Parenting Self-Efficacy and Problem Behavior in Children at High Risk for Early Conduct Problems: The Mediating Role of Maternal Depression

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ABSTRACT

Parenting self-efficacy (PSE) has been positively linked to children’s adjustment and negatively associated with maternal depression. However, most PSE research has been cross-sectional, limited to predominantly white, middle-class samples, and has not examined potential mechanisms underlying associations of PSE with children’s behavior. The present study investigates (1) how PSE changes over time, (2) the relationship between age 2 PSE and children’s behavior problems two years later, (3) and the potential mediating role of maternal depression in relation to the association between PSE and child problem behavior. Participants are 652 ethnically and geographically diverse mothers and their children, at high risk for conduct problems. PSE increased between ages 2 and 4 and higher initial levels predicted lower maternal- and alternate caregiver-reported age 4 conduct problems after controlling for initial problem behavior. Maternal depression at age 3 mediated these relationships. Implications for parenting interventions, focusing on PSE and maternal psychopathology, are discussed.

Key words: Parenting Self-Efficacy, Child Problem Behavior, Early Childhood, Maternal Depression

The relationship between parenting and children's healthy development has been well-documented (Dishion & McMahon, 1998; Gardner, Ward, Burton, & Wilson, 2003), and this association has been found to be particularly evident during early childhood when parents play a more prominent role in children's socialization process relative to older ages (Campbell, Shaw, & Gilliom, 2000; Gardner, 1987; Shaw & Bell, 1993). Also during early childhood, parenting self-efficacy (PSE), or perceived competence in the parenting role, has been positively linked with observed parenting competence (e.g., warmth, sensitivity, engagement). In fact, PSE has been found to mediate associations between parenting and children’s developmental outcomes (Coleman & Karraker, 2003). In light of this promising research on PSE, it is somewhat surprising to find a dearth of literature on the developmental course or stability of PSE or longitudinal data linking its development with children’s socioemotional outcomes. In addition, most research on PSE has been conducted with predominantly European-American, middle-class families (see Raver & Leadbeater, 1999, and Zayas, Jankowski, & McKee, 2003 for notable exceptions). Even fewer studies have examined potential mediating factors that might account for associations between PSE and child problem behavior. While PSE has been found to mediate associations between parenting and child outcomes, it is possible that underlying intrapersonal characteristics such as parental well being might contribute to PSE and its association with child outcomes. The current study sought to advance our knowledge on PSE by examining its developmental course from the toddler to preschool period, by exploring its longitudinal relation with emerging children’s conduct problems, and testing whether associations between PSE and children’s conduct problems were potentially mediated by maternal depressive symptoms. The study was carried out with a large sample of 652 children at high risk for developing early conduct problems.
based on the presence of socioeconomic, family, and child risk factors.

**Parenting Self-Efficacy and General Self-Efficacy Theory**

PSE has been defined as the degree to which parents expect to competently and effectively perform their roles as parents (Teti & Gelfand, 1991), and it is rooted in general self-efficacy theory. Guided by social learning theory, general self-efficacy refers to the belief in one's ability to perform behaviors successfully (Bandura, 1977). Overall, self-efficacy includes the motivation, cognitive resources, and courses of action necessary to implement control over a specific task or event (Ozer & Bandura, 1990). Self-efficacy reflects perceived self-competence as opposed to expectations of task success or failure (Bandura, 1977). In other words, an individual with high self-efficacy may anticipate task failure in a situation that would realistically require advanced expertise in a specific domain.

In general, people who have high self-efficacy have been found to trust their competence in the face of environmental demands, conceptualize difficult situations as challenges, have less negative emotional arousal in the face of stress, and exhibit perseverance when challenged (Jerusalem & Mittag, 1995). In contrast, people with lower self-efficacy tend to doubt themselves and experience high levels of anxiety when faced with adversity, assume more responsibility for task failure than success, interpret challenges as threats, avoid difficult tasks, and cope dysfunctionally. In light of these cognitive, emotional, and behavioral manifestations, it is critical to study self-efficacy within the domain of parenting. Specifically, it is important to understand how PSE unfolds over time, particularly during early childhood when children are quickly gaining increased mobility and independence in the context of limited cognitive abilities, thereby presenting unique challenges to parents to protect toddler's safety and the safety of valuables, pets, and other family members, particularly younger siblings (Shaw & Bell, 1993).

**The Developmental Course of Parenting Self-Efficacy**

Despite the theoretical significance of PSE, we know relatively little about its developmental course during early childhood, a period of time that has been found to be critical for parenting and children's subsequent adjustment (Shaw, Bell, & Gilliom, 2000). During toddlerhood, children rapidly acquire a repertoire of cognitive, social, and motor skills, challenging parents to tailor their parenting techniques to children's changing needs. In turn, children during this key developmental period are especially dependent on the influence of their caretakers in terms of their social and emotional adjustment. Because of the unique circumstances presented during this period of development not only for children, but also for the growth of parents, it is critical to understand how PSE unfolds specifically during early childhood. One study followed changes in PSE among low-income minority mothers from the third trimester of pregnancy to three months post-partum (Zayas et al., 2005). The authors found that PSE significantly increased during the transition to motherhood. In one of the few other longitudinal studies using an ethnically diverse, middle-class sample, Gross, Conrad, Fogg, and Wothke (1994) examined changes in PSE among two cohorts of children from ages 1 to 2 and 2 to 3, respectively, with measurements of PSE three times each year. PSE was found to increase between ages 1 and 2 in Cohort 1, but remain stable from ages 2 to 3 in Cohort 2. In light of these studies, there is some evidence that PSE initially increases in the first couple of years of children's lives and then shows moderate stability; however, longitudinal modeling of growth parameters across at least three measurement waves is needed to elucidate the developmental trajectory of PSE.

**Parenting Self-Efficacy and Children's Socioemotional Adjustment**

As early-onset behavior problems beginning as early as the toddler period have been linked to the development of more severe conduct problems in middle childhood and adolescence, such as delinquency and substance use (Campbell et al., 2000; Shaw & Gross, in press), it is critical to identify factors in early childhood that contribute to or protect children from the maintenance of problem behavior. Based on PSE's theoretical and empirical links to several dimensions of parenting behavior (Bor & Sanders, 2004; Coleman, Trent, Bryan, King, Rogers, & Nazir, 2002), it is logical to consider its associations with problem behavior during early childhood. In fact, PSE has been linked to children's development in terms of behavioral adjustment (Bor & Sanders, 2004). For example, as early as 5 months, PSE was found to be positively related to concurrent ratings of infant soothability (Leerkes & Crockenberg, 2002). At age 2, Raver and Leadbeater (1999) found that PSE was inversely related to children's concurrent difficult temperament among a sample of urban impoverished families. Furthermore, children's observed compliance, negativity, and avoidance of mother at age 2 was found to be associated with concurrent ratings of PSE among predominantly middle-class, mother-toddler dyads (Coleman & Karraker, 2003). Among a demographically similar sample of mothers with school-aged children, higher PSE was concurrently associated with less emotionally reactive and more sociable behavior (Coleman & Kar-
In terms of problem behavior, lower levels of PSE among mothers of preschool-aged children at high risk for developing conduct problems were found to be associated with higher levels of concurrent children's disruptive behaviors (Bor & Sanders, 2004). Furthermore, mothers of clinically-referred, 2- to 8-year-old children with conduct problems reported lower levels of PSE than a comparative community sample (Sanders & Woolley, 2005).

Despite the existence of several studies examining relations between PSE and different dimensions of child functioning, most work in this area has been cross-sectional. Furthermore, with notable exceptions (Raver & Leadbeater, 1999; Zayas et al., 2005), most work on PSE has been conducted using predominantly white, middle-class samples (e.g., Coleman et al., 2002; Leerkes & Crockenberg, 2002; Teti & Gelfand, 1991). Thus, more research that incorporates culturally and socioeconomically diverse samples is needed to extend previous findings to under-represented groups.

**Parenting Self-Efficacy and Children’s Conduct Problems and the Mediating Role of Maternal Depression**

In addition to needing more studies that trace the development course of PSE over time and link PSE to specific child outcomes using samples of children at risk for high rates of clinically-meaningful psychopathology, few researchers have attempted to examine potential mediators of associations between PSE and child adjustment. The development of general self-efficacy is thought to result from four domains of experiences, including individual histories of task successes versus failures, vicariously learning through the successes and failures of others, verbal persuasion from others, and aversive physiological arousal, such as stress responses (Bandura, 1989). While PSE has been theoretically linked to a number of early life experiences (e.g., history of childhood maltreatment, maternal stress), maternal depression represents one important intrapersonal filter through which the detrimental effects of maternal PSE on children's functioning may be transmitted. Specifically, hallmarks of depression such as feelings of helplessness and hopelessness may underlie and drive feelings of low maternal PSE and lead to the development of children's problem behavior. Thus, associations between low PSE and children's conduct problems may be accounted for by the negative cognitions and affect associated with depression. As both clinical depression and subclinical elevated depressive symptomatology have both been associated with children's maladjustment (Cummings, Keller, & Davies, 2005; Farmer, McGuffin, & Williams, 2002), the terms maternal depressive symptoms and depression are used throughout this paper to describe elevated symptoms that were measured on a continuous scale.

To build a logical case for considering maternal depression as a mediator between PSE and child conduct problems, it is important to establish its relationship with both PSE and child functioning. In fact, maternal depression has been found to be associated with both low PSE (Bor & Sanders, 2004; Haslam, Pakeman, & Smith, 2006; Teti & Gelfand, 1991; Zayas et al., 2005) and children's problem behavior, including conduct problems (Owens & Shaw, 2003; Shaw et al., 1994). For example, Bor and Sanders (2004) found that maternal depressive symptoms were negatively related to concurrent PSE. However, as most research on the relationship between maternal depression and PSE has been cross-sectional, it is difficult to determine the precise direction of effects. Overall, studies examining associations between maternal depression and different facets of child adjustment have been more prevalent, including longitudinal studies examining associations with child conduct problems carried out in early childhood. While not uniformly consistent and sometimes suffering from informant response bias (Fergusson, Lynskey, & Horwood, 1993) by relying on one informant for reports of both maternal depression and child problem behavior, the pattern of overall results suggest a longitudinal association between maternal depression in early childhood and both preschool and later school-age conduct problems (Shaw et al., 2000).

In terms of establishing the link between PSE and maternal depression, research on general self-efficacy and negative life events considered to be dependent on maternal behavior (e.g., divorce, change in residence, loss of job) suggest that lower self-efficacy is more prevalent among mothers with histories of depression (Maciejewski, Prigerson, & Mazure, 2000). These findings suggest that maternal depression could play an important role in affecting the course of PSE, and ultimately affecting the impact of low PSE on children's problem behavior. Given the established link between maternal depression and child problem behavior, particularly conduct problems (Owens & Shaw, 2003; Shaw et al., 1994), we sought to test the possibility that maternal depression may serve as an underlying mechanism linking PSE to children's conduct problems.

**Present Study**

The current study had three primary goals. First, we sought to characterize the trajectory of PSE over three time points during early childhood among a large sample of families facing high levels of socioeconomic, family, and child risk. Second, associations between PSE and later child conduct problems were
explored, controlling for age 2 child problem behavior and using multiple reporters of child problem behavior two years after initial assessment of PSE. A third goal was to explore the role of maternal depressive symptoms as a potential mediator of the relationship between PSE and subsequent child conduct problems. In comparison to the vast majority of prior research on PSE, the current study, the Early Steps Multisite Project, included a longitudinal design, the use of a large, ethnically diverse sample of children at high risk for clinically-meaning problem behavior, and the exploration of a potential mechanism underlying the relationship between PSE and child conduct problems: maternal depression.

In terms of hypotheses, based on the limited longitudinal research on PSE (Gross et al., 1994; Zayas et al., 2005) and mother’s increasing experience in the parenting role, we expected to see increases in PSE over time. Second, based on prior research (Bor & Sanders, 2004, Sanders & Woolley, 2005), we expected PSE to be negatively associated with children’s later conduct problems even after accounting for initial conduct problems using both maternal and alternate caregiver (AC) reports (tested as separate structural models). Finally, based on prior cross-sectional studies linking PSE to maternal depression (Haslam et al., 2006; Zayas et al., 2005) and maternal depression to later child conduct problems (Owens & Shaw, 2003), maternal depressive symptoms at age 3 were expected to mediate associations between PSE at age 2 and both maternal and AC reports of child conduct problems at age 4.

Method

Participants

Participants were a sample of 652 mother-child dyads drawn from a larger preventive intervention study (N = 731) recruited between 2002 and 2003 from WIC Programs in the metropolitan areas of Pittsburgh, PA, and Eugene, Oregon, and within and outside the town of Charlottesville, VA (Shaw, Wilson, Gardner, & Dishion, 2007). Families were approached at WIC sites and invited to participate if they had a 2-year-old child, following a screen to ensure that they met the study criteria by having socioeconomic, family, and/or child risk factors for future behavior problems. Risk criteria for recruitment were defined at or above one standard deviation above normative averages within the following three domains: (a) child behavior (conduct problems, high-conflict relationships with adults), (b) family problems (maternal depression, daily parenting challenges, substance use problems, teen parent status), and (c) socio-demographic risk (low education achievement and low family income using WIC criterion). Two or more of the three risk factors were required for inclusion in the sample.

Of the 731 families (49% female), 272 (37%) were recruited in Pittsburgh, 271 (37%) in Eugene site, and 188 (26%) in Charlottesville. More participants were recruited in Pittsburgh and Eugene because of the larger population of eligible families in these regions relative to Charlottesville. Across sites, the children were reported to belong to the following racial groups: 27.9% African American (AA), 50.1% European American (EA), 13.0% biracial, and 8.9% other races (e.g. American Indian, Native Hawaiian). In terms of ethnicity, 13.4% of the sample reported being Hispanic American (HA). During the period of screening from 2002 to 2003, more than two-thirds of those families enrolled in the project had an annual income of less than $20,000, and the average number of family members per household was 4.5 (SD = 1.63). Forty-one percent of the sample had a high school diploma or GED equivalency, and an additional 32% had one to two years of post-high school training. The children in the sample had a mean age of 29.9 months (SD = 3.2) at the time of the age 2 assessment.

Retention. Of the 731 families who initially participated, 659 (89.9%) were available at the one-year follow-up and 619 (84.7%) participated at the two-year follow-up when children were 4 years old. At ages 3 and 4, selective attrition analyses revealed no significant differences in project site, children’s race, ethnicity, or gender, initial levels of maternal depression or children’s externalizing behaviors (parent and AC reports). Furthermore, no differences were found in the number of participants who were not retained in the control versus the intervention groups at both ages 3 (n = 40 and n = 32, respectively) and 4 (n = 58 and n = 53, respectively).

For the present study, participants who completed only one assessment wave (n = 52) and primary caregivers who were not the biological mother at all timepoints (n = 27) were omitted from all analyses, yielding a total sample size of 652 for the current study. Omitted participants (n = 79) did not differ from the remainder of the sample based on race, site, treatment group status, maternal level of education, or age 2 levels of maternal depression or children’s problem behavior as indicated by the Eyberg Intensity and Problem Scales (both maternal and AC reports) and the AC report of the Child Behavior Checklist Externalizing subscale. However, the omitted participants did have significantly higher maternal-reported Externalizing subscale scores as compared to the retained children, t(728) = 2.16, p = 0.03.

For analyses using AC reports of children’s problem behaviors, participants were included if they had a participating AC for both the ages 2 and 4 assessment.
waves, yielding a sample size of 267. For the current study, 51% of ACs were biological fathers, 19% were grandmothers, 7% were maternal paramours, and the remainder ranged in relationship from stepfather to cousin. At age 4, 44% of ACs were biological fathers, 19.5% were grandmothers, 7.5% were maternal paramours, and 7.5% were aunts, with the remainder ranging in relationship status. Sixty-three percent of ACs were the same reporter from age 2 to age 4.

Design and Procedure
Mothers and, if available, ACs, who agreed to participate in the study were scheduled for a 2.5-hour home visit when children were between 2 years and 2 years 11 months old. Each assessment involved a series of interactive tasks and caregivers completed several questionnaires, including those about PSE, maternal well-being, and child problem behavior. The home visit protocol was repeated at ages 3 and 4.

Families received $100 for participating in the age 2 home visit, $120 at the age 3 assessment, and $140 at the age 4 assessment. Randomization to treatment was balanced on gender to assure an equal number of males and females in the control and intervention sub-sample. To ensure blindness, the examiner opened a sealed envelope, revealing the family’s group assignment only after the assessment was completed, and shared this information with the family. Examiners carrying out follow-up assessments were not informed of the family’s assigned condition. For a detailed description of the intervention, see Shaw et al. (2007). For the purposes of the current study, treatment group status was used as a covariate in all analyses.

Maternal reports of PSE from ages 2, 3, and 4, were used for the current study. Maternal and AC reports of child problem behavior were used from the ages 2 and 4 assessments, with maternal reports of depression being used from the age 3 assessment.

Maternal Measures
Demographics questionnaire. Demographic data were collected from mothers during the age 2 visit. This measure included questions about family structure, parental education and income, parental criminal history, and areas of familial stress and strengths.

Parenting self-efficacy. Maternal self-efficacy specifically related to parenting was measured using the 10-item Efficacy subscale of the Parenting Sense of Competence Scale (Johnston & Mash, 1989). Items were rated on a 6-point Likert scale ranging from “strongly agree” to “strongly disagree.” Because of the high-risk nature of our sample, items were reworded to reflect an 8th grade reading level. For example, the original item, “The problems of taking care of a child are easy to solve once you know how your actions affect your child, an understanding I have acquired” was reworded as “I now realize the problems of taking care of a child are easy to solve once you now know how your actions affect you child.” Alpha reliability of the items within each timepoint in the current sample ranged from 0.69 to 0.72.

Center for Epidemiological Studies on Depression scale (CES-D). The CES-D (Radloff, 1977) is a well-established and widely used 20-item measure of depressive symptomatology that was administered to mothers at the age 3 home assessment. Participants reported how frequently they had experienced a list of depressive symptoms during the past week on a scale ranging from 0 (less than a day) to 3 (5-7 days). Items were summed to create an overall depressive symptoms score. For the current sample, the internal consistency was 0.77.

Children’s Measures
Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2000). The CBCL for Ages 1.5-5 is a 99-item questionnaire that assesses behavioral problems in young children. Mothers completed the CBCL at the ages 2 and 4 visits. The broad-band Externalizing factor was used to evaluate the frequency of problem behavior during the study period. Internal consistencies for Externalizing were 0.86 and 0.91 for maternal reports at ages 2 and 4, respectively, and were 0.90 and 0.91 for AC reports at ages 2 and 4, respectively.

Eyberg Child Behavior Inventory. This 36-item behavior checklist also was administered at the ages 2 and 4 assessments (Robinson, Eyberg, & Ross, 1980). The Eyberg includes two factors that focus on the perceived intensity and whether or not the behavior is a problem for caregivers. The Intensity factor measures the caregiver-report of the strength of the problem behavior using a seven-point scale. The Problem factor consists of dichotomous ratings of whether or not each behavior serves as a problem for the caregiver. The Inventory has been highly correlated with independent observations of children’s behavior, differentiated clinic-referred and non-clinic populations (Robinson et al., 1980), and showed high test-retest reliability (0.86) and internal consistency (0.98; Webster-Stratton, 1985). In the current study, alpha reliabilities for the Problem factor were .85 and .92 at ages 2 and 4 for maternal reports, respectively, and .91 and .93 at ages 2 and 4 for AC reports, respectively. Alpha reliabilities for the Intensity factor were .86 and .94 at ages 2 and 4 for maternal reports, respectively, and .92 and .94 at ages 2 and 4 for AC reports, respectively.
Results

Descriptive Statistics and Intercorrelations
Means and standard deviations for study variables are presented in Table 1. It should be noted that T-scores ($M = 50$, $SD = 10$) are presented for all measures of children’s conduct problems. On average, children were nearly one standard deviation above the normative mean for maternal reports of age 2 externalizing behaviors as measured by the Child Behavior Checklist ($M = 59.23$, $SD = 7.95$), age 2 maternal-reported Eyberg intensity of behavior ($M = 58.94$, $SD = 7.95$), and maternal-reported Eyberg problem behavior scale at both ages 2 and 4 ($M = 59.07$, $SD = 8.40$ and $M = 59.72$, $SD = 10.94$, respectively). In terms of maternal depression, scores of 16 and above on the CES-D have been found to reflect clinically-meaningful depressive symptoms (Eaton & Kessler, 1981; Myers & Weissman, 1980). Specifically, this cut-off score showed a modest relationship with clinical depression in community samples (Wetzler & van Praag, 1989). On average at age 3, mothers in the sample reported elevated levels of depressive symptomatology ($M = 15.59$, $SD = 11.02$), with over 60% scoring at or above 16.

Intercorrelations of study variables are presented in Table 2. With the exception of the non-significant correlation between age 2 PSE and AC-reported Eyberg problem score at age 4 and the trend between age 2 PSE and AC-reported externalizing problems ($r = -0.10$, $p = 0.10$), all variables were significantly correlated in the expected directions. Specifically, (1) PSE scores were positively associated across time, (2) PSE scores were negatively correlated with children’s problem behaviors at ages 2 and 4 and maternal depression at age 3, and (3) age 3 maternal depression was positively associated with all factors of children’s problem behaviors at ages 2 and 4.

Data Analysis Approach
Latent growth curve modeling (LGCM) was used to model initial levels of, and changes in, PSE over time. LGCM captures individual differences in development longitudinally by using structural equation modeling to estimate the mean intercept (starting point) and slope (rate of change) of individuals based on their observed scores on multiple indicators of a specific construct of interest. Given the scores on the observed variables, maximum likelihood estimates are used to find the most likely values of the unobserved latent growth parameters. The mean latent intercept and slope are then used to describe the shape of the average growth curve (McArdle & Bell, 2000).

LGCMs can be used to make predictions about the means and covariances of the data, yielding fit indices including Chi-square goodness of fit significance test, the Comparative Fit Index (CFI; Bentler, 1990), Tucker-Lewis Index (TLI; Tucker & Lewis, 1973), Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993), and the Standardized Root

<table>
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<tr>
<th>Table 1</th>
<th>Descriptive Statistics for Measured Variables</th>
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<td>$M$</td>
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<td>Maternal Reports</td>
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<td>PSE Age 4</td>
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<td>Eyberg Behavior Problem, Age 2</td>
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<th>Table 2</th>
<th>Correlation Matrix of Measured Variables</th>
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<td>1. PSE Age 2</td>
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<td>2. PSE Age 3</td>
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<td>3. PSE Age 4</td>
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<td>4. Externalizing Age 2 - M</td>
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<td>5. Externalizing Age 4 - AC</td>
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<td>8. Problem Age 2 - M</td>
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<td>15. Problem Age 4 - AC</td>
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<td>16. Depression Age 3</td>
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Note. PSE = Parenting self-efficacy, M denotes maternal report and AC denotes alternate caregiver report. *p < .05, **p < .01
Mean Square Residual (SRMR). CFI and TLI values greater than 0.95 and RMSEA and SRMR values less than 0.05 indicate good model fit. A nonsignificant Chi-square value indicates that the proposed covariance matrix does not differ from the observed covariance matrix, suggesting adequate model fit. Because the Chi-square test is sensitive to sample size (Widaman & Thompson, 2003), the ratio of Chi-square/df provides a better fit index with larger sample sizes (Bollen, 1989), with values less than 2.5 indicating adequate model fit. For all analyses, missing data were handled using full information maximum likelihood estimation in Mplus Version 4.0 (Muthén, & Muthén, 1998).

Tests of mediation were conducted using the bootstrap sampling method to test the significance of the indirect path (Shrout & Bolger, 2002). Data are randomly drawn with replacement from the observed dataset to create a new dataset of the same size. This procedure is repeated a specified number of times (1000 for the current study), and the indirect effect is estimated from each of the datasets, yielding a confidence interval. An advantage of the bootstrap method is that it does not assume a normally distributed parameter estimate, which is important given that distributions of indirect effect estimates repeatedly have been found to be positively skewed (Mackinnon, Lockwood, Hoffman, West, & Sheets, 2002; Shrout & Bolger, 2002). As such, when assuming normality, the resulting confidence intervals produce asymmetric error rates, thereby decreasing the power necessary to detect the indirect effect (MacKinnon et al., 2002). Because bootstrap methodology does not assume a normal distribution, it is a more powerful test than traditional multi-step approaches, and is recommended for small to moderate sample sizes (Shrout & Bolger, 2002).

**Unconditional Latent Growth Curve Model of PSE**

**Goal 1: Change in PSE over children’s ages 2, 3, and 4.** First, in order to model change in PSE over time, an unconditional (i.e., no covariates were included in the model) LGCM was fit using Mplus Version 4.0 (Muthén, & Muthén, 1998). All fit indices indicated that the model was a good fit to the data, $\chi^2 (2) = 4.93, p > .05$; CFI = 0.99; TLI = 0.99, RMSEA = 0.04; SRMR = 0.03. Parameter estimates of the unconditional LGCM suggested that average initial levels of PSE were significantly different from zero ($b = 30.40, SE = 0.17, p < .01$); however, this is not particularly meaningful given there was no zero
point on the PSE scale that was administered. More importantly, there was significant individual variability around the intercept (b = 13.08, SE = 0.95, p < .01), meaning that individuals significantly deviated from average levels of PSE at age 2. In terms of growth, PSE significantly increased between ages 2 and 4 (b = 0.40, SE = 0.08, p < .01). There was not significant individual variation around the average slope. As a result, predictors and outcomes were only extended to the intercept parameter for all conditional LGCMs.

**Conditional Latent Growth Curve Models of PSE**

**Goals 2 and 3: Relationships between PSE, children’s problem behaviors, and maternal depression.** Separate conditional latent growth curve models were fit for maternal versus AC reports of children’s problem behavior. Parameter estimates of both models are presented in Figures 1 (using maternal reports of problem behavior) and 2 (using AC reports of problem behavior). In both models, error terms were allowed to correlate between each manifest indicator of children’s behavior problems and its counterpart across ages 2 and 4 to account for shared method variance. For example, the age 2 externalizing error term was correlated with the age 4 externalizing error term. Furthermore, error variances between the Eyberg intensity score and the Eyberg problem score were allowed to correlate within timepoint at age 2 and at age 4 to account for shared method variance. For parsimony, error variances were not represented in the models.

In terms of the LGCM using maternal reports of children’s behavior problems, all fit indices suggested that the model was a good fit, \( \chi^2 (54) = 109.19, p = .00; \chi^2/df = 2.02, CFI = 0.98; TLI = 0.97, RMSEA = 0.04; SRMR = 0.04. \) As shown in Figure 2, lower levels of PSE at age 2 (i.e. intercept) predicted higher levels of maternal-reported children’s problem behavior at age 4 (b = -0.35, SE = 0.10, p < .01) after controlling for the significant effects of age 2 levels of problem behavior on both initial levels of PSE (b = -0.25, SE = 0.04, p < .01) and age 4 problem behavior (b = 0.70, SE = 0.09, p < .01), as well as maternal educational attainment on PSE (b = -0.47, SE = 0.14, p < .01) and significant treatment effects on both maternal depression (b = -1.71, SE = 0.81, p < .05) and children’s behavior problems (b = -1.77, SE = 0.55, p < .01). Site differences were also covaried in the model; however, effects were non-significant.

Significant relationships between initial levels of PSE and maternal depression at age 3 and between age-3 depression and children’s behavior problems at age 4 were in the expected direction (b = -0.89, SE = 0.14, p < .01 and b = 0.09, SE = 0.03, p < .01, respectively). In terms of the mediating effect of maternal depression at age 3, the confidence interval of the indirect effect based on 1000 bootstrap samples did not include zero (95% CI: -0.13 to -0.02), suggesting significant mediation of maternal depression on the relationship between PSE at age 2 and maternal-reported children’s problem behavior at age 4. Next, because the bootstrapping technique is recommended when fitting models with moderate sample sizes and the Sobel test requires more power to detect effects (Mackinnon et al., 2002), mediation also was tested using the more rigorous, large sample, Sobel method (Sobel, 1982). Results using the Sobel test were also significant (z = -2.69, p < .01), further supporting the mediating role of maternal depression.

Because of the potential reporter bias in the LGCM using only maternal reports, the identical model was fit using AC reports of children’s problem behavior at ages 2 and 4. All fit indices suggested that the model was a very good fit to the observed data, \( \chi^2 (54) = 87.53, p = .00; \chi^2/df = 1.62, CFI = 0.97; TLI = 0.96, RMSEA = 0.04; SRMR = 0.04. \) Results showed similar patterns of effects with a significant negative relationship between PSE at age 2 and children’s problem behaviors at age 4 (b = -0.34, SE = 0.15, p < .01). Again, significant relationships between initial levels of PSE and maternal depression at age 3 and between age-3 maternal depression and children’s behavior problems at age 4 were in the expected direction (b = -0.96, SE = 0.25, p < .01 and b = 0.09, SE = 0.04, p < .05, respectively). As compared to the model with only maternal reports, the model with AC-reported children’s problem behavior showed nonsignificant pathways between maternal level of education and initial PSE and between age 2 problem behavior and age 3 maternal depression. There were also nonsignificant treatment effects on maternal depression and age 4 problem behavior.

With respect to mediation, the confidence interval of the indirect effect of depression based on 1000 bootstrap samples did not include zero (95% CI: -0.17 to -0.01), providing further confirmation of the mediating role of maternal depression. Results using the Sobel test of the indirect effect were also significant for the AC-report model (z = -2.13, p < .01).

**Discussion**

Three primary goals were pursued in the current study: (1) to examine the stability and developmental course of PSE over time, (2) to examine longitudinal associations between PSE and children’s behavior problems, (3) and to test the mediating role of maternal depression in reference to associations between PSE and children’s later behavior problems. In terms of the first goal, consistent with our expectations and the limited available extant literature (Gross et al., 1994; Zayas et al., 2005) as well as logical expectations...
from mothers gaining more experience in the parental role, we found that PSE significantly increased from the toddler to preschool period. Furthermore, individual mothers’ levels of PSE did not significantly deviate from the average trajectory of the entire sample, suggesting that mothers varied little in their rate of change from ages 2 to 4. In terms of the second goal, as predicted, lower levels of PSE at age 2 (i.e., intercept parameter) predicted higher rates of children’s problem behavior at age 4 even after controlling for initial levels of conduct problems. This relationship was found using both maternal and AC reports of problem behavior. Importantly, AC reports of child conduct problems provided corroborating evidence of maternal reports of associations between PSE and later child adjustment, a common limitation of prior research in this area. Last, using bootstrap methodology, we found that maternal depression at age 3 mediated the relationship between age 2 PSE and age 4 children’s problem behavior as reported by both mothers and ACs. This result, also corroborated by two informants, is consistent with the notion that maternal depression represents one factor that may underlie low PSE and account for associations between PSE and child conduct problems. It is also worth noting that mediation effects were corroborated using the Sobel test, which requires more power to detect a significant effect.

These findings extend the current literature by assessing the course and stability of PSE at three time points over the course of two years. As previously discussed, most studies examining PSE have not been longitudinal in design or were limited by the use of two time points (e.g., Zayas et al., 2005). By using three assessment timepoints, we were able to model latent growth parameters to describe the average growth curve of the sample, which both corroborated and extended previous findings regarding increases in PSE during early childhood (Gross et al., 1994; Zayas et al., 2002). Moreover, the current sample was ethically diverse and low-income, further extending the extant research on PSE, which has typically focused on majority, middle class samples (e.g., Coleman et al., 2002; Leekes & Crockenberg, 2002; Teti & Gelfand, 1991).

