scores based on one measurement model in which six (EC and children's externalizing problem behaviors at the three assessments) latent constructs were estimated. In the measurement model we included T2, T3, and T4 mother- and teacher-reported EC (and observed EC at T2 and T3) and children's mother- and teacher-reported externalizing problem behaviors. Per standard procedures, we allowed each latent variable to correlate with the other latent variables. Expressivity was not included in the model because it already had only one indicator. Because we were interested in comparing relations across time, consistent with common practice, we set the T2 loadings equal to their equivalents on the T3 and T4 latent constructs (Cole & Maxwell, 2003). The model fit was $\chi^2(48) = 76.63, p < .01$, comparative fit index (CFI) = 0.97, root mean square error of approximation (RMSEA) = .06; standardized root mean square residual (SRMR) = .074.⁴ Hu and Bentler (1999) recommended the values close to (or greater than) 0.95 for the CFI, .06 (or less) for the RMSEA, and <.08 for the SRMR. When we allowed the loadings to be freely estimated, the estimation resulted in undefined parameters (e.g., $R^2 > 1$), although the model did fit slightly better, $\chi^2_{\Delta}(5) = 20.51, p < .01$. However, because of these problems and because the constrained model fit the data, to ease the interpretation we used values from the constrained model to create composite scores.⁵

The composite scores to be used subsequently as indicators of latent constructs in the longitudinal structural equation models were created by computing the sum of the weighted scores of the indicators using the unstandardized loadings from the measurement model. For example, the composite score for T2 externalizing problems was created by multiplying T2 mother- and teacher-reported externalizing problems by their loadings, summing the two values, and dividing by the sum of the two unstandardized loadings. When data were missing, the weighted scores of valid data were summed and divided by the sum of the valid weights. The composite scores were then used as indicators in subsequent models. Similar to the method used by Sandler, Tein, Mehta, Wolchik, and Ayers (2000), the loading for each indicator (i.e., the composite scores) was fixed at 1, and the measurement errors of the composite indicators were fixed to the value calculated from the loadings and reliabilities of the individual measures.

The hypothesized longitudinal model fit the data reasonably well, $\chi^2(15) = 32.11, p < .01$, CFI = 0.98, RMSEA < .08; SRMR = .04. As displayed in Figure 1, all autoregressive paths were significant. Of importance, T2 expressivity was positively related to T3 EC, and T3 EC was negatively related to T4 externalizing problem behaviors. EC did not predict mothers' expressivity across time. To formally test mediation, we followed the confidence interval method recommended by MacKinnon et al. (2002) that accommodates the non-normal distribution of the indirect effects. The upper and lower confidence limits for the indirect effect

⁴Although the observed index of EC was not always significantly correlated with mother- and teacher-reported EC, the relations were in the expected directions (and sometimes significant). Moreover, consistent with prior work, in the measurement model, the loading for observed EC was significant. In structural equation modeling, the error variance can be modeled, and it is common for variables to be more interrelated when this happens. In contrast, the correlations between mother- and teacher-reported internalizing problems were never significant and measurement models that included mother- and teacher-report of internalizing problems failed to converge.

⁵Because there was some evidence from the initial measurement model that the strength of the loadings varied over time, we reestimated the models presented in the figures after allowing the loadings to be freely estimated. The models were the same (fit and the significance levels of the paths) as those presented in Figures 1 and 2.

are calculated on the basis of the product of the two random variables from tables produced by Meeker, Cornwell, and Aroian (1981). The confidence interval for the indirect effect displayed in Figure 1 did not include zero (lower confidence limit = -0.48 ; upper confidence limit = -0.02 ; $p < .05$), which indicates that T3 children's EC significantly mediated the relation between T2 mothers' expressivity and T4 children's externalizing problems.

To test the premise that mothers' expressivity may be influenced by children's externalizing problems, we estimated the model shown in Figure 1, but added paths from T2 externalizing problem behaviors to T3 expressivity (and from T3 externalizing problem behaviors to T4 expressivity). Adding these two paths to the model did not improve the fit of the hypothesized model, $\chi^2_{\Delta}(2) = 1.99$, *ns*, and neither path was significant. In addition, when we estimated the hypothesized model but added direct paths from T2 expressivity to T3 externalizing problem behaviors (and from T3 expressivity to T4 externalizing problem behaviors), the model fit did not change significantly, $\chi^2_{\Delta}(2) = 2.22$, *ns*, and both paths were nonsignificant.

Internalizing Problem Behaviors—Mother- and teacher-rated internalizing problems were not related and in preliminary measurement models mother and teacher reports would not load on one construct; therefore, we estimated separate models for these two outcomes. New factor scores for EC were estimated from a measurement model that included three latent variables (EC at each assessment) and eight indicators (parent- and teacher-reported EC at each assessment and observed EC and T2 and T3). This model fit well, $\chi^2(16) = 20.41$, *ns*, CFI = 0.99, RMSEA = .04. When the loadings were freely estimated, the model fit was $\chi^2(13) = 9.49$, *ns*, CFI = 1.00, RMSEA = .01, which was a significant change in fit, $\chi^2_{\Delta}(3) = 10.92$, $p < .05$ (see Footnote ⁵).

The model fit for teacher-rated internalizing problems was $\chi^2(15) = 29.92$, $p < .05$, CFI = 0.97, RMSEA < .08; SRMR = .05 (see Figure 2a). T3 EC mediated the relations between T2 mothers' expressivity and T4 teacher-rated internalizing problems (lower confidence limit = $-.64$; upper confidence limit = $-.02$; $p < .05$). Paths from EC to expressivity were not significant. The model fit did not improve when we added paths from teacher-reported internalizing problems to mothers' expressivity [as described above; $\chi^2_{\Delta}(2) = .07$, *ns*], and both paths were nonsignificant. Moreover, when we added direct paths from expressivity to internalizing problem behaviors (as described above), the change in fit was not significant, $\chi^2_{\Delta}(2) = 2.13$, *ns*, and neither path was significant.

The model fit for mother-rated internalizing problems was $\chi^2(15) = 35.23$, $p < .01$, CFI = 0.96, RMSEA = .086; SRMR = .051. The paths displayed in Figure 2b are similar to those shown in Figure 2a, but T3 EC did not predict T4 parent-reported internalizing problems. The model fit did not improve when we added paths from mother-reported internalizing problems to mothers' expressivity, $\chi^2_{\Delta}(2) = 2.806$, *ns*, and both paths were nonsignificant. Moreover, when we added direct paths from expressivity to mother-reported internalizing problem behaviors, as described above, the change in fit was not significant, $\chi^2_{\Delta}(2) = 1.76$, *ns*, and neither path was significant.⁶

Box's *M* tests were used to examine whether child's sex, SES (using a median split), or age (using a median split) moderated the models (Winer, 1971). Although Box's *M* suggested that sex, SES, and age might moderate some of the models, we did not obtain evidence of

⁶When we reestimated the models presented in the figures using mothers' positive expressivity (rather than the difference score), the findings very virtually identical (e.g., the models exhibited the same level of fit, and mediation was significant for externalizing problems and teacher-reported internalizing problems). However, T2 mothers' negative dominant expressivity did not predict T3 children's EC. Because observed persistence was not obtained at T4, we computed additional models that did not include persistence at T2 and T3. The three models fit the data and mediation was significant in the externalizing model, marginal in the teacher-reported internalizing model, and nonsignificant in the mother-reported internalizing model.

moderation using multiple group models (i.e., we did not find evidence that the paths differed based on sex, SES, or age). This is not surprising because Box's *M* is a very sensitive test, and our sample size was not large. Therefore, we computed regressions in which we tested whether sex, SES, or age moderated the relations between T2 expressivity and T3 EC or between T3 EC and T4 problem behaviors. We created composites by averaging scores across reporters on a given construct and controlled for prior and concurrent effects of the variables. Only 2 of 12 regressions were significant (the 4 critical paths [from T2 expressivity to T3 EC and from T3 EC to either T4 externalizing problems, mother-reported internalizing problems, or teacher-reported internalizing problems] \times 3 potential moderators). Thus, there was limited evidence of moderation of the critical paths.

Discussion

Results from numerous studies indicate that measures of ERSBs often concurrently and longitudinally predict children's problem behaviors. Despite the importance of this topic, there has been relatively little examination of the processes that might mediate the relations between indices of socialization and children's problem behaviors. Moreover, there are only a few studies in which mediated relations between maternal socialization and children's problem behaviors have been examined longitudinally. Although cross-sectional data are informative, longitudinal data are necessary to more thoroughly test a hypothesized process of mediation. Longitudinal data also allow for more thorough testing of alternative models. In this study, we used three waves of longitudinal data, with constructs measured at each assessment, to examine mediation of associations between mothers' expressivity and children's problem behaviors. The results are consistent with the hypothesis that children's EC mediates the relations between maternal expressivity and children's externalizing problem behaviors; mediation for internalizing problems behaviors was less consistent. We did not find evidence that mothers' expressivity was predicted from children's EC or their problem behaviors.

Based on cross-sectional work, we predicted that children's EC would mediate the relations between mothers' expressivity and children's problem behaviors. Indeed, although evidence of mediation for internalizing problems was less consistent, there was evidence of significant mediation for externalizing problems. Evidence of across-time mediation for externalizing problems extends nonlongitudinal work in the United States, China, and Indonesia in which investigators have found that children's EC mediated the relations between ERSBs and measures of children's social functioning (Eisenberg, Gershoff, et al., 2001; Eisenberg, Liew, & Pidada, 2001; Zhou, Eisenberg, Wang, & Reiser, 2004).

The present findings represent an important extension for several reasons. First, most studies have included only one assessment; when all constructs are assessed at the same time, it is difficult to rule out alternative models. The current study used three time points and allowed for prediction across time, which is consistent with the design Cole and Maxwell (2003) recently recommended for testing mediation. With the three waves of data, we could better test the mediational hypothesis and alternative models in which children's EC (or children's problem behaviors) were predictors of mothers' expressivity. Further, an additional alternative model that allowed for direct effects of mothers' expressivity to children's problem behaviors did not fit better than the hypothesized model, and the direct paths from expressivity to problem behaviors were not significant when the path from EC to problem behaviors was in the model. Thus, although there were some zero-order relations between expressivity and problem behaviors, the direct path was not significant when EC was included as a predictor. Although the correlational nature of the data limits conclusions, the use of three assessments, controlling for continuity over time, and the lack of effects from children's EC (or problem behaviors) to mothers' expressivity strengthens this study. These data provide strong, albeit not conclusive,

support for the hypothesis that mothers' expressivity can promote children's EC, which may then contribute to children's externalizing problem behaviors.

For some time, authors have hypothesized that the socialization process is bidirectional; however, there are not a lot of data on this topic, especially data on constructs similar to those in this study. The lack of evidence of bidirectional relations in this study contrasts with findings that 6- to 8-year-old children's regulation predicted their mothers' punitive responses to children's negative emotions 2 years later, which predicted children's regulation when they were 10-12 years old (Eisenberg et al., 1999). There are a number of reasons why the results from this study may not have replicated Eisenberg et al.'s findings. First, in this study we included a measure of children's problem behaviors at the second assessment (which was not done in the Eisenberg et al. study) and allowed this measure to correlate with mothers' expressivity and children's EC. Estimating these additional parameters probably further reduced the amount of available variance to be explained. Second, mothers' responses to their children's negative emotions, the measure used in the 1999 study, and their general expressivity, the measure used in this study, are different aspects of ERSBs. Most notably, mothers' expressivity may more closely reflect their personality than would their reactions to negative emotions in specific contexts and therefore would be less likely than other ERSBs to be influenced by children's EC. Nevertheless, although EC did not predict later measures of expressivity in this study's structural equation models, in zero-order correlations mother-reported T2 EC did predict T3 mothers' expressivity (and mother-reported T3 EC predicted T4 mothers' expressivity). It is possible that we would have found bidirectional relations if the time between assessments was longer, if the sample was larger, or if another measure of ERSB was used. Indeed, studies that replicate and extend the current findings while using other ERSB are needed.

