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Cover Page Note

Thank you to my mentor, Dr. Anne Hungerford, for helping me with this project. I have learned a great deal from you and I am extremely grateful for all of your guidance and support.

Relations between Maternal Personality, Parenting, and Toddlers' Emotion Regulation and Externalizing Behaviors

The purpose of the current study was to examine the relations between maternal personality, parenting behavior, and children's emotion regulation and externalizing behaviors. More specifically, this research examined whether maternal personality was related to parenting behavior, and whether parenting behavior was related to toddlers' emotion regulation and externalizing behavior problems. Parenting behavior was examined as a potential mediator and moderator of associations between maternal personality and children's outcomes. Before discussing the current study, the following sections provide a framework by reviewing relevant theory and research.

Emotion Regulation

Calkins defined emotion regulation as "the processes or strategies that are used to manage emotional arousal so that successful interpersonal functioning is possible" (Calkins, 1994, p.53). This definition provides a picture of emotion regulation as a set of coping strategies that children use in order to keep their emotions from becoming overwhelming. In infancy children begin to develop their emotion regulation skills. By toddlerhood, children have progressed from complete reliance on their caregivers for regulation, and can self-regulate their emotions to a limited extent (Calkins, 1994). Examples of emotion regulatory strategies, for managing negative emotions include self-comforting (e.g., thumb sucking), help-seeking (e.g., seeking help from mother), and distraction (e.g., playing with an object not related to the task) (Calkins, Smith, Gill, & Johnson, 1998). Having emotion regulatory skills helps children in situations where controlling emotions is necessary or desirable, including negative emotions such as fear or frustration/anger, as well as positive emotions (Calkins et al., 1998). Because these skills begin to develop in infancy, early interactions with caregivers, and their sensitivity in responding to the needs of the infant are hypothesized to be a very important component in the development of emotional self-regulation (Calkins, 1994).

By the second year, the toddler has transitioned to an active mode of emotion regulation (Calkins & Hill, 2007). This active mode is largely influenced by extrinsic factors which include "the manner in which caregivers shape and socialize their infant's emotional responses, and the relationship that develops between infant and caregiver as a consequence of these important interactions" (Calkins & Hill, 2007, p. 233). Mothers' interactions with their children are important to teach them strategies to control higher levels of emotional arousal. Unsupportive interactions by the caregivers may lead to difficulties in developing appropriate emotional regulatory skills. For example, when parents simply walk away from their frustrated and crying child, the child does not learn a healthy way to deal with this frustration in future contexts (Calkins & Hill, 2007). Therefore,

the unsupportive parent does not provide an appropriate model, and the child is left without the tools to control their emotions. There are multiple ways that caregivers may influence their children's emotional development. Accordingly, it is important to research the impact of various forms of caregiving on children's emotion regulation.

Behavior Problems

Behavior problems in children are divided into two main types, internalizing and externalizing behavior problems. Internalizing problems are intrapersonal in nature and often involve behaviors such as withdrawal, anxiety, fearfulness, and depression. In contrast, externalizing problems are interpersonal in nature and often involve behaviors such as hyperactivity, aggression, defiance, and destructive behavior (Fanti & Henrich, 2010). Externalizing problems can develop by the age of 2. Once these problems develop, they are quite stable and accordingly they place the child at risk for academic difficulties, undesirable interactions with peers and parents, delinquency, substance abuse, and future antisocial behavior (Fanti & Henrich, 2010). In fact, some research has shown that externalizing problems developed as early as age 2, will continue through the school-age period and often carry into early adolescence in approximately 50% of cases (Shaw, Winslow, Owens, Vondra, Cohn & Bell, 1998). Further, externalizing problems in school-age children and adolescents are "highly resistant to change" and accordingly, are extremely costly to both the child and society (Shaw et al., 1998, p. 95).

Due to the potentially long-term effects of early externalizing behavior problems, there is much interest in identifying the causes of externalizing problems in children. Recent studies have shown that examining the parent child relationship can help detect children at risk for developing externalizing and emotional problems (Mäntymaa, Puura, Luoma, Vihtonen, Salmelin, & Tamminen, 2009). The parent child relationship is important to study not only in the context of behavior problems, but in predicting the overall emotional development of the child. According to some theorists, the time between infancy and preschool is one in which "many developmental trajectories leading to adaptive or maladaptive outcomes begin" (Shaw et al., 1998, p. 95). Accordingly, it is essential to study the parent child relationship and which precursors may relate to the development of externalizing problems in children.

Maternal Personality and Parenting Behavior

A number of studies have examined relations between maternal personality and parenting behavior. Belsky, Crnic, and Woodworth (1995) conducted a study in which they examined associations between personality and parenting. The participants of this study were 69 married European-American couples and their first born sons. Maternal personality was assessed using measures of agreeableness, neuroticism and extraversion obtained from the NEO

Five Factor Inventory (NEO-FFI; Costa & McCrae, 1985). In the NEO-FFI, neuroticism is the tendency to encounter negative moods; extraversion is the tendency to be outgoing and social; agreeableness is the tendency to have sympathy for others and desire to help them; openness is the tendency to have curiosity, be independent and have an active imagination; and conscientiousness is the tendency to be organized, purposeful and diligent (Clark, Kochanska, & Ready, 2000). The latter two dimensions were not examined in this study. Parenting behavior was assessed during naturalistic observations of family interactions when children were 15 and 21 months old. Parenting was evaluated using measures of positive and negative affect, sensitivity, intrusiveness, detachment, and cognitive stimulation.

