MOTHERS’ PERSONAL DISTRESS AND CHILD DYSREGULATION: JOINT CONTRIBUTIONS TO CHANGE IN MATERNAL SUPPORT IN AN EMOTIONALLY CHALLENGING SITUATION

BY

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THESIS

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Abstract

In this study, I examined the contributions of mothers’ self-reported personal distress to two types of change in maternal support during a challenging snack-delay task: (a) within-mother change in support “in the moment” (i.e., in intervals immediately following instances of within-child increase in dysregulation); and (b) rate of change in maternal support over the course of the snack-delay task. I also examined whether associations between mothers’ personal distress and change in maternal support would be more pronounced when children displayed high overall levels of dysregulation during the task. Participants were 128 mothers and their 32-month-old children (66 girls). Mothers completed questionnaires assessing personal distress, and maternal support and child dysregulation were coded in 15-second intervals from digital recordings of the snack delay. Tests of multilevel models revealed that mothers’ personal distress was unrelated to maternal support “in the moment” (i.e., in intervals immediately following instances of within-child increase in dysregulation). However, mothers who reported higher levels of personal distress showed a greater rate of decline in support over the course of the snack delay, but only when overall levels of child dysregulation were high. Taken together, the results indicate that although trait-level personal distress may not predict mothers’ immediate responses to child dysregulation, it may have cascading or cumulative effects over time during an emotionally challenging situation. Findings also highlight the importance of investigating real-time variations in parenting behavior.

Key words: personal distress, maternal support, child dysregulation, time-series analyses
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Chapter 1: Introduction

Maternal support during emotionally challenging situations is vital for promoting children’s healthy social and emotional development. Mothers’ supportive behavior such as praise, validation, and providing explanations and reasons can help children learn how to manage and regulate their own emotions (Calkins, Smith, Gill & Johnson, 1998; Spinrad, Stifter, Donelan-McCall, & Turner, 2004), which in turn contributes to children’s social competence and adjustment (Eisenberg et al., 1999; Fabes, Leonard, Kupanoff & Martin, 2001). Maternal harsh, minimizing or punitive responses, on the other hand, have been associated with children’s decreased social competence and increased regulatory difficulties (Eisenberg, Cumberland & Spinrad, 1998; Eisenberg & Fabes, 1994).

Given the significance of maternal support for promoting healthy social and emotional development, it is important to understand the factors that predict mothers’ supportive versus nonsupportive behavior in emotionally challenging situations. Mothers’ personality traits are considered to be an important predictor of parenting (Belsky, 1984; Belsky & Barends, 2002). In particular, mothers’ trait-level negative emotionality may play a role in how parents respond to children in emotionally challenging situations (Dix, 1991; Eisenberg et al., 1998). Studies have found that mothers who report higher levels of neuroticism (a trait characterized by negative emotionality, such as anxiety, worry, fear and distress) tend to exhibit less warmth and support of the child’s autonomy (Metsäpelto & Pulkkinen, 2003) and more controlling behaviors (Kochanska, Lee Clark & Goldman, 1997; Prinzie, Stams, Deković, Reijntjes, & Belsky, 2009). However, an emotional tendency that has not been examined much in prior research in relation to parenting is personal distress, which is a trait capturing the individual’s negative emotional response to others’ negative emotions and may be particularly relevant to parenting.

In the present study, I examined whether mothers’ trait-level personal distress contributes to mothers’ supportive behavior toward their toddler-aged children during a challenging snack-delay task. During toddlerhood, children make strides in developing skills in affective and behavioral regulation (Brownell & Kopp, 2010). This developmental period may also be particularly emotionally challenging for parents, as toddlers tend to exhibit more negative and resistant behaviors compared to earlier or later years (Edwards & Liu, 2002). Thus, investigating mothers’ personal distress as a predictor of maternal support during emotional challenges and during this developmental period is warranted.

Personal Distress

Eisenberg and Eggum (2009) defined personal distress as “a self-focused, aversive affective reaction to the apprehension of another’s emotion, associated with the desire to alleviate one’s own, but not the other’s distress” (p. 72). According to Eisenberg et al. (1991), personal distress is characterized by feelings of anxiety and apprehension related to one’s own welfare, and individuals who experience personal distress may have difficulty in effectively regulating these feelings (Eisenberg & Eggum, 2009).
Additionally, Batson, Fultz, and Schoenrade (1987) viewed distress as an emotional reaction with self-oriented motivational consequences where the goal is to relieve one’s own distress. Consistent with these conceptualizations, personal distress has been associated with decreased intention to help another individual in an experimentally manipulated distressing situation (Batson, O’Quin, Fultz, Vanderplas & Isen, 1983) and a desire to avoid or escape the distressing situation (Batson et al., 1983; Eisenberg, Fabes, Miller, et al., 1989). Further, although situational factors may play a role in the type of emotion an individual experiences in response to another’s distress (see Davis, 1983b), the degree of distress experienced in response to another’s distress is also viewed, in part, as a personality disposition that is fairly stable across situations (Davis, Luce & Kraus, 1994; Davis et al., 1999; Konrath, O’Brien & Hsing, 2011).

In examining how trait-level personal distress may relate to maternal supportive behavior during a challenging situation, we draw from two conceptual frameworks. First, according to Dix’s (1991) model of affective processes in parenting, once emotions have been activated in parents, these emotions organize and orient parents towards events. Emotions can cause changes in cognitions, motivations and physiology. Dix proposed that intense negative emotions may interfere with parents’ appraisals and cognitions during interactions with their children, challenge parents’ ability to manage their own emotions effectively, and influence parents’ motives by causing them to focus on reducing their own arousal. Thus, parents experiencing more intense negative emotions while engaged in parenting may have more self-focused than child-focused motives and, as a result, may act less supportively towards their child. Because personal distress is a negative emotional reaction associated with greater self-focused motives and diminished intention to help others (Batson et al., 1983; Eisenberg, Fabes, Miller, et al., 1989), personal distress may disrupt parenting in the ways outlined by Dix (1991). Yet, avoidance and escape may not always be possible during parent-child interactions and, therefore, personal distress may prompt other nonsupportive parenting behaviors, such as failing to acknowledge the child’s cues, responding harshly or using threats.

Second, Gottman, Katz and Hooven’s (1996) theoretical work on meta-emotions emphasizes how parental beliefs and emotions may influence how parents respond to their children’s negative emotions. In semi-structured interviews in which parents were asked about their beliefs, feelings and responses in regard to their own and their children’s emotions, Gottman et al. found that parents who reported feeling uncomfortable with or overwhelmed by their child’s negative emotional displays were more likely to dismiss their child’s emotions as unimportant or punish their child, rather than accept and validate their child’s emotional state. These parents often reported that their goal was to terminate the child’s negative emotional state as quickly as possible. Parents who tended to dismiss or reject children’s emotions were also likely to believe that children’s negative emotions are harmful and should not be expressed. Although
Gottman et al. did not aim to assess parents’ personal distress specifically, the types of interview responses described above (e.g., feeling uncomfortable and overwhelmed by the child’s emotional state) are consistent with the notion that parents may experience personal distress in relation to their child’s negative emotionality. Thus, parents who experience high levels of distress may be more likely to hold dismissive beliefs about emotions and respond less supportively when their children are faced with an emotional challenge.

In support of these conceptual models, empirical evidence indicates a robust relation between parents’ negative emotions and less optimal parenting behaviors. In a meta-analysis of 42 empirical studies, Rueger, Katz, Risser and Lovejoy (2011) examined the relation between parents’ self-reported global affect (positive and negative) and parenting behaviors (supportive and unsupportive parenting practices) towards children from infancy to late adolescence. Parental negative affect was positively associated with more harsh-negative parenting practices ($r = .19$) and negatively associated with supportive-positive parenting practices ($r = .13$). Child age was tested as a moderator, and the association between parents’ negative affect and supportive parenting behavior was strongest for parents of preschool-aged children, suggesting that it may be especially important to study these processes with parents of young children.

In the only study that examines the link between parents’ personal distress and parental behavior, Fabes, Poulin, Eisenberg and Madden-Derdich (2002) found that parent-reported personal distress in response to their child’s displays of negative emotions was associated with higher levels of parent-reported punitive and minimizing reactions towards children’s negative emotions among parents (predominantly mothers) of 3- to 6-year-old children. However, reliance on self-reported measures of both parental distress and parental responses to children’s negative emotions increases shared source variance and was thus a limitation of this study.

Using observational assessments of parenting minimizes concerns of shared source variance, and such studies also provide evidence that parents’ experiences of negative emotions may disrupt parenting. For instance, Dix, Gershoff, Meunier and Miller (2004) found that supportive parenting was lower among mothers who reported experiencing more negative emotions during interactions with their children, particularly when those mothers also reported that their emotions were triggered by self-oriented concerns. Leerkes (2010) reported that expectant mothers who experienced higher levels of negative affect in reaction to videotapes of infants exhibiting negative emotions had lower levels of observed maternal sensitivity to distress at 6 months postpartum with their own infant. Additionally, Leerkes et al. (2015) reported that maternal emotional risk (i.e., negative emotionality assessed via self-report) was associated with self-focused emotions and negative processing of videotaped infant cry cues (assessed prenatally), which in turn predicted lower levels of observed maternal sensitivity towards their own
infants at 6 months. Among mothers of 2- to 3-year-old children, Lorber and O’Leary (2005) found that mothers’ self-reported negative emotional experiences in response to watching videotapes of themselves interacting with their children were associated with observer ratings of over-reactive discipline. In sum, these studies suggest that mothers’ negative emotions are associated decreased supportive parenting and increased non-supportive parenting. The few studies, however, that have measured maternal behavior observationally have not examined trait-level personal distress specifically as a predictor of parenting. The present study will address this gap.

**A Process-Oriented Approach to Parenting**

Parenting has been typically conceptualized as a relatively stable phenomenon. Empirical studies, including the ones cited above, have often (implicitly) examined parenting as a stable process by summing behavioral ratings across sessions to obtain global measures of parenting (e.g., Dix et al., 2004; Leerkes, 2010; Leerkes et al., 2015; Lorber & O’Leary, 2005). Although parenting may be stable across situations to some degree, it may also vary based on the child’s emotions, situational constraints or the child’s age (Bornstein, 2015; Cole, Teti & Zahn-Waxler, 2003; O’neal & Magai, 2005). Teti and Cole (2011) describe the need for a more process-oriented approach by examining moment-to-moment stability and variation in parenting across time and contexts. Adopting a more process-oriented approach permits identification of individual patterns or trajectories of parenting behavior that are often obscured when only global indices of parenting are examined.

Notably, although several empirical studies illustrate the strength of a process-oriented approach for assessing associations between children’s emotion regulation strategy use and subsequent emotional displays (Ekas, Braungart-Rieker, Lickenbrock, Zentall & Maxwell, 2011; Gilliom, Shaw, Beck, Schonberg & Lukon, 2002; Morris et al., 2011), few studies have employed this method to study change in parenting behavior. In one of the few studies to do so, Cole, LeDonne and Tan (2013) tested whether maternal negative emotions changed as a function of children’s emotions and behaviors during a frustrating task concurrently and at 18, 24, 36 and 48 months. Maternal self-reported negative emotions during the tasks declined more rapidly over time when high-anger children at 18 months showed declined in their levels anger displays across the four time points. In contrast, maternal negative emotions did not decline over time for children who maintained stable levels of anger over time. This finding demonstrates that the intensity of mothers’ emotions over developmental time may vary based on developmental changes in child characteristics.

In addition to examining changes in parenting over developmental time, considering changes in parenting over “real time” is warranted. In one of the few studies to consider parenting in real time, Lorber and Slep (2005) rated child negative affect in 5-sec intervals while mothers and children engaged in series of laboratory tasks (e.g., clean-up, play). Global ratings of maternal discipline strategies were
also conducted. Mothers were shown a video playback of the session and asked to rate their negative
emotions for each 5-sec interval. These authors found that mothers engaged in more harsh and lax
discipline strategies when they reported an increase of negative emotions (relative to their own mean)
following 5-second intervals in which their toddler displayed negative affect. These findings suggest that
maternal behavior may vary based on children’s emotional displays and maternal emotional responses to
child negative emotions “in the moment.” In the present report, I adopted a similar micro-analytic lens to
examine change in maternal support across real time during a challenging snack-delay task.

**Child Dysregulation as a Moderator**

Psychological characteristics of parents may combine with situational factors to predict parenting
behaviors (see Bornstein, 2015). The nature of children’s emotions and behaviors may be one such
situational factor. Children’s difficult temperaments can be stressful for parents (Bates & Pettit, 2007).
Studies also show that child negative emotionality moderates the association between parents’ personality
traits and parenting behaviors (Clark, Kochanska & Ready, 2000; Koenig, Barry & Kochanska, 2010).
Specifically, parents who were less extraverted and optimistic engaged in less optimal parenting
behaviors, particularly when their children were high on negative emotionality and disruptive behaviors.
Because personal distress is an emotional response specifically to another’s distress, mothers who
experience high levels of personal distress may be more likely to become distressed when their children
have difficulty managing negative emotions and behaviors during challenges. Thus, child dysregulation
(i.e., high levels of disruptive behavior and negative affect) may moderate the relation between mothers’
trait-level personal distress and parenting.

**The Current Study**

In the current study, I examined the extent to which mothers’ trait-level personal distress related
to their supportive behavior towards their children in an emotionally challenging situation. I also
investigated whether this association was pronounced when children displayed high levels of
dysregulation. Mother-toddler dyads were observed during a snack-delay task in which the toddlers were
required to wait to receive an attractive snack that was visible but not accessible to them, and maternal
support and child dysregulation during the task were coded in 15-second intervals. Adopting a process-
oriented approach, I examined the extent to which mothers’ trait-level personal distress related to
maternal support on average (between-person variation), as well as deviations in maternal support in a
given interval from the mother’s own average support across all 15-second intervals (within-person
variation). Further, I examined the rate of change in maternal support over the full course of the snack-
delay task.

I addressed two primary research questions. First, is mothers’ trait-level personal distress related
to their provision of support “in the moment,” especially when children are displaying more dysregulated
behavior in the previous moment compared with their own average? Because personal distress is more likely to be associated with less supportive behavior when the other person is upset or expressing negative affect, I hypothesized that mothers who reported higher levels of personal distress would be less supportive (compared with the mother’s own average level of support throughout the snack-delay task) immediately following “moments” (i.e., 15-second intervals) in which their children displayed higher dysregulation compared with the child’s own average. I also expected this association to be stronger when children displayed higher overall levels of dysregulation during the task (i.e., ratings of child dysregulation averaged across all intervals).

Second, is mothers’ trait-level personal distress related to rate of change in observed maternal support across the 5-minute snack-delay task? I hypothesized that mothers who reported higher levels of personal distress would show more rapid rates of decline in support over the course of the snack-delay task. Further, because personal distress is an emotional reaction that occurs specifically in response to others’ distress, I hypothesized that the association between maternal personal distress and rate of decline in maternal support would be more pronounced for mothers whose children displayed higher overall levels of dysregulation.
Chapter 2: Method

Participants

One-hundred and twenty-eight toddlers (66 girls) and their parents participated in a short-term longitudinal study of children’s social development in early childhood. Families were recruited via birth announcements and flyers sent to local daycare centers and community organizations. Children were between 31 and 35 months of age ($M = 32.7$ months, $SD = .76$) at the first time point. Mothers averaged 32.80 years of age ($SD = 5.63$) and 16.39 years of education ($SD = 2.46$). Fathers averaged 34.27 ($SD = 5.69$) years of age and 16.17 ($SD = 2.70$) years of education. Mothers and fathers were 3% and 4% African-American, 6% and 3% Asian-American, 82% and 86% European-American, 1% and 1% Hispanic, 2% and 4% Native-American, and 6% and 2% more than one race, respectively. Both parents were European American for 76% of the sample. The median family income was $65,000 ($SD = $33,180). Eighty-nine children had siblings in the home (33 were first-born, 42 were second-born, and 14 were third- or later-born). Data from one family were excluded from this report because the mother and child did not speak in English during the observational session.

Procedure

Data for this study was collected at multiple time points when children were 2.5 to 5 years of age. Data from the first time point were utilized for this report. Mother-child dyads were videotaped in a variety of interactive tasks during a 90-minute laboratory visit. The tasks included a modified Strange Situation, play, clean up, snack delay, snack, picture book task, and Empty Box procedure (see McElwain, Holland, Engle, & Wong, 2012, for further details). For the purposes of the current report, I used data from the 5-min snack-delay task, in which mother-child dyads were seated together at a child-sized table and mothers were instructed to have their child wait for the snack (teddy grahams, banana, juice and water bottle) while they completed some paperwork. The mother was given a word puzzle to complete, and a transparent box containing the snack items was placed on the table in front of the child. A knock at the end of 5 minutes signaled the end of the delay task and the beginning of snack. To minimize the child’s awareness of the task objectives, mothers received written instructions for the snack delay. At the end of the laboratory visit, mothers received a questionnaire packet, which included items assessing personal distress, to complete at home and return by mail.

Measures

Maternal personal distress. Mothers’ personal distress was measured using subscales of two questionnaires. First, the Personal Distress subscale of the Interpersonal Reactivity Index (IRI; Davis, 1983a) measured dispositional personal distress in response to others’ distress. Mothers rated each item on a 5-point scale from 0 (does not describe me well) to 4 (describes me very well), and ratings were averaged to form the Personal Distress subscale (7 items, $a = .80$; e.g., “being in a tense emotional
situation scares me”). The IRI is an established and well-validated measure of dispositional empathy (Davis, 1983a). The Personal Distress subscale has shown strong construct validity, with higher scores on this subscale associated with higher scores on measures of emotional vulnerability and fearfulness (Davis, 1983a).

Second, the Distress Reactions subscale of the Coping with Toddlers’ Negative Emotions Scale (CTNES; Spinrad, Eisenberg, Kupfer, Gaertner, & Michalik, 2004) captured mothers’ distress reactions specifically in response to child negative emotions. Mothers were presented with 12 hypothetical situations and rated their level of distress to each situation on a 7-point scale (1 = very unlikely, 7 = very likely; \( a = .84 \); e.g. “If my child becomes angry because he/she wants to play outside and cannot do so because he/she is sick, I would feel upset myself”). The CTNES was adapted from the Coping with Children’s Negative Emotions Scale (CCNES; Fabes et al., 2002) specifically for use with parents of toddlers. The CTNES has shown good internal consistency and test-retest reliability across a period of two to four months (Spinrad et al., 2004).

Consistent with previous research (Fabes et al., 2002), scores on the Personal Distress subscale of the IRI and the Distress Reactions subscale of the CTNES were positively correlated in the current sample \( (r = .45, p < .001) \). To obtain a more robust measure of the construct, mothers’ scores on the two subscales were standardized and averaged to create a composite score of maternal personal distress.

**Observed mother and child behavior.** From digital video recordings of the 5-min snack-delay task, two separate pairs of trained and reliable coders assessed: (a) maternal support and non-support; and (b) child disruptive behavior and negative affect in 15-second intervals using coding schemes developed for this study. Coders were blind to all other study data. Datavyu (Datavyu Team, 2014), a computerized video coding tool, allowed for intervals to be synchronized in time across mother and child behaviors.

**Maternal support** (e.g., responding to the child’s bids in a positive manner, providing explanations or reasons, praising the child, distracting the child away from the snack box, or validating the child’s affect) and **non-support** (e.g., ignoring the child’s bids, physically moving the child or taking the snack box away from the child, interrupting the child, threatening to punish the child, or engaging in sarcastic or derogatory remarks) were each rated on a 4-point scale, ranging from 0 (no evidence of behavior) to 3 (intense, enduring, and/or frequent occurrences of behavior), during each 15-second interval. (See Appendix A for the full coding scheme.) Twenty-five percent of the tapes were randomly assigned to both coders. Interobserver reliability was calculated using intraclass correlations (ICCs = .90 and .84 for maternal support and non-support, respectively). Fifteen-second interval scores of maternal support and non-support showed a negative, moderate correlation \( (r = -.51, p < .001) \). To obtain a more robust measure of **maternal support** toward the child, ratings of support and non-support (reverse scored)
were summed within each 15-second interval, with higher scores indicating more support (possible range = 0 to 6).

Child disruptive behavior (e.g., grabbing the mother’s pen, attempting to open the box, or not complying with the mother’s requests) and child negative affect (e.g., frowning, whining or frustrated tones; child negative affect was modified from Cole, Barrett, & Zahn-Waxler, 1992) were each rated on a 4-point scale, ranging from 0 (no evidence of behavior) to 3 (intense, enduring, and/or frequent occurrences of behavior), during each 15-second interval (see Appendix B for full child coding scheme). Twenty-five percent of the cases were randomly assigned to both coders, and the scales showed good interobserver reliability (ICCs = .85 and .83 for child disruptive behavior and negative affect, respectively). The 15-second interval scores of child disruptive behavior and negative affect were positively correlated ($r = .22, p = .01$), although the association was weak, which is likely due to the relatively low levels of negative affect observed. To obtain a more robust measure of child behavior, the two scales were summed to obtain a score of child dysregulation for each 15-second interval, with higher scores indicating more negative behavior and affect (possible range = 0 to 6).

Data Analytic Strategy

To test personal distress and child dysregulation as predictors of change in maternal support, I estimated a series of multilevel models using Mplus 7.31 (Muthén & Muthén, 1998-2012). First, as recommended by Hoffman (2015), a series of unconditional models were tested to examine whether there was significant interdyad variance in maternal support. Significant interdyad variance in the unconditional models merited tests of conditional models. For all models tested, Wald tests were used to assess the significance of fixed effects and -2ΔLL tests were used to assess the significance of variance components.

In tests of the conditional models, the Level 1 predictors were time (i.e., 20 15-second intervals across the 5-min snack delay) and within-child dysregulation (i.e., child’s dysregulation in a given interval). Within-child dysregulation was person-mean centered (i.e., raw score for a given interval minus the child’s mean level of dysregulation across the snack delay). The Level 2 predictors were maternal personal distress and between-child dysregulation (i.e., average of all 15-second interval scores for child dysregulation during the snack delay). To increase interpretability of model parameters, mothers’ personal distress and between-child dysregulation were grand-mean centered (i.e., individual’s score on the variable minus the group mean).

Data on maternal personal distress were missing for five mothers because they did not complete the questionnaire measures. Comparisons (t-tests) between mothers with and without missing data on personal distress indicated no significant differences on observed maternal support or child dysregulation during the snack delay. To account for these missing data, full-information maximum likelihood (FIML) estimation was used. FIML utilizes all data available and provides less biased estimates compared with
other methods such as listwise deletion (Schafer & Graham, 2002). Thus, the sample size was 127 for all models tested.

**Lagged model.** A set of models were tested to examine the effects of within-child dysregulation in a given interval on within-mother change in maternal support in the next interval, and to examine mothers’ personal distress and between-child dysregulation as predictors of this lagged association. First, I tested an unconditional lagged model with within-child dysregulation in a given 15-second interval (“interval $t$,”) as a predictor of maternal support in the next 15-second interval (“interval $t + 1$”). Both the random intercept of maternal support and lagged effect of within-child dysregulation on maternal support were estimated. This “unconditional” model (i.e., no predictors of the Level 1 association) provided a test of whether there was significant inter-individual variation in the association to merit testing a conditional model.

Given significant inter-individual variation in the unconditional lagged model, I tested a conditional model to examine mothers’ personal distress and between-child dysregulation as predictors of the Level 1 lagged association between child dysregulation at interval $t$ and mother support at interval $t + 1$. Mothers’ personal distress, between-child dysregulation and Maternal Distress x Between-Child Dysregulation were entered as predictors at Level 2. Additionally, covariances were estimated: (a) between the Level 1 lagged association and the intercept of maternal support; and (b) among maternal personal distress, between-child dysregulation, and the Maternal Distress x Between-Child Dysregulation interaction term.

**Slope model.** The next set of multilevel models were tested to examine rate of change in maternal support over the course of the task, and mothers’ personal distress and between-child dysregulation as predictors of the slope of maternal support. First, I examined an unconditional model (i.e., time as the only predictor) to assess whether there was significant inter-individual variation in the slope of maternal support to merit testing a conditional model. In this model, the intercept was centered at the first interval of the snack-delay task.

Given significant inter-individual variation in the unconditional slope model, I tested a conditional model to examine the joint contributions of mothers’ personal distress and between-child dysregulation on the rate of change in maternal support. Time was entered as a within-person predictor at Level 1, and mothers’ personal distress, between-child dysregulation and Maternal Distress x Between-Child Dysregulation were entered as between-person predictors at Level 2. Additionally, covariances were estimated (a) between the random slope and intercept of maternal support, and (b) among maternal distress, between-child dysregulation, and the Maternal Distress x Between-Child Dysregulation interaction term.
**Interaction probes.** When interactions between mothers’ personal distress and child dysregulation were significant, I followed Aiken and West’s (1991) guidelines for testing and plotting simple slopes. I plotted slopes for association between maternal personal distress and maternal support at low (1 SD below the Mean), moderate (at the Mean) and high (1 SD above the Mean) levels of between-child dysregulation. I also tested whether simple slopes were significantly different from zero.
Chapter 3: Results

Preliminary Analyses

Means, standard deviations and range for the between-person raw scores of maternal support and child dysregulation (i.e., scores averaged across all intervals) are reported in Table 1. Intercorrelations among the between-person raw scores are also shown in Table 1 and indicated that mothers who reported higher levels of personal distress tended to show lower levels of support to their child, on average. Higher mean levels of maternal support were also associated with lower mean levels of child dysregulation. Intraclass correlations (ICCs) were computed from an empty means, random intercept model for maternal support and child dysregulation, respectively, to estimate the proportion of variance explained by between- and within-person variability. The ICC for maternal support was .24, indicating that 24% of the variation in maternal support was between mothers (i.e., individual differences in maternal support) and 76% of the variation was within mothers (i.e., time-specific deviations or fluctuations about one’s mean level of support). Likewise, the ICC for child dysregulation was .22, indicating that 22% of the variation in child dysregulation was between children and 78% was within children.

I examined child gender, maternal years of education, and family income as potential covariates by testing correlations between these variables and the predictors and outcome. None of the demographic variables were associated with at least one predictor (e.g., maternal personal distress, between-child dysregulation) and the outcome measure (e.g., maternal support, average rating across intervals?) and so I did not include the demographic measures in tests of the main models.
Table 1

Descriptive Statistics and Correlations Among Study Variables

<table>
<thead>
<tr>
<th>Study measures</th>
<th>1.</th>
<th>2.</th>
<th>3.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mothers’ personal distress</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2. Child dysregulation (mean score)</td>
<td>-.003</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>3. Maternal support (mean score)</td>
<td>-.21*</td>
<td>-.29**</td>
<td>---</td>
</tr>
<tr>
<td>N</td>
<td>123</td>
<td>127</td>
<td>127</td>
</tr>
<tr>
<td>Mean</td>
<td>.001</td>
<td>.64</td>
<td>3.7</td>
</tr>
<tr>
<td>SD</td>
<td>.85</td>
<td>.53</td>
<td>.64</td>
</tr>
<tr>
<td>Range</td>
<td>-1.81 - 2.37</td>
<td>0 - 3.40</td>
<td>1.95 - 4.90</td>
</tr>
</tbody>
</table>

*p < .05, ** p < .01

Lagged Models

Unconditional models. To examine within-child dysregulation at interval t as a predictor of maternal support at interval t+1, I first tested a series of unconditional models (see Appendix C, Table S1). Comparison between the random intercept model and the empty means model (i.e., fixed intercept only) revealed significant interdyad variation in the intercept of maternal support (var_intercept = .349, SE = .048; -2ΔLL [1] = 447.77, p < .001). More notably, comparison of the random lagged model with the random intercept/fixed lagged model revealed significant interdyad variation in the lagged association (var_slope = .04, SE = .013; -2ΔLL [2] = 25.74, p < .001). This latter test included the intercept-lagged association covariance (see Table S1). The significance of the random intercept and lagged parameters indicated that the tests of the main model (i.e., with predictors of the intercept and lagged association) were merited. The mean for the random intercept (i.e., mean of maternal support) was significant (b = 3.667, SE = .058, p < .001). However, the mean for the lagged association was non-significant (b = -.019, SE = .032, p = .54). Thus, on average, within-child dysregulation in a given interval was unrelated to maternal support in the subsequent interval.

Conditional model. Next, I tested a conditional model to assess the joint contributions of mothers’ personal distress and between-child dysregulation at Level 2 to the Level 1 lagged association between within-child dysregulation at interval t and mother support at interval t +1. As shown in Table 2,
significant main effects of mothers’ personal distress and between-child dysregulation emerged for the intercept of maternal support (i.e., the mean levels of maternal support). Higher levels of mothers’ personal distress and between-child dysregulation were each associated with lower levels of maternal support. The Maternal Distress x Between-Child Dysregulation interaction on the intercept of maternal support was nonsignificant.

With respect to prediction of the lagged association, maternal personal distress and the Maternal Distress x Between-Child Dysregulation interaction were nonsignificant predictors, yet between-child dysregulation emerged as a significant predictor (i.e., a cross-level interaction between between-child and within-child dysregulation; see Table 2). Probes of this cross-level interaction revealed that when between-child dysregulation was high (1 SD > group mean), mothers showed less maternal support on average in following intervals when their children showed more dysregulation than they did on average, although this slope was marginally significant \( (b = -.066, SE = .035, p = .06) \). In contrast, when between-child dysregulation was low (1 SD < mean), within-child dysregulation in the prior interval was related to more maternal support in the next interval, although this association did not reach significance \( (b = .08, SE = .054, p = .13) \); see Figure 1). In sum, when children displayed high levels of dysregulation overall, mothers showed less support following occasions when their children displayed higher dysregulation than they did on average. Mothers’ personal distress, however, was not associated with the level of maternal support following instances of heightened child dysregulation.
Table 2

*Maternal Personal Distress and Between-child Dysregulation as Predictors of Lagged Association between Within-child Dysregulation in Interval t and Maternal Support in Interval t+1*

<table>
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<td>Between-child dysregulation</td>
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*p < .05, ** p < .01, *** p < .001

*Note.* The maternal personal distress and between-child dysregulation predictors were grand-mean centered and within-child dysregulation was person-mean centered for the model tests. The intercept-lag covariance was also estimated and was nonsignificant (*B* = .001, *SE* = .018, *p* = .96).
**Figure 1.** Lagged associations between within-child dysregulation in interval $t$ and maternal support in interval $t+1$ as a function of between-child dysregulation.

**Slope Models**

*Unconditional models.* To examine the rate of change in maternal support over the course of the snack-delay task, I tested a series of unconditional models (see Appendix D, Table S2). As described above for the lagged model, the comparison between the random intercept model and the empty means model revealed significant interdyad variation in the intercept of maternal support. Further, comparison of the random slope model with the random intercept/fixed slope model revealed significant interdyad variation in the slope ($var_{slope} = .0004, SE = .0003; -2\Delta LL [2] = 5.84, p = .05; see Table S2$). This latter test included the intercept-slope covariance. The significance of the random intercept and slope parameters indicate that the tests of the main model (i.e., with predictors of the intercept and slope) are merited. The means of the random intercept of maternal support (i.e., at time 0; $b = 3.75, SE = .06, p < .001$) and the slope of maternal support ($b = -.01, SE = .004, p = .01$) were both significant. On average, maternal support decreased over the course of the snack-delay task.

*Conditional model.* Next, I tested a conditional model to assess the contributions of mothers’ personal distress and between-child dysregulation to change in maternal support over
the course of the 5-min snack delay. As shown in Table 3, significant main effects emerged for mothers’ personal distress and between-child dysregulation on the intercept of maternal support (i.e., maternal support in the first interval). Mothers who reported higher levels of personal distress were less supportive in the first interval, and higher levels of between-child dysregulation was also related to less maternal support in the first interval. The Maternal Distress x Between-Child Dysregulation on the intercept of maternal support was nonsignificant. In predicting the slope of maternal support, mothers’ personal distress and between-child dysregulation (i.e., cross-level interactions between each of the predictors with time) were nonsignificant, yet the Maternal Distress x Between-Child Dysregulation interaction was significant (see Table 3). This interaction reflected a cross-level interaction between time at Level 1 and maternal personal distress and between-child dysregulation at Level 2.

In probing this interaction, I plotted maternal support over time as a function of mothers’ personal distress and between-child dysregulation. As shown in Figure 2a, probes revealed that at high levels of between-child dysregulation (i.e., $1 SD >$ grand mean), mothers who reported moderate to high levels of personal distress (i.e., at the mean or $1 SD >$ mean) showed a more rapid rate of decline in maternal support over the 5-min snack delay ($b = -.013$ and -.022, $SEs = .006$ and .009, $p = .02$ and .01 for mothers who were moderate and high on distress, respectively), whereas mothers who reported low levels of personal distress (i.e., $1 SD <$ mean) did not show a significant rate of change in maternal support ($b = -.003$, $SE = .008$, $p = .71$). In contrast, as shown in Figure 2b, when between-child dysregulation was low (i.e., $1 SD <$ grand mean), mothers who reported low personal distress showed a more rapid rate of decline in support ($b = -.019$, $SE = .008$, $p = .02$), whereas mothers who reported moderate to high levels of distress did not show a significant rate of change in maternal support ($bs = -.008$ and .003, $SEs = .006$ and .008, $p = .16$ and .67 for moderate and high levels of personal distress, respectively).

In sum, mothers who reported moderate to high levels of personal distress showed a more rapid rate of decline in maternal support over the course of the snack-delay task, but only when children displayed high mean levels of dysregulation. Somewhat surprisingly, mothers who reported low levels of personal distress also showed a more rapid rate of decline in support, but only when children displayed low mean levels of dysregulation.
Table 3

Mothers’ Personal Distress and Between-Child Dysregulation as Predictors of the Rate of Change in Maternal Support

<table>
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<td>Level 2 predictors of intercept</td>
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<tr>
<td>Maternal personal distress</td>
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<td>Between-child dysregulation</td>
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<td>.004</td>
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<td>Between-child dysregulation</td>
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<td>.007</td>
<td>.52</td>
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<td>Maternal Distress x Between-Child Dysregulation</td>
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<td>.011</td>
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<td>Residual variance (within)</td>
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$^\dagger p < .10, ^* p < .05, ^{**} p < .01, ^{***} p < .001$

Note. The maternal personal distress and between-child dysregulation predictors were grand-mean centered for the model tests. The intercept-slope covariance was non-significant ($b = .002, SE = .003, p = .38$).
**Figure 2a.** Rate of change in maternal support over time as a function of maternal distress when between-child dysregulation is high (1 SD > Mean).

** Maternal Supportive Behavior **

- Mdistress_low (1 SD < M)
- Mdistress_moderate (mean)
- Mdistress_high (1 SD > M)

**Interval 0**

**Interval 10**

**Interval 20**

Maternal Supportive Behavior

**Time in 15-second intervals over 5 minutes**

** p < .01, * p < .05**
**Figure 2b.** Rate of change in maternal support over the snack-delay task as a function of maternal personal distress when between-child dysregulation is low (1 SD < Mean).

![Diagram showing the rate of change in maternal support over the snack-delay task as a function of maternal personal distress.](image-url)

* p < .05

**Follow-Up Analyses**

Two sets of follow-up analyses were conducted as robustness checks on the main model tests. First, I tested the lagged and slope models above, controlling for associations between within-child dysregulation and within-mother support in concurrent intervals. The effect of between-child dysregulation on the lagged association between Level 1 child dysregulation and maternal support reported in Table 2 remained significant ($b = -0.125, SE = 0.056, p = 0.03$). Further, the Maternal Distress $\times$ Between-Child Dysregulation interaction as a predictor of the slope of maternal support reported in Table 3 remained significant ($b = -0.022, SE = 0.011, p = 0.04$). These follow-up analyses increase confidence in the lagged model findings, in particular, because it strengthens the conclusion that within-child increase in dysregulation in the *prior* interval, and not child dysregulation in the concurrent interval, is associated with within-mother decrease in support.

Second, given that high maternal personal distress was associated with a steeper decline in maternal support only when child dysregulation was high, I aimed to assess whether children’s trajectories of dysregulation during the snack-delay task varied as a function of mothers’ personal distress. To this end, I tested a model with maternal personal distress as a predictor of the intercept and
slope of child dysregulation. The effects of maternal personal distress on the intercept \((b = .046, SE = .068, p = .50)\) and slope \((b = -.005, SE = .005, p = .35)\) of child dysregulation were both nonsignificant.
Chapter 4: Discussion

Personal distress, a self-focused emotional reaction occurring in response to another’s distress, may be particularly relevant to parenting young children, especially during emotional challenges where some children may be prone to exhibiting high levels of dysregulation. This was one of the first studies to examine the associations between mothers’ personal distress and observed maternal support. I adopted a process-oriented approach, which allows tests of different types of within-person change in maternal support. I also examined the individual and joint contributions of maternal personal distress and child dysregulation to two types of change in maternal supportive behavior during a challenging snack-delay task: (a) maternal support “in the moment,” i.e., following intervals of within-child change in dysregulation; and (b) rate of change in maternal support over the course of the task. Results indicated that mothers’ personal distress was unrelated with maternal support “in the moment” following instances of heightened child dysregulation, but mothers who reported higher levels of personal distress showed a greater rate of decline in maternal support over the course of the task when mean levels of child dysregulation were high. Follow-up analyses indicated that these findings were robust. Specifically, they increased confidence that my main findings were not due to: (a) within-child dysregulation in concurrent intervals; or (b) increases in child dysregulation across the snack delay for mothers who reported higher levels of personal distress. Below, I first discuss findings for the rate of change in maternal support followed by the null findings for maternal support “in the moment.”

Rate of Change in Maternal Support

As hypothesized, mothers who reported experiencing moderate to high levels of personal distress showed a greater decline in support over the course of the snack-delay task compared with mothers who reported low levels of personal distress, but this association emerged only when child dysregulation averaged across the snack-delay task was high. In college students, personal distress has been associated with self-focused motives and decreased desire to help others in distress (Batson et al., 1983). The findings of the current study extend this body of literature to the parenting context. These findings are also in line with prior studies that have found links between higher trait levels of negative affect and less supportive parenting behaviors (Dix et al., 2004; Leerkes, 2010, Leerkes et al., 2015; Lorber & Slep, 2005; Rueger et al., 2011). However, in contrast to prior studies that adopted a static approach to parenting, this study is unique in that it demonstrated associations between higher levels of personal distress and a steeper decline in maternal support over time.

The snack-delay task was challenging because children had to wait for a snack while the mother was nearby but occupied with another task. Mothers high on trait-level personal distress may have become more distressed as the task progressed when their children displayed high levels of dysregulation, and these mothers became more focused on reducing their own arousal than attending to their child’s
cues. As a result, these mothers may have been too taxed to respond to their children supportively. I interpret this result in terms of Dix’s (1991) model, which posits that parents’ experiences of negative emotions may minimize parental support because parents are focused on reducing their own arousal at the expense of attending to the child’s cues. An alternative but not mutually exclusive explanation is grounded in Gottman et al.’s (1997) theoretical work on meta-emotions. Of particular relevance is Gottman et al.’s discussion of the concept of emotional flooding, which refers to experiencing intense negative emotions that can become difficult to effectively regulate. Flooding, which may occur in reaction to another family member’s negative emotion, may cause the individual to make more negative attributions even in positive or neutral situations because of the high levels of negative affect experienced. It is possible that personal distress disrupts parenting through similar mechanisms, such that mothers who became more distressed as the task progressed may have made negative attributions about the child’s behavior, resulting in less supportive parenting behaviors. A third possibility is that mothers higher on personal distress may have become less efficacious in their parenting ability as the task went on because they became more distressed. Consequently, their ability to support their child during the challenge may have also decreased. Consistent with this interpretation Coleman and Karraker (1997) reported that higher levels of negative arousal were associated with lower levels of parenting self-efficacy. Future research should examine the mothers’ emotional experiences, attributions and self-efficacy as potential mechanisms by which trait-level personal distress may disrupt – in real time – supportive parenting during challenging situations.

It is important to note that personal distress was associated with a steeper decline in maternal support over the course of the task only when children exhibited high levels of dysregulation. Personal distress is an emotional response specifically to others’ distress (Eisenberg & Eggum, 2009), and the current findings are consistent with this key element. Mothers who experience high trait-levels of personal distress may become more distressed when their child becomes dysregulated and, as a result, respond less supportively. In contrast, mothers who have high trait-levels of personal distress may not become as distressed when their child displays low levels of dysregulation, and thus their supportiveness does not show similar declines. Consistent with prior studies (Clark et al., 2000; Koenig et al., 2010), the current results suggest that parents’ personality traits relate to parenting based on children’s emotions and behaviors.

Unexpectedly, mothers who reported low levels of personal distress also displayed a significant decline in support over the course of the wait task, but only when children were low on dysregulation. For children who displayed low levels of dysregulation overall, however, mothers low on personal distress began the task with relatively high levels of support than mothers who were moderate or high on personal distress. The level of support for mothers low on personal distress (and whose children were low on
dysregulation) may have regressed towards the mean over the course of the snack delay. Alternatively, mothers low on personal distress may be less attuned to or aroused by their child’s cues in challenging situations and, thus, may be more likely to ignore their children’s cues, especially when the child’s low levels of dysregulation does not require a response. As a result, these mothers also declined in support as the task progressed.

**Maternal Support “in the Moment”**

I also expected to find associations between personal distress and maternal support “in the moment” (i.e., in intervals immediately following instances of within-child increase in dysregulation), particularly in the context of high child mean levels of dysregulation. Because personal distress occurs in the context of others’ distress (Eisenberg & Eggum, 2009), I anticipated that mothers who reported higher levels of personal distress would be less supportive than they typically were, particularly during moments when their children exhibited higher levels of dysregulation than they typically did. However, maternal personal distress was not related to “in the moment” changes in maternal support, regardless of the child’s mean level of dysregulation. Perhaps the snack-delay task was not challenging enough to reveal associations between mothers’ personal distress and maternal support “in the moment” in a relatively low-risk sample. Instead, such associations may emerge in more affect-intense or challenging situations, and/or with a higher-risk sample.

In contrast, and as discussed above, mothers who experienced moderate or high levels of personal distress showed a greater rate of decline in support over the course of the snack-task when child dysregulation was high. This implies that time may play an important role in the link between mothers’ personal distress and decreased maternal support when child dysregulation is high, at least in a low to moderate challenge. Taken together, these findings suggest that although trait-level personal distress may not predict mothers’ immediate responses to child dysregulation, it may have cascading or cumulative effects over time. That is, mothers high on personal distress may become distressed over time during moderately challenging situations – perhaps due to becoming focused on reducing their own arousal, forming negative attributions about the child or feeling less efficacious as the task progressed when their children display high levels of dysregulation, which may lead to a steeper decline in supportive behavior.

The findings from this study demonstrate that parenting is a dynamic process and highlight the importance of considering different types of within-mother change in real time (e.g., “in the moment,” and over time) when examining maternal support, as different patterns of associations may emerge for different types of change.

**Additional Findings**

Although not central to my main research questions, two additional sets of findings are worth noting. First, child mean dysregulation was significantly associated with maternal support “in the
moment” (i.e., immediately following instances of within-child change in dysregulation). Specifically, when a child’s mean level of dysregulation was high, mothers tended to respond less supportively “in the moment” following instances when her child displayed higher dysregulation than his/her own average. In contrast, when a child’s overall dysregulation was low, mothers tended to respond more supportively “in the moment” following instances when her child displayed higher dysregulation than his/her own average, although this simple slope did not reach significance. This finding is consistent with prior studies that suggest that child negative emotionality and dysregulated behavior are associated with less supportive and responsive parenting (see Bates, Schermerhorn, & Petersen, 2012), perhaps because child negative temperament may be stressful for parents (Bates & Pettit, 2007). Importantly, the current results suggest that such associations are not just between persons (i.e., children who are more dysregulated than other children have mothers who are less supportive than other mothers), but also within-person. That is, children who are more dysregulated than other children have mothers who respond less supportively than they typically do, particularly during moments when their children engage in higher levels of negative emotions and behaviors than they typically do.

Second, my model tests also included personal distress and between-child dysregulation as predictors of the intercept of maternal support in each model (i.e., the first 15-second interval of the snack-delay in the slope model, and the average level of maternal support in the lagged model). Mothers who experienced higher levels of personal distress had lower intercepts of maternal support. This is consistent with prior research that suggests that personal distress is associated with less prosocial intent and behavior (Batson et al., 1987; Eisenberg Fabes, Miller, et al., 1989). Similarly, mothers of children who displayed high mean levels of child dysregulation also had lower intercepts of maternal support. This is also in line with previous research that shows that parents of children with difficult temperaments tend to be less supportive (e.g., Bates & Pettit, 2007; Bates et al., 2012), although it is not possible to infer the direction of effects between these two variables from this study. Notably, although higher levels of personal distress and child dysregulation were each associated with lower levels of maternal support compared with other mothers, the combined effects of these variables only occurred when I examined maternal support dynamically (i.e., within-mother change over time). This finding again underscores the importance of considering time in the context of parenting.

Limitations and Future Directions

This study is not without limitations. The sample was predominantly middle-class and European-American, and the findings cannot be generalized to other populations. Parents’ socialization of emotions can vary across different cultural contexts (Cole & Tan, 2007), which can differentially impact maternal support when children experience difficulty regulating their emotions and behavior. Further, this sample was relatively low risk; mothers did not report extreme levels of personal distress, and children did not
display extreme levels of dysregulation during the snack-delay task. Future studies should investigate whether mothers’ personal distress and child dysregulation are associated with similar or different patterns of maternal support for samples of mothers and/or children who have higher levels of emotional risk. For instance, Skowron, Cipriano-Essel, Benjamin, Pincus and Van Ryzin (2013) found that maltreating mothers showed less consistency in parenting during a challenge than non-maltreating mothers.

Second, this study was focused on mothers. Given that the majority of prior research on parental affect and support has focused predominantly on mothers (Calkins et al., 1998; Spinrad et al., 2004), I focused on mothers to build upon an existing body of literature. However, it is also important to consider how paternal personal distress may relate to fathers’ provision of support, as well as to mothers’ provision of support, during emotional challenges. Rueger et al. (2011) found that negative affect was associated with less supportive and more hostile parenting practices for both mothers and fathers. On the other hand, Eisenberg, Fabes, Schaller and Miller (1989) found that males were more likely to inhibit or mask personal distress compared with females. Investigating parent gender differences in the links between personal distress and parental support is a key area for future research.

Third, I examined maternal support during a task designed to elicit frustration in children, and these findings cannot be generalized to maternal support during other types of challenges. Parents can vary in their responses to different types of negative emotions (Eisenberg et al., 1998). It is possible that personally distressed mothers show different patterns of change in support when confronted with other types of negative emotions in children, such as sadness or anxiety. Future studies should investigate the links between personal distress and maternal support in other types of emotional challenges.

The present study is also limited in that it did not examine mothers’ cognitions. A method frequently used to study parents’ cognitions is to ask parents to report in-the-moment cognitions when watching playbacks of videotaped interactions with their children (e.g., Dix et al., 2004). Given our findings that mothers’ personal distress is related to greater declines in support over the course of the task, understanding maternal cognitions during challenging tasks like the snack-delay could shed new insights on why parenting behavior shows a steeper decline for mothers who are personally distressed.

Despite these limitations, this study has a number of strengths and makes significant contributions to theory. I investigated the contributions of an emotional reaction not examined in the parenting context by prior studies, and the results suggest that personal distress may be an important predictor of supportive behavior. Additionally, by adopting a process-oriented approach to studying parenting, this study extends theoretical models on parenting by demonstrating that parenting is a dynamic process that can vary in real time. Further, I found significant associations between higher levels of personal distress and a steeper decline in maternal support even in a low to moderate challenge in the laboratory, which suggests that
these associations may be even more pronounced in real-life challenging situations beyond the laboratory. Finally, I utilized a multi-method approach by using self-reports for personal distress and observational measures of parenting behavior, which reduces shared source variance.

A fruitful avenue for future research is to investigate mechanisms that may protect mothers who tend to experience personal distress from responding less supportively. An emotion regulation strategy found to be helpful in reducing personal distress is cognitive reappraisal (i.e., reinterpreting a situation to change the way one responds to it). In an experimental study by Lamm, Batson and Decety (2007), participants watched videos of patients undergoing painful medical treatments and were given either a positive or a negative appraisal context. Participants in the negative appraisal condition reported experiencing higher levels of personal distress than participants in the positive appraisal condition. Investigating the protective role of emotion regulation strategies for personally distressed mothers may help inform the design of interventions to help mothers manage distress more effectively during parenting challenges.

The findings of this study have important implications for practice. Utilizing a process-oriented approach to identify within-mother patterns in support enables practitioners to tailor interventions according to individual patterns of change (Teti & Cole, 2011). Mothers who are personally distressed may benefit from developing skills to help them manage distress over time and provide consistent support to children during challenging situations, particularly if their children are prone to displaying high levels of dysregulation. Additionally, mothers with children who display high levels of dysregulation can be coached to cope with stress and provide support during moments when their children appear more dysregulated than usual. Mothers who feel comforted when they are distressed report higher levels of well-being (Luthar & Ciciolla, 2015). Equipping mothers with adequate coping skills, self-soothing strategies and support networks, therefore, can help them parent in supportive ways.
References


Appendix A: Maternal Behavior Coding Scheme

SUPPORTIVE BEHAVIOR

This scale focuses on how the mother observes and responds to the child's social gestures, expressions, and signals. The key defining characteristic of supportive interaction is that it is child centered. The supportive mother is tuned to the child and manifests awareness of the child's needs, moods, interests, and capabilities, and allows this awareness to guide his/her interaction. In toddlers this also includes support of the child's own agenda, his needs for autonomy, independence, and mastery, and his individual self-regulatory abilities (and deficiencies).

Low-level supportive behaviors:
- verbally or non-verbally (through actions/gestures) responding to the child’s questions, comments, or actions in positive/neutral manner (e.g. giving reasons or explanations)
- expanding verbally or non-verbally on what the child is saying/doing (without interfering in child’s activity)
- allowing the child to engage in an activity of his/her choosing (e.g., child moves box to end of the table and mom says “as long as you don’t open it, it’s okay.”) as long as it does not violate task rules (i.e., opening the box, not sitting in the chair, leaving the room) or puts the child’s safety at risk.
- encouraging or praising the child’s efforts (e.g., “you’re doing a great job waiting!” or “thank you for waiting!”)
- initiates conversation with the child when the child is NOT focused on the box/snack (e.g. “Are you having fun today?”). Note: if initiation seems to interrupt the child’s words/activities or is said in a harsh tone, code as non-supportive instead.

High-level supportive behaviors:
- Distracting the child by redirecting his/her attention away from opening the box (e.g. “tell me what’s in the box,” or “Can you help me with this puzzle?”)
  - Support should only be coded if child is clearly focused on snack/snack container
  - If child is focused on something else (e.g., noise outside; cameras), a maternal request for help with the word puzzle would NOT be coded as supportive.
  - Any distraction given by the mother should be mother-initiated (e.g., if child provides a distraction and mother goes along with distraction provided by child, it would be coded as a low-level supportive behavior).
- verbally acknowledging and/or validating the child's affect, interests or intent (e.g. “I know it’s frustrating to wait”)

Rating Scale

0 = no supportive behavior present in the interval
1 = one brief instance of a low-level supportive behavior is present
2 = Two or more instances of low-level supportive behaviors OR one instance of high-level supportive behavior is present
3 = Two or more instances of high-level supportive behaviors
   = A combination of low and high-level supportive behaviors is present

If one instance of high-level support lasts more than 10 seconds (e.g. mom engages the child in the puzzle for more than 10 seconds), code as 3.
NON-SUPPORTIVE BEHAVIOR

Non-supportive behavior is **adult centered** rather than child centered. Prototypically, non-supportive mothers do not match the child’s signals, level of play or pace of interaction needed. These mothers might impose their own agenda on the child, might not be fully available to meet the child’s needs or might not make an effort to understand and engage with the child. Non-supportive behaviors are also apparent when the mother does not allow the child a “turn” or an opportunity to respond at his/her pace. Additionally, non-supportive mothers may appear detached and ignore the child, dismiss the child’s affect or punish the child using threats.

**Low-level non-supportive behaviors:**
- Verbally or non-verbally responding to the child’s questions, comments, or actions in **harsh/a abrupt/sharp manner**
- physically but gently taking box from child while he/she is holding it
- physically but gently moving the child (e.g. moving the child’s hand away from the puzzle or pen)
- briefly insisting that the child do something (e.g., help with puzzle, sing a song) in which he/she is not interested
- talking over or interrupting the child when he/she is talking
- does not appear fully present or available to the child (e.g., child asks question and mother’s response doesn’t answer the question, mother doesn’t seem to be listening; mom is delayed in responding to child’s bid). If there is a delay in response, code as NS even if the response is supportive.
- clearly ignoring child’s social bid (i.e., question, request, suggestion that mother do something) made in positive/neutral manner. Do NOT code unless bid is clearly directed towards mother. **Note:** if child repeats the same thing more than once within 5 seconds or less to get the mother’s attention and the mother ignores the child, code as one instance. If the child says or does different things OR if 5 seconds or longer have passed between each utterance and the mother ignores the child each time, code as multiple instances.
- ‘Shushing’ the child

**High-level non-supportive behaviors**
- physically but abruptly or harshly taking box from child while he/she is holding it
- mother doesn’t follow through with rules, limit-setting or discipline (e.g., mother says “no/don’t” to child and child continues to engage in negative acts, and then mother doesn’t respond or redirect the child to another activity) [can code in same interval in which child is not following rule or next interval; but only code in one interval]
- physically but abruptly or harshly moving child (e.g., to sit down)
- insisting multiple times in the same interval that the child do something (e.g., help with puzzle) in which he/she is not interested
- evident lack of awareness of child’s inappropriate behavior (mother is “doing her own thing” and child is standing on chair)
- minimizing/dismissing the child’s emotions (e.g. “there is nothing to be upset about” or “there is no reason for you to be so impatient”)
- Clearly ignoring child’s social bid accompanied by negative affect (child is distressed or frustrated)
- Clearly ignoring child’s negative affect (child is distressed or frustrated), with no bid present
- **excessively or abruptly disciplining the child.** (Abrupt discipline that is clearly in the child's best interests, such as removing a child from danger, are NOT coded. If mother provides appropriate limits in neutral/positive tone, do NOT code.)
- **punishing the child; e.g. threats** (You won’t get a snack if you don’t wait until I finish)
- **sarcasm or derogatory remarks** (e.g., “You have patience like your father.”)

Do NOT code: mother’s refusal to comply with child requests (i.e. child wants mother’s pen or wants to switch chairs with the mother and the mother does not comply).
Rating scale

0 = no non-supportive behavior present in the interval

1 = one brief instance of a low-level non-supportive behavior is present

2 = Two or more instances of low-level non-supportive behaviors OR one instance of high-level non-supportive behavior is present

3 = Two or more instances of high-level non-supportive behaviors

   = A combination of low and high-level non-supportive behaviors is present

If one instance of high-level nonsupport lasts more than 10 seconds (e.g. mom ignores child crying for more than 10 seconds), code as 3.

**Note: if the one instance of high-level behaviors occurring involves punishing the child, excessively disciplining child, or using sarcasm, code as 3.**
Appendix B: Child Behavior Coding Scheme

DISRUPTIVE BEHAVIOR

Low-level disruptive behaviors
- Physically disturbing or trying to distract the mother while she is writing (e.g. trying to grab or grabbing the mother’s pen or clipboard, covering her sheet with their hands, etc.) Do NOT code child’s attempts at making conversation with the mother.
- Asking the mother “Can I have a snack now?” or “Can you open the box?” or “are you done yet?” after the mother has explicitly told the child that he or she needs to wait. Note: Do not code if child is talking about the box/snack or playing with/simply touching the container.

Moderate-level disruptive behaviors
- Minor instances of non-compliance, such as child actively disobeying or ignoring mother’s instructions (e.g. mother asks child to stop touching the box and the child continues to touch the box or reaches out to touch it again). Note: only code if non-compliance occurs within 10 seconds of mother’s instructions. If enduring or severe, code as high-level.
- Verbally resists mother’s instructions (e.g. mother says ‘you have to wait,’ and child says ‘no!’). If enduring or severe, code as high-level.
- Child attempts to grab the box, open it and/or take the snack out.
- Child gets up from the chair after the mother has previously told the child to be seated, OR child gets up from the chair to reach for the box because the mother has placed the box out of the child’s reach.

High-level disruptive behaviors
- Child bangs fists, throws objects or tips over chair.
- Child moves excessively, runs around the room, tries to open the door, climbs on the table or rolls on the floor.
- Child screams or shouts.

Rating Scale

0 = No disruptive behavior is present

1 = ONE instance of low-level behavior is present

2 = Two or more instances of low-level behaviors and/or ONE moderate-level behavior is present

3 = Two or more instances of moderate-level behaviors OR one or more instances of high-level behaviors OR a combination of low, moderate and/or high-level behaviors are present
CHILD NEGATIVE AFFECT (modified; Cole, Barret, & Zahn-Waxler, 1992)

This scale is intended to capture negative affect. Displays of glumness, dysphoria, tearfulness, and wistfulness are all regarded as dimensions of sadness. Behavioral cues include the melody and volume of the voice (lower and less volume of voice), a turned-down facial expression (lips turned down and pressed together), and a slackening of the muscular tone of the face and body. The child may tilt and drop his or her head, and look down. In regard to voice, vocal quality drops off at end of statement, volume changes to lower or softer volume without intention to whisper; soft moan, whimper, or groan may occur. In face, lip corners turned down and/or lower lip depressed (as in quivering lip), mouth may appear slack, also chin may be raised pushing lower lip up and out, inner brows may be raised and brow lowered or furrowed giving an appearance like / \; eyes may be lowered or lids drooped. Head may be tilted to one side. May wipe eyes as if crying and have teary, red eyes. Do not code sighs unless other clues are available.

Displays of hostility, sarcasm, irritation, annoyance, harshness, and frustration are all regarded as dimensions of anger. Behavioral cues include a harsh tone of voice, an insistent or protesting tone, mouth movements such as the “square” mouth, jutting the jaw, or pressing or tightening the lips, and tightening the eyes as in a glare or hard stare. Also includes body movements such as clenching the fists (if done as a threat, would be coded as aggression rather than anger). Physical acts of anger also include rough play when rough play occurs in the context of anger. In regard to voice, vocal quality is harsh, pitch, and volume often increase with voice sounding insistent, demanding, irritable, protesting. Air is expelled as when asserting, but harsh quality must be present (emphatic statements in general may be neutral or joyful). In face, brows may be lowered, lids can be tightened or narrowed as in hard stare; mouth appears “set” with lips pressed or tightened (if only one of these appears, then code as anxiety/distress), lids can also be raised, teeth may be grit or clenched, jaw thrust forward, if mouth open, shape may be squarish or rectangular.

**PRETEND NEGATIVE AFFECT WILL NOT BE CODED.**

Rating Scale

0 = No affect present

1 = Low degree of negative affect
(a) one brief, low-level display of negative affect lasting less than 3 seconds (e.g., whine, pout, harsh voice, fleeting angry look).

2 = Moderate degree of negative affect
(a) low-level negative affect lasting 3 to 9 seconds (e.g., sustained whine, pout, harsh voice), (b) one clear, more intense display of negative affect (face and/or voice clearly show sadness or anger) that is less than 3 seconds.

3 = High degree of negative affect
(a) low-level negative affect lasting 10 seconds or more (whining, pouting, grumbling, frustration), (b) at least two clear, intense displays of sadness or anger, (c) crying.

(Note: Since crying is less frequent in laboratory research it is not a criterion for coding a 3 for sadness; if crying does occur for a significant portion of the segment, this code should be used.)

* NOTE: Do NOT code affect if it is the result or consequence of an interaction with the Experimenter/Child Interviewer or physical harm (e.g., child falls; accidentally pokes self).
Appendix C: Model Tests of Unconditional Models with Random Intercepts and Lagged Association Parameters

<table>
<thead>
<tr>
<th>Model parameters</th>
<th>Fixed intercept model</th>
<th>Random intercept model</th>
<th>Random intercept, fixed lagged model</th>
<th>Random lagged model</th>
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<tr>
<td></td>
<td>Est (SE)</td>
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<td>Est (SE)</td>
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<td>Fixed effects</td>
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<tr>
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<td>3.659</td>
<td>&lt; .001</td>
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<tr>
<td></td>
<td>(.056)</td>
<td></td>
<td>(.056)</td>
<td></td>
</tr>
<tr>
<td>Lagged association</td>
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<td>(.024)</td>
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<td>Random effects</td>
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<tr>
<td>Intercept variance</td>
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<td>&lt; .001</td>
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<tr>
<td>Lagged variance</td>
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<tr>
<td>Intercept-lagged covariance</td>
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<td></td>
<td>(.074)</td>
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<td>(.056)</td>
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<tr>
<td>Model fit</td>
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<td>Number of parameters</td>
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Note. Wald tests were conducted to assess the significance of the fixed effects, and -2LL likelihood ratio tests were conducted to assess the significance of the random effects. An additional random lagged associations model was estimated with the intercept-lagged association covariance was fixed to 0 (mode fit: -2LL [5] = 7332.94), to permit tests of the individual parameters of the random lagged association and intercept-lagged association covariance reported in the final model above.
Appendix D: Model Tests of Unconditional Models with Random Intercepts and Slope Parameters

*Note.* Wald tests were conducted to assess the significance of the fixed effects, and -2LL likelihood ratio tests were conducted to assess the significance of the random effects. An additional random slopes model was estimated with the intercept-slope covariance was fixed to 0 (mode fit: -2LL [5] = 7723.10), to permit tests of the individual parameters of the random slope and intercept-slope covariance reported in the final model above.

<table>
<thead>
<tr>
<th>Model parameters</th>
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<tr>
<td>Fixed effects</td>
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<tr>
<td>Intercept</td>
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<td>Residual variance</td>
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<td>1.101 (.056)</td>
<td>&lt; .001</td>
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<tr>
<td>Model fit</td>
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