Published in final edited form as:

J Clin Child Adolesc Psychol. 2015 ; 44(4): 640–654. doi:10.1080/15374416.2014.886254.

Predicting Externalizing and Internalizing Behavior in Kindergarten: Examining the Buffering Role of Early Social Support

Amy E. Heberle,

Department of Psychology, University of Massachusetts, Boston

Sarah C. Krill,

Department of Psychology, University of Massachusetts, Boston

Margaret J. Briggs-Gowan, and

Briggs-Gowan, Department of Psychiatry, University of Connecticut Health Center

Alice S. Carter

Department of Psychology, University of Massachusetts, Boston

Abstract

Objective—This study tested an ecological model predicting children’s behavior problems in kindergarten from risk and protective factors (parent psychological distress, parenting behavior, and social support) during early childhood.

Method—Study participants were 1161 socio-demographically diverse mother-child pairs who participated in a longitudinal birth cohort study. The predictor variables were collected at two separate time points and based on parent reports; children were an average of two years old at Time 1 and three years old at Time 2. The outcome measures were collected when children reached Kindergarten and were six years old on average.

Results—Our results show that early maternal psychological distress, mediated by sub-optimal parenting behavior, predicts children’s externalizing and internalizing behaviors in kindergarten. Moreover, early social support buffers the relations between psychological distress and later sub-optimal parenting behaviors and between sub-optimal parenting behavior and later depressive/withdrawn behavior.

Conclusions—Our findings have several implications for early intervention and prevention efforts. Of note, informal social support appears to play an important protective role in the development of externalizing and internalizing behavior problems, weakening the link between psychological distress and less optimal parenting behavior and between sub-optimal parenting behavior and children’s withdrawal/depression symptoms. Increasing social support may be a productive goal for family and community-level intervention.

Keywords

internalizing disorders; externalizing disorders; prevention; parenting; stress

Externalizing behaviors typically emerge in the second year of life (Baillargeon et al., 2007) and then decline steeply in frequency between toddlerhood and the transition to formal schooling (Miner & Clarke-Stewart, 2008; NICHD, 2004; Shaw, Gilliom, Ingoldsby, & Nagin, 2003; Tremblay, 2006). Children who do not show such a decline are likely to have ongoing problems related to their behavior as they are at risk for negative long-term behavioral and emotional outcomes (Moilanen, Shaw, & Maxwell, 2010) and poorer academic performance (Masten et al., 2005) compared to children without high levels of externalizing behavior. Internalizing behaviors and symptoms, including anxious and depressive behaviors, also appear early in life, and trajectories of internalizing and externalizing behaviors appear to be linked across the toddlerhood to school age period (Gilliom & Shaw, 2004). In contrast to externalizing behavior, it appears to be typical for certain forms of internalizing behavior—for example, general anxiety—to increase from toddlerhood to school age. However, for some children who are temperamentally, contextually, or otherwise vulnerable, the toddler-to-preschool period may be a time in which maladaptive, dysfunctional schemas associated with impairing levels of anxiety and/or depressive symptoms begin to emerge.

Externalizing and internalizing behaviors often present in toddlerhood, and ecological factors such as dysfunctional parent-child interactions and family stress (Campbell, Shaw, & Gilliom, 2000) appear to increase the risk of problematic presentations of each of these symptom domains. Intervention targeting such ecological factors during these early years may prevent a child's externalizing and internalizing behaviors from progressing beyond typical frequency or severity and causing impairment during times of increased social, behavioral, and academic demands (e.g., the transition to formal schooling). Thus, we join others (e.g., Smeeckens, Riksen-Walraven, & Van Bakel, 2007) in arguing for the importance of understanding which factors early in a child's life predict emotional and behavior problems during the school transition; we were also interested in how early ecological risk and protective factors interact with one another. In this paper, we tested a model of the relations among three modifiable ecological risk and protective factors—maternal parenting, maternal psychological distress, and early social support—as well as relations between these factors and externalizing/internalizing outcomes.

Maternal Psychological Distress and Sub-Optimal Parenting

Parenting behaviors are associated with children's social-emotional functioning. The presence of sub-optimal parenting behaviors (e.g., harsh parenting) or absence of optimal behaviors (e.g., encouragement of autonomy) may diminish the child's ability to learn developmentally appropriate self-regulation skills, which are typically established in the context of supportive, structuring parent-child interactions (Maccoby, 1992). When these skills fail to develop in line with developmental expectations, the child may have difficulty relating adaptively to parents, other adults and children (Cole, Michel, & Teti, 1994). Sub-optimal parenting practices such as harsh discipline (Paterson & Sanson, 1999),

inappropriate limit setting (Middleton, Scott, & Renk, 2009), and restrictiveness (McNamara, Selig, & Hawley, 2010) have consistently been associated with children's externalizing behaviors. Excessive parental control (Chorpita, Brown, & Barlow, 1998; Rapee, 1997) and parental rejection/disengagement (Rapee, 1997) have similarly been linked with internalizing symptoms.

Psychological distress—defined here as the experience of high levels of stress, depressive symptoms, and/or anxious symptoms—is a well-studied risk factor for sub-optimal parenting. Highly stressed parents demonstrate less sensitive parenting (Ayoub, Vallotton, & Mastergeorge, 2011), more punitive parenting (Moore, Whaley, & Sigman, 2004), more inconsistent parenting (Del Vecchio & O'Leary, 2006; Miner & Clarke-Stewart, 2008), and greater negativity toward their children (Crnic, Gaze, & Hoffman, 2005) than parents with lower stress levels. A meta-analysis conducted by Lovejoy et al. (2000) found that depressed mothers exhibited significantly more negative and disengaged parenting practices and fewer positive parenting practices in comparison to non-depressed mothers. Parents with high levels of *anxiety* have also been found to exhibit sub-optimal parenting behaviors, including greater disengagement and withdrawal than parents with lower levels of anxiety in interactions with their children (Woodruff-Borden, Morrow, Bourland, & Cambron, 2002).

Beyond the effects of psychological distress on parenting behaviors, parents who experience high levels of distress may directly model dysregulated emotions and dysfunctional behavior patterns that are then imitated by their children and/or lead their children to internalize the expectancy that others will behave unreliably (Maccoby & Martin, 1983). Biological mechanisms such as genetic risk (Gelhorn et al., 2005; Larsson, Dilshad, Lichtenstein, & Barker, 2011) and fetal exposure to stress hormones (Glover, O'Connor, & O'Donnell, 2010) may also contribute to the link between maternal psychological distress and child behavior problems.

The Role of Social Support

Not all children exposed to sub-optimal parenting or maternal psychological distress develop externalizing or internalizing behavior problems, nor do all distressed mothers demonstrate sub-optimal parenting. For both children and parents, other factors—such as social support—may buffer the effects of any given risk factor, leading to more positive outcomes in the presence of the risk factor than would otherwise be expected (Belsky, 1984; Cohen & Wills, 1985; Luthar, Cicchetti, & Becker, 2000). In this study, we tested whether social support—including functional emotional (e.g., provision of advice and validation) and/or instrumental (e.g., assistance with daily tasks and/or finances) support—experienced by mothers served a protective role for either mothers or children. Though social support has received attention in the theoretical literature as a potential buffering/moderating variable, most parenting research to date has focused only on the main effects of social support.