This study found that high levels of agreeableness predicted high levels of positive parenting and low levels of negative parenting for mothers. More specifically, they found that high levels of agreeableness were correlated with high levels of cognitively stimulating parenting and low levels of both detachment and negative affect. In contrast, high levels of neuroticism were related to expressing negative affect towards the child, as well as to being cognitively non-stimulating and insensitive in interactions with the child. In conclusion, this study showed that agreeableness was correlated with more adaptive parenting and neuroticism was correlated with less adaptive parenting.

A second study, conducted by Clark et al. (2000), examined maternal personality and its interaction with infants' negative emotionality in predicting parenting behavior. The participants in this study included 112 mother-child dyads. This study consisted of two sessions in which both maternal and child behaviors were observed. Maternal personality was measured using the NEO-FFI. Children's frustration was evaluated through three assessments that are part of a larger standardized laboratory battery including the arm restraint task, the car seat task, and the toy retraction task. These tasks were coded for ratings of latency to first response of anger, manifestation of anger, average intensity, and peak intensity of anger. A third measure used in this study was maternal use of power assertion, which was measured through observation over the course of two disciplinary tasks. The final measure of this study was maternal responsiveness which was assessed through examining mother-child interactions during a range of activities in the laboratory.

The findings of this study indicate that mothers who scored high on either neuroticism or extraversion were more controlling and forceful in their attempts to control children's behavior. With respect to maternal responsiveness, this study found that mothers who scored high in conscientiousness displayed more responsive behavior toward their children. This study provides evidence that neuroticism and extraversion are linked to more controlling parenting. Finally, it indicates that conscientiousness is linked to more responsive parenting.

The relationship between maternal power assertion and maternal personality was also examined by Kochanska, Askan, and Nichols (2003). A total of 57 mother-child dyads participated in this study, where they were assessed at ages 9, 14, 22, 33, 45, 56, and 73 months. The data for this study came from observations during laboratory sessions, and questionnaires given to the mothers. Maternal personality was assessed through the NEO-FFI at the 9 month assessment. Maternal power assertion was measured through observation during the laboratory sessions. The procedure to test maternal power assertion consisted of “do” and “don’t” contexts. The “do” contexts involved asking the child to clean up the toys they were playing with. The “don’t” contexts involved asking the child not to touch desirable toys. Finally, a score of overall child difficulty was created by combining ratings of child defiance and child negative affect.

Findings indicated that higher scores on the personality factor of neuroticism were correlated with use of a more forceful and negative style of discipline (i.e., greater power assertion). This finding was independent of the child’s difficulty level. Another finding of this study was that mothers who scored high in extraversion, used more power assertion in the “do” discipline contexts of this study. Finally, mothers who scored low in agreeableness were also more likely to use power assertion in the “do” discipline contexts. This study provides additional evidence that neuroticism and extraversion are correlated with more controlling parenting, whereas agreeableness is correlated with less controlling parenting.

A fourth study conducted by Koenig, Barry, and Kochanska (2010) evaluated the effects of both maternal personality and child difficult temperament on parenting behavior. The participants of this study were 102 mother-child dyads. This study consisted of four assessments that occurred at ages 7, 25, 38, and 67 months. Maternal personality was assessed using the NEO-FFI, which mothers completed when children were 7 months old. Measurement of children’s temperament was based on laboratory observations at 25 and 38 months. Child anger was assessed through toy retraction tasks, where a desirable toy was taken from the children but still held within their view for a maximum of 30 seconds. Based on this coding, the researchers calculated measures of latency to anger and peak anger in the child. Finally, a score for positive parenting was created by combining measures of parental responsiveness and positive affect displayed towards the child.

This study found that mothers who exhibited higher neuroticism on the NEO-FFI engaged in less positive parenting, regardless of the child’s temperament. Kochanska et al. (2003) also found a link between neuroticism and more controlling parenting, independent of children’s temperament. Unlike other studies of maternal personality and parenting, this study did not find a link between the other four personality factors and parenting practices.

Smith et al. (2007) also conducted a study in which they examined the relationship between maternal personality and parenting behavior. The participants of this study included 216 mother-child dyads. This study consisted of two assessments, one at the age of 18 months and the other at 30 months. At the 18 month assessment, mother-child interactions were observed and recorded during various play tasks. Maternal personality was examined using a questionnaire that assessed the “big five” personality factors. Maternal sensitivity was scored during laboratory assessments at 18 and 30 months, by evaluating how attentive and responsive the mother was to the child’s needs. Maternal emotional expressions were evaluated during the laboratory-based observations, resulting in ratings for both positive and negative emotional expressions.

The findings of this study indicated that mothers who scored higher on agreeableness and conscientiousness were more sensitive toward their children. In contrast, mothers who scored higher on neuroticism showed less sensitivity to their children. These findings are consistent with other research showing that higher levels of agreeableness and conscientiousness and lower levels of neuroticism, are related to more adaptive parenting. In this study, there was no correlation between extraversion or openness and maternal sensitivity. Regarