Published in final edited form as:
Infant Behav Dev. 2008 December ; 31(4): 594–605. doi:10.1016/j.infbeh.2008.07.006.

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

Chelsea M. Weaver,
University of Pittsburgh

Daniel S. Shaw,
University of Pittsburgh

Thomas J. Dishion, and
University of Oregon

Melvin N. Wilson
University of Virginia

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 caregiver-reported age 4 conduct problems after controlling for problem behavior at age 2. The relationship between PSE and later conduct problems was mediated, however, by maternal depression. These findings suggest maternal depression as a potential disruptor of caregiver confidence in early childhood, which has implications for the design and focus of parenting interventions.

Keywords

Parenting Self-Efficacy; Child Problem Behavior; Early Childhood; Maternal Depression

The relationship between parenting and children's problem behavior has been well-documented (Dishion & Patterson, 2006; Gardner, Ward, Burton, & Wilson, 2003). Given the principle of hierarchical integration, it is generally true that successful parenting in early childhood sets that stage for the same in middle childhood and adolescence, to the beneficence of the developing young person. Research on parenting in early childhood

Correspondence regarding this paper should be addressed to Chelsea M. Weaver, Department of Psychology, University of Pittsburgh, 210 S. Bouquet St., 4103 SENSQ, Pittsburgh, PA 1560, Email: cmw40@pitt.edu, Phone: 412-624-4020, Fax: 412-624-8991.

confirms that parents play a more prominent role in children's socialization process relative to older ages (Campbell, Shaw, & Gilliom, 2000; Deater-Deckard, 2000; Fagot, 1997; Gardner, 1987; Pettit & Bates, 1990; Shaw & Bell, 1993).

An important component of human behavior, and change and adaptation of behavior, is the sense of efficacy to complete tasks or execute complex skills (Bandura, 1977; Bandura, 2006). This principle has been applied to parenting, with the development of measures and studies of parenting self-efficacy (PSE). 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, 2005 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 depression 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.

Self-efficacy and Parenting

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; Bandura, 2006). 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, high levels of self-efficacy has been found to predict 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, low self-efficacy is associated with self-doubt, high levels of anxiety when faced with adversity, assuming more responsibility for task failure than success, interpreting challenges as threats, and avoiding difficult tasks,. Given that parenting in early childhood is characteristically complex and filled with change and unpredictability (Shaw & Bell, 1993), it would seem that the parent's sense of efficacy would be germane to understanding which parents will rise to the occasion, or alternative, which will become more discouraged and perhaps deteriorate over time, leading to increasing problem behavior in young children.

The Developmental Course of Parenting Self Efficacy

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 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, 2008), 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 & Karraker, 2000). 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.

Maternal Depression as a Mediator

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 worthlessness 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 covariation between PSE and child problem behavior. In fact, maternal depression has been found to be associated with both low PSE (Bor & Sanders, 2004; Haslam, Pakenham, & 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) has suggested that lower self-efficacy is more prevalent among mothers with histories of depression (Maciejewski, Prigerson, & Mazure, 2000). These findings indicate 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 present 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 at age 3 as a potential mediator of the covariation between PSE and subsequent child conduct problems while controlling for the autoregressive effect of maternal depression at age 2. Effects of maternal race and child's gender on PSE, maternal depression, and child problem behavior were also explored. 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.

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 hypothesized 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 (Dishion et al., in press). 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). Twenty-three percent of the sample did not have a high school diploma, 41% had a high school diploma or GED, 33% had some college education, and 3% had a 4-year college degree. 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 at age 2, 51% of ACs were biological fathers, 19% were grandmothers, 7% were maternal paramours, and the remainder ranged in relationship from step-father 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 Dishion et al. (in press). 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, domain-specific 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 know how your actions affect you child*." In the scale's initial development, efficacy items were found to load on a common factor, with loadings ranging from 0.53 to 0.71, and the alpha reliability for the efficacy factor found to be 0.76 among a sample of Canadian parents of children 4 to 9 years of age (Johnston & Mash, 1989). For the current sample, the alpha reliability of the items ranged from 0.69 to 0.72 across the three assessments at ages 2, 3, and 4..