Parental perceptions of low levels of social support are associated with higher levels of parental psychological distress even when accounting for child functioning (Silver, Heneghan, Bauman, & Stein, 2005). In addition, perceptions of high social support are associated with more optimal parenting behaviors (Burchinal, Follmer, & Bryant, 1996;

Author Manuscript

Ensor & Hughes, 2010; Woody & Woody, 2007) and with fewer negative parenting behaviors (Brandt, 1984; Ensor & Hughes, 2010) across multiple racial and socio-economic groups. Parent perceptions of social support during early childhood also predict more positive parent-child interactions over time (Green, Furrer, & McAllister, 2011). In addition, social support, mediated by parenting behaviors, predicts preschool children's parent-rated security of attachment and observed willingness to share (Coyl, Newland, & Freeman, 2010; Ensor & Hughes, 2010). Social support also has also been shown to have a direct effects on parents' reports of difficulties experienced with their children (McConnell, Breitkreuz, & Savage, 2011; Sheppard, 2008).

Author Manuscript

Based on these findings, the importance of considering social support in relation to parent and child functioning is clear. However, while intervention researchers and clinicians have demonstrated an interest in social support as a factor that may protect children exposed to risk factors for behavior problems, there has been limited empirical research on the buffering effects of early social support on parent/child outcomes. In addition, relatively few studies have used the longitudinal approach of this study to understand the role of social support in relation to parenting and psychological distress. Research on early risk and protective factors for *internalizing* behavior problems has been similarly sparse. Finally, much of the research on early internalizing and externalizing behavior problems has focused on children expected to be at high risk of developing these problems (e.g., children of clinically depressed parents; low-income children). This study makes a unique contribution to the literature by examining our hypotheses within a representative sample of mothers and children.

Author Manuscript

The aims of this report were to determine whether early maternal perceptions of social support buffer the effects of early sub-optimal parenting and maternal psychological distress on externalizing and internalizing behavior during the transition to formal school. We tested the following hypotheses:

1. Maternal psychological distress in toddlerhood (Time 1) will be positively associated with externalizing and internalizing behaviors during the school transition, such that children whose mothers report higher levels of distress when they are toddlers will have more behavior problems in the school transition (see Figure 1a).
  2. The effects of maternal psychological distress in toddlerhood (Time 1) on children's behavior during the school transition will be partially explained (mediated) by the relation between psychological distress and sub-optimal parenting one year later (Time 2), such that mothers who report high levels of distress at Time 1 will subsequently report less optimal parenting at Time 2, and less optimal parenting will be associated with higher levels of problem behaviors for children during the school transition (see Figure 1b).
  3. Mothers' perceived levels of social support at the first time point (Time 1) will buffer (moderate) the relation between their psychological distress at Time 1 and their parenting one year later (Time 2), such that mothers who experience higher levels of social support at Time 1 will experience a smaller negative impact of
- Author Manuscript

psychological distress at Time 1 on their parenting at Time 2 compared to mothers who experience lower levels of social support.

4. Mothers' perceived levels of social support at Time 1 will have a lasting protective effect on children, buffering (moderating) the relation between their parenting at Time 2 and child outcomes in the school transition.

In our sample, measures of social support, sub-optimal parenting, and maternal psychological distress were all relatively stable across the first two time points in our sample (all manifest variable Time 1 to Time 2 R^2 's > .5; all latent variable Time 1 to Time 2 R^2 's > .8). Because of this stability and because of our interest in identifying risk and protective factors present early in the child's life, before maladaptive patterns of relating to others, coping strategies, and methods of self-expression are firmly established, we focused on risk factors measured at the first assessment point, when children were an average of 24.6 months old.

Methods

Participants

Participants were 1161 mother-child pairs recruited between July 1995 and September 1997 through a longitudinal birth cohort study of children and their parents living in the New Haven-Meriden Standard Metropolitan Statistical Area (SMSA). Participants were sampled from all birth records for children born at Yale-New Haven Hospital during that period. 675 infants (8%) were excluded from sampling due to one of these criteria: premature birth (< 36 weeks), low birth weight (< 2,200 grams), low 1-and 5 minute Apgar scores (< 5), chromosomal anomalies, or severe anoxia at birth. Eighteen infants were excluded due to death or adoption prior to sampling and 277 siblings were also excluded. Finally, the child of a study investigator was excluded from sampling. After these exclusions, 7,433 families were eligible for sampling. From this pool, a random sample of 1788 families was contacted to participate. Following sampling, 297 families became ineligible for study participation based on one or more of these criteria: no parent could participate in English, the child was not in the custody of either biological parent, the family had relocated, or eligibility could not be verified. 1329 families (89% of those eligible) participated in the Time 1 assessment, 88.0% of eligible families completed the Time 2 assessment and 81.6% of families who had participated at Time 1 or Time 2 completed the Kindergarten assessment. Between Time 1 and Kindergarten, a small number of children were excluded from continued study participation based on a diagnosis of developmental delay ($N=17$), death ($N=1$), or leaving the custody of their biological parents ($N=5$). An additional 151 non-maternal caregivers were dropped for this report, resulting in a final sample size of 1161. Mother-child pairs were considered to be eligible for the current analyses if they participated at Time 1 or Time 2.

The average child age was 24.6 months at Time 1 ($SD= 7.22$ months), 36.5 months at Time 2 ($SD= 7.24$), and 6.0 years at Time 3 (kindergarten) ($SD= .38$ years). Boys comprised 48.2% of the sample. Mothers racially/ethnically self-identified as: 67.4% white, 15.9% African American, 5% Hispanic/Latino, 8.4% multi-racial, 2% Asian, and 1.4% other. Mothers were an average of 32.15 years of age ($SD=6.10$ years) at Time 1, and 44.7% had

completed college. 80.8% of mothers identified as married/cohabiting. 17.9% of this sample was living in poverty (with poverty status assigned based on receipt of federal or state benefits).

Among teachers, 96% self-identified as female. In terms of racial/ethnic identity, 95% of teachers who reported identified as white, 2% black, 1% Hispanic, and 2% Asian, American Indian, or Middle Eastern. 43% of teachers did not report any personal demographic information. 82.2% of teachers reported completing a graduate degree.

Procedures

At Time 1 and Time 2, a letter was sent to parents inviting them to participate in the study, followed one week later by a questionnaire booklet and a children's book. Parents were also offered the opportunity to complete the questionnaire packet orally with an interviewer. In addition to the children's book, parents received \$25 for participation. At the kindergarten assessment, parents received another questionnaire packet containing similar questions to the Time 1 and Time 2 packet. In addition, provided parental permission was obtained, teachers were invited to complete a packet on child behavior, teacher demographics, and related variables. The majority of parents (81.8%) gave permission for their child's teacher to participate, and most invited teachers (83.8%) provided data. Teachers were contacted in the spring to avoid potential biases in reporting that might occur if teacher assessments were collected very soon after the initial transition to school in the fall. The average time lag between parent and teacher reports was approximately 2.5 months ($M=82$ days, $SD=89$ days). Parents received \$30 for participation in the kindergarten assessment and teachers received \$25. All procedures were approved by the institutional review board and informed consent was obtained from all participants. As all measures used in these analyses were completed by parents, child assent was not required or obtained for these measures (though assent was obtained for measures in the larger study that required child participation).

Measures

Parent Psychological Distress (Time 1)

Center for Epidemiological Studies Depression Scale (CESD) (Radloff, 1977): The CESD (Time 1 Cronbach's $\alpha=.89$) is a 20-item self-report measure of depression symptoms in the past week. Symptoms are rated on a 0 (rarely or none of the time) to 3 (most or all of the time) scale, with higher scores representing more severity. Sample items include: "I felt depressed" and "I thought my life had been a failure."

Beck Anxiety Inventory (BAI) (Beck & Steer, 1993): The BAI (Time 1 Cronbach's $\alpha=.81$) is a 21-item self-report measure that assesses anxiety symptoms experienced in the past week. Items are rated on a 4-point (0-3) scale, with higher scores representing more symptom severity. Sample anxiety symptoms include feeling "shaky", "scared", and "faint."

Parenting Stress Index-Short Form (PSI/SF)—Parent Distress subscale (Abidin, 1990): The 12-item Parent Distress subscale of the PSI/SF (Time 1 Cronbach's $\alpha=.88$) was used as a component of the latent construct of parental psychological distress. Sample items include:

“I feel alone and without friends” and “I find myself giving up more of my life to meet my children’s needs than I expected.”

Sub-Optimal Parenting (Time 1 and Time 2)

O’Leary Parenting Scale (Arnold, O’Leary, Wolff & Acker, 1993): The Parenting Scale is a measure of dysfunctional discipline practices in parents of young children. The current study utilized the Laxness (Time 1 Cronbach’s $\alpha=.81$, Time 2 Cronbach’s $\alpha=.77$, 8 items) (e.g. “When I say my child can’t do something I let my child do it anyway”) and Over-reactivity (Time 1 Cronbach’s $\alpha=.75$, Time 2 Cronbach’s $\alpha=.65$, 7 items) (e.g. “When I’m upset/under stress, I am picky and on child’s back”) subscales.

Parenting Stress Index-Short Form (PSI/SF)—Parent-Child Dysfunctional Interaction subscale (Abidin, 1990): The Parent-Child Dysfunctional Interaction subscale of the PSI/SF (Time 1 Cronbach’s $\alpha=.88$, Time 2 Cronbach’s $\alpha=.87$, 12 items) was used as a component of the latent construct of Sub-Optimal Parenting. Sample items include: “My child rarely does things for me that make me feel good” and “My child smiles at me much less than I expected.”

Social Support (Time 1)

Medical Outcomes Study Social Support Survey (MOS-SSS) (Sherbourne & Stewart, 1991): The MOS-SSS is a self-report survey that assesses perceived functional social support across a variety of domains. The current study utilized the Emotional (Time 1 Cronbach’s $\alpha=.96$, 8 items) and Instrumental (Time 1 Cronbach’s $\alpha=.91$, 4 items) support domains. Response options range from 1=none of the time to 5=all of the time. Higher scores indicate a greater perception of social support. Sample emotional support items include: “Having someone to confide in or talk to about yourself or your problems.” Instrumental support item examples include: “Having someone to help you if you were confined to bed.”

Quality of Marriage Index (QMI) (Norton, 1983): The QMI (Time 1 Cronbach’s $\alpha=.96$) is a 6-item scale measuring marital satisfaction. The first five items are rated on a 7-point scale (1=totally disagree, 7 = totally agree). The sixth item assesses the overall degree of happiness in the relationship and is also rated on a 7-point scale (1=extremely unhappy, 7=perfect). In this study, parents were asked to complete the QMI if they had a spouse/partner or other romantic relationship. Sample items include: “My relationship with my partner is very stable” and “I really feel like part of a team with my partner.”

Child Behavior Problems (Time 1 and Kindergarten)

Child Behavior Checklist (CBCL) (Achenbach & Rescorla, 2001): The CBCL measures child behavioral and emotional problems on a 3-point likert scale (0=“Not True,” 1=“Somewhat or Sometimes True,” or 2=“Very True or Often True.”). The CBCL measures two broadband domains of behavior problems (Internalizing and Externalizing) as well as Total Problems. The current study uses two sub-scales of the Externalizing domain, Attention Problems (parent-reported T1 Cronbach’s $\alpha=.51$, 3 items; parent-reported K Cronbach’s $\alpha=.75$, 10 items; teacher-reported K Cronbach’s $\alpha=.90$, 10 items) and

Aggression (parent-reported T1 Cronbach's $\alpha=.80$, 10 items; parent-reported K Cronbach's $\alpha=.87$, 18 items; teacher-reported K Cronbach's $\alpha=.87$, 17 items), as components of the latent construct of externalizing behaviors at Time 1 and kindergarten. Sample items include: "can't sit still, and is restless, or hyperactive" and "demands a lot of attention." The current study also uses two sub-scales of the Internalizing domain, Anxiety (parent-reported K Cronbach's $\alpha=.72$, 13 items) and Withdrawal/Depression (parent-reported K Cronbach's $\alpha=.62$, 8 items), as components of the latent construct of internalizing behaviors at kindergarten. Sample items include: "cries a lot" and "secretive, keeps things to self." Because the Anxiety and Withdrawal/Depression subscales have relatively few items and low reliability in the toddler years, the CBCL broadband internalizing domain (parent-reported T1 Cronbach's $\alpha=.86$, 19 items) was used as a measure of internalizing behavior at Time 1.

Both parent and teacher-reported CBCL externalizing scores are included at kindergarten. The loadings of teacher-reported Aggression and Attention Problems on the latent externalizing constructs were relatively low; therefore, as a check of our findings, we also tested all models separately for parent- and teacher-reported outcomes. These analyses confirmed that the pattern of findings reported below applies for both parents and teachers; full results are available by request from the first author. We expected that teachers would be less reliable reporters of internalizing symptoms than they are of externalizing symptoms and found, in fact, that teacher reports load very poorly (all $\beta < .06$) onto a construct consisting of the shared variance in parent and teacher-reported withdrawal/depression and anxiety; therefore, analyses of internalizing outcomes are based exclusively on parent reports.

Infant-Toddler Social Emotional Assessment (ITSEA) (Carter & Briggs-Gowan, 2006):

The ITSEA is a 166-item measure of infant behavioral, social, and emotional functioning. ITSEA items are rated on a 3-point scale: 0= "Not true/rarely," 1= "Somewhat true/sometimes," and 2= "Very true/often." The ITSEA Aggression/Defiance subscale (Time 1 Cronbach's $\alpha=.79$, 12 items) was used as a component of the latent construct of externalizing behaviors at Time 1. Sample items include: "acts aggressive when frustrated." The ITSEA Internalizing domain score was used as a component of the latent construct of internalizing behaviors at Time 1 (Cronbach's $\alpha=.81$, 30 items). Sample items include: "seems nervous, tense, or fearful."

Analysis

Data were analyzed using SPSS version 19 and MPlus version 6. All manifest variables were tested for normality and variables with skewness values > 1 or < -1 were normalized using a log transformation. Four indicators of model fit— the Root Mean Square Error of Approximation (RMSEA), the Standardized Root Mean Residual (SRMR), the Tucker-Lewis Index (TLI), and the Comparative Fit Index (CFI)—are reported for all models except the moderation models, for which traditional model fit statistics are not available in MPlus. Though cut-off values for adequate model fit statistics vary across authors, conservative estimates state that values $<.06$ for the RMSEA, $<.08$ for the SRMR, and $>.95$ for the TLI and CFI represent a close fitting model (Hu & Bentler, 1999). In addition, the Bayesian

Information Criterion (BIC) was used to compare non-nested models (e.g., the mediation model versus the direct effect model). Based on the recommendations of Raftery (1995), a difference of at least 6 was taken as strong evidence that the model with a smaller BIC value had better fit than the model with a larger BIC value. Finally, the chi-square statistic is reported for each model. However, the chi-square statistic is a poor indicator of practical model fit, as it is strongly influenced by sample size (Fan, Thompson, & Wang, 1999). Thus, for the models described below, chi-square values are reported but are not interpreted as meaningful measures of model fit.

Results

Missing Data

Less than 15% of data were missing for all variables measured at Times 1 and 2, with the exception of the Time 1 O'Leary Parenting Scales and CBCL Aggression scale, for which approximately 25% of the data was missing by design as these measures were not appropriate for children under 18 months of age. Approximately 20% of parent-reported and 40% of teacher-reported data was missing for the outcome variables at the Kindergarten assessment. Significant correlations (ranging from $r = -.07^* - .20^*$, $p < .01$) between demographic factors and missing data indicate that Kindergarten parent and teacher data was more likely to be missing from children living in poverty, and with single, younger parents, though only parent age significantly predicted missingness in a regression model with all three variables. These correlations were small and are likely significant only because of the large sample size in this study. Further, missing parent data was significantly correlated with missing teacher data in Kindergarten ($r = .48^*$, $p < .01$). FIML estimation, which produces unbiased parameter estimates for MAR data, was used to estimate all parameters in the context of missing data (Enders & Bandalos, 2001).

Preliminary Analysis—Descriptive statistics for manifest variables are shown in Table 1. Confirmatory factor analysis was used to test the fit of the hypothesized model (see Figure A1) to the data. To improve the fit of the measurement model, correlated errors were added between eleven pairs of related (within-time or within-measure) indicator variables ($R = -.134 - .669$) (see Table A1). The specific pairs of indicator variables were chosen based on model modification indices as well as on the fact that, as all of these variables were measured using the same form of assessment (paper questionnaire) and completed by the same respondent (the child's mother), it was expected that they would have a high degree of shared measurement error. The revised model had excellent fit (see Table 2).

All Time 1 and Time 2 latent predictors and Kindergarten outcome measures were specified using the factor identification method, meaning that the latent variance was set to 1.0 and all factor loadings were freely estimated. Because the Kindergarten externalizing variables had only two indicator variables, they required an additional restriction to be identified; thus, the residual variances of parent-reported Inattention and Aggression were fixed to zero. Indirect control was used in all models to account for the effects of early externalizing and internalizing problems on all predictor variables and in the mediation model to account for the effects of early sub-optimal parenting on psychological distress. Loading values and

residual error values are reported in the Appendix (Figure A1). Model fit statistics and R^2 values are reported in Table 2.

Hypothesis 1: Direct Effect of Parent Psychological Distress on Kindergarten Behavior

In the first model, we examined the effects of parent psychological distress at Time 1 on kindergarten Inattention, Aggression, Anxiety, and Withdrawal/Depression (Figure 1a). To maintain consistency between the full-group direct effects model and the moderation models that follow, latent sub-optimal parenting and social support at Time 1 and sub-optimal parenting at Time 2 were entered in the model. Correlation pathways were specified between all Time 1 variables, and Time 2 sub-optimal parenting was regressed on Time 1 sub-optimal parenting.

The direct effect model demonstrated a good fit for the data (see Table 2). Though CFI and TLI were both less than .95, the combination of $RMSEA < .06$ and $SRMR < .08$ indicates that the probability that the model is misspecified is low (Hu & Bentler, 1999). There was a significant main effect of psychological distress on Inattention ($\beta = .463$, $p < .001$), Aggression ($\beta = .490$, $p < .001$), Anxiety ($\beta = .438$, $p < .001$), and Withdrawal/Depression ($\beta = .401$, $p < .001$) with higher maternal psychological distress at Time 1 predicting greater problems in kindergarten. In addition, Time 1 psychological distress was negatively correlated with Time 1 social support ($R = -.922$, $p < .001$) and positively correlated with Time 1 sub-optimal parenting ($R = .888$, $p < .001$). Time 1 social support and Time 1 sub-optimal parenting were also negatively correlated ($R = -.717$, $p < .001$). As expected, the pathway from Time 1 sub-optimal parenting to Time 2 sub-optimal parenting was significant ($\beta = .877$, $p < .001$). Finally, Time 1 behavior problems were associated with Time 1 psychological distress (externalizing $\beta = .481$, $p < .001$; internalizing $\beta = .338$, $p < .001$), Time 1 sub-optimal parenting (externalizing $\beta = .430$, $p < .001$; internalizing $\beta = .365$, $p < .001$), and Time 1 social support (externalizing $\beta = -.245$, $p < .01$; internalizing $\beta = -.235$, $p < .001$).

Hypothesis 2: Mediation of Parent Psychological Distress by Parenting Behavior

We next tested whether Time 2 sub-optimal parenting mediated the effect of Time 1 psychological distress on children's behaviors in kindergarten (see Figure 1b). As the pathways from Time 1 externalizing and internalizing to Time 1 psychological distress were non-significant (all $p > .50$), these pathways were trimmed from the final model. In addition, as the direct effect of psychological distress was fully mediated for each outcome variable (β aggression = .144, $p = .231$; β inattention = .175, $p = .135$; β anxiety = .140, $p = .167$; β withdrawal/depression = .212, $p = .086$), these pathways were removed from the final model. The final mediation model showed a good fit for the data (see Table 2). In addition, the BIC value for the mediation model was approximately 16 points lower than that of the direct effect model, demonstrating that the mediation model had superior fit in comparison to the direct effect model. The results supported our hypothesis that Time 2 sub-optimal parenting mediates the pathway between Time 1 psychological distress and kindergarten behavior for all outcomes. The pathway from Time 1 psychological distress to Time 2 sub-optimal parenting was significant and positive ($\beta = .874$, $p < .001$), indicating that parents with high psychological distress during their child's toddlerhood reported less optimal

parenting approximately one year later, even accounting for parenting behavior at Time 1. The pathways from Time 2 sub-optimal parenting to Aggression ($\beta = .525, p < .001$), Inattention ($\beta = .493, p < .001$), Anxiety ($\beta = .462, p < .001$), and Withdrawal/Depression ($\beta = .424, p < .001$) were positive and significant, indicating that higher levels of sub-optimal parenting at Time 2 were associated with higher levels of symptoms in kindergarten. The indirect effect of Time 1 psychological distress mediated by Time 2 sub-optimal parenting (estimated using the MPlus Indirect command) was positive and significant for all outcomes (β aggression = .459, $p < .001$; β inattention = .431, $p < .001$; β anxiety = .404, $p < .001$; β withdrawal/depression = .371, $p < .001$).

Hypothesis 3: Moderation of the Parent Psychological Distress to Parenting Behavior Pathway by Social Support

Our third hypothesis was that the relation between Time 1 psychological distress and Time 2 sub-optimal parenting would be moderated by Time 1 social support. This hypothesis was tested using the MPlus latent moderated structural (LMS) approach, which has been favorably compared to other techniques for assessing moderation in a latent variable model (see Moosbrugger, Schermelleh-Engel, Kelava, & Klein, 2009 for a full description of the LMS approach and comparison to alternative approaches). Our hypothesis was supported, as the interaction term was significantly associated with Time 2 sub-optimal parenting ($b = -.123, p < .01$). In addition, the main effects of social support ($b = 1.834, p < .01$) and psychological distress ($b = 1.733, p < .01$) were significant. Though MPlus does not produce traditional fit statistics for models with interaction terms, the BIC value for the moderation model was smaller than the value for the direct effect (difference in BIC values = 51) or mediation (difference in BIC values = 35) models, indicating that it better accounted for the observed data than these models. A plot of the interaction effect (Figure 2) showed that the relation between psychological distress and sub-optimal parenting was strongest at low levels of maternal social support.

Hypothesis 4: Moderation of the Parenting Behavior to Child Behavior Pathways by Social Support

Our final hypothesis was that the relations between Time 2 sub-optimal parenting and kindergarten outcomes are moderated by Time 1 social support. We used separate models to test the interaction term for each outcome, but *all* outcomes were regressed on Time 2 sub-optimal parenting to maintain consistency with the final mediation model. Hypothesis 4 was not supported for Aggression ($b = -0.004, p = .774$), Inattention ($b = 0.000, p = .981$), or Anxiety ($b = 0.001, p = .659$); in addition to demonstrating non-significant coefficients for the interaction terms, these models did not have improved fit (BIC values) in comparison to the mediation model. The interaction term was significant ($b = -.009, p < .01$) for Withdrawal/Depression and sub-optimal parenting remained a significant predictor with the interaction term in the model ($b = 0.036, p < .01$). The effect of social support on Withdrawal/Depression was not statistically significant ($b = -0.019, p = .257$). Further analysis of the interaction effect showed that the relation between sub-optimal parenting at Time 2 and Withdrawal/Depression in kindergarten was stronger at low levels of social support than at higher levels of support. However, the BIC value for this model was two points greater than the BIC value for the mediation model, indicating that the inclusion of the interaction term predicting

to Withdrawal/Depression did not produce a model that better accounted for the data than the mediation model.

Discussion

In this study's diverse, community sample, sub-optimal parenting behaviors in toddlerhood were found to mediate the effect of early maternal psychological distress on children's externalizing and internalizing behaviors in kindergarten, with psychological distress at Time 1 (M age=2 years) predicting sub-optimal parenting behaviors at Time 2 (M age = 3 years), and sub-optimal parenting behaviors predicting inattention, aggression, anxiety, and depressive symptoms in kindergarten. Social support was found to moderate the impact of parent psychological distress on sub-optimal parenting behaviors, such that mothers with high levels of social support were somewhat protected from the effects of psychological distress on their parenting behaviors. Social support also moderated the impact of sub-optimal parenting on children's withdrawal/depression, such that children of mothers who reported high levels of perceived social support when the children were toddlers were somewhat protected from the effects of later sub-optimal parenting on withdrawal/depressive symptoms in Kindergarten. In each of the models tested, the effect of early externalizing and internalizing behavior on the early predictor variables was controlled for. Our results suggest that identification and intervention targeting mothers' psychological distress, parenting behaviors, and access to social support when children are one and two years of age may reduce the magnitude of both externalizing and internalizing behavior problems during the school transition.

Our models showed a main effect of parent psychological distress in toddlerhood on children's behavior in kindergarten, replicating the finding that exposure to a parent's psychological distress early in life predicts a child's later behavioral functioning (Maughan, Cicchetti, Toth, & Rogosch, 2007). These results provide support for the practice of targeting parent mental health as a component of any universal prevention or targeted prevention program, as is done in programs like the Incredible Years (Shepard & Dickstein, 2009) and indicates that this practice may ameliorate children's risk for *internalizing* problems as well as for externalizing behavior problems that have been the primary focus of such interventions. In addition, our models showed that the effects of parent psychological distress were mediated by parenting behaviors, reinforcing previous findings linking parent psychological functioning to parenting behavior (e.g. Lovejoy et al., 2000).

Our models also demonstrate that social support moderates the relation between psychological distress and parenting behavior. Social support may be functioning as a buffer in several ways; for instance, parents with high social support may be receiving parenting advice that improves parenting behavior even though they continue to experience psychological distress. In addition, parents with high levels of support may have greater access to childcare, allowing them time for self-care. Further, the moderating effect of early social support on Kindergarten withdrawal/depression suggests that children exposed to high levels of social support early in life may observe parents utilizing their social support network, and learn to draw support from others to reduce distress and increase social

engagement. The child may also directly utilize the caregiver's social support network for encouragement, praise, and support in times of transition.

Our models did not demonstrate support for the hypothesis that social support moderates the relationship between sub-optimal parenting and inattention, aggression, or anxiety. It is possible that children directly benefit more from social support—which may bring exposure to adults with a fuller range of affect than their parents, adults who are warm and positive toward them, etc.—as it impacts withdrawal/depression symptoms compared to other symptoms. It may also be that the impact of parents' perceptions of social support on children's anxiety, aggression, and inattention is primarily proximal, and measurement of social support either at the time of exposure to sub-optimal parenting or at the time at which child behaviors were assessed might be expected to show different findings. It is also important to note that our measure of social support was based on the parent's report. Measures of the child's experience of social support (Dubow, Edwards, & Ippolito, 1997; Werner & Smith, 1982), or of structural social support in a community, may be more fruitful in determining the impact of social support on children.

Strengths of this study include the large sample size, the fact that our sample is racially/ethnically and socio-economically diverse, and the availability of both parent and teacher reports of externalizing behavior problems. This study also allowed us to examine the buffering role of early maternal perceptions of social support over time, and included a latent measurement of this construct incorporating measurements of instrumental, emotional, and intimate relationship support dimensions. The use of SEM is an additional strength of this study, as SEM accounts for measurement error and thus produces more accurate parameter estimates in comparison to more traditional statistical methods. In traditional techniques using measured variables, correlation/predictive pathways are likely to be attenuated due to the effects of measurement error. SEM produces correlations and regression coefficients that are free of this attenuation and thus represent more accurate estimates of the true relations among constructs.