When interpreting longitudinal findings it is important to consider the consistency of the variables. For example, the fact that the autoregressive path for externalizing problems was stronger from T2 to T3 than from T3 to T4 may be one reason that EC predicted T4, but not T3, externalizing problems. Therefore, although Figure 1 suggests the lack of a significant relation between externalizing problems and EC in earlier childhood, it seems more likely that such a relation exists (which is consistent with significant correlations between T2 EC and T3 externalizing problems in Table 4), but that the autoregressive path from T2 to T3 externalizing problems made it difficult to obtain an across-time path. This explanation may also apply to the similar pattern of findings for teacher-reported internalizing problems.

Another factor may explain why mothers' expressivity predicted EC across time at T3 but not at T4. The lack of a significant path from T3 expressivity to T4 EC was probably partly due to the weaker zero-order relations between these variables than between T2 expressivity to T3 EC. If the decrease in prediction of EC from expressivity over time is replicated, it suggests that efforts aimed to change the development of EC should begin early in childhood. It is possible that the influence of parents' socialization efforts decreases somewhat as children age and as other socializers (e.g., peers, siblings, and other adults) become increasingly influential (Collins & Laursen, 2004). Thus, over time the direct influence of mothers' expressivity on children's EC is possibly somewhat reduced.

This study replicates and extends previous studies on the consistency of mothers' expressivity, children's EC, and children's problem behaviors. To our knowledge, the extant literature contains some data on the consistency of mothers' expressivity over 2 (Eisenberg et al., 2003), but not 4, years. The findings on the consistency of EC are similar to findings reported by Murphy, Eisenberg, Fabes, Shepard, & Guthrie (1999) and Kochanska et al. (2000) with younger children. Moreover, similar to data reported by the NICHD Early Child Care Research Network (2004), as well as to the literature they reviewed, in this study, the consistency of

externalizing problem behaviors was stronger than for internalizing problem behaviors. Despite the consistency in constructs, we did find evidence of across-time prediction. This is important because it suggests that, despite the consistency in constructs, there is some ongoing prediction from mothers' expressivity on EC (and of EC on problem behaviors) as children progress through childhood. Of course, it is also possible that genetic factors partly account for the relations between mothers' expressivity and children's EC and problem behaviors (e.g., heritable neuroticism or negative emotionality may partly underlie all of these variables).

Despite methodological strengths, including use of multiple reporters, with an observed measure, and a longitudinal design, there are limitations that should be considered when interpreting the findings. First, although the reported measures of EC were all significantly related to the measures of problem behaviors, the observed measure of EC was inconsistently related to problem behaviors. It is possible that the relation of observed EC with problem behaviors was weaker than those for reported EC because the former reflect regulation on one specific task, not across settings. The development of additional observational measures of EC (especially for older children and adolescents) is an important area of future research. Second, the sample comprised primarily European American working- and middle-class families. The extent to which findings generalize to other populations remains to be tested. Although relations between EC (or more broadly regulation) and problem behaviors (or more broadly social functioning) tend to be similar in samples of children from either other cultures (Eisenberg, Liew, et al., 2001; Zhou et al., 2004) or minority samples in the United States (Smith & Walden, 2001), prediction of EC or regulation from measures of ERSB is likely to be influenced by the meaning of mothers' expressivity (Eisenberg, Liew, et al., 2001). Third, mothers only reported on one ERSB: their expressivity. Future workers would probably benefit from adding additional measures of both expressivity and other ERSBs. In addition, the measure of mothers' expressivity was self-reported; in future work it would be useful to assess maternal expressivity with other types of measures. Finally, the extant literature would be strengthened by findings showing that mothers' expressivity predicts their children's EC while controlling for genetic contributions.

In summary, this study extends the extant literature by using three waves of longitudinal data to test the premise that children's EC mediates the relations between mothers' expressivity and children's problem behaviors. The findings are consistent with limited cross-sectional and longitudinal data in which EC mediated relations between ERSBs and children's problem behaviors (Brody et al., 2003; Eisenberg, Gershoff, et al., 2001). The pattern of findings raises a number of other questions. For example, in future work it would be useful to examine whether the strength of the relations between ERSBs and children's EC and problem behaviors changes over time and how the spacing of assessments affects the pattern of findings (Collins & Graham, 2002). If assessments are too close together, consistency in constructs may limit across-time prediction, but spacing assessments too far apart may not be theoretically justified. Integrating methodological advances as well as testing similar processes in intervention and prevention research, in which investigators can experimentally change ERSBs, and perhaps children's EC, offers the most potential for clearly demonstrating the premises suggested in correlational research.

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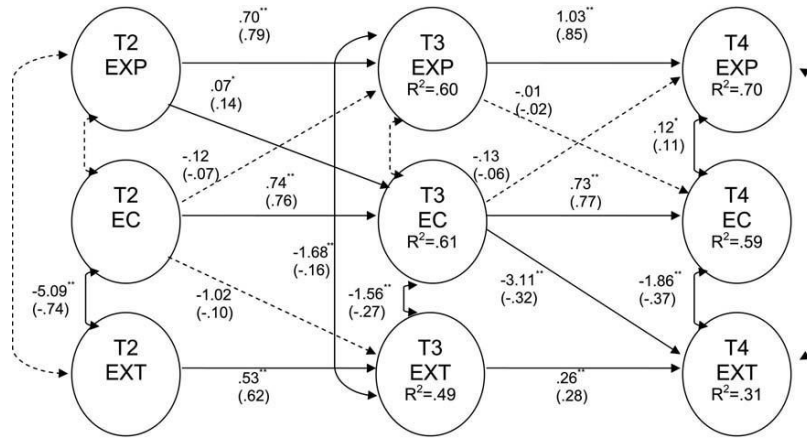


Figure 1. Longitudinal relations between mothers' expressivity (EXP) and children's effortful control (EC) and externalizing problem behaviors (EXT). Each latent variable is indicated by one composite score and the loading is fixed at 1. This information was excluded from the figure to ease the interpretation. Unstandardized estimates are above the standardized estimates, which are in parentheses. Dotted lines are nonsignificant paths or covariances. * $p < .05$. ** $p < .01$.

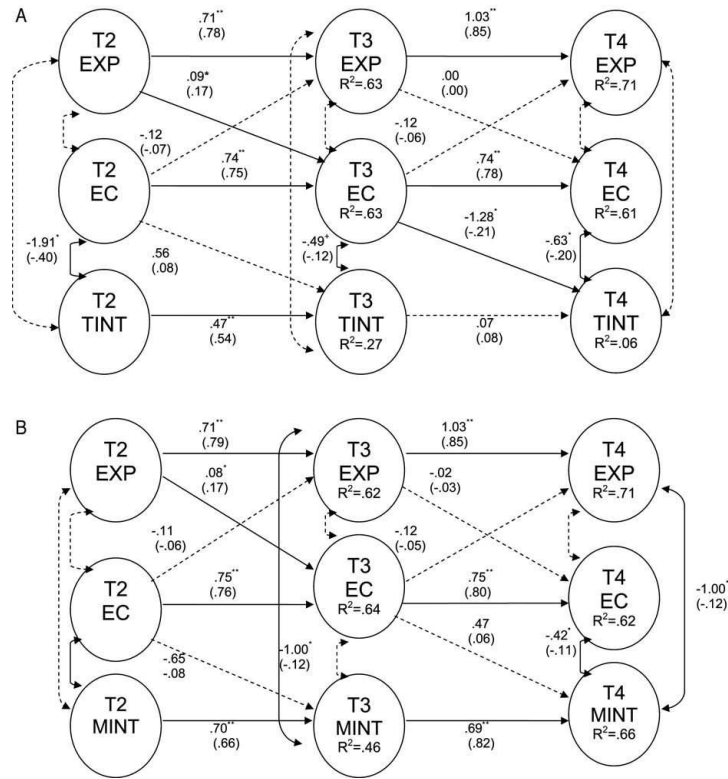


Figure 2. A, Longitudinal relations between mothers' expressivity (EXP) and children's effortful control (EC) and teacher-reported internalizing problem behaviors (TINT). Each latent variable is indicated by one composite score and the loading is fixed at 1. This information was excluded from the figure to ease the interpretation. Unstandardized estimates are above the standardized estimates, which are in parentheses. Dotted lines are nonsignificant paths or covariances. ⁺*p* < .10. **p* < .05. ***p* < .01. B, Longitudinal relations between mothers' expressivity and children's effortful control and mother-reported internalizing problem behaviors (MINT). Each latent variable is indicated by one composite score and the loading is fixed at 1. This information was excluded from the figure to ease the interpretation. Unstandardized estimates are above the standardized estimates, which are in parentheses. Dotted lines are nonsignificant paths or covariances. ⁺*p* < .10. **p* < .05. ***p* < .01.

Descriptive Statistics for Major Variables

Table 1

	M				SD				α			
	T2	T3	T4	T4	T2	T3	T4	T4	T2	T3	T4	T4
Mothers' expressivity												
Positive	7.35	7.31	7.27	7.27	1.00	.95	.98	.98	.87	.87	.89	.89
Negative dominant	3.85	3.91	3.90	3.90	1.14	1.20	1.22	1.22	.78	.82	.84	.84
Children's effortful control												
Mother-reported attention shifting	4.14	4.34	4.38	4.38	0.89	0.97	0.89	0.89	0.77	0.83	0.79	0.79
Teacher-reported attention shifting	4.65	4.72	4.76	4.76	1.21	1.12	1.00	1.00	0.89	0.87	0.86	0.86
Mother-reported attention focusing	4.73	4.84	4.81	4.81	0.87	0.82	0.82	0.82	0.73	0.69	0.72	0.72
Teacher-reported attention focusing	4.86	4.75	4.89	4.89	1.15	1.14	0.96	0.96	0.82	0.81	0.80	0.80
Mother-reported inhibitory control	4.78	4.98	4.98	4.98	0.88	0.90	0.97	0.97	0.81	0.85	0.85	0.85
Teacher-reported inhibitory control	4.79	5.02	5.02	5.02	1.18	1.05	0.88	0.88	0.90	0.84	0.86	0.86
Observed ^d	.68	.69	—	—	.29	.31	—	—	.98	.97	—	—
Children's problem behaviors												
Mother-reported externalizing behaviors	12.47	11.39	9.23	9.23	7.87	7.37	6.99	6.99	0.89	0.88	0.88	0.88
Teacher-reported externalizing behaviors	9.22	7.95	5.60	5.60	11.68	9.80	8.19	8.19	0.96	0.94	0.94	0.94
Mother-reported internalizing behaviors	8.39	9.13	7.15	7.15	6.72	7.06	6.26	6.26	0.87	0.87	0.86	0.86
Teacher-reported internalizing behaviors	5.89	5.55	4.35	4.35	6.79	5.82	4.86	4.86	0.89	0.86	0.86	0.86

Note. T2 = Time 2, T3 = Time 3, T4 = Time 4.

^dThere are dashes for observed effortful control (EC) dashes because it was not measured at T4. The numbers (.98 and .97) for observed EC are Pearson r s.

Table 2

Concurrent Correlations Among Time 2 Variables

	1	2	3	4	5	6	7	8
1. Mother's expressivity								
2. Effortful control: mother report	.32**							
3. Effortful control: teacher report	.00	.38**						
4. Effortful control: observed	.12	.27**	.08					
5. Externalizing: mother report	-.21**	-.48**	-.21**	.00				
6. Externalizing: teacher report	-.27**	.09	-.27**	-.22**				
7. Internalizing: mother report	.21**	.56**	.21**	-.70**	.00			
8. Internalizing: teacher report	-.01	-.09	-.01	.25	-.27**			
	.02							
	-.06							
	-.42**							
	-.18*							
	-.01							
	.59**							
	-.12							

Note. Mothers' expressivity is a difference score (e.g., positive minus negative dominant emotion).

* $p < .05$.