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 2 and age 3 home assessments. 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. In terms of convergent validity, clinically depressed individuals have been found to score higher on the CES-D than non-depressed individuals (Weissman et al., 1996). Internal consistencies have been found to range from 0.80 to 0.90 and test-retest reliabilities have ranged from 0.40 to 0.70 among community samples (Devins et al., 1988; Radloff, 1977). For the current sample, the internal consistency was 0.73 at age 2 and 0.77 at age 3.

Children's Measures

Child Behavior Checklist—(CBCL/1.5-5; 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/1.5-5 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. Overall, the CBCL/1.5-5 has been found to have adequate test-retest reliability (range = 0.68 to 0.92) and good cross-informant agreement (parent-child care provider agreement = 0.65; Achenbach & Rescorla, 2000). 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 & Kesslerm, 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 both ages 2 and 3, mothers in the sample reported elevated levels of depressive symptomatology (M = 16.57, SD = 10.39 and M = 15.59, SD = 11.02, respectively), with over 40% scoring at or above the clinical cut point of 16 at each timepoint.

Intercorrelations of study variables are presented in Table 2. With the exception of the non-significant correlations between age 2 PSE and AC-reported Eyberg problem score at age 4 and age 2 maternal depression and AC-reported externalizing problems at ages 2 and 4, and nonsignificant trends between age 2 PSE and AC-reported externalizing problems (r = -.10, p = 0.10), and age 2 maternal depression and age 4 AC-reported Eyberg intensity score at age 4 (r = .10, p < 0.10), all variables were significantly correlated in the expected directions. Specifically, PSE scores were positively associated across time, PSE scores were negatively correlated with children's problem behaviors at ages 2 and 4 and maternal depression at ages 2 and 3, and 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; Brown & Cudeck, 1993), and the

Standardized Root 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 non-significant 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, χ^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: Covariations 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, χ^2 (74) = 166.99, p = .00; χ^2/df = 2.23, CFI = 0.96; TLI = 0.95, RMSEA = 0.04; SRMR = 0.05. 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 = −0.38, SE = 0.11, p < .01) after controlling for the significant effects of age 2 levels of problem behavior on both initial levels of PSE (b = −0.21, SE = 0.04, p < .01) and age 4 problem behavior (b = 0.65, SE = 0.08, p < .01), as well as maternal educational attainment on PSE (b = −0.45, SE = 0.14, p < .01) and significant treatment effects on both maternal depression at age 3 (b = −1.91, SE = 0.76, p < .05) and children's behavior problems (b = −1.70, SE = 0.56, p < .01). Site differences were also covaried in the model; however, effects were non-significant.

Main effects of maternal race and children's gender were also explored. We compared European American mothers versus mothers of racial minority groups (i.e., African-American, Biracial, and "other") due to the small sample sizes of minority groups other than African-American. Mothers of racial minority groups were found to have higher initial levels of PSE as compared to European American mothers (b = −0.86, SE = 0.35, p < .05). There were no significant effects of race on maternal depression at age 3 or on age 4 behavior problems. In terms of child's gender, there were nonsignificant trends for mothers with girls to have higher levels of depression at age 3, controlling for age 2 depression (b = 0.19, SE = 0.11, p < .10) and for boys to have higher rates of age 4 problem behavior after controlling for initial levels of conduct problems (b = −0.16, SE = 0.08, p < .10).

Significant covariations 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 = −.76, SE = 0.13, p < .01 and b = 0.10, SE = 0.02, p < .01, respectively). In terms of the mediating effect of maternal depression at age 3 while controlling for age 2 levels of depression, the confidence interval of the indirect effect based on 1000 bootstrap samples did not include zero (95% CI: −0.13 to −0.03), suggesting significant mediation of maternal depression on the covariation 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 = −2.13, p < .05), 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, χ^2 (71) = 102.24, p = .01; χ^2/df = 1.44, 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 = −0.32, SE = 0.05, p < .01). Again, significant relationships were found between initial levels of PSE and maternal depression at age 3 while controlling for the autoregressive effect of age 2 depression, and between age-3 maternal depression and children's behavior problems at age 4, both in the expected direction (b = −.72, SE = 0.25, p < .01 and b = 0.10, SE = 0.04, p < .01, 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 intervention effects on maternal depression at age 3 and age 4 problem behavior. There were no significant effects of maternal race on PSE, maternal depression, or children's problem behavior in the AC-report model. In terms of gender, boys were found to

have higher levels of age 4 problem behavior than girls, while controlling for initial levels ($b = -.28$, $SE = 0.11$, $p < .05$).

With respect to mediation, the confidence interval of the indirect effect of age 3 depression while controlling for age 2 levels of depression based on 1000 bootstrap samples did include zero (95% CI: −0.17 to −0.01); however, the upper bound suggests a non-significant trend, providing some corroborating evidence of the mediating role of maternal depression. Results using the Sobel test of the indirect effect also indicated a trend towards mediation for the AC-report model ($z = -1.95$, $p < .10$).

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 (e.g., Bor & Sanders, 2004). 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 mothers, even after controlling for initial levels of depression at age 2. Furthermore, analyses using AC-reported children's problem behavior provided some support for this finding with a nonsignificant trend consistent with a meditational model of maternal depression. This result, partially corroborated by two informants (i.e., PCs and ACs), 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 an indirect 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. Most studies examining PSE have not been longitudinal in design or have been 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 ethnically 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; Leerkes & Crockenberg, 2002; Teti & Gelfand, 1991). It should be noted that the authors chose to use a domain-specific measure of PSE as opposed to a task-specific measure, the latter of which has been shown to have greater predictive validity (see Coleman & Karraker, 1997). A domain-level measure of PSE was chosen because it was incorporated into a larger multi-site longitudinal intervention study designed to prevent the development of conduct problems among high-

risk families. With our interest in modeling PSE over time, items of the domain-specific PSOC allowed for the measure to be applicable over a longer span of childhood, providing the opportunity to collect multiple measurement occasions over time that could be used for growth modeling procedures. Task-specific measures typically contain items that are linked to children's particular developmental levels. For example, the Toddler Care Questionnaire (Gross & Rocissano, 1988), which is a widely-used task-specific measure of PSE, is only appropriate for children between 12 and 36 months of age (sample item: *Knowing how to manage toilet training*), which would limit the ability to model the developmental course of PSE over childhood. In contrast, the PSOC has been cited as the most widely-used PSE scale in the extant literature (see Jones & Prinz, 2005) and is applicable for children as old as 9 years (Johnston & Mash, 1989), allowing us to collect multiple measurement occasions over time.

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; Achenbach & Rescorla 2000; and Eyberg Child Behavior Inventory; Robinson et al., 1980). 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. Relatedly, it should be noted that we also controlled for the effect of age 2 maternal depression on initial levels of PSE, which is important given that the presence of elevated depressive symptoms were shown in this study to be related to lower age 2 PSE. In other words, biases in self-reports among depressed mothers were covaried in both of the conditional models.

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 helplessness and incompetence reinforced. Our findings support this assertion because we were able to control for the autoregressive effect of age 2 maternal depression on depressive symptoms at age 3. In other words, initial levels of PSE predicted *change* in maternal depression from age 2 to age 3, and in turn, this increase predicted higher rates of child behavior problems. 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 with learned helplessness fueling low PSE, which in turn reinforces feelings of learned helplessness.

Interestingly, in terms of racial differences, we found that mothers belonging to racial minority groups had higher initial levels of PSE as compared to European American mothers, but only in the model that contained maternal reports of children's behavior problems. This finding was exploratory as we had no specific hypothesis about how maternal race would be related to PSE, and there is very little in the extant literature examining racial differences in maternal PSE. A notable exception is Elder, Eccles, Ardelt, and Lord's (1995) work demonstrating no difference in average levels of PSE among AfricanAmerican and European American parents of urban adolescents. Furthermore, this finding should be interpreted with caution as we were not able to replicate it in the model using AC reports of children's problem behavior.

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. Very few prevention programs to date specifically targeted changes in PSE. One exception is the *Dare to be You* program (Miller-Heyl, MacPhee, & Fritz, 1998), which focused on improving PSE and other parenting factors (i.e., knowledge of developmental norms, problem-solving skills) among mothers of 2 to 5 year olds at high risk for substance use during adolescence. The study authors found positive treatment effects for PSE, which in turn predicted improved parenting and fewer child oppositional behaviors (Miller-Heyl et al., 1998). Baseline PSE has also been indicated as a predictor of treatment outcomes 18 months following intervention in families of 7- to 10-year-old children with ADHD (Hoza et al., 2000). That maternal depression mediated associations between PSE and child conduct problems in the current study 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 targeted constructs, may be planned and implemented with mothers of children at high risk for developing conduct problems.

References

Abramson LY, Seligman MEP, Teasdale JD. Learned helplessness in humans: Critique and reformulation. Journal of Abnormal Psychology. 1978; 87:49–74. [PubMed: 649856]

Achenbach, TM.; Rescorla, LA. Manual for the ASEBA preschool forms & profiles. Burlington VT: University of Vermont Department of Psychiatry; 2000.

Bandura A. Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review. 1977; 84:191–215. [PubMed: 847061]

Bandura A. Regulation of cognitive processes through perceived self-efficacy. Developmental Psychology. 1989; 25:729–735.

Bandura A. Toward a psychology of human agency. Perspectives on Psychological Science. 2006; 1:164–180.

Bentler PM. Fit indexes, Lagrange multipliers, constraint changes and incomplete data in structural models. Multivariate Behavioral Research. 1990; 25:163–172.

Bollen, KA. Structural equations with latent variables. New York, NY: John Wiley & Sons; 1989.

Bor W, Sanders MR. Correlates of self-reported coercive parenting of preschool-aged children at high risk for the development of conduct problems. Australian and New Zealand Journal of Psychiatry. 2004; 38:738–745. [PubMed: 15324339]

Brown, MW.; Cudeck, R. Testing structural equation models: Alternative ways of assessing model fit. Newbury Park, CA: Sage; 1993. p. 136-262.

Campbell SB, Shaw DS, Gilliom M. Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. Development and Psychopathology. 2000; 12:467–488. [PubMed: 11014748]

Coleman PK, Karraker KH. Self-Efficacy and Parneting Quality: Findings and future applications. Developmental Review. 1997; 18:47–85.

Coleman PK, Karraker KH. Parenting self-efficacy among mothers of school-age children: Conceptualization, measurement, and correlates. Family Relations. 2000; 49:13–24.

Coleman PK, Karraker KH. Maternal self-efficacy beliefs, competence in parenting, and toddlers' behavior and developmental status. Infant Mental Health Journal. 2003; 24:126–148.

Coleman PK, Trent A, Bryan S, King B, Rogers N, Nazir M. Parenting behavior, mothers' self-efficacy beliefs, and toddler performance on the Bayley Scales of Infant Development. Early Child Development and Care. 2002; 172:123–140.

Cummings EM, Keller PS, Davies PT. Towards a family process model of maternal and paternal depressive symptoms: Exploring multiple relations with child and family functioning. Journal of Child Psychology and Psychiatry. 2005; 46:479–489. [PubMed: 15845128]

Deater-Deckard K. Parenting and child behavioral adjustment in early childhood: A quantitative genetic approach to studying family processes and child development. Child Development. 2000; 71:468–484. [PubMed: 10834478]

Devins GM, Orme CM, Costello CG, Binik YM, Frizzell B, Henderikus JS, Pullen WM. Measuring depressive symptoms in illness populations: Psychometric properties of the Center for Epidemiologic Studies Depression (CES-D) Scale. Psychological Health. 1988; 2:139–156.

Dishion, TJ.; Patterson, GR. The development and ecology of antisocial behavior. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology. Vol. 3: Risk, disorder, and adaptation. New York: Wiley; 2006. p. 503-541.

Dishion TJ, Shaw DS, Connell A, Wilson MN, Gardner F, Weaver CM. The Family Check Up with high-risk families with toddlers: Outcomes on positive parenting and early problem behavior. Child Development. (in press).

Eaton WW, Kesslerm LG. Rates of symptoms of depression in a national sample. American Journal of Epidemiology. 1981; 114:528–538. [PubMed: 7304583]

Elder GH, Eccles JS, Ardelt M, Lord S. Inner-city parents under economic pressure: Perspectives on the strategies of parenting. Journal of Marriage and Family. 1995; 57:771–784.

Fagot BI. Attachment, parenting, and peer interactions of toddler children. Developmental Psychology. 1997; 33:489–499. [PubMed: 9149927]

Farmer, A.; McGuffin, P.; Williams, J. Measuring psychopathology. Oxford: Oxford University Press; 2002.

Fergusson DM, Lynskey MT, Horwood JL. The effect of maternal depression on maternal ratings of child behavior. Journal of Abnormal Psychology. 1993; 21:245–269.

Gardner FE. Positive interaction between mothers and conduct-problem children: Is there training for harmony as well as fighting? Journal of Abnormal Psychology. 1987; 15:283–293.

Gardner F, Ward S, Burton J, Wilson C. The role of mother-child joint play in the early development of children's conduct problems: A longitudinal observational study. Social Development. 2003; 12:361–378.

Gross D, Conrad B, Fogg L, Wothke W. A longitudinal model of maternal self-efficacy, depression, and difficult temperament during toddlerhood. Research in Nursing and Health. 1994; 17:207–215. [PubMed: 8184132]

Gross D, Rocissano L. Maternal confidence in toddlerhood: Its measurement for clinical practice and research. Nurse Practitioner. 1988; 13:19–29. [PubMed: 3374866]

Haslam DM, Pakenham KI, Smith A. Social support and postpartum depressive symptomatology: The mediating role of maternal self-efficacy. Infant Mental Health Journal. 2006; 27:276–291.

Hoza B, Owens JS, Pelham WE, Swanson JM, Conners CK, Hinshaw SP, Arnold LE, et al. Parent cognitions as predictors of child treatment response to Attention-Deficit/Hyperactivity Disorder. Journal of Abnormal Child Psychology. 2000; 28:569–583. [PubMed: 11104318]

Jerusalem, M.; Mittag, W. Self-efficacy in stressful life transitions. In: Bandura, A., editor. Self-efficacy in changing societies. New York: Cambridge University Press; 1995. p. 177-201.

Johnston C, Mash EJ. A measure of parenting satisfaction and efficacy. Journal of Clinical Child Psychology. 1989; 18:167–175.

Jones TL, Prinz RJ. Potential roles of parental self-efficacy in parent and child adjustment: A review. Clinical Psychology Review. 2005; 25:341–346. [PubMed: 15792853]

Leerkes EM, Crockenberg SC. The development of maternal self-efficacy and its impact on maternal behavior. Infancy. 2002; 3:227–247.

Maciejewski PK, Prigerson HG, Mazure CM. Self-efficacy as a mediator between stressful life events and depressive symptoms: Differences based on history of prior depression. British Journal of Psychiatry. 2000; 176:373–378. [PubMed: 10827887]

Mackinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. Psychological Methods. 2002; 7:83–104. [PubMed: 11928892]

McArdle, J.; Bell, R. An introduction to latent growth curve modeling for developmental data analysis. In: Little, T.; Schnabel, K.; Baumert, J., editors. Modeling Longitudinal and Multilevel Data. Mahwah, NJ: Lawrence Erlbaum Associates; 2000.

Miller-Heyl J, MacPhee D, Fritz JJ. DARE to be you: A family-support, early-prevention program. The Journal of Primary Prevention. 1998; 18:257–285.

Myers J, Weissman M. Use of a self-report symptom scales to detect depression in a community sample. American Journal of Psychiatry. 1980; 137:1081–1084. [PubMed: 7425160]

Muthén, LK.; Muthén, B. M-Plus user's guide. Los Angeles, CA: Authors; 1998.

Owens EB, Shaw DS. Predicting growth curves of externalizing behavior across the preschool years. Journal of Abnormal Child Psychology. 2003; 31:575–590. [PubMed: 14658739]

Ozer EM, Bandura A. Mechanisms governing empowerment effects: A self-efficacy analysis. Journal of Personality and Social Psychology. 1990; 58:472–486. [PubMed: 2324938]

Pettit GS, Bates JS. Describing family interaction patterns in early childhood: A "social events" perspective. Journal of Applied Developmental Psychology. 1990; 11:395–418.

