Predicting Change in Parenting Stress Across Early Childhood: Child and Maternal Factors

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Abstract:

This study examined maternal parenting stress in a sample of 430 boys and girls including those at risk for externalizing behavior problems. Children and their mothers were assessed when the children were ages 2, 4, and 5. Hierarchical linear modeling (HLM) was used to examine stability of parenting stress across early childhood and to examine child and maternal factors predicting parenting stress at age 2 and changes in parenting stress across time. Results indicated that single parenthood, maternal psychopathology, child anger proneness, and child emotion dysregulation predicted 2-year parenting stress. Child externalizing behaviors predicted initial status and changes across time in parenting stress. Stability of parenting stress was dependent upon child externalizing problems, as well as interactions between child externalizing problems and gender, and child externalizing problems and emotion regulation. Results are discussed in the context of mechanisms by which parenting stress may influence the development of child externalizing behaviors. Keywords Parenting stress, Externalizing behavior, Emotion regulation, Hierarchical linear modeling, Early childhood.

Article:

The demands of parenting a young child create significant stress for almost all parents at one time or another. The assessment of parenting stress varies from examining every day hassles occurring within the normative parenting context (Crnic & Greenberg, 1990) to assessing more significant distress within the parent-child system (Abidin, 1990). Abidin (1992, 1995) proposed that parenting stress is created by a mismatch between the perceived demands of parenting and the resources available to meet those demands (Abidin, 1995) and can be defined as the negative mental response attributed to the self and/or the child created by "a series of appraisals made by each parent in the context of his or her level of commitment to the parent role" (Abidin, 1992, p. 410). Regardless of how parenting stress is conceptualized, greater stress typically indicates poorer outcomes in both the child and parent (usually maternal) domains (Crnic & Low, 2002). Increased parenting stress has been repeatedly identified as a risk factor for higher levels of child disruptive behavior problems (Barry, Dunlap, Cotten, Lockman, & Wells, 2005; Podolski & Nigg, 2001; Qi & Kaiser, 2003) as well as maladaptive parenting practices (Calkins, Hungerford, & Dedmon, 2004; see Kazdin & Whitley, 2003 for a review). Although research identifying parenting stress as a risk factor for maladaptive parenting and negative child outcome is

prevalent, the mechanisms by which parenting stress impacts child outcome is still unclear (Deater-Deckard, 2005).

In comparison to studies examining parenting stress as a predictor of outcome, fewer studies have focused on understanding which factors influence parenting stress and its stability over time (Chang et al., 2004). Clearly, a better understanding of stability and change of parenting stress over the course of early childhood would have important implications not only for understanding the development of behavior problems but also for the design of effective early preventive and intervention programs. Thus, the purpose of this study was to examine mother's parenting stress over time in a sample of children that included those at-risk for developing externalizing behavior problems during the preschool period in order to begin to understand causal mechanisms in parenting stress (Chang et al., 2004; Kazdin & Whitley, 2003).

Predictors of parenting stress

If parenting stress is conceptualized as distress related to the parent-child system, then the stresses associated with the parenting role will be exacerbated by a variety of child, parent, and environmental factors (Abidin, 1990). For example, the association between externalizing behaviors and parenting stress is well documented (Morgan, Robinson, & Aldridge, 2002). Approximately half of all preschoolers who display significant oppositionality, aggression, and/or impulsivity continue to display these behaviors over time and once established, these behaviors show remarkable continuity across development (Campbell, 2002; Loeber et al., 1993). While child disruptive behavior problems are often viewed as the eventual result of parenting stress, the directionality between these two factors is difficult to disentangle (Crnic & Low, 2002). This is in part because most research examining the relationship between parenting stress and behavior problems has been cross-sectional. With regard to prospective research, parental stress during infancy was found to be predictive of behavior problems in later childhood (Benzies, Harrison, & Magill-Evans, 2004). However, even here parents may be reacting to difficulties in temperament and emotion regulation that are also risk factors for later behavior problems. Longitudinal research examining the relationship between these factors across a series of time points may help to clarify the relationship between parenting stress and child behavior.

Child characteristics such as temperament and emotion regulation certainly impact parenting stress, parent-child interactions, and the development of later child behavior problems (Moffitt & Caspi, 2001). Negative affectivity, particularly anger proneness, has been associated with the presence of disruptive behavior in children (Eisenberg et al., 2001; Lehman, Steier, Guidash, & Wanna, 2002), and the presence of a difficult temperament has been associated with higher levels of parenting stress (Chang et al., 2004; Ostberg & Hagekull, 2000). Thus, the tendency for a child to anger easily would likely increase the demands of parenting and exacerbate parenting stress during toddlerhood. In addition, whether the child is able to successfully regulate emotions is important because it is implicated in behaviors such as negative emotionality and uncontrolled behavior which are characteristic of externalizing behavior problems (Campbell, 2002; Calkins, Gill, Johnson, & Smith, 1999; Calkins & Dedmon, 2000; Calkins, 2002). It may be that these biologically-based characteristics increase parental distress (Calkins et al., 2004; Sheinkopf et al., 2005) and that this distress and negative emotionality maladaptively interact to produce more serious externalizing problems later in childhood.

Finally, it is also important to examine the moderating effects of child gender on parenting stress. Disruptive behavior problems are more common among school-age boys (Keenan & Shaw, 1997) so it is not surprising that less research has examined processes that underlie the development of externalizing behaviors for girls (Hinshaw, 2002). Consequently, few studies have examined gender differences in how parenting stress is associated with behavior problems. However, Keenan and Shaw (1997) reviewed the literature examining differences in behavioral outcomes for girls versus boys and found that research indicates that rates of externalizing behaviors for girls and boys begin to diverge around age four. Additionally, a recent meta-analysis examining gender differences in temperament traits found that girls demonstrated increased inhibitory control as well as greater ability to regulate their attention (Else-Quest, Hyde, Goldsmith, & Van Hulle, 2006). Given these gender differences in temperament and the fact the gender differences emerge in externalizing behaviors during preschool, mothers of girls may experience less parental distress during toddlerhood than mothers of boys and this difference may increase during the preschool period.

Factors residing within the parent or within the environment also significantly influence the stress associated with the parenting role. Parental psychopathology is a significant risk factor for both ineffective parenting and child behavior problems (Barry et al., 2005; Cummings, Keller, & Davies, 2005; Qi & Kaiser, 2003). Maternal psychopathology has also been shown to be related to higher levels of parenting stress (Misri, Reebye, Milis, & Shah, 2006; Sheinkopf et al., 2006). Mental illness may prevent a parent from accessing cognitive and social coping skills needed to decrease parenting stress subsequently increasing the risk for maladaptive parenting practices (Webster-Stratton, 1990).

Single parenthood is another risk factor for a host of negative parent and child outcomes (see Ricciuti, 2004 for a review). However, being a single parent is also associated with more distal contextual variables such as minority status, lower economic resources, and lower education levels thus complicating an understanding of the effects of single parenthood on parenting and child outcome (Copeland & Harbaugh, 2005; Ricciuti, 2004). The multiple demands of being a single parent may increase the risk for parental psychopathology (Davies, Avison, & McAlpine, 1997) and create greater stress related to parenting (Copeland & Harbaugh, 2005).

In summary, both child and parent characteristics influence parenting stress in complex ways. Therefore, a careful examination of how parenting stress changes across early childhood and the factors that predict stability and change, would improve the ability to develop a more specific and comprehensive model for how parenting stress impacts child behavioral outcomes.

Goals and hypotheses of the present study

Given that parenting stress has repeatedly been found to be a risk factor for maladaptive parenting and child behavior, parenting stress is the focus of this study rather than a predictor of parent or child outcome. Very few studies have examined the stability of parenting stress over time in an at-risk sample (although see Crnic, Gaze, & Hoffman, 2005 for a normative sample) and no studies to date have used analytic techniques (such as hierarchical linear modeling or latent growth curve analysis) designed to investigate within individual change as well as interindividual variability. Therefore, this study conceptualizes parenting stress as a malleable construct that has the potential to change during the preschool period and is influenced by both

the parent and the child, a perspective that may shed light on the relationship between parenting stress and both parent and child behavior.

We used hierarchical linear modeling (HLM) to investigate the stability of maternal parenting stress in early childhood, from age 2 to 5, and to examine factors that predict both initial status in parenting stress at age 2 and increases or decreases in stress level from 2 to 5. First, we predicted an overall normative decline in parenting stress which is consistent with the fact that disruptive behaviors decline normatively during early childhood (Campbell, 2002). We also predicted significant individual variability in maternal parenting stress during the preschool period and that this variability would be predicted by child and maternal characteristics. Specifically, we hypothesized that child externalizing problems would predict both higher initial levels of parenting stress and increases in parenting stress across time. Given the robust link between these two factors, we sought to increase the level of specificity of this relationship by examining child externalizing problems as a time-varying predictor and hypothesized that increases and decreases in externalizing problems would significantly predict respective changes in parenting stress across early childhood. Additionally, given that gender differences in externalizing behaviors begin to emerge during the preschool years, we expected gender to be an important predictor of parenting stress and hypothesized that mothers of girls would show less stress associated with parenting over time. We also predicted that child anger proneness and emotional dysregulation would result in higher initial levels of parenting stress and a less steep decline in stress across the preschool period. With regard to maternal characteristics, we predicted that single parenthood and psychopathology would predict higher initial levels and a less steep decline in parenting stress across early childhood.

METHOD

Participants

The current sample utilized data from three cohorts of children and their mothers who are part of an ongoing longitudinal study. Cohorts were recruited through child day care centers, the County Health Department, and the local Women, Infants, and Children (WIC) program. Potential participants for cohorts 1 and 2 were recruited at 2-years of age (cohort 1: 1994–1996 and cohort 2: 2000–2001) and screened using the Child Behavior Checklist (CBCL 2-3; Achenbach, 1992) completed by the mother in order to over-sample for externalizing behavior problems. Children were identified as being at risk for future externalizing behaviors if they received an externalizing T-score of 60 or above. Efforts were made to obtain approximately equal numbers of males and females (n = 307). Cohort 3 was initially recruited when infants were 6-months of age (in 1998) for their level of frustration based on laboratory observation and parent report and followed through the toddler period (See Calkins, Dedmon, Gill, Lomax, & Johnson, 2002, for more information). Children whose mother's completed the CBCL at 2-years of age were included in the current study (n = 140). Of the entire sample (N = 447), 37% of the children were identified as being at risk for future externalizing problems. There were no significant demographic differences between cohorts with regard to gender, X^2 (2, N = 447) = .63, p = .73, race, X^2 (2, N = 447) = 1. 13, p = .57, or 2-year SES, F (2, 444) = .53, p = .59. Cohort 3 had a significantly lower average 2-year externalizing T-score (M = 50.36) compared to cohorts 1 and 2 (M = 54.49), t (445) = − = − 4.32, p = .00.

Of the 447 original screened participants, 6 were dropped because they did not participate in any 2 year data collection. At 4 years of age, 399 families participated. Families lost to attrition included those who could not be located, who moved out of the area, who declined participation, and who did not respond to phone and letter requests to participate. There were no significant differences between families who did and did not participate in terms of gender, X^2 (1, N = 447) = 3.27, p = .07, race, X^2 (1, N = 447) = .70, p = .40, 2-year SES, t (424) = .81, p = .42, or 2-year externalizing T-score, t (445) = − = −.36, p = .72. At 5- years of age 365 families participated including 4 that did not participate in the 4-year assessment. Again, there were no significant differences between families who did and did not participate in terms of gender, X2 (1, N = 447) = .76, p = .38, race, X2 (1, N = 447) = .17, p = .68, 2-year socioeconomic status, t (424) = 1.93, p = .06) and 2-year externalizing T-score, t (445) = − = − 1.73, p = .09.

The current sample included the 430 children (52% female) and their mothers who participated in the 2-year laboratory visit. In terms of ethnicity, sixty-seven percent were European American, 27% were African American, 4% were biracial, and 2% were Hispanic. At age 2, the children were primarily from intact families (81%) and families were economically diverse with Hollingshead (1975) scores ranging from 14 to 66 (M = 39.56).

PROCEDURES

Children and their mothers participated in the study when the children were 2, 4, and 5 years of age. Mothers were provided a detailed verbal description of the laboratory visit and were asked to read and sign an informed consent form. Children and mothers participated in a series of laboratory tasks designed to elicit a variety of behaviors of developmental interest including emotion regulation which were videotaped for later coding. Mothers also completed questionnaires assessing family demographics, their own functioning, and their child's behavior. For the current study, two coded tasks from the 2-year laboratory visit were used and selected questionnaires were used from all three laboratory visits and are described below.

MEASURES

Parenting stress

The Parenting Stress Index—Short Form (PSI-SF; Abidin, 1995) is a 36-item scale completed by the child's primary caregiver that was used to assess the source and degree of parenting stress. The PSI-SF was administered when the children were 2, 4, and 5 years of age. The index contains subscales for stress stemming from the child, the parent-child relationship, and the parent as well as a total score. Items are rated on a 5-point scale (*Strongly Agree, Agree, Not Sure, Disagree, Strongly Disagree*). This measure demonstrates good reliability and validity (Abidin, 1995). We used the Total Stress raw score (α = .91; Abidin, 1995) as an assessment of overall maternal parenting stress where higher scores indicate increased parenting stress.

Externalizing behavior problems

The Child Behavior Checklist (CBCL; Achenbach 1991; 1992) is a broad-band behavior rating scale. We used the externalizing subscale as an index of externalizing behavior problems at each age. When the children were 2-years of age, mothers completed the CBCL for 2–3 year olds (Achenbach, 1992). When the children were 4 and 5, mothers completed the CBCL for 4–18 year olds (Achenbach, 1991). At 2-years of age, the externalizing subscale consisted of the subscales of aggression and destructive behavior, which were comprised of 26 items. At 4 and 5

years of age, the externalizing subscale consisted of the subscales of aggression and delinquency, which were comprised of 33 items. Items were rated on a 3-point scale (*Not true, Sometimes true, Often true*). The externalizing subscale has adequate psychometric properties, including internal consistency (α = .93), test-retest reliability, and longitudinal stability and discriminates between clinically referred and nonreferred children (Achenbach, 1991, 1992). Because different versions of this measure were completed according to the child's age at the time of the assessment, and because we were interested in children's disruptive behaviors relative to the expected level of behaviors given children's respective ages, the CBCL externalizing T-score was used where higher scores indicated more externalizing behaviors.

Anger proneness

The Toddler Behavior Assessment Questionnaire (TBAQ; Goldsmith, 1996) is a 108-item scale used to assess temperament-related behavior completed by the mother at the 2-year visit. Items are rated on a 6-point scale (*Never, Very rarely, Less than half the time, About half the time, More than half the time, Almost always, Always*). The measure contains five subscales including activity level, anger, fear, pleasure, and interest. The anger subscale was used in this study which has good internal consistency (α =.82–88; Goldsmith, 1996). Anger was defined as crying, protesting, hitting, pouting, or other signs of anger in situations involving conflict with the caregiver or another child. Higher scores indicate higher anger proneness.

Maternal psychopathology

The Symptom Checklist-90-Revised (SCL-90-R; Derogatis, 1994) is a self-report measure that assesses adult psychopathology symptoms. Mothers completed this measure at the 2-year visit and rated how much distress each of the 90-items caused them over the past 7-days using a 5-point scale (*Not at all, A little bit, Moderately, Quite a bit, and Extremely*). Twelve factor scores are derived from the SCL-90-R: somatization; obsessive-compulsive; interpersonal sensitivity; depression; anxiety; hostility; phobic anxiety; paranoid ideation; psychoticism; general severity; positive symptom distress; and positive symptom total. Adequate psychometric properties (internal consistency, test-retest reliability, and validity) have been demonstrated (Derogatis, 1994; Derogatis & Cleary, 1977). We used the general severity index raw score to assess the mother's overall psychopathology. Higher scores indicate greater psychopathology.

Emotion dysregulation

The current study utilized two tasks completed at the 2-year visit designed to elicit frustration and regulatory behavior (LAB-TAB, Goldsmith & Rothbart, 1993) in order to assess children's level of emotion dysregulation (i.e., the child's inability to manage or inhibit their emotions during times of distress). The first was a prize in a box task where cookies or a desirable toy were placed in a transparent box that the child was unable to open for 2 min. The second was a high chair task where the child was placed in a high chair without any toys or snacks for 5 min. For the cookie/toy in box task, the mother was asked to limit her interactions with her child, however during the high chair task she was instructed to respond to her child as she deemed necessary. If the child was highly distressed for more than 30 s, the task was discontinued. These tasks are part of a series standardized affect-eliciting laboratory procedures that have been used in prior work to assess temperament attributes in young children (Durbin, Klein, Hayden, Buckley, & Moerk, 2005; Goldsmith & Rothbart, 1993).

Prior research has shown relations between emotion regulation and emotion reactivity measures where reactivity is a part of the response to the contextual demands that require regulatory strategies to adjust for this change in reactivity (Calkins et al., 1999; Calkins & Johnson, 1998; Stifter & Braungart, 1995). Thus, both degree of distress and specific regulatory behaviors are considered evidence of emotion regulation processes (Calkins & Johnson, 1998; Cole, Martin, & Dennis, 2004). Therefore, reactivity and regulation behaviors were coded from videotapes of the frustration tasks (Calkins et al., 1999; Stifter & Braungart, 1995) and used to create an Emotion Dysregulation Index. Emotion reactivity was indexed by measures of distress (when the child whined, pouted, fussed, cried, screamed, or tantrummed), coded in four ways: a) proportion of distress was defined as the amount of time (in seconds) the child was distressed divided by the total time of the task scaled from 0 to 4 based upon the percent of time the child spent distressed (*0/None = 0%, 1/Minimal =< 1% to 5%, 2/Low => 5% to 19%, 3/Moderate to High => 19% to 98%),* b) negative reactivity was coded once for the entire task on a scale from 0 to 4 (*no emotional distress, mild distress, moderate distress, extreme distress*), c) global episode affect was coded once for the entire task on a scale from − − 3 to 3 (*high distressed affect, moderate distressed, mild distressed, neutral, mild joy, moderate joy, extreme joy*), and d) intensity of the child's behavior was coded once for the entire task on a scale from 0 to 4 (*not intense, mildly intense, somewhat intense, intense, very intense*).

Emotion regulation was indexed by the frequency of effective regulation behaviors, distraction and self-stimulating, and ineffective regulation behaviors, help-seeking and es cape, used as strategies for regulating negative affect. Each behavior was coded on a scale from 0 to 2 (*not used, infrequent/sometimes, often*). Distraction and self-stimulating were combined to form a positive regulatory behavior composite. Help-seeking and escape were combined to form a negative regulatory behavior composite. Additionally, global regulation, defined as the use of behavioral skills in an effort to decrease distress during the tasks, was coded on a scale from 0 to 4 (*no control, little control, somewhat regulated, mostly regulated, well regulated*).

Four coders (one graduate student and three advanced undergraduates) were involved in the reactivity and regulation coding. Coders trained by working together on 10% of the videotaped sessions (these were recoded independently after reaching reliability) and subsequently independently scoring an additional 10% for reliability where any disagreements in coding were resolved through consensus agreement (Calkins & Dedmon, 2002). Inter-coder reliability for the proportion of distress measure was excellent (r = .99). Reliability kappas for ordinal codes ranged from good (.72-intensity of goal reaching behavior) to excellent (1.0-episode affect and distraction use). The reactivity and regulation codes were significantly correlated (mean r = .51; range = .07–.91) and an Emotion Dysregulation Index score was created by standardizing and averaging proportion of distress, global negative reactivity, global episode affect (reversed scored), intensity of behavior, positive regulatory behavior (reversed scored), negative regulatory behavior, and global regulation (reversed scored) which had high internal consistency (α = .88). Higher scores indicated greater dysregulation.

Data analytic strategy

First, preliminary analyses (descriptive statistics and correlations) were computed. Next, growth curve analyses were conducted to examine trajectories of parenting stress across early childhood using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). HLM was used because it

allows for unbalanced designs so those children with incomplete outcome data could be included in the analyses. Parenting stress and child externalizing problems were measured when children were 2, 4, and 5 years of age. All other variables were assessed when children were 2-years of age. Age was centered at 2-years so that the intercept indicated initial levels of parenting stress. Linear growth trajectories were fit using full maximum likelihood estimation and the results reported were based on the robust standard errors. Initially, individual and group-level patterns of parenting stress were examined through a linear unconditional growth model. Next, we fit a series of models to characterize how well changes in children's externalizing behaviors predicted changes in parenting stress across early childhood. Because externalizing behaviors were measured at each age it was entered as a time-varying covariate and so allowed for the temporal variation of this factor. Next, we examined the variability in interindividual change in parenting stress by adding 2-year child and maternal factors to predict initial levels of parenting stress and to predict increases or decreases in parenting stress from 2-years to 5-years. During this process, different models were fit sequentially using a backward elimination method where the full model was fit and then non-significant predictors were removed one by one starting with the least significant predictor. Determination of best model fit was assessed using Bayesian Information Criterion (BIC), where smaller numbers indicate better fit and differences greater than 10 are considered to provide strong evidence for favoring the model with the lower BIC score (Kass & Raftery, 1995). This index has been shown to be helpful in comparing non-nested models and penalizes the model for the number of parameters which helps prevent overspecification (Singer & Willett, 2003). Selected interactions of continuous variables were plotted at +/− 1 SD from the mean unless otherwise noted (Aiken & West, 1991).

RESULTS

Missing data

The use of HLM accounts for missing data longitudinally under the assumption that data are missing at random (MAR). Thus, despite attrition between 2 and 5 years of age, the analysis below included all 430 participants. Overall, patterns of missing predictor data were examined revealing that missing data were predicted by the continuous 2-year variables used in the model, Little's MCAR test, $\chi 2$ (80, N = 430) = 141.91, $p < .0001$, indicating predictor data were MAR and not missing completely at random (MCAR). HLM does not account for missing data within the time invariant (level 2) variables. Given that listwise deletion of cases without complete data caused a 33% reduction in sample size (n = 142) which would have produced a significant loss in power and possible bias given that data were not MCAR (Little & Rubin, 2002), and that the amount of missing data for any one variable was relatively small (between 3 % and 20%) and significantly predicted by other variables in the model, missing values (with the number missing for each variable in parenthesis) for parent psychopathology (n = 73), emotion dysregulation (n = 15) and anger proneness (n = 85) were imputed through maximum likelihood estimation (*mle*) using the expectation method (EM) algorithm in SPSS 13. The EM method is an iterative process used to impute missing values and is indicated to be superior to listwise deletion, mean substitution, and multiple regression (Garson, 2006). Table 1 provides values of the imputed means and standard errors for these variables in parentheses highlighting that they remain very similar before and after data imputation.

Table 1 provides descriptive statistics of predictor and outcome measures which were adequately distributed and did not require transformations and correlations among these variables were

Table 1 Descriptive statistics for predictor and outcome measures

Measures	*n*	*M*	*SD*	Range
2-year measures				
Maternal psychopathology	359	0.43 (0.43)	0.35 (0.33)	0–2.31
Anger proneness	347	3.98 (4.00)	0.87 (0.81)	1.67–6.43
Emotion dysregulation	417	0.00 (0.00)	0.76 (0.75)	− 1.24–2.51
Externalizing problems	417	51.9	9.32	30–91
Parenting stress	417	74.00	17.98	36–134
4-year measures				
Externalizing problems	371	52.24	9.25	30–91
Parenting stress	371	70.41	17.62	37–135
5-year measures				
Externalizing problems	341	51.70	10.29	30–79
Parenting stress	319	67.38	18.43	36–132

Note. Numbers in parentheses indicate means and standard deviations of each measure after data imputation increased the *N* for all predictor variables to 430.

computed (see Table 2). Linear trajectories were fitted for all models because three waves of data were available. Linear models have been recognized as providing a good approximation about the nature of change even when the actual change is more complex (Rogosa, Brant, & Zimowski, 1982). Effects on the intercept and slope are provided for selected models in Table 3 and random effects for these models are presented in Table 4. Table 5 presents a comparison of model fit for all models. Figure 1 illustrates the 3-way interaction effects.

Table 2 Inter-correlations of predictor and outcome measures

	1	2	3	4	5	6	7	8	9
1. Maternal psychopathology	—	*.27*	.06	*.40*	*.42*	*.39*	*.40*	*.34*	*.39*
2. Anger proneness		—	*.24*	*.55*	*.43*	*.39*	*.32*	*.35*	*.27*
4. Emotion dysregulation			—	*.16*	*.22*	*.21*	.10	*.14*	.05
4. 2 yr externalizing problems				—	*.53*	*.63*	*.43*	*.59*	*.43*
5. 2 yr parenting stress					—	*.46*	*.60*	*.43*	*.52*
6. 4 yr externalizing problems						—	*.54*	*.74*	*.46*
7. 4 yr parenting stress							—	*.53*	*.70*
8. 5 yr externalizing problems								—	*.53*
9. 5 yr parenting stress									—

Note. *Italic* correlations significant ($p < .01$).

The results of fitting the unconditional growth model indicate that parenting stress declined across early childhood. The intercept (the average parenting stress score when children were 2-years of age) was 74.2 and the slope (the average rate of change in parenting stress for each year) was − − 1.92. Both estimates were significantly different from zero with adequate reliability estimates of .71 for the intercept and .38 for the slope. There was a negative correlation between the intercept and slope (r = −.29) indicating a relationship between higher 2-year parenting stress levels and more steeply declining slopes. Variances (random effects) around the intercept and slope were significant (see Table 4) indicating substantial interindividual heterogeneity that may be partially explained through predictor variables.

Table 3 Results of best fitting hierarchical linear models for change in parenting stress across early childhood ($N = 430$)

	Model					
	Unconditional growth		Reduced level 1		Reduced combined	
Fixed effects	β (*SE*)	*t* (*df*)	β (*SE*)	*t* (*df*)	β (*SE*)	*t* (*df*)
Intercept (initial status)	74.2 (0.87)	85.6 (429)***	30.4 (2.74)	11.1 (429)***	42.00 (3.03)	13.9 (424)***
Ethnicity (Minority)					−4.75 (1.30)	−3.65(424)**
SES						
Marital status (Single)					3.72 (1.80)	2.07 (424)*
Gender (Girl)						
Maternal psychopathology					13.1 (1.91)	6.85 (424)***
Emotion dysregulation					2.43 (0.94)	2.60 (424)**
Anger proneness					3.49 (0.80)	4.35 (424)***
Slope (Age)	−1.92 (0.31)	−6.23 (429)***				
Time varying covariate			0.84 (0.05)	15.86 (1072)***	0.64 (0.06)	11.25 (1065)***
Externalizing problems						
Slope (Age) by externalizing problems			−0.042 (0.006)	−7.19 (429)***	−0.025 (0.008)	−3.18 (427)**
Gender (Girl)					−.029 (0.01)	−3.07 (427)**
Emotion dysregulation					−.023 (0.008)	−2.83 (427)**

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

Table 4 Variance components for hierarchical linear models for change in parenting stress across early childhood ($N = 430$)

	Random effects		
Model	Variance	*df*	χ^2
Unconditional growth			
Intercepts	228.89	379	1321.2***
Slopes (Age)	14.36	379	626.4***
Individual	92.27		
Reduced level 1			
Intercepts	134.07	364	896.5***
Slopes (Age) by externalizing	0.0044	364	550.2***
Individual	93.63		
Reduced combined			
Intercepts	108.10	359	823.2***
Slopes (Age) by externalizing	0.0039	362	543.5***
Individual	89.96		

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

Table 5 Model comparisons for change in parenting stress across early childhood ($N = 430$)

Model	Comparison deviance	# Parameters	BIC	BIC difference
Unconditional growth (*Age*)	9177.4	6	9213.8	—
Full level 1 (*Age, Externalizing, Age by Externalizing*)	8692.7	8	8741.2	472
Reduced level 1 (*Externalizing, Age by Externalizing*)	8685.8	7	8728.2	13.0
Full combined (*Reduced Level 1, all predictors entered at intercept and Age by Externalizing interaction*)	8571.0	21	8698.3	29.8
Reduced combined (*Reduced Level 1, Ethnicity, Psychopathology, Dysregulation, Temperament entered at intercept; Gender and Dysregulation entered at Age by Externalizing interaction*)	8581.3	14	8666.2	32.1

Note. BIC = Bayes Information Criterion (Formula = Deviance + ln(n)*p; ln = natural log, n = sample size, and p = # of parameters) where smaller values are favorable and differences greater than 10 provide very strong evidence for favoring the model with the lower BIC score (Kass & Raftery, 1995).

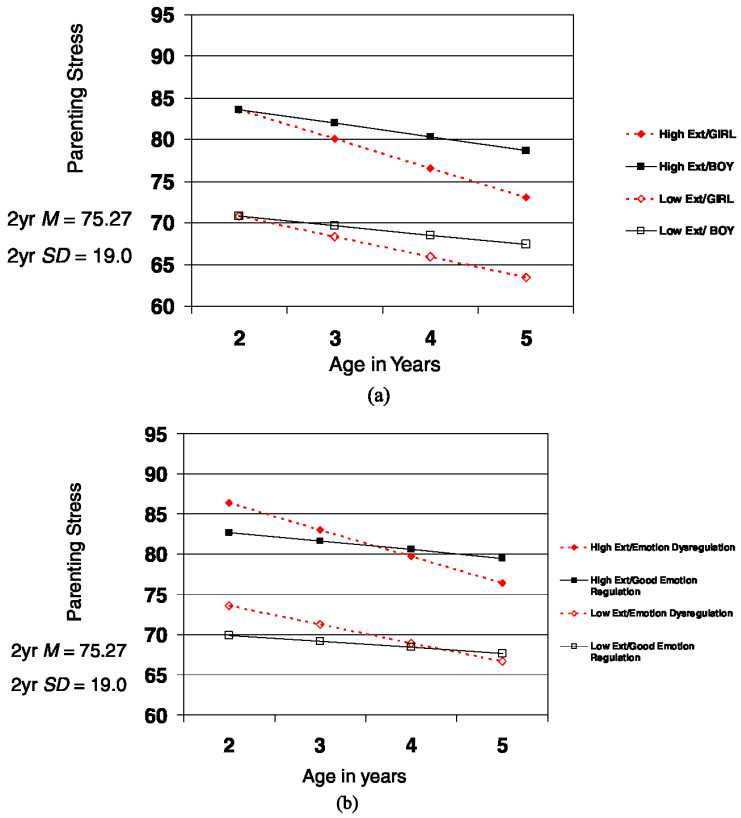

Fig. 1 (a) The interaction of gender, externalizing problems, and age predicting change in parenting stress across early childhood. (b) The interaction of emotion dysregulation, externalizing problems, and age predicting change in parenting stress across early childhood

We next added child externalizing problems to the model as a time-varying covariate (externalizing problems were measured at each age) in a series of three equations: 1) child externalizing problems added as a main effect to the unconditional growth model, 2) the interaction between child externalizing problems and age (slope) added to the model, and finally 3) a reduced model with age removed. In terms of model specification, it should be noted that within multilevel modeling, level 1 coefficients may be specified as random or fixed to zero. In our models, the main effect of child externalizing problems was entered as non-randomly varying (given the degrees of freedom associated with three time points, this constraint was necessary to identify the model) while intercept and slope effects were allowed to vary randomly. The results of the main effect model indicated that child externalizing problems significantly predicted changes in parenting stress across time (coefficient = 0.79, *se* = 0.054, $t_{1072} = 14.70$, p = .000), Thus, parenting stress increased as children's externalizing behaviors increased. The negative main effect of age (or slope) remained significant as well (parenting stress decreased as children aged).

Given these findings, the interaction between age and externalizing problems was added to the model to determine if children's level of externalizing problems affected the slope trajectory. When this interaction was added to the model the main effect of age (or slope) became non-significant indicating that the effect of age on parenting stress was dependent upon the level of children's externalizing problems and was subsequently removed from the model. Thus, the final level 1 model included the intercept, the main effect of child externalizing problems, and the interaction between age and child externalizing problems. This model fit better compared to the full level 1 model as indicated by a smaller Bayesian Information Criterion (BIC) (Difference =

13.0, see Table 5). The effects for this model are presented in Table 3. This model indicates that parenting stress increased as children's externalizing behaviors increased across early childhood. Additionally, the interaction effect indicates that the decrease in parenting stress across early childhood was dependent upon the level of child externalizing problems. Thus, while behavior problems may decrease normatively during early childhood, higher disruptive behavior problems indicated higher parenting stress at each age. Specifically, there was a slightly steeper decline in parenting stress across early childhood for mothers whose children displayed high levels of externalizing behaviors compared to mothers whose children displayed low levels of externalizing behaviors. However, while the decline in parenting stress across early childhood was slightly steeper for mothers of children who displayed significant externalizing behaviors compared to those that did not display these behavioral challenges, parenting stress levels across all ages were greater for parents whose children displayed higher externalizing problems compared to parents whose children did not. Variances (random effects) around the intercept and age by child externalizing problems interaction were significant indicating substantial interindividual heterogeneity still existed that may be partially explained through 2-year predictor variables (see Table 4).

We next examined how child and maternal factors would predict both initial levels of parenting stress and changes in parenting stress across the preschool period. Therefore, marital status, maternal psychopathology, gender, emotion dysregulation, and anger proneness were added to the model as predictors of the intercept and the age by child externalizing problems interaction (slope). Ethnicity and SES were included as covariates. Non-significant predictors were re moved and the resulting reduced model indicated that ethnicity, marital status, maternal psychopathology, emotion dysregulation, and anger proneness were significant predictors of 2-year parenting stress (the intercept). Additionally, gender and emotion dysregulation were predictors of the age by child externalizing problems interaction. This reduced model was more parsimonious and fit better than the full model as indicated by a Smaller BIC (Difference = 32. 1, see Table 5). The fixed effects for this model are presented in Table 3 and indicated that higher 2-year parenting stress was predicted by Caucasian ethnicity, single parenthood, higher maternal psychopathology, higher child emotion dysregulation, higher child anger proneness and higher child externalizing problems. Changes in parenting stress across early childhood were predicted by child externalizing problems (higher externalizing problems indicated greater parenting stress) and also two, 3-way interactions. These interactions qualified the previously described relationship between parenting stress, child externalizing problems, and age. Specifically, the first effect indicates that mothers of boys with higher levels externalizing behaviors evidenced a slightly steeper decrease in parenting stress over time compared to mothers of boys with low levels of externalizing behaviors. Mothers of girls, however, showed a steeper decline in parenting stress across time regardless of the level of externalizing behaviors compared to boys, and this decrease was more pronounced for mothers of girls who exhibited higher levels of externalizing problems. This relationship is depicted in Fig. 1a. The second 3-way interaction can be described similarly. This effect indicates that parenting stress decreased for mothers of children who exhibited high levels of emotion dysregulation and that this increase was steeper for mothers of children who exhibited both high emotion dysregulation and high externalizing behaviors. In contrast, parenting stress remains relatively stable across time for children who exhibited appropriate emotion regulation, regardless of their level of externalizing behaviors (Fig. 1b).

It should be noted that there was no interaction effect of gender by Emotion Regulation and thus a 4-way interaction effect between gender, Emotion Regulation, child externalizing problems, and Time was not examined. Lastly, even after fitting the final model, variances around the intercept and slope by child externalizing problems interaction were significant (see Table 4) indicating that additional unexplained variation within both the intercept and the age by externalizing problems interaction existed.

DISCUSSION

The purpose of this study was to examine mother's parenting stress within a longitudinal framework during the preschool period in a sample of children that included those at risk for developing externalizing behavior problems. We used HLM to examine both the stability of parenting stress across this period as well as child and maternal predictors of initial stress and change in stress over time.

Overall, the findings supported our hypotheses regarding change and individual differences. First, the unconditional growth model indicated an overall decline in parenting stress across the early childhood period. Prior research has demonstrated that externalizing problems also decline in the preschool period for many children (Campbell, 2002). If children's behavioral challenges decrease over early childhood then a corresponding decline in the stress associated with parenting may be expected. Over the preschool period children learn skills to regulate their behavior and function adaptively. This behavioral independence allows mothers to become less responsible for monitoring and regulating their child's emotion during everyday tasks which likely reduces parenting stress. Additionally, mothers adapt their parenting practices during early childhood to better suit their child's behavioral needs and skills, which may also tend to reduce parenting stress.

Also as expected there was significant interindividual variability in patterns of parenting stress. Mothers reported varied levels of parenting stress when their children were 2 years of age. Additionally, while some mothers evidenced a decline in parenting stress, this pattern was not unique to all mothers. This result was not surprising as parenting stress is impacted by a variety of factors. We attempted to explain a portion of this interindividual variability by assessing a variety of child and maternal factors.

Both child and maternal factors predicted parental stress when children were 2 years of age. With regard to child factors, we found that higher levels of externalizing behavior problems, anger proneness, and emotion dysregulation predicted higher parenting stress in toddlerhood. In terms of maternal factors, higher maternal psychopathology and single parenthood also predicted higher initial parenting stress. These results are consistent with prior research examining child and parent functioning and with models describing the determinants of parenting stress (Abidin, 1990). The results indicate that the expression of parenting stress is multiply determined and that both negative child and maternal characteristics serve to exacerbate parental distress related to raising a toddler.

Our examination of the stability of parenting stress with respect to time revealed several interesting results. We measured child behavior problems and parenting stress at each time point and thus were able to more precisely examine the association between parenting stress and child

behavior problems across the preschool period. This was important because children's levels of externalizing behaviors during this timeframe are not particularly stable (Campbell, 2002). We found that mothers whose children displayed high levels of externalizing behaviors at all ages also displayed high levels of parenting stress across time indicating a robust connection between parenting stress and externalizing behaviors. For children whose disruptive behaviors remain high and relatively stable during the preschool years, their behaviors begin to impact other areas of child functioning such as early school success and peer relations (Hinshaw, 1992). Children's lack of mastery in these domains may result in keeping demands for punitive parenting high (e.g., mothers mitigating child fighting, maintaining a strained relationship with school personnel) and keep stress levels associated with the parenting role elevated.

Although child externalizing problems were strongly associated with parenting stress at each measured age, there was also an age by child externalizing problems interaction such that the effect of behavior problems on parenting stress decreased slightly as children became older. Thus, if a child's behavior remained stable across early childhood there was a slight decrease in parenting stress over time. Perhaps parents of children who display continual disruptive behaviors during the preschool period learn coping mechanisms over time to manage these behaviors which may decrease the distress related to parenting their child. While this effect remained significant even after the inclusion of two interaction effects it was quite small and did not negate the main effect of child externalizing problems on parenting stress. In other words, mothers of children who displayed continual high disruptive behaviors displayed much higher levels of parenting stress across the preschool period compared to mothers whose children did not display disruptive behaviors.

We found that the stability of parenting stress across early childhood differed in complex ways by both child gender and level of emotion dysregulation. While there was no significant difference between mothers of girls and boys in parenting stress at 2-years, mothers of girls who displayed both high and stable externalizing behaviors evidenced a steeper decline in parenting stress as their children aged compared to mothers of boys displaying this same behavior pattern. Additionally, compared to mothers of children who displayed high externalizing behaviors, mothers of girls who did not display externalizing behaviors during the preschool period also evidenced a decline in parenting stress while parenting stress for mothers of boys who displayed this same behavior pattern remained more stable. This result is consistent with prior research indicating that rates of disruptive behavior problems between girls and boys do not differ at 2-years but that more girls show a decline or lack of increase in disruptive behaviors during early childhood (see Keenan & Shaw, 1997). There are several important distinctions that occur in girls' versus boys' early development that may explain this result. Girls develop language skills and social-emotional skills at a faster rate than boys, and these developments may lead to better early self-control of their behaviors (Keenan & Shaw, 1997). This faster rate of development likely makes it easier for parents to teach girls prosocial strategies (sharing, perspective taking, being compliant with commands). Therefore, even for girls whose behavior problems remain stable across the preschool period, the development of language and social emotional skills likely serve to counter balance their behavioral challenges.

An unexpected effect was that parenting stress declined more steeply for mothers of children who exhibited higher emotion dysregulation at 2-years. This decline was steepest for mothers of

children who had higher emotion dysregulation and higher levels of externalizing problems. During infancy the ability to regulate emotions is dictated primarily by physiological arousal, but during toddlerhood children begin to master higher order strategies for self- regulation within the attentional, emotional, and behavioral domains (Calkins & House, 2004). At age 2, there is likely more variation in children's emotion regulation as some may have begun to master higher order emotion regulation strategies while others have not. The children in our study who at 2-years of age displayed high emotion dysregulation may have had high physiological arousal and had not yet mastered some of the basic higher order emotion regulation skills. Thus, children who became significantly physiologically aroused may have been unable to assess the laboratory task in order to determine which behaviors (such as distraction and self-stimulation) would be useful to regulate their emotions (Calkins & Dedmon, 2002). Mothers of toddlers who cannot utilize basic regulatory strategies to manage their emotional arousal during frustrating tasks are likely to have increased parenting stress compared to mothers of toddlers who are able to use these strategies. Though the timing of the development of these regulation strategies may vary, most children master these basic skills to some degree during the preschool years. As toddlers begin to learn these skills and are able to regulate their emotions, parenting stress would likely diminish somewhat for their mothers.

Several limitations of this study deserve attention. This study only examined mothers' parenting stress. Certainly, future studies need to make special efforts to gain information from fathers to determine if the findings hold for fathers as well. Additionally, while we included a laboratory measure of emotion dysregulation, the other variables used in this study were assessed using maternal report. Our conclusions would be stronger if child characteristics were assessed by paternal or teacher report and/or through observation. Also, even after the inclusion of child and maternal characteristics into our model, mothers still exhibited significant interindividual variability in both initial levels of parenting stress as well as stability of parenting stress across time. Thus, we were unable to completely capture why mothers of 2-year old children are variable in their levels of parenting stress and why their stress levels change in unique ways during the preschool period. The inclusion of more parent characteristics such as social support, parenting behavior, and parental efficacy may have further explained this variability (Crnic & Low, 2002). Given that the majority of our sample was married, a measure of marital satisfaction or spousal agreement with regard to parenting may have predicted parenting stress (Abidin, 1992).

The results of this study serve to increase our understanding of how mothers come to be distressed in their parenting role. A question that naturally follows from this study is *how* these results help to reveal the processes by which parenting stress impacts child outcome. It has been theorized that the effects of parenting stress on negative child outcome were mediated through parenting behavior (Abidin, 1992). However, recent research suggests that parenting stress may have a more direct effect on child outcome or, if indirect, is mediated through other mechanisms (Anthony et al., 2005; Crnic et al., 2005). Certainly, our results confirm that the relationship between parenting stress and child externalizing problems is strong. Parenting stress is a critical component of the parent-child system that is continually impacted by both the parent and child. It is possible that parenting stress may not change actual parenting behavior such as whether a parent typically uses authoritative versus authoritarian parenting strategies. Rather parenting stress may impact both the consistency and appropriateness by which parents use their typical

parenting strategies and/or the emotional context with which they deliver parenting strategies or parent generally. Cummings and Davies (1995) argued for more attention to the direct effect of emotion on both the parent-child system and on subsequent child outcome. High levels of parenting stress may decrease the warmth and security a parent can provide the child especially during interactions following child misbehavior. Therefore, in order to better understand the impact of parenting stress on the development of child externalizing problems, future studies should not only assess parenting strategies but also assess the emotional context in which these strategies take place.

The ability to provide effective and readily available interventions to young children who display significant behavioral challenges may serve to prevent the development of later serious externalizing psychological disorders for a significant subset of children (Keenan & Shaw, 1994). If parenting stress has direct effects on child behavior problems then strategies to decrease parenting stress should be considered an integral component of parent training. Addressing the distress regarding the parental role would likely produce a more emotionally favorable environment for parent-child interactions. If parenting stress is decreased then parents may be more able to increase their positive affect toward their child and increase the frequency that they deliver positive parenting practices (e.g. encouragement, fostering creativity, special playtime) that may not be contingent upon specific child behaviors but are a significant component of improving the parent-child relationship as a whole (Webster-Stratton, 1999).

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