This study also has several limitations. The majority of measured variables came from maternal reports, though the Kindergarten externalizing outcomes also incorporated teacher-reported problems. The absence of paternal reports limits the generalizability of our findings, as does the fact that data were more likely to be missing for children from lower SES backgrounds who had single, younger mothers. In addition, parent-report measures have been criticized for relying solely on parents' memory and perceptions, both of which may be inaccurate or biased (Maccoby & Martin, 1983). Self-report measures are vulnerable to the effects of parent mood, language ability, vocabulary level, and other sources of variability across parents (Aspland & Gardner, 2003). Future research in which social support is measured through observation, interview, or through multiple reporters would be informative, as would future research utilizing observational measures of parenting behavior. SEM may in part account for self-report bias if this bias is inconsistent across measures, as latent constructs represent only the shared variance across measures (and therefore will exclude biased information if the bias is inconsistent across measures). In addition, our assessments of social support and parenting behavior may not fully capture these constructs; further research on the role of additional dimensions of social support (e.g.,

formal social support and parenting-specific social support) and additional aspects of parenting behavior (e.g., positive behaviors) within our model would increase the comprehensiveness of the model. The data used in this study contained small but systematic patterns of missingness; FIML estimation was used in an effort to compensate for this limitation. In addition, the time lag between parents' reporting and teachers' reporting of child behavior, which was two- and a half-months on average, may have contributed to the relatively low shared variance between parent and teacher reports of externalizing. Finally, some of our measures of child behavior had lower internal consistency than would be ideal (e.g., parent-reported Kindergarten Withdrawal/Depression (Cronbach's $\alpha = .62$) and parent-reported Time 1 attention problems (Cronbach's $\alpha = .51$)). These values are unsurprising given that reporting on an infant's attention skills or a Kindergartener's internalizing symptoms is expected to be more difficult for parents than reporting on more obvious behaviors such as hitting or shouting; nevertheless, replication of our findings with more reliable measures would be of value.

Despite the limitations noted above, this study makes several important contributions to the literature. We sought to identify changeable risk factors in the developing child's environment that predict the occurrence of externalizing and internalizing behavior problems during the school transition. In doing so, we found that mothers' psychological distress in toddlerhood, mediated by sub-optimal parenting behavior approximately one year later, predicts children's inattention, aggression, anxiety, and depression/withdrawal during the school transition. Both of these factors have been shown to be responsive to intervention, and our results indicate that intervening on either of these risk factors early in life may halt the process leading to problematic levels of *both* internalizing and externalizing behavior in early school-age children. In addition, we found that early social support appears to buffer the effect of psychological distress on parenting behavior, such that mothers who experience high levels of psychological distress appear to be protected in their parenting when they also experience high levels of social support. This finding has important implications for efforts to prevent the occurrence of a broad spectrum of child behavior problems. This finding is particularly exciting given the potential for benefits to extend to an entire community when social support is the target of intervention. Future research on the outcomes of social-support-oriented interventions for children and parents is highly warranted and may lead to exciting opportunities for promoting the health of entire groups of families.

Acknowledgments

This research was supported in part by NIMH R01 MH55278 (Alice S. Carter, PI), by NIMH/NIH R25 MH071286 (Kerim Munir, PI), and by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1356104.

Appendix

Figure A1.
Measurement Model

Table A1

Values for Correlated Errors Between Measured Variables

Correlated Measures		Correlated Error Value
Measure 1	Measure 2	
Time 1 CESD	Time 1 BAI	.308 ***
Time 1 PSI	Time 1 PSI	.341 ***
Dysfunctional	Parenting Distress	
Interaction		
Time 1 QMI	Time 1 CESD	-.134 ***
Time 1 MOS	Time 1 MOS	.543 ***
Emotional	Instrumental	
Support	Support	
Time 1 O'Leary	Time 2 O'Leary	.587 ***
Laxness	Laxness	
Time 1 O'Leary	Time 2 O'Leary	.502 ***
Overreactivity	Overreactivity	
Time 1 PSI	Time 2 PSI	.264 ***
Dysfunctional	Dysfunctional	
Interaction	Interaction	
Time 1 ITSEA	Time 1 ITSEA	.178 ***
Internalizing	Aggression	
Time 1 CBCL	Time 1 CBCL	.328 ***
Internalizing	Attention	
	Problems	
Time 1 CBCL	Time 1 CBCL	.462 ***
Internalizing	Aggression	
Kindergarten	Kindergarten	.669 ***
teacher-reported	teacher-reported	
Aggression	Inattention	

***
p .001

References

- Abidin, RR. Parenting stress index short form-test manual. Pediatric Psychology Press; Charlottesville, VA: 1990.
- Achenbach, TM.; Rescorla, LA. Manual for the ASEBA School-Age Forms & Profiles. University of Vermont, Research Center for Children, Youth, and Families; Burlington, VT: 2001.
- Aspland H, Gardner F. Observational measures of parent-child interaction: An introductory review. *Child & Adolescent Mental Health*. 2003; 8(3):136–143.
- Ayoub C, Vallotton CD, Mastergeorge AM. Developmental pathways to integrated social skills: The roles of parenting and early intervention. *Child Development*. 2011; 82(2):583–600. doi:10.1111/j.1467-8624.2010.01549.x. [PubMed: 21410921]
- Baillargeon RH, Normand CL, Séguin JR, Zoccolillo M, Japel C, Pérouse D, Tremblay RE. The evolution of problem and social competence behaviors during toddlerhood: A prospective population-based cohort survey. *Infant Mental Health Journal*. 2007; 28(1):12–38.

- Beck, AT.; Steer, RA. Manual for the Beck Anxiety Inventory. Psychological Corporation; San Antonio, TX: 1993.
- Belsky J. The determinants of parenting: a process model. *Child Development*. 1984; 55(1):83–96. doi:10.1111/1467-8624.ep7405453. [PubMed: 6705636]
- Brandt PA. Stress-buffering effects of social support on maternal discipline. *Nursing Research*. 1984; 33(4):229–234. doi:10.1097/00006199-198407000-00010. [PubMed: 6204278]
- Burchinal MR, Follmer A, Bryant DM. The relations of maternal social support and family structure with maternal responsiveness and child outcomes among African American families. *Developmental Psychology*. 1996; 32(6):1073–1083.
- Campbell SB, Shaw DS, Gilliom M. Early externalizing behavior problems: Toddlers and preschoolers at risk for later maladjustment. *Development and Psychopathology*. 2000; 12(03):467–488. [PubMed: 11014748]
- Carter, AS.; Briggs-Gowan, MJ. Manual for the Infant-Toddler Social & Emotional Assessment (ITSEA) - Version 2. Psychological Corporation, Harcourt Press; San Antonio, TX: 2006.
- Chorpita BF, Brown TA, Barlow DH. Perceived control as a mediator of family environment in etiological models of childhood anxiety. *Behavior Therapy*. 1998; 29(3):457–476. doi:10.1016/S0005-7894(98)80043-9.
- Cohen S, Wills TA. Stress, social support, and the buffering hypothesis. *Psychological bulletin*. 1985; 98(2):310. [PubMed: 3901065]
- Cole PM, Michel MK, Teti LO. The development of emotion regulation and dysregulation: A clinical perspective. *Monographs of the Society for Research in Child Development*. 1994; 59(2/3):73–100. doi:10.2307/1166139. [PubMed: 7984169]
- Coyl DD, Newland LA, Freeman H. Predicting preschoolers' attachment security from parenting behaviours, parents' attachment relationships and their use of social support. *Early Child Development and Care*. 2010; 180(4):499–512.
- Crnice KA, Gaze C, Hoffman C. Cumulative parenting stress across the preschool Period: Relations to Maternal Parenting and Child Behaviour at Age 5. *Infant and Child Development*. 2005; 14(2): 117–132. doi:10.1002/icd.384.
- Del Vecchio T, O'Leary SG. Antecedents of toddler aggression: Dysfunctional parenting in mother-toddler dyads. *Journal of Clinical Child & Adolescent Psychology*. 2006; 35(2):194–202. doi: 10.1207/s15374424jccp3502_3. [PubMed: 16597215]
- Dubow EF, Edwards S, Ippolito MF. Life stressors, neighborhood disadvantage, and resources: a focus on inner-city children's adjustment. *Journal of clinical child psychology*. 1997; 26(2):130–144. doi:10.1207/s15374424jccp2602_2. [PubMed: 9169374]
- Enders CK, Bandalos DL. The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*. 2001; 8(3):430–457.
- Ensor R, Hughes C. With a little help from my friends: Maternal social support, via parenting, promotes willingness to share in preschoolers born to young mothers. *Infant and Child Development*. 2010; 19(2):127–141.
- Fan X, Thompson B, Wang L. Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling: A Multidisciplinary Journal*. 1999; 6(1):56–83. doi:10.1080/10705519909540119.
- Gelhorn HL, Stallings MC, Young SE, Corley RP, Rhee SH, Hewitt JK. Genetic and environmental influences on conduct disorder: symptom, domain and full- scale analyses. *Journal of Child Psychology and Psychiatry*. 2005; 46(6):580–591. [PubMed: 15877764]
- Gilliom M, Shaw DS. Codevelopment of externalizing and internalizing problems in early childhood. *Development and Psychopathology*. 2004; 16(2):313–33. [PubMed: 15487598]
- Glover V, O'Connor TG, O'Donnell K. Prenatal stress and the programming of the HPA axis. *Neuroscience & Biobehavioral Reviews*. 2010; 35(1):17–22. [PubMed: 19914282]
- Green BL, Furrer CJ, McAllister CL. Does attachment style influence social support or the other way around? A longitudinal study of Early Head Start mothers. *Attachment & Human Development*. 2011; 13(1):27–47. doi:10.1080/14616734.2010.488121. [PubMed: 21240693]

- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*. 1999; 6(1):1–55. doi:10.1080/10705519909540118.
- Larsson H, Dilshad R, Lichtenstein P, Barker ED. Developmental trajectories of DSM-IV symptoms of attention-deficit/hyperactivity disorder: genetic effects, family risk and associated psychopathology. *Journal of Child Psychology and Psychiatry*. 2011; 52(9):954–963. doi: 10.1111/j.1469-7610.2011.02379.x. [PubMed: 21434915]
- Lovejoy MC, Graczyk PA, O'Hare E, Neuman G. Maternal depression and parenting behavior: A meta-analytic review. *Clinical Psychology Review*. 2000; 20(5):561–592. doi:10.1016/S0272-7358(98)00100-7. [PubMed: 10860167]
- Luthar SS, Cicchetti D, Becker B. Research on resilience: Response to commentaries. *Child Development*. 2000; 71(3):573–575.
- Maccoby, EE.; Martin, JA. Socialization in the context of the family: Parent-Child Interaction. In: Hetherington, EM., editor. *Handbook of child psychology: Vol. 4. Socialization, personality, and social development*. 4th ed.. Vol. 4. Wiley; New York: 1983. p. 1-101.
- Maccoby, Eleanor E. The role of parents in the socialization of children: An historical overview. *Developmental psychology*. 1992; 28(6):1006.
- Masten AS, Roisman GI, Long JD, Burt KB, Obradovi J, Riley JR, Tellegen A. Developmental cascades: Linking academic achievement and externalizing and internalizing symptoms over 20 years. *Developmental Psychology*. 2005; 41(5):733–746. [PubMed: 16173871]
- Maughan A, Cicchetti D, Toth SL, Rogosch FA. Early-occurring maternal depression and maternal negativity in predicting young children's emotion regulation and socioemotional difficulties. *Journal of Abnormal Child Psychology*. 2007; 35(5):685–703. [PubMed: 17503175]
- McConnell D, Breitzkreuz R, Savage A. From financial hardship to child difficulties: main and moderating effects of perceived social support. *Child: Care, Health and Development*. 2011; 37(5): 679–691. doi:10.1111/j.1365-2214.2010.01185.x.
- McNamara KA, Selig JP, Hawley PH. A typological approach to the study of parenting: associations between maternal parenting patterns and child behaviour and social reception. *Early Child Development and Care*. 2010; 180(9):1185–1202.
- Middleton M, Scott SL, Renk K. Parental depression, parenting behaviours, and behaviour problems in young children. *Infant & Child Development*. 2009; 18(4):323–336.
- Miner JL, Clarke-Stewart KA. Trajectories of externalizing behavior from age 2 to age 9: Relations with gender, temperament, ethnicity, parenting, and rater. *Developmental Psychology*. 2008; 44(3):771–786. doi:10.1037/0012-1649.44.3.771. [PubMed: 18473643]
- Moilanen KL, Shaw DS, Maxwell KL. Developmental cascades: Externalizing, internalizing, and academic competence from middle childhood to early adolescence. *Development and Psychopathology*. 2010; 22(3):635–653. doi:10.1017/S0954579410000337. [PubMed: 20576184]
- Moore PS, Whaley SE, Sigman M. Interactions between mothers and children: Impacts of maternal and child anxiety. *Journal of Abnormal Psychology*. 2004; 113(3):471–476. doi: 10.1037/0021-843X.113.3.471. [PubMed: 15311992]
- Moosbrugger H, Schermelleh-Engel K, Kelava A, Klein AG. Testing multiple nonlinear effects in structural equation modeling: A comparison of alternative estimation approaches. *Structural equation modeling in educational research: Concepts and applications*. 2009:103–136.
- NICHHD. Trajectories of Physical Aggression from Toddlerhood to Middle School: Predictors, Correlates, and Outcomes. Blackwell Publ.; 2004.
- Norton R. Measuring marital quality: A critical look at the dependent variable. *Journal of Marriage & Family*. 1983; 45(1):141.
- Paterson G, Sanson A. The association of behavioural adjustment to temperament, parenting and family characteristics among 5-year-old children. *Social Development*. 1999; 8(3):293–309. doi: 10.1111/1467-9507.00097.
- Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*. 1977; 1(3):385–401. doi:10.1177/014662167700100306.
- Raftery AE. Bayesian model selection in social research. *Sociological methodology*. 1995; 25:111–164.

- Rapee RM. Potential role of childrearing practices in the development of anxiety and depression. *Clinical Psychology Review*. 1997; 17(1):47–67. [PubMed: 9125367]
- Shaw DS, Gilliom M, Ingoldsby EM, Nagin DS. Trajectories leading to school-age conduct problems. *Developmental Psychology*. 2003; 39(2):189. [PubMed: 12661881]
- Shepard SA, Dickstein S. Preventive intervention for early childhood behavioral problems: An ecological perspective. *Child and Adolescent Psychiatric Clinics of North America*. 2009; 18(3): 687–706. doi:10.1016/j.chc.2009.03.002. [PubMed: 19486845]
- Sheppard M. Social support use as a parental coping strategy: Its impact on outcome of child and parenting problems--A six-month follow-up. *British Journal of Social Work*. 2008; 39(8):1427–1446. doi:10.1093/bjsw/bcn084.
- Silver EJ, Heneghan AM, Bauman LJ, Stein RE. The relationship of depressive symptoms to parenting competence and social support in inner-city mothers of young children. *Maternal and Child Health Journal*. 2005; 10(1):105–112. [PubMed: 16382333]
- Smeekens S, Riksen-Walraven JM, Van Bakel HJA. Multiple determinants of externalizing behavior in 5-year-olds: A longitudinal model. *Journal of Abnormal Child Psychology: An official publication of the International Society for Research in Child and Adolescent Psychopathology*. 2007; 35(3):347–361. doi:10.1007/s10802-006-9095-y.
- Tremblay RE. Prevention of youth violence: why not start at the beginning? *Journal of abnormal child psychology*. 2006; 34(4):481–487. doi:10.1007/s10802-006-9038-7. [PubMed: 16865544]
- Werner, EE.; Smith, RS. *Vulnerable But Invincible: A Study of Resilient Children and Youth*. McGraw-Hill; 1982.
- Woodruff-Borden J, Morrow C, Bourland S, Cambron S. The behavior of anxious parents: Examining mechanisms of transmission of anxiety from parent to child. *Journal of Clinical Child and Adolescent Psychology*. 2002; 31(3):364–374. [PubMed: 12149974]
- Woody D, Woody DJ. The significance of social support on parenting among a group of single, low-income, African American mothers. *Journal of Human Behavior in the Social Environment*. 2007; 15(2-3):183–198. doi:10.1300/J137v15n02_11.

