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Developmental foundations of externalizing problems in young children: The role of effortful control

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Abstract

Examined associations between effortful control temperament and externalizing problems in 220 3-year-old boys and girls, controlling for co-occurring cognitive and social risk factors. We also considered possible additive and/or interactive contributions of child dispositional anger and psychosocial adversity, and whether relations between effortful control and early externalizing problems were moderated by child gender. Individual differences in children's effortful control abilities, assessed using behavioral and parent rating measures, were negatively associated with child externalizing problems reported by mothers, fathers, and preschool teachers. These associations were not overshadowed by other cognitive or social risk factors, or by other relevant child temperament traits such as proneness to irritability. Further analyses revealed that associations between externalizing problem behavior and effortful control were specific to components of child problem behavior indexing impulsive-inattentive symptoms. Thus, children's effortful control skills were important correlates of children's early disruptive behavior, a finding that may provide insight into the developmental origins of chronic behavioral maladjustment.

Problems of aggression, impulsivity, and inattention, often labeled externalizing symptoms, represent the most common forms of childhood maladjustment (IOM, 1989; Kazdin, 1995). Once established, these problems tend to be chronic, placing children at risk for a wide range of negative adaptational outcomes including academic failure, rejection by peers, conflicted interactions with parents, siblings, peers, and teachers, and delinquent behavior (Caspi & Moffitt, 1995; Coie & Dodge, 1998; Patterson, Reid, & Dishion, 1992). How early in life do these problems become established? Recent research has shown that serious externalizing problems can be identified in the toddler and preschool years (Keenan & Wakschlag, 2000), and that individual differences in externalizing behaviors persist at moderate levels across the transition from early to middle childhood (e.g., Campbell, Pierce, Moore, Marakovitz, & Newby, 1996; Shaw, Gilliom, & Giovanelli, 2000; Speltz, DeKlyen, Calderone, Greenberg, & Fisher, 1999). However, difficulties

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with the control of aggression and impulses are extremely common in early childhood (Koot, Van Den Oord, Verhulst, & Boomsma, 1997; Richman, Stevenson, & Graham, 1982; Tremblay, 2000), reflecting, in part, rapid changes in the normal establishment of self-regulatory competence (Kopp, 1989). Thus, there is a compelling need to identify factors in early childhood that are associated with chronic versus self-limiting patterns of externalizing behavior. Effective prevention of these problems hinges upon knowledge of early risk factors and pathogenic processes.

A growing body of research indicates that childhood externalizing problems may reflect inadequate regulation of attention and impulses (Barkley, 1997; Hughes, White, Sharpen, & Dunn, 2000; Moffitt, 2003; Morgan & Lilienfeld, 2000; Newman & Wallace, 1993; Nigg, 2000; Olson, Schilling, & Bates, 1999; Oosterlaan, Logan, & Sergeant, 1998; Rothbart, Posner, & Hershey, 1995; Teichner & Golden, 2000). Moreover, individual differences in children's regulatory abilities have been found to predict externalizing problems across lengthy periods of development. For example, Moffitt, Caspi, Dickson, Silva, and Stanton (1996) found that children with early-onset conduct disorders differed from others on examiners' ratings of hyperactive/oppositional behavior at age 3. The latter were construed as evidence of early difficulties with regulation of attention and impulsivity. Similarly, Olson et al. (1999) found that laboratory measures of impulsive functioning in young, school-age children predicted ratings of delinquency and impulsivity in late adolescence. To date, however, relatively little research has been directed toward identifying specific self-regulatory problems associated with externalizing problems. In the following, we propose that one construct of regulation, effortful control, may play a key role in the development of early externalizing problems.

Effortful Control: An Important Developmental Context for Understanding Early Externalizing Behavior?

Effortful control, which was introduced by Rothbart and colleagues (Rothbart, 1989; Rothbart & Bates, 1998), is defined as the child's capacity to inhibit a dominant response and initiate a subdominant response. In other words, how well does the child modulate impulsive responding according to varying situational demands? According to Rothbart, effortful control is a temperament trait that emerges during the latter half of the first year of life, in concert with maturation of the anterior attention network, and functions to regulate more "reactive" aspects of temperament such as fear and anger (Rothbart, Derryberry, & Posner, 1994). Individual differences in effortful control develop rapidly during the toddler and preschool years (Diamond & Taylor, 1996; Gerardi–Caulton, 2000; Kochanska, Murray, Jacques, Koenig, & Vandegeest, 1996; Posner & Rothbart, 2000; Reed, Pien, & Rothbart, 1984), and show moderate levels of continuity across early (Kochanska et al., 1996; Kochanska, Murray, & Coy, 1997; Kochanska, Murray, & Harlan, 2000) and middle (Olson et al., 1999) childhood. In addition, effortful control is related to a broad range of adaptational outcomes, including social competence, empathic responsiveness, and internalization of conduct (Eisenberg, Fabes, Guthrie, Murphy, Maszk, Holmgren, & Suh, 1996; Eisenberg, Guthrie, Fabes, Shepard, Losoya, Murphy, Jones, Poulin, & Reiser, 2000; Kochanska et al., 1997, 2000; Kochanska, Tjebkes, & Forman, 1998; Rothbart, Ahadi, & Hershey, 1994). For these reasons, effortful control has been construed as a developmental milestone that has important implications for understanding the origins of individual differences in children's social, emotional, and cognitive competence (Kochanska et al., 2000; Posner & Rothbart, 2000).

In summary, individual differences in effortful control develop rapidly during the toddler and preschool years and are thought to underlie the establishment of competent self-regulation. Recently, poor effortful control skills made significant contributions to externalizing problem behavior in school-age children (Eisenberg, Cumberland, Spinrad, Fabes, Shepard, Reiser, Murphy, Losoya, & Guthrie, 2001; Hughes et al., 2000) Thus, although few empirical data exist, it is logical to assume that early-onset behavior problems may reflect deficient effortful control skills. Ini-

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tial empirical studies have shown that externalizing problems in the toddler and preschool years are associated with low effortful control (Murray & Kochanska, 2002) and with related constructs such as impulsivity (Calkins & Dedmon, 2000; Hughes et al., 2000; Moffitt, 1990; Olson & Hoza, 1993; Speltz, Deklyen, & Greenberg, 1999) and attentional disorganization (Olson, Bates, Sandy, & Schilling, 2002). In the current study, we provided a conservative test of this hypothesis by examining contributions of effortful control in relation to other potentially important developmental and psychosocial correlates of child externalizing problems. Major research issues are briefly discussed below.

Specificity of associations between effortful control and child externalizing

The preschool period is a time of rapid growth in a broad range of cognitive and social–cognitive competencies (e.g., Cutting & Dunn, 1999; Kochanska et al., 1996; Wellman, Harris, Banerjee, & Sinclair, 1995). Effortful control has been conceptualized as one dimension of early regulatory competence with potentially important implications for understanding the development of externalizing problems. However, in comparison with normally developing peers, young children with high levels of externalizing problems have been found to manifest somewhat lower levels of general cognitive maturity, suggesting that hypothesized relations between effortful control and externalizing actually may reflect more generalized deficits in cognitive competence (Moffitt, 1993). Thus, we examined relations between children's effortful control skills and externalizing problems controlling for individual differences in general cognitive maturity.

Additive and/or interactive contributions of child anger. Children's early conduct problems reflect the operation of multiple temperament systems (Lahey, Waldman, & McBurnett, 1999). The role of dispositional anger is particularly important: low frustration tolerance coupled with quickness to anger is thought to underlie externalizing problem behavior (Bates, 2000; Rothbart & Bates, 1998). For example, children who show high levels of anger and frustration also manifest higher levels of externalizing than others (Calkins & Dedmon, 2000; Cole, Zahn–Waxler, Fox, Usher, & Welsh, 1996; Eisenberg et al., 1996; Rothbart et al., 1994), a finding that is hardly surprising given that these constructs of negative emotionality (temper outbursts; hostility; irritable reactivity) are defining features of childhood conduct disturbances. Increasingly, models of temperament and psychopathology have encompassed the joint contributions of negative emotionality and effortful control (Derryberry & Rothbart, 1997). For example, Eisenberg and colleagues (Eisenberg et al., 2001) found that school-age children with high levels of externalizing problems manifested high levels of dispositional anger combined with low levels of effortful control. Thus, we examined whether children's effortful control skills would combine additively and/or interactively in relation to children's early externalizing behavior.

Incremental Contributions of Effortful Control in Relation to Psychosocial Stressors

A third issue concerned the relative contributions of effortful control temperament in light of psychosocial stressors that have been associated with child externalizing problems in many previous reports. Developmental pathways to children's behavior problem outcomes are widely believed to be multifactorial and transactional, reflecting processes of continuous dynamic interplay between qualities children bring to their social interactions (such as temperamental dispositions) and characteristics of the immediate caregiving environment and its social–ecological context (Sameroff, 1995, 2000). Currently, multiple risk models of the development of conduct problems predominate (e.g., Campbell, Shaw, & Gilliom, 2000; Deater–Deckard, Dodge, Bates, & Pettit, 1998; Greenberg, Speltz, DeKlyen, & Jones, 2001; Shaw et al., 1998), and thus the relative contributions of child variables such as effortful control must be understood in the context of other important influences, particularly social risk factors.

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However, in previous studies of cognitive deficits associated with early-onset externalizing problems, few investigators have attempted to control for the co-occurring effects of social adversity (Raine, Yaralian, Reynolds, Venables, & Mednick, 2002). In the current study, we considered the following parenting and family ecological stressors that have been related to early externalizing problems in many previous reports.

1. *Harsh discipline*. Based on a large body of previous research (e.g., Campbell et al., 1996; Gershoff, 2002; Shaw, Winslow, Owens, Vondra, Cohn, & Bell, 1998), children who experience relatively high levels of physically and emotionally punitive disciplinary transactions with caregivers would be expected to show higher levels of externalizing problems than others. In a recent meta-analysis Gershoff (2002) found associations between physical punishment and child externalizing problems in all 27 studies that were analyzed, although the strength of these relations is controversial (e.g., Baumrind, Larzelere, & Cowan, 2002).
2. *Low warmth*. Other reports have highlighted low levels of supportive parent–child relations as risk factors for early problems behaviors. For example, patterns of warm, responsive caregiving have been related to low levels of early externalizing problems (Gardner, 1994; Olson, Bates, Sandy, & Lanthier, 2000; Pettit, Bates, & Dodge, 1997; Rothbaum & Weisz, 1994; Shaw et al., 1998).
3. *Destructive marital conflict*. An extensive literature has shown that young children who are exposed to high levels of marital conflict and aggression are at elevated risk for a broad range of negative developmental outcomes that include problems of aggressive, disruptive behavior (e.g., Cummings, Davies, & Campbell, 2001; Erel & Burman, 1995; Grych & Fincham, 2001). Children are especially likely to show negative emotions and behaviors when they experience destructive forms of marital conflict such as threats, physical coercion and aggression, emotional abuse, and direct involvement (e.g., Davies, Myers, Cummings, & Heindel, 1999; El-Sheikh, Cummings, & Reiter, 1996; Grych & Fincham, 1993).

In the current study, we questioned whether the contributions of child temperament to early externalizing behavior would remain significant after controlling for co-occurring contributions of relevant psychosocial factors. A related issue concerned the *nature* of the associations between temperament and psychosocial risk. Recent reports have revealed that psychosocial factors moderate relations between temperament and child externalizing behavior in early childhood (e.g., Bates et al., 1998). Moderation effects also are generally consistent with transactional models (Sameroff & Mackenzie, 2003). To the best of our knowledge, no previous investigators have determined whether psychosocial risk moderates relations between effortful control temperament and early externalizing behavior. Therefore, this issue was examined in the current study.

Moderating effects of child gender

We also considered possible gender differences in relations between effortful control and externalizing behavior. Child gender has been shown to be a powerful moderator of the development of externalizing behavior in young children (Keenan & Shaw, 1997). Whereas, before age 4 boys and girls show few differences in level of disruptive behavior (Achenbach, Edelbrock, & Howell, 1987; Hay, Castle, & Davies, 2000), after age 4 substantial differences are found (Keenan & Shaw, 1997; Tremblay, Pihl, Vitaro, & Dobkin, 1996). Further research is needed to determine why this is the case. According to Keenan and Shaw (1997), one possibility is that toddler and preschool-age girls are more mature than boys in developmental skills that contribute to control of aggression and impulsivity. Consistent with this speculation, other investigators have found that toddler and preschool-age girls show more advanced effortful control abilities than boys (e.g., Kochanska et al., 2000). Therefore, we examined the possibility that relationships between children's effortful control

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capabilities and early externalizing problems were differentially patterned for boys and girls.

In addition, it is important to consider possible interactions between child gender and family risk factors (Keenan & Shaw, 1997; McFayden–Ketchum, Bates, Dodge, & Pettit, 1996; Miller, Cowan, Dowan, Hetherington, & Clingempeel, 1993). For example, associations between caregiving risk and externalizing problems have been found to be stronger in boys than in girls (Rothbaum & Weisz, 1994), and some research has suggested that boys may be more sensitive to the negative consequences of adverse early parenting than girls (e.g., Shaw et al., 1998).