Radloff LS. The CES-D scale: A self-report depression scale for research in the general population. Applied Psychological Measurement. 1977; 1:385–401.

Raver CC, Leadbeater BJ. Mothering under pressure: Environmental, child, and dyadic correlates of maternal self-efficacy among low-income women. Journal of Family Psychology. 1999; 4:523–534.

Robinson EA, Eyberg SM, Ross WA. The standardization of an inventory of child conduct problem behaviors. Journal of Clinical Child Psychology. 1980; 9:22–29.

Sanders MR, Woolley ML. The relationship between maternal self-efficacy and parenting practices: Implications for parent training. Child: Care, Health & Development. 2005; 31:65–73.

Shaw DS, Bell RQ. Developmental theories of parental contributors to antisocial behavior. Journal of Abnormal Child Psychology. 1993; 21:493–518. [PubMed: 8294650]

Shaw DS, Bell RQ, Gilliom M. A truly early starter model of antisocial behavior revisited. Clinical Child and Family Psychology Review. 2000; 3:155–172. [PubMed: 11225751]

Shaw, DS.; Gross, H. Early childhood and the development of delinquency: What we have learned from recent longitudinal research. In: Lieberman, A., editor. The long view of crime: A synthesis of longitudinal research. New York, NY: Springer; 2008. p. 79-127.

Shaw DS, Keenan K, Vondra JI. The developmental precursors of antisocial behavior: Ages 1–3. Developmental Psychology. 1994; 30:355–364.

Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychological Methods. 2002; 7:422–445. [PubMed: 12530702]

Sobel, ME. Asymptotic confidence intervals for indirect effects in structural equation models. In: Leinhardt, S., editor. Sociological methodology. San Francisco, CA: Jossey-Bass; 1982. p. 290-312.

Teti DM, Gelfand DM. Behavioral competence among mothers of infants in the first years: The mediational role of maternal self-efficacy. Child Development. 1991; 62:918–929. [PubMed: 1756667]

Tucker LR, Lewis C. A reliability coefficient for maximum likelihood factor analysis. Psychometrika. 1973; 38:1–10.

Webster-Stratton C. Comparisons of behavior transactions between conduct-disordered children and their mothers in the clinic and at home. Journal of Abnormal Child Psychology. 1985; 13:169–183. [PubMed: 4008751]

Weissman MM, Bland RC, Canino GF, Faravelli C, Greenwald S, Hwu HG, et al. Cross-national epidemiology of major depression and bipolar disorder. Journal of the American Medical Association. 1996; 276:293–299. [PubMed: 8656541]

Wetzler, S.; van Praag, HM. Assessment of depression. In: Wetzler, S., editor. Measuring mental illness: Psychometric assessment for clinicians. Washington, DC: American Psychiatric Association; 1989. p. 71-88.

Widaman KF, Thompson JS. On specifying the null model for incremental fit indices in structural equation modeling. Psychological Methods. 2003; 8:16–37. [PubMed: 12741671]

Zayas LH, Jankowski KRB, Mckee MD. Parenting competence across pregnancy and postpartum among urban minority women. Journal of Adult Development. 2005; 12:53–62.

Acknowledgments

This research was supported by a grant from the National Institute on Drug Abuse (DA16110-02).

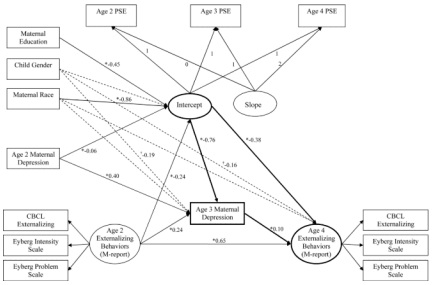

Figure 1.

Latent growth curve model of parenting self-efficacy (PSE) from ages 2 to 4, maternal depression at age 3, and maternal-reported children's problem behaviors at age 4 (showing unstandardized path coefficients; mediational model in bold for emphasis). Note that site and treatment group status are included as covariates, but are not represented in the model for simplicity.

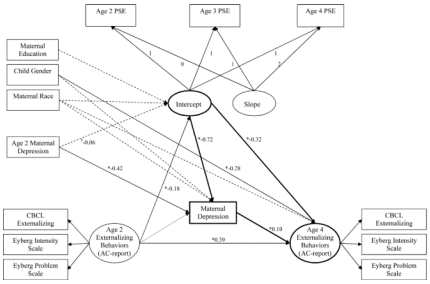

Figure 2.

Latent growth curve model of parenting self-efficacy (PSE) from ages 2 to 4, maternal depression at age 3, and alternate caregiver-reported children's problem behaviors at age 4 (showing unstandardized path coefficients; mediational model in bold for emphasis). Note that site and treatment group status are included as covariates, but are not represented in the model for simplicity.

Table 1

Descriptive Statistics for Measured Variables

	Mean	Standard Deviation
Maternal Reports		
PSE - Age 2	30.31	4.66
PSE - Age 3	30.93	4.84
PSE - Age 4	31.09	4.71
CBCL Externalizing Behaviors – Age 2	59.23	7.95
Eyberg Behavior Intensity – Age 2	58.94	7.95
Eyberg Behavior Problem – Age 2	59.07	8.40
CBCL Externalizing Behaviors – Age 4	53.71	10.37
Eyberg Behavior Intensity – Age 4	57.78	9.63
Eyberg Behavior Problem – Age4	59.71	10.71
CES-D Depression Score – Age 2	16.57	10.39
CES-D Depression Score – Age 3	15.59	11.02
Alternate Caregiver Reports		
CBCL Externalizing Behaviors – Age 2	53.70	9.53
Eyberg Behavior Intensity – Age 2	55.76	8.20
Eyberg Behavior Problem – Age 2	50.30	9.54
CBCL Externalizing Behaviors – Age 4	49.73	9.77
Eyberg Behavior Intensity – Age 4	54.41	8.17
Eyberg Behavior Problem – Age 4	51.51	10.17

Table 2

Correlation Matrix of Measured Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. PSE Age 2																	
2. PSE Age 3	.60*																
3. PSE Age 4	.56*	.63*															
4. Externalizing Age 2 - M	−.22*	−.28*	−.22*														
5. Externalizing Age 2 - AC	−.21*	−.18*	−.19*	.30*													
6. Intensity Age 2 - M	−.13*	−.13*	−.11*	.48*	.22*												
7. Intensity Age 2 - AC	−.17*	−.18*	−.24*	.31*	.67*	.30*											
8. Problem Age 2 - M	−.14*	−.13*	−.13*	.38*	.25*	.59*	.21*										
9. Problem Age 2 - AC	−.23*	−.22*	−.23*	.23*	.59*	.20*	.64*	.29*									
10. Externalizing Age 4 - M	−.18*	−.28*	−.34*	.49*	.28*	.36*	.25*	.23*	.16*								
11. Externalizing Age 4 - AC	−.10†	−.24*	−.26*	.30*	.36*	.17*	.34*	.14*	.24*	.39*							
12. Intensity Age 4 - M	−.18*	−.26*	−.33*	.40*	.24*	.43*	.26*	.25*	.18*	.78*	.29*						
13. Intensity Age 4 - AC	−.16*	−.24*	−.33*	.22*	.31*	.18*	.38*	.14*	.29*	.39*	.72*	.35*					
14. Problem Age 4 - M	−.17*	−.25*	−.30*	.38*	.25*	.29*	.23*	.35*	.25*	.68*	.32*	.75*	.35*				
15. Problem Age 4 - AC	−.07	−.25*	−.23*	.14*	.30*	.16*	.29*	.17*	.35*	.25*	.58*	.22*	.67*	.25*			
16. Depression Age 2	−.16*	−.14*	−.14*	.16*	.05	.13*	.12*	.10*	.12*	.21*	.07	.19*	.10†	.17*	.15*		
17. Depression Age 3	−.21*	−.34*	−.29*	.24*	.13*	.17*	.17*	.12*	.18*	.32*	.23*	.28*	.23*	.26*	.28*	.44*	

Note. PSE = Parenting self-efficacy; M denotes maternal report and AC denotes alternate caregiver report.

*$p < .05$

†$p < .10$