In addition to modeling PSE over time, the current study adds to the literature by demonstrating that age 2 levels of PSE predicted a latent construct of age-4 children’s problem behavior, using factors from two previously validated instruments (i.e., CBCL and Eyberg Inventory). Importantly, these associations remained evident even after controlling for age 2 levels of child conduct problems. Very few studies have linked PSE to children’s behavioral adjustment (see Bor & Sanders, 2004; Sanders &Wooley, 2004 for notable exceptions), much less over a two-year period and controlling for children’s behavioral adjustment. In addition to controlling for initial levels of problem behavior, the effect of age 2 levels of problem behavior on initial levels of PSE were also covaried. This, in essence, controlled for child effects in the estimation of age 2 PSE, which is important given the sample consisted of children already showing elevated rates of behavioral maladjustment upon recruitment.

The current study also extended previous research examining associations between PSE and child adjustment by investigating the potential mediating function of maternal depression. The results are consistent with the hypothesis that negative cognitions that characterize depression likely provide the framework through which low PSE, or feelings of incompetence in the parenting role, directly affects the socioemotional adjustment of children. In other words, depressive characteristics such as withdrawal, sad affect, and worthlessness likely provide a vehicle through which PSE elicits children’s disruptive behavior.

In terms of a theoretical explanation accounting for the mediating role of maternal depression, learned helplessness (Abramson, Seligman, & Teasdale, 1978) represents one potential intrapersonal mechanism. The theory of learned helplessness posits that when confronted with a negative event, individuals who attribute poor outcomes to internal, stable, and/or global factors are more likely to have depressive responses than those who attribute negative outcomes to external, unstable, or specific factors. In terms of PSE in the context of depression, for a mother high on learned helplessness, low PSE may be due to attributions that her child’s behavior is uncontrollable. As a result, children’s negative behaviors would likely worsen, with maternal feelings of incompetence reinforced. Moreover, lower PSE may persist as depressed mothers become focused on the challenges of synchronizing parenting techniques with children’s changing developmental needs, especially among children showing early markers of behavioral maladjustment. As a result, children’s conduct problems may generate a vicious intrapersonal cycle, learned helplessness fueling low PSE, which in turn reinforces feelings of learned helplessness.

The findings of the current study have implications for prevention programs targeting children’s conduct problems. Specifically, given the associations found between PSE and both maternal and AC reports of later child conduct problems, the findings suggest that prevention programs be aimed at increasing PSE among mothers during early toddlerhood. Although the current results are limited by the study’s correlational design, limiting inferences about causality, they do suggest that associations between PSE and child conduct problems are evident for toddlers at high
risk for showing early-starting conduct problems. Targeting PSE in future prevention trials would thus be a logical next step to test whether increasing PSE would result in improvements in child behavior. That maternal depression mediated associations between PSE and child conduct problems suggests maternal depression is another target for improving both PSE and child behavior. It is likely that improvements in mother’s cognitions and attributions might lead to improvements in PSE. As successful psychological (e.g., cognitive-behavioral therapy) and pharmacotherapeutic (SSRIs) methods for treating depression already exist, in the short term it might be easier to test these ideas by targeting maternal depression.

An important limitation of the current study that warrants careful consideration is method bias. All of the main study variables were questionnaire reports, and in the model using all maternal reports of children’s problem behavior, all of the variables were from the same reporter. By using the AC reports of children’s behavioral maladjustment, we directly addressed reporter bias; however, method bias remains problematic. It should be noted that two of the three constructs of interest in the current study (i.e., PSE and depressive symptomatology) are optimally measured using self-reports as they represent internal feelings and cognitions. In terms of assessing children’s problem behavior, future research should use multiple methods of data collection including direct observations of children engaged with several salient caretakers, and ideally, across various environmental contexts.

Future directions in the study of PSE should also examine longitudinal transactional processes between both PSE and children’s problem behavior as well as PSE and maternal depression. First, as we have shown that mothers’ cognitions and behaviors impact their children, it is likely that children’s behaviors impact mothers’ developmental trajectories of PSE. For example, a child may respond with rule-breaking behavior to elicit a response from a mother who is withdrawn. The child’s behavior may reinforce maternal feelings of incompetence and the inability to exercise effective parental management of her child. In turn, low levels of PSE likely perpetuate a negative cycle between the mother–child dyad. Similar transactional, intrapersonal processes likely take place between PSE and maternal depression. Advanced longitudinal statistical techniques such as parallel processes and latent difference score models can be used to shed light on these complex dynamics, providing information regarding the relative importance of each construct across development. As a result, more precise and effective prevention programs, in terms of developmental timing and a potential changing focus of target constructs, may be planned and implemented with mothers of children at high risk for developing conduct problems.

References