Heterogeneity Within the Externalizing Spectrum

Finally, we examined whether different subtypes of child externalizing problems have distinctive patterns of associations with measures of developmental and psychosocial risk. Most previous research has focused on global constructs of externalizing problem behavior. However, it is unclear whether externalizing problems should be considered one broad dimension of maladjustment, or separate but interrelated dimensions (Hinshaw, 1987; Lahey, Loeber, Quay, Frick, & Grimm, 1992). For example, dimensional ratings of conduct problems and hyperactivity tend to be highly intercorrelated, overlap considerably in the diagnosis of clinical cases, and share many common risk factors (e.g., Hinshaw, Lahey, & Hart, 1993). Increasingly, however, childhood externalizing problems have been viewed as heterogeneous, as evidenced by the classification of attention-deficit/hyperactivity disorder (ADHD) symptoms into two broad subtypes (American Psychological Association, 2000) and by the differentiation of distinct subtypes of conduct problems (Loeber, Wung, Keenan, Giroux, Stouthamer–Loeber, VanKammen, & Maughan, 1993; Moffitt & Caspi, 2001; Rutter, Giller, & Hagell, 1998). Given the dearth of research on this issue with toddler- and preschool-age children, we questioned whether the narrow-band subtypes of early externalizing problems (attention problems, aggression, and destructive behavior) would be differentially related to measures of effortful control and associated risk factors.

The Current Study

Data were drawn from the first wave of an ongoing longitudinal study of young children at risk for school-age externalizing problems (Olson & Sameroff, 1997). Guided by an overarching developmental systems framework, we adopted a multimethod, multiinformant approach to the assessment of child risk factors and behavioral outcomes (e.g., Campbell et al., 2000). Our primary hypothesis was that individual differences in children's effortful control skills would be negatively associated with child externalizing problems, even after controlling for the co-occurring contributions of relevant intraindividual and psychosocial factors. Secondary goals were (a) to determine whether effortful control and anger/frustration made additive and/or interactive contributions to early externalizing behavior, (b) to determine whether relations between early risk variables and child externalizing problems were differentially patterned for boys and girls, (c) to determine whether subtypes of early externalizing behavior would be differentially associated with measures of developmental and social risk, and (d) to determine whether relations between effortful control and early externalizing behavior were moderated by level of family psychosocial adversity.

Method

Participants

Participants were 220 3-year-old children (107 girls; age range = 32–45 months, $M = 41.25$ months, $SD = 1.72$ months) who were part of an ongoing longitudinal study of young children at risk for school-age conduct problems (Olson & Sameroff, 1997). Children represented the full range of externalizing symptom severity on the Child Behavior Checklist/2–3 (CBCL/2–3) (Achenbach, 1992), with an oversampling of toddlers in the medium high to high range of the Externalizing Problems scale ($T > 60$; 44%). Most families (95%)

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were recruited from newspaper announcements and fliers sent to day care centers and preschools; others were referred by preschool teachers and pediatricians. To recruit children with a range of behavioral adjustment levels, two different ads were periodically placed in local and regional newspapers and child care centers, one focusing on hard to manage toddlers, and the other on normally developing toddlers. Once a parent indicated interest, a screening questionnaire and brief follow-up telephone interview were used to determine the family's appropriateness for participation and willingness to engage in a longitudinal study. Children with serious chronic health problems, mental retardation, and/or pervasive developmental disorders were not included the current study. Families were paid for their participation.

Most children (91%) were of European American heritage. Others were of African American (5.5%), Hispanic American (2.5%), and Asian American (1%) racial or ethnic backgrounds. The majority (87.9%) resided in two-parent families; of the remaining households, 5.3% of parents identified themselves as single (never married), and 6.8% as divorced. Fifty-five percent of mothers worked outside the home. Nineteen percent of mothers and 24% of fathers had received high school educations with no further educational attainment, 46% of mothers and 34% of fathers had completed 4 years of college with no further training, and 35% of mothers and 42% of fathers had completed some additional graduate or professional training. The median annual family income was $52,000, ranging from $20,000 to over $100,000.

Procedure

Following rapport building that included obtaining the child's assent to participate, measures of effortful control and cognitive competence were individually administered during a laboratory session. Children received small gifts in exchange for their participation.

Mothers were interviewed in their homes by a female social worker. Basic demographic information was obtained; in addition, mothers responded to questions concerning their child's behavioral adjustment, and they described the types of discipline strategies used by both parents in response to child misbehavior. Subsequent to a home visit, mothers completed questionnaires concerning the child's behavioral adjustment and temperament. Fathers were also asked to complete ratings of their child's behavioral adjustment, and 66.2% agreed to participate. To examine whether the subsample of participants for whom maternal and paternal data were available differed from the subsample with mother participation only, these groups were compared on major study variables. Results of a multivariate analysis of variance (MANOVA) revealed no significant differences between these groups on maternal reports of psychosocial adversity or maternal and teacher reports of child externalizing problems (Kerr, Lopez, Olson, & Sameroff, 2004).

Finally, 85% of the children in our study were enrolled in preschool or daycare programs. Preschool teachers were asked to contribute ratings of children's behavioral adjustment, and 95% agreed and were given gift certificates for their participation.

Laboratory Assessments

Effortful control tasks

Individual differences in effortful control were assessed using six tasks from Kochanska et al.'s (1996) toddler-age behavioral battery. As described below, each task was designed to tap Rothbart's (1989) general construct of effortful control (suppressing a dominant response and initiating a subdominant response according to varying task demands). All tasks were introduced as "games," and children were reminded of the rules midway through each task. To provide a check on accuracy of recording, 15 test administrations were videotaped and independently scored. Reliability was excellent (mean $\kappa = .95$, range = .92–.98). Individual tasks are described below, in the order in which they were administered.

Turtle and Rabbit. The Turtle and Rabbit game was a measure of the child's ability to slow

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down motor activity. The child's task was to move a same-sex doll (baseline), a fast rabbit, and a slow turtle along a curving path mounted on a piece of poster board. The child was instructed to stay on the path and bring the figure "home" to a toy barn under the following conditions: (a) the "fastest rabbit in the world" needs to go home fast; and (b) the "slowest turtle in the world" needs to get home slowly (two trials for each). Scoring (a slightly adapted version of Kochanska's) reflected: *accuracy in negotiating the path* (1 = *child negotiates less than one-half of the path*, 2 = *child negotiates more than half of the path*, 3 = *child follows path and stays within lines*), and *ability to slow down motor activity* (difference between averaged fast and slow trials). Standardized mean scores were computed.

Tower task. The Tower task measured the child's ability to suppress and initiate activity in response to a verbal signal. The child was asked to take turns with the examiner (E) while building a block tower using 20 blocks (three trials). The E waited before placing each block until the child indicated that s/he was giving him/her a turn. Coding reflected the proportion of blocks placed by the child in relation to the total number of blocks. The score was reversed so that higher scores indicated higher levels of effortful control, that is, if the child gave E all due turns, the child's score would equal one-half of the total number of blocks. Mean scores were computed.

Delay. The child was required to wait while the examiner rang a bell before retrieving a small piece of candy from under a glass cup. There were four trials, with delays of 10, 15, 20, and 30 s. The child is told that E will hide the snack under the cup, and when the bell rings, s/he may have it. In the middle of each time trial, E picked up the bell as if ready to ring it. Children's scores on each trial were coded from 0 to 4 (0 = *child eats candy before E lifts bell*, 1 = *child eats candy after bell is lifted*, 2 = *touches bell or cup before bell is lifted*, 3 = *touches bell or cup after bell is lifted*, and 4 = *child waits until bell is rung*). A mean score of the four trials was computed.

Whisper task. The Whisper task assessed the child's ability to lower his/her voice. The child was asked to whisper the names of 10 cartoon characters that were presented consecutively. Each trial was coded from 0 to 2 (0 = *shout*, 1 = *normal*, 2 = *whisper*).

Tongue. The child was asked to hold a small piece of candy on his/her tongue, without chewing, eating, or swallowing it. There were four trials: 10, 15, 20, and 30 s. Coding reflected the amount of time that elapsed before the child ate the candy. The mean score was computed.

Lab Gift. This was an adapted version of Kochanska et al.'s (1996) task. The child was asked to sit in a chair facing away from the table where the examiner noisily wrapped a gift for him/her (60 s). The examiner asked the child not to look, so that s/he could wrap up the "surprise." Next, the wrapped gift was placed near the child, who was asked to wait while the examiner searched for a bow (120 s). Coding involved frequency of peeking during the 60-s interval, number of times the child made verbal references to the gift, number of times the child touched the gift, and the number of seconds that elapsed before the child took the gift. These scores were composited into a single index (α = .82).

Total effortful control score. As recommended by Kochanska et al. (1996), a total effortful control score was computed by summing standardized individual subtest scores (α = .70).

Cognitive maturity

Children's level of cognitive maturity was assessed using two subtests of the Wechsler Preschool and Primary Intelligence Scale—Revised (WPPSI-R; Wechsler, 1989): Vocabulary and Block Design. These subtests were summed to create a single index.

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Adult Ratings of Child Behavior

Behavior problem checklists

Mothers completed the CBCL/2–3 (Achenbach, 1992), a measure of toddler's behavioral and emotional problems. A subsample of fathers (n = 145) also completed the CBCL/2–3. Respondents rate the child on items that describe the child's behavior currently or within the previous 2 months. The 99 problem behavior items are rated on 3-point scales (2 = *very true or often true of the child*, 1 = *somewhat or sometimes true*, 0 = *not true of the child*). There are two broad band, factor analytically derived dimensions of child problem behavior, Internalizing (25 items on subscales Anxious/Depressed and Withdrawn) and Externalizing (26 items on subscales Aggressive Behavior and Destructive Behavior). The narrow- and broadband problem behavior scales were highly intercorrelated, for example, on average, mothers' and fathers' ratings of total Externalizing Problems correlated .87 with Destructive Behavior and .95 with Aggression (both ps $< .0001$). Achenbach (1992) reported that major scales of the CBCL/2–3 had high test–retest reliability (.91 for Total Problems, .84 for Externalizing Problems). In the current sample, mothers and fathers had moderately high levels of agreement on the total Externalizing Problems scale ($r = .44$, $p < .001$).

A subsample of preschool teachers (n = 189) completed the Caregiver–Teacher Report Form for Ages 2–5 (Achenbach, 1997). The behavior problem items are identical to those of the CBCL/2–3. Achenbach (1997) derived broad Internalizing and Externalizing scales, with subscale components that differed somewhat from those of the CBCL (e.g., the Externalizing Problems scale was defined by Aggressive Behavior and Attention Problems). As with the parent ratings, the broadband index of Externalizing Problems was highly correlated with its narrow-band subscales (rs = .92 with Attention Problems and .96 with Aggression, both ps $< .001$). In the current sample, mothers' and teachers ratings of child Externalizing Problems were not significantly correlated ($r = .12$, *ns*). However, fathers and teachers had moderately high levels of convergence in their perceptions of child externalizing problems (r = .41, $p < .001$).

Temperament questionnaire

An abbreviated version of Rothbart's Child Behavior Questionnaire (CBQ; Ahadi, Rothbart, & Ye, 1993) was used to assess parent's perceptions of child temperament. We created an Effortful Control Index by summing children's scores on Inhibitory Control (α = .77) and Attentional Focusing ($\alpha = .85$), the two most theoretically and empirically salient components of the construct (e.g., Rothbart & Bates, 1998; Posner and Rothbart, 2000). The Anger/Frustration scale ($\alpha = .77$) was also extracted.

Parenting behaviors. Mothers completed the Parenting Dimensions Inventory (PDI; Power, Kobayashi–Winata, & Kelley, 1988). During the home interview, mothers reported how frequently they and their husbands had physically disciplined their child (e.g. spank, grab, shake) during the last 3 months (Dodge, Pettit, & Bates, 1994). Possible answers included *never* (0), *once/month* (1), *once/week* (2), *daily* (3), and *several times daily* (4). We adapted this measure by creating a rank-order scale based on the frequency with which the mother reported that her child received physical punishment from either parent. Thirty-six rankings were possible. The lowest rank was assigned to children who received no physical punishment from either their mother or father. Children assigned the next lowest rank received no physical punishment from one parent, but were physically punished once per month by the other parent. Children who experienced physical punishment several times daily from both parents received the highest rank.

Two composite variables were derived: *Warm Responsiveness* and *Punitive Discipline*. For Warm Responsiveness, the Nurturance and Responsiveness subscales, theoretically related as dimensions of parental warmth, were averaged to form a total score ($\alpha = .73$). For Punitive Discipline, the

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Table 1. *Means and standard deviations on all study variables*

	M		*SD*		
	Boys	Girls	Boys	Girls	Gender Difference
Child behavior					
Effortful Control	−.30	.30	1.97	1.01	G > B, $p < .05$
WPPSI IQ	21.59	22.38	5.45	5.35	
Child temperament ratings (CBQ)					
Effortful Control	−.19	.17	1.44	1.21	G > B, $p < .05$
Anger/Frustration	4.58	4.55	.76	.72	
Child externalizing problems					
CBCL externalizing					
Mother	12.17	11.12	7.59	7.39	
Father	12.05	9.41	6.84	6.09	B > G, $p < .05$
CTRF externalizing					
Teacher	12.85	7.70	14.33	10.22	B > G, $p < .05$
Parenting and marital stress					
Punitive Discipline	2.08	1.72	1.69	1.59	
Warm Responsiveness	.15	.14	1.81	1.50	
Destructive Marital Conflict	2.83	2.78	1.43	1.75	

Physical Punishment scale of the PDI summarizes the total number of endorsements of spanking and hitting in parents' responses to five hypothetical situations involving child misbehavior (e.g., on a 0–3-point scale, how likely would the parent be to spank and hit in response to child defiance?). To create a total score, this questionnaire scale was composited (additive sum) with the interview-based measure of punitive discipline ($\alpha = .71$).

Destructive marital conflict. On separate scales of the Kerig Conflicts and Problem-Solving Scales (Kerig, 1996), mothers rated the likelihood that they and their partner would use particular conflict strategies during marital disputes. The total frequency with which mothers reported that they or their partner would engage in destructive responses to conflict were summed into a total scale, Destructive Marital Conflict ($\alpha = .82$). Destructive responses included use of verbal aggression (e.g., yelling, shouting, name calling, insulting), physical aggression (e.g., threaten to hurt partner, push, pull, shove, handle roughly, hit), and involving the child in conflict (e.g., involving the child in arguments; arguing in front of the children).

Results

Overview

Means and standard deviations for all study variables are shown in Table 1, computed separately for boys and girls. In preliminary analyses, we examined gender differences and descriptive relationships between measures. Initially, we examined zero-order relationships between children's effortful control capabilities and externalizing behavior, and, using hierarchical multiple regression techniques, we determined whether effortful control made a unique contribution to child externalizing over and above contributions of general intellectual maturity. Next, dispositional anger/frustration was examined as possible contributor to early externalizing problems, and we determined whether effortful control and anger combined additively and/or interactively as predictors of child externalizing problems. Finally, we determined whether individual differences in children's effortful control skills would make incremental contributions to child externalizing problems after accounting for co-occurring contributions of variations in psychosocial adversity, and whether levels of psychosocial

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adversity and effortful control would make additive and/or interactive contributions to early externalizing behavior.

Descriptive Analyses

Gender differences

Laboratory measures of child effortful control and intellectual maturity. Gender differences in laboratory measures of child functioning were examined using a MANOVA, with child gender as the between-subjects factor and the composite effortful control and cognitive maturity indexes as dependent measures. A significant main effect for child gender was obtained, F (2, 198) = 3.71, $p < .01$. Univariate tests revealed that girls showed higher levels of effortful control than boys, F (1, 202) = 12.20, $p < .001$. However, boys and girls did not differ significantly on the measure of cognitive maturity.

Mother report temperament scales. Next, we examined possible gender differences on the CBQ temperament scales Effortful Control and Anger/Frustration. A significant multivariate main effect for child gender was obtained, F (2, 202) = 5.10, $p < .01$. Univariate tests revealed that girls had higher scores than boys on Effortful Control, F (1, 209) = 4.10, $p < .05$. However, boys and girls did not differ significantly on the Anger/Frustration scale.

Externalizing behavior reports. Potential gender differences in child behavior problems were analyzed using MANOVA. Separate analyses were conducted for each different informant, given the substantial differences in sample sizes. Using maternal reports of child externalizing and internalizing problems as dependent variables, the multivariate main effect for child gender failed to reach significance. However, a significant multivariate main effect was found for child gender in relation to fathers' reports of child behavior problems, F (2, 142) = 3.27, $p < .05$. Univariate tests revealed that fathers rated boys more highly than girls on externalizing problems ($F = 6.04$, $p < .05$). Boys and girls did not differ significantly on fathers' reports of internalizing problems. Similarly, using teacher ratings of child externalizing and internalizing problems as dependent variables, the multivariate main effect for child gender was significant, F (2, 187) = 6.71, $p < .001$. Boys were rated more highly than girls on externalizing problems ($F = 7.20$, $p < .01$), but there were no significant gender differences in internalizing problem ratings.

Measures of psychosocial adversity. Using MANOVA, we examined whether parenting and marital stressors would differ for girls and boys, with child gender as the between-subjects factor and measures of Punitive Discipline, Warm Responsiveness, and Destructive Marital Conflict as dependent variables. The multivariate main effect for child gender failed to reach significance; no further tests were conducted.

Family demographic correlates of child problem behavior

Maternal and paternal education and family income were not significantly correlated with either mothers' or fathers' ratings of child externalizing problems. However, teachers' ratings of child externalizing behavior were modestly negatively correlated with levels of maternal education ($r = -.17$, $p < .05$) and family income ($r = -.19$, $p < .05$).

Zero-order correlations between study variables

Zero-order correlations between measures of child temperament, child cognitive maturity, and family psychosocial adversity are shown in Table 2. There were several important descriptive findings. First, mirroring Kochanska et al.'s (1996) findings, behavioral and maternal rating measures of effortful control were significantly positively correlated. These data provide independent support for the validity of the behavioral battery. Second, the temperament scales Effortful Control and Anger/Frustration were significantly negatively correlated, indicating that children with high levels of effortful control skills tended to manifest lower levels of anger than others.

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Table 2. *Zero-order correlations between measures of child temperament, cognitive maturity, and psychosocial adversity*

Variables	1	2	3	4	5	6	7
IQ (1)	1.00	.35***	.25**	−.13	−.11	.18*	−.21*
EC:BEHAV (2)		1.00	.33***	−.16	−.18*	.13	−.02
EC:CBQ (3)			1.00	−.34***	−.29**	.29**	−.04
ANGER:CBQ (4)				1.00	.28**	−.18*	.24**
PUN (5)					1.00	−.24*	−.18*
WM/RESP (6)						1.00	−.22*
DESTR (7)							1.00

Note: IQ, WPPSI BD + Vocab; EC:BEHAV, total score, Kochanska effortful control battery; EC:CBQ, Effortful Control; ANGER:CBQ, Anger/Frustration; PUN, Punitive Discipline; WM/RESP, Warm Responsiveness; DESTR, Destructive Marital Conflict.

Third, measures of parenting behavior and destructive marital conflict were intercorrelated in expectable ways. Mothers who endorsed frequent use of punitive discipline also reported higher levels of destructive marital conflict and less frequent displays of warmth and responsiveness than others. Fourth, punitive parenting behavior was negatively correlated with children's effortful control scores, whereas the opposite pattern of relations was found for warm/responsive parenting. In addition, high levels of destructive marital conflict were also negatively correlated with child intellectual maturity, and positively correlated with high levels of child anger/frustration, as reported by mothers.

Effortful Control and Child Externalizing Behavior

We found strong support for our main hypothesis that high levels of child externalizing problems would be associated with low levels of effortful control. As shown in Table 3, both the behavioral and mother report measures of effortful control were significantly negatively correlated with mothers', fathers', and teachers' ratings of child externalizing problems. Although mothers' ratings of child problem behavior were unrelated to children's levels of cognitive maturity on the WPPSI tasks, we did find modest negative associations between child IQ and fathers' and teachers' ratings.