Figure 1a. Direct Effect of Latent Psychological Distress

All pathways shown are significant at $p < .01$. All coefficients in Figure 1 are standardized.

Figure 1b. Mediation of Latent Psychological Distress by Latent Sub-Optimal Parenting
 All pathways shown are significant at $p < .01$. All coefficients in Figure 1 are standardized.

Figure 2. Moderation of the Effect of Psychological Distress on Parenting by Social Support

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Table 1

Descriptive statistics and 2-tailed bivariate Pearson correlations for manifest variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 T1 CB Att	1																						
2 T1 CB Agg	.60**	1																					
3 T1 IT Agg	.47**	.75**	1																				
4 T1 CB Int	.52**	.59**	.44**	1																			
5 T1 IT Int	.23**	.30**	.37**	.58**	1																		
6 T1 P-C Dys	.29**	.33**	.30**	.39**	.27**	1																	
7 T1 Over.	.28**	.37**	.34**	.33**	.15**	.29**	1																
8 T1 Lax	.16**	.16**	.22**	.15**	.16**	.19**	.24**	1															
9 T1 P-D	.33**	.40**	.33**	.41**	.25**	.61**	.39**	.19**	1														
10 T1 BAI	.27**	.35**	.27**	.29**	.18**	.18**	.29**	.12**	.36**	1													
11 T1 CESD	.26**	.30**	.28**	.31**	.23**	.32**	.34**	.16**	.50**	.60**	1												
12 T1 Sup I	-.17**	-.16**	-.16**	-.22**	-.16**	-.29**	-.31**	-.21**	-.39**	-.22**	-.37**	1											
13 T1 Sup E	-.15**	-.16**	-.14**	-.20**	-.12**	-.25**	-.25**	-.12**	-.38**	-.22**	-.32**	.71**	1										
14 T1 QMI	-.13**	-.18**	-.20**	-.19**	-.11**	-.22**	-.23**	-.09**	-.36**	-.24**	-.45**	.34**	.22**	1									
15 T2 P-C Dys	.28**	.32**	.30**	.34**	.26**	.52**	.33**	.21**	.45**	.27**	.35**	-.28**	-.24**	-.25**	1								
16 T2 Over.	.22**	.30**	.30**	.28**	.10**	.29**	.62**	.18**	.36**	.23**	.31**	-.20**	-.17**	-.26**	.37**	1							
17 T2 Lax	.15**	.15**	.18**	.18**	.17**	.28**	.23**	.62**	.24**	.09**	.21**	-.23**	-.12**	-.17**	.26**	.26**	1						
18 PK CB Anx	.22**	.28**	.27**	.39**	.32**	.26**	.18**	.12**	.27**	.21**	.25**	-.20**	-.19**	-.18**	.32**	.22**	.17**	1					
19 PK CB WD	.28**	.23**	.20**	.33**	.29**	.28**	.15**	.12**	.24**	.22**	.27**	-.23**	-.18**	-.17**	.32**	.20**	.10**	.57**	1				
20 PK CB Agg	.42**	.52**	.43**	.33**	.16**	.27**	.27**	.15**	.29**	.22**	.27**	-.20**	-.16**	-.20**	.35**	.30**	.19**	.54**	.47**	1			
21 PK CB Att	.44**	.41**	.32**	.29**	.14**	.27**	.22**	.18**	.26**	.15**	.25**	-.22**	-.19**	-.13**	.33**	.25**	.18**	.48**	.43**	.64**	1		
22 TK CB Agg	.12**	.11*	.14**	-.01	-.07	.13**	.04	.07	.05	.01	.06	-.09*	-.02	-.09*	.19**	.10**	.15**	.09*	.13**	.34**	.34**	1	
23 TK CB Att	.15**	.08	.10**	-.02	-.06	.13**	.07	.14**	.03	.04	.10*	-.10**	-.02	-.05	.16**	.11**	.18**	.05	.09*	.28**	.42**	.67**	1
N	863	868	1143	860	1161	1151	863	863	1147	1127	1132	1138	1136	1013	1062	1039	1043	948	949	949	953	674	674
Mean	1.53	7.32	0.50	4.90	0.53	15.64	16.85	20.85	20.80	4.50	8.77	4.33	4.09	5.85	15.90	12.83	16.20	2.00	0.69	3.44	2.04	2.71	7.21

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
SD	1.52	6.00	0.31	4.59	0.22	5.08	5.69	7.12	8.31	5.35	7.68	0.83	0.95	1.19	4.80	4.30	5.83	2.30	1.16	3.96	2.60	4.90	9.00

P-D=PSI=Parenting Stress Index (short form), Parenting Distress Subscale; PC-Dys=PSI=Parenting Stress Index (short form), Parent-Child Dysfunctional Interaction Subscale; BAI=Beck Anxiety Inventory; CESD=Center for Epidemiological Studies Depression Scale; QMI=Quality of Marriage Index; CB=Child Behavior Checklist; IT=Infant Toddler Social Emotional Assessment; Over.=O'Leary Parenting Scales Overreactivity Subscale; Lax=O'Leary Parenting Scales Laxness Subscales; Sup I=instrumental social support (MOS); Sup E=emotional social support. K=Kindergarten; T=teacher report; P=parent report.

** p < 0.01;
* p < .05.

Table 2

Model Fit Indices

Model	χ^2	df	RMSEA (90% CI)	CFI	TLI	SRMR	R ² Aggression	R ² Inattention	R ² Anxiety	R ² Withdrawal/ Depression
Measurement Model: No Structural Pathways	471.84 **	191	0.036 (.032-.040)	0.965	0.954	0.038	0.74 **	0.52 **	0.58 **	0.46 **
Direct Effect Model: Psychological Distress Predicting Child Outcomes	685.7 **	203	0.045 (.042-.049)	0.940	0.925	0.050	0.77 **	0.56 **	0.59 **	0.45 **
Mediation Model: Psychological Distress Mediated by Sub-Optimal Parenting	683.78 **	205	0.045 (.041-.049)	0.941	0.927	0.052	0.77 **	0.50 **	0.60 **	0.45 **

** p<.001; CFI=comparative fit index; TLI=Tucker-Lewis Index; SRMR=standardized root mean square residual; RMSEA=root mean square error of approximation