** $p < .01$.

Table 3

Concurrent Correlations Among Major Variables at T3 and T4

	1	2	3	4	5	6	7	8
1. Mother's expressivity								
2. Effortful control: mother report	.24**		.17*	.03	-.38**	-.19*	-.22*	-.10
3. Effortful control: teacher report	.08	.31**	.40**	.09	-.55**	-.30**	-.31**	-.06
4. Effortful control: observed	—	.36**	—	.16 [†]	-.24**	-.65**	-.02	-.15 [†]
5. Externalizing: mother report	-.20**	—	—	—	-.06	-.24**	.05	-.10
6. Externalizing: teacher report	-.01	-.58**	-.27**	—	.39**	.33	.54**	.02
7. Internalizing: mother report	-.30**	-.31**	-.64**	—	.36**	-.09	.07	.33**
8. Internalizing: teacher report	.09	-.03	-.10	—	.18	.47**	-.06	.11

Note. Time 3 (T3) relations are above and Time 4 (T4) relations are below the main diagonal. Mothers' expressivity is a difference score (e.g., positive minus negative dominant emotion). There are dashes below the main diagonal because observed EC (effort control) was not measured at T4.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.

Correlations from T2 to T3

Table 4

T2 variables	T3 variables							
	1	2	3	4	5	6	7	8
1. Mother's expressivity	.60**	.37**	.18*	-.05	-.25**	-.13	-.14†	-.10
2. Effortful control: mother report	.33**	.79**	.36**	.11**	-.44**	-.34**	-.29**	-.09
3. Effortful control: teacher report	-.12	.40**	.57**	.29**	-.23**	-.49**	-.04	-.12
4. Effortful control: observed	-.11**	.07	.12	.54**	.02	.01	.19*	.06
5. Externalizing: mother report	-.23**	-.45**	-.12	.02	.70**	.30**	.40**	-.04
6. Externalizing: teacher report	.02	-.26**	-.39**	.31**	.25**	.61**	-.03	.20*
7. Internalizing: mother report	-.14†	-.16*	.10	.19*	.40**	-.03	.58**	.06
8. Internalizing: teacher report	.07	-.08	-.02	-.23**	-.04	.33**	-.08	.42**

Note. Mothers' expressivity is a difference score (e.g., positive minus negative dominant emotion). T2 = Time 2; T3 = Time 3.

† $p < .10$.

* $p < .05$.

** $p < .01$.

Table 5

Correlations from T2 and T3 to T4

	T4 variables							
	1	2	3	4	5	6	7	8
T2 variables								
1. Mother's expressivity	.61**	.27**	.25**	—	-.15	-.18**	-.11	.07
2. Effortful control: mother report	.27**	.72**	.31**	—	-.47**	-.24**	-.19*	-.04
3. Effortful control: teacher report	-.06	.42**	.49**	—	-.27**	-.35**	.05	-.25**
4. Effortful control: observed	-.09	.11	.05	—	-.03	-.12	.23**	.00
5. Externalizing: mother report	-.20**	-.37**	-.21**	—	.56**	.16 [†]	.25**	.04
6. Externalizing: teacher report	.07	-.27**	-.34**	—	.31**	.36**	-.15 [†]	.28**
7. Internalizing: mother report	-.17*	-.16*	-.09	—	.32**	.01	.48**	.10
8. Internalizing: teacher report	.00	-.01	-.15 [†]	—	.14	.17*	.05	.11
T3 variables								
1. Mother's expressivity	.68**	.30**	.05	—	-.20*	-.08	-.15	.08
2. Effortful control: mother report	.25**	.83**	.35**	—	-.52**	-.34**	-.19*	-.07
3. Effortful control: teacher report	.09	.45**	.51**	—	-.23**	-.40**	.00	-.14
4. Effortful control: observed	-.01	.16 [†]	.11	—	-.02	-.10	.09	-.17*
5. Externalizing: mother report	-.26**	-.47**	-.22**	—	.64**	.22*	.28**	.14
6. Externalizing: teacher report	-.12	-.27**	-.35**	—	.33**	.33**	-.06	.05
7. Internalizing: mother report	-.25**	-.37**	-.13	—	.35**	.01	.74**	-.01
8. Internalizing: teacher report	-.10	-.04	-.04	—	.01	.06	.23*	.04

Note. Mothers' expressivity is a difference score (e.g., positive minus negative dominant emotion). There are dashes in column 4 because observed EC (effort control) was not assessed at T4.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.