Thus, hierarchical multiple regression analyses were conducted to evaluate the relative contributions of children's effortful control skills to child Externalizing Problems, controlling for variations in child cognitive maturity. Dependent variables were ratings of child Externalizing Problems contributed by mothers, fathers, and teachers; independent variables were entered in the following order: child cognitive maturity on the first step; and child effortful control (behavioral and maternal report measures) on the second step. As shown in Table 4, maternal ratings were robustly predicted by a single measure, Effortful Control. Although child IQ made significant contributions to fathers' and teachers' ratings of externalizing problems, variations in effortful control continued to make highly significant incremental contributions to the variance in these outcomes beyond the contributions of intellectual maturity.

Given that girls had higher effortful control scores than boys, HMR analyses were also used to determine whether child gender moderated associations between effortful control and externalizing behavior. Dependent variables were mothers', fathers', and teachers' ratings of child externalizing problems; independent variables were entered in the following order: Effortful Control (behavioral + rating measures) on the first step; Child Sex on the second step; and the interaction term Child Sex × Effortful Control on the third step. Following procedures recommended by Aiken

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Table 3. *Zero-order correlations between effortful control, IQ, and child externalizing problems*

	Measures of Effortful Control		
Externalizing Ratings by Informant	Behavioral	Mother CBQ	IQ
Mothers ($N = 220$)	−.21*	−.53***	−.09
Fathers ($N = 145$)	−.37*	−.44**	−.20*
Preschool teachers ($N = 189$)	−.28*	−.31**	−.20*

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

and West (1991), predictor variables were centered. Effortful Control made a highly significant contribution to the variance in mothers', fathers', and teachers' ratings of child externalizing problems ($R^2 = .27$, .21, and .17, respectively, all ps $< .001$). Child gender did not make a significant incremental contribution to the variance in any dependent measure, and no significant interactions were obtained.

Contributions of Dispositional Anger

Next, we examined potential additive and/or interactive contributions of child anger/frustration. Using mothers', fathers', and teachers' ratings of child externalizing problems as separate dependent variables, ratings of Anger/Frustration were entered on the first step. Behavioral and rating measures of effortful control were entered (as a block) on the second step, and the interaction term Irritable Reactivity × Effortful Control was entered on the final step. As shown in Table 5, Anger/Frustration was a highly significant predictor of maternal reports of child externalizing problems. Even so, measures of effortful control remained highly significantly predictive of this outcome. Contrary to expectation, however, Anger did not predict fathers' or teachers' externalizing behavior ratings.

We also examined the possibility of a nonlinear effect wherein children who were low on Effortful Control and high on Anger/Frustration would manifest higher levels of externalizing problems than others. As shown in Table 5, the interaction terms did not reach significance.

Associations Between Psychosocial Stressors and Child Externalizing

Measures of psychosocial adversity were related in expectable ways to maternal reports of child externalizing problems. To a modest degree, mothers who described their children as high in externalizing problems also reported more frequent use of punitive discipline ($r = .23$, $p < .05$), higher levels of destructive marital conflict ($r = .15$, $p < .05$), and less frequent displays of warmth and responsiveness ($r = -.22$, $p < .05$), than others. Associations between parenting behavior and child externalizing problems generalized across teachers' ratings of child externalizing problems at $r = -.17$ with Warm Responsiveness and $r = .15$ with Punitive Discipline (both ps $<$ .05). However, fathers' ratings of child externalizing problems were unrelated to maternal reports of parenting behavior and destructive marital conflict.

Hierarchical multiple regression analyses were used to determine whether children's effortful control skills made significant incremental contributions to the variance in maternal ratings of child externalizing problems after accounting for the contributions of psychosocial factors, and whether measures of psychosocial adversity and effortful control would combine interactively in relation to child externalizing. Dependent variables were mothers', fathers', and teachers' ratings of child externalizing behavior. Measures of psychosocial adversity were entered (simultaneously) on the first step, measures of effortful control on the second, and two-way interactions between each psychosocial factor and

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Table 4. *Hierarchical multiple regression analyses: Incremental contributions of effortful control to child externalizing problems, controlling for child IQ*

Dependent Variables	ΔR^2	ΔF	*df*	Δp
l. Externalizing problems: maternal ratings				
IQ	.01	1.77	1, 199	*ns*
Effortful Control	.22	56.73	1, 198	.00
2. Externalizing problems: father ratings				
IQ	.04	5.59	1, 133	.01
Effortful Control	.14	21.06	1, 132	.00
3. Externalizing problems: teacher ratings				
Maternal education, family income	.04	4.15	2, 183	.01
IQ	.03	5.47	1, 182	.05
Effortful Control	.09	17.47	1, 181	.00

effortful control on successive steps. Predictor variables were centered (Aiken & West, 1991). Measures of psychosocial adversity accounted for a significant portion of the variance in maternal ratings of child externalizing behavior ($\Delta R^2 = .10$, $\Delta F = 6.73$, $\Delta p < .01$). Even so, measures of effortful control, entered on the second step, made a highly significant incremental contribution to the variance in this outcome ($\Delta R^2 = .17$, $\Delta F = 35.70$, $\Delta p < .001$). Similarly, variations in effortful control made a highly significant incremental contribution to teachers' externalizing problem ratings after controlling for contributions of family risk (punitive discipline, low warmth, low parental education/income entered simultaneously; $\Delta R^2 = .13$, $\Delta F = 17.51$, $\Delta p < .01$). However, none of the interaction terms reached significance.

Hierarchical multiple regression analyses were also used to examine possible interactions between measures of psychosocial adversity and child gender. Dependent variables were mothers', fathers', and teachers' ratings of child Externalizing Problems. After entering Punitive Discipline, Warm Responsiveness, Destructive Marital Conflict, and family socioeconomic status (SES) simultaneously on the first step, the following interaction terms were entered on successive steps: Punitive Discipline × Child Sex; Warm Responsiveness × Child Sex; and Destructive Marital Conflict × Child Sex. No significant interaction effects were obtained.

Effortful control and externalizing problem subscales

Finally, we considered whether distinct subscales of child externalizing were differentially related to measures of effortful control. As expected, externalizing problem subscales were highly intercorrelated within informants (average $r = .66$, range = .61–.87). Thus, although exploratory analyses revealed nearly identical patterns of zero-order correlations between measures of effortful control and externalizing problem subscales, unique associations could be masked by the high degree of multicollinearity. A series of hierarchical multiple regression analyses were conducted to determine whether parents' and teachers' ratings of child Aggression would make significant incremental contributions to the variance in parents' reports of child conscience, beyond contributions of co-occurring problems of attention and impulse control. The dependent variable was a composite index of child effortful control (behavioral plus parent report measure); in separate analyses, parent or teacher ratings indexing impulsive, inattentive behavior were entered on the first step, and ratings of aggression were entered on the second step. Results were highly consistent across the reports of different informants. Effortful control was strongly predicted by mothers' ratings of Destructiveness, a subscale indexing inattentive, boisterous, and impulsive behavior ($R^2 = .32$, $\Delta F = 70.68$, $p < .0001$); however, incre-

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Table 5. *Hierarchical multiple regression analyses: Anger/frustration and effortful control as predictors of child externalizing problems*

Dependent Variables	ΔR^2	ΔF	*df*	Δp
l. Externalizing problems: maternal ratings				
Anger/Frustration	.28	34.15	1, 207	.00
Effortful Control	.14	22.81	1, 206	.00
Effortful Control × Anger	.01	2.83	1, 204	*ns*
2. Externalizing problems: father ratings				
Anger/Frustration	.02	28.55	1, 136	*ns*
Effortful Control	.15	22.02	1, 135	.00
Effortful Control × Anger	.00	.57	1, 131	*ns*
3. Externalizing problems: teacher ratings				
Maternal education, family income	.04	4.15	2, 183	.01
Anger/frustration	.00	.01	1, 182	*ns*
Effortful Control	.13	24.76	1, 181	.00
Effortful Control × Anger	.01	3.08	1, 180	*ns*

mental contributions of child Aggression failed to reach significance ($R^2 = .00$). Similarly, fathers' ratings of Destructiveness made significant contributions to effortful control ($R^2 = .25$, $\Delta F = 50.68$, $\Delta p < .001$), whereas incremental contributions of Aggression were negligible ($R^2 = .03$, *ns*). Finally, teachers' ratings of child Attention Problems made significant contributions to effortful control ($R^2 = .11$, $\Delta F = 21.30$, $\Delta p < .001$), whereas incremental contributions of teachers' ratings of Aggression failed to reach significance.

Discussion

Our primary objective was to examine relations between effortful control temperament and externalizing problems in young children. According to Rothbart and colleagues, the construct of effortful control encompasses self-regulatory mechanisms, chiefly inhibition of impulsive behavior and active deployment of attention, which emerge in late infancy and develop rapidly between the ages of 2 and 6 (Posner & Rothbart, 2000; Rothbart & Bates, 1998). There are compelling reasons for linking problems in effortful control to the development of externalizing problems in toddler- and preschool-age children. Prior research has indicated that different executive skills, particularly ability to flexibly inhibit impulsive action, may play a central role in the development and persistence of disruptive behavior disorders (e.g., Barkley, 1997; Moffitt, 2003; Olson et al., 1999; Nigg, 2000). Given its relevance to both normal and atypical development (e.g., Kochanska et al., 2000; Posner & Rothbart, 2000), effortful control is a key developmental construct to examine in studies of young children at risk for externalizing problems. In the current study, we examined associations between effortful control and externalizing behavior in a sample of special interest: 3-year-old children with varying levels of risk for school-age externalizing problems. Because stable individual differences in behavioral maladjustment and self-regulation can be detected during these years, the early preschool period provides an opportune time for examining risk markers that differentiate stable versus self-limiting patterns of externalizing problems. At the same time, this period of rapid developmental change yields an expansive array of other factors that could explain associations between effortful control and child externalizing behavior. For this reason, we examined contributions of effortful control in relation to other potentially important developmental and psychosocial correlates of child externalizing problems.

Our main hypothesis was strongly supported: both the behavioral index and mothers' ratings of children's effortful control

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capabilities were negatively associated with ratings of child externalizing problems contributed by mothers, fathers, and teachers. Thus, relations between low effortful control skills and child externalizing behavior showed impressive generalizability across different relationship systems and situational contexts. Moreover, individual differences in children's effortful control skills made highly significant incremental contributions to the variance in child externalizing problems, beyond the contributions of variations in child intellectual maturity and levels of parenting and family risk. These findings provide a "downward extension" of research on school-age populations showing that measures of executive dysfunction predict externalizing problems even after controlling for potential confounds such as IQ and family adversity (e.g., Seguin, Boulerice, Harden, Tremblay, & Pihl, 1999).

Another important issue concerned the specificity of relations between effortful control and child externalizing problems. There is significant heterogeneity in the development of disruptive behavior (Rutter, 2003). For example, children with early-onset conduct problems and co-occurring symptoms of attention deficit hyperactivity disorder are more likely than others to show persistent behavior problems (Henry, Caspi, Moffitt, & Silva, 1996). Thus, some narrow-band subtypes of child externalizing problems, particularly attention problems, may be more strongly linked with children's effortful control skills than others. Indeed, further analyses revealed that externalizing problem subscales indexing inattention and impulsive/disruptive behavior accounted for all of the variance in associations between effortful control and child externalizing problem behavior. These findings converge with prior theory (e.g., Barkley, 1997) and research showing that evidence for executive deficits is clearest in preschoolers with comorbid ADHD symptoms (Hughes, Dunn, & White, 1998; Hughes et al., 2000; Speltz, DeKlyen, Calderone, et al., 1999). They also underscore the importance of examining linkages between distinct subcomponents of the heterogeneous externalizing problems construct and developmental risk factors (e.g., see review by Hinshaw, 2002).

A related issue concerned the nature of the effortful control construct, which is defined by heterogeneous components that may be differentially related to child externalizing problems. For example, Olson et al.'s (2002) longitudinal study spanning the toddler through middle childhood years showed that subdimensions of cognitive, behavioral, and attentional control had different patterns of stability and early developmental precursors. In future research, it will be important to determine whether distinct subcomponents of effortful control have different implications for understanding children's long-term behavioral adjustment.

The greatest challenge to the validity of our findings concerns the potential circularity of association between measures of temperament risk and child behavior problems. For example, one could argue that measures of temperament and early problem behavior are confounded, in that they are defined by similar items and/or constructs. However, this threat is greatest when measures of both constructs are contributed by the same individual. In the current study, child behavior problems were rated by three different informants, and effortful control was assessed using both behavioral indices and parent ratings. Moreover, correlations between effortful control and child externalizing were in the .4–.5 range, a robust, but hardly overlapping, level of association. Finally, two prior studies have shown that measurement confounding did not account for associations between maternal ratings of temperament and mother, father, and caregiver reports of behavior problem symptoms in early childhood (Lemery, Essex, & Smider, 2002; Lengua, West, & Sandler, 1998). Although these considerations do not eliminate this thorny issue, they do increase our confidence that the current findings are not simply artifacts of confounded measures. Pending further research, we posit that effortful control and child externalizing problems are interrelated but theoretically distinct constructs, and that low levels of effortful control are necessary but not sufficient risk factors for the development of chronic problems of impulsive, disruptive behavior.

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Contributions of anger/frustration

We also examined potential additive and/or interactive contributions of dispositional anger to child externalizing problems. Based on previous research, children with high levels of dispositional anger/frustration were expected to manifest higher levels of externalizing problems than others. This hypothesis was partially confirmed: Anger was a highly significant predictor of maternal reports of child externalizing behavior. Supporting an additive model of risk, children's effortful control skills continued to make a significant incremental contribution to the variance in mother-reported externalizing when contributions of anger had been accounted for. However, ratings of dispositional anger did not predict child externalizing problems reported by fathers or teachers.

In addition, we hypothesized that anger and effortful control would make interactive contributions to early externalizing behavior, such that children with low levels of effortful control and high proneness to anger would manifest higher levels of externalizing problems than others (e.g., Eisenberg et al., 2001). However, none of these predicted interactions were obtained.

Thus, in contrast with results obtained in relation to children's effortful control skills, relations between child anger and early externalizing behavior were neither extensive nor robust. It may be the case that measures of anger/frustration are not sensitive correlates of disruptive behavior during this early age period. However, our measures of proneness to anger were limited to maternal reports of children's daily functioning. Examining psychophysiological and behavioral measures of young children's responses to frustrating stimuli would be a logical direction for further research efforts, potentially yielding more robust findings. For example, Calkins and Dedmon (2000) found that highly aggressive toddlers did not differ from others in their resting heart rate levels; however, measures of heart rate variability in response to a stressful laboratory task did differentiate high- and low-risk toddlers, highlighting the risk potential of suboptimal stress regulation. Similarly, Hughes, Cutting, and Dunn (2001) found that disruptive preschoolers "acted nasty" with peers when frustrated in rigged competitive games.

In addition, we speculate that relations between anger regulation and effortful control might become more closely linked in later years, due to increasing levels of adverse social experiences. For example, based on recent theory (e.g., Posner & Rothbart, 2000), Nigg (2003) predicted a "cascade effect" wherein executive deficits worsen between the toddler through school-age years in some at-risk children, due to escalating levels of negative experiences with family members and peers. We will examine this hypothesis in future, planned longitudinal analyses.

Contributions of psychosocial adversity

Current models of child psychopathology stress the importance of understanding contributions of child risk factors in the context of co-occurring levels of social adversity (e.g., Moffitt, 2003; Sameroff & Mackenzie, 2003). However, as Raine et al. (2002) have pointed out, few investigators have examined the extent to which cognitive deficits contribute to early-onset externalizing problems in relation to differential levels of social risk. In the current study, children's levels of exposure to harsh parental discipline, low parental warmth/responsiveness, and destructive marital conflict had predictable associations with maternal and teacher ratings of child externalizing behavior. Moreover, variations in child effortful control skills continued to make highly significant incremental contributions to maternal reports of externalizing behavior, after controlling for contributions of psychosocial factors. Thus, at the early preschool level, individual differences in children's effortful control skills were robust and generalized predictors of child externalizing problems; where relevant psychosocial correlates were found, our data primarily supported an additive model of risk (Sameroff, 2000).

Consistent with previous longitudinal research on early externalizing problems (e.g., Campbell et al., 2000; Sameroff & Mackenzie, 2003), we believe that developmental risk factors have the most predictive utility when understood in the context of the child's rela-

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tionships with parents, siblings, peers, and teachers. Thus, in further studies we will determine whether children's early effortful control skills are most highly predictive of chronic externalizing behavior when they co-occur with adverse social experiences in family and preschool settings.

Moderating effects of child gender

In prior research, child gender has been identified as a powerful moderator of children's externalizing problem trajectories across the preschool and early school-age periods (Keenan & Shaw, 1997; Lahey et al., 2000; Moffitt, Caspi, Rutter, & Silva, 2001; Tremblay, Boulerice, Harden, McDuff, Perusse, Pihl, & Zoccolillo, 1996). One possible explanation is that girls possess relatively high levels of developmental skills that ameliorate disruptive behavior (Keenan & Shaw, 1997). Evaluation of this hypothesis requires longitudinal follow-up data, not yet available on our project. However, consistent with Kochanska et al.'s (2000) findings, girls manifested more advanced skills than boys in ability to organize and sustain attention, delay gratification, and inhibit impulsive responding. In further research, we will determine whether these early gender differences are associated with differential levels of behavior problem continuity.

We also questioned whether associations between effortful control, associated risk factors, and early externalizing behavior would be differentially *patterned* for boys and girls. Most prior research linking executive function and externalizing behavior has been conducted with school-age boys. However, some investigators also have reported links between impaired executive function and externalizing problems in girls as well as boys (Giancola, Mezzich, & Tarter, 1998; Seguin et al., 1999). Our findings are in agreement with these studies, suggesting, in addition, that early-onset externalizing problems may reflect similar developmental precursors in girls and boys.

Limitations

Limitations to the generalizability of our findings should be noted. Most children in our study were from intact, two-parent, middle-class families. Therefore, our findings may not generalize to children growing up in other family constellations, or to those whose families experience severe economic hardship. Similarly, reflecting the local population, children and parents in our study primarily were from European American backgrounds. Thus, our findings may have limited generalizability to racially and ethnically diverse populations of young children.

Children in our constrained community sample represented the full range of the Externalizing Problems spectrum with a disproportionate number in the medium-high to high range. However, relatively few had Externalizing scores in the extreme range, limiting generalizability to clinically referred populations.

Another limitation was that measures of psychosocial adversity and child anger were drawn from maternal report. As noted above, behavioral indices of these constructs may yield a different and possibly richer pattern of findings than those reported in the current paper.

Finally, these data were drawn from the first wave of an ongoing longitudinal study, and thus were specific to a single time period. Although these data provide important information about specific self-regulatory problems associated with early disruptive behavior, follow-up data are needed to determine the true risk potential of individual differences in children's early regulatory competencies and social experiences.

General Conclusion

In conclusion, we found strong support for the hypothesis that individual differences in effortful control temperament would be negatively associated with externalizing problem behavior in the early preschool period. Our data were unique in showing that relations between children's effortful control skills and externalizing behavior generalized across the reports of multiple informants (mothers, fathers, teachers) in multiple assessment settings (home, preschool) and with multiple measures (behavioral and parent report) of effortful control. Relations between children's effortful control skills and externalizing be-

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havior were not overshadowed by other cognitive and social risk factors, or by other relevant child temperament traits such as irritable reactivity. Thus, individual differences in effortful control may play a critical role in the early development of children's externalizing problems, an hypothesis that will be evaluated in further longitudinal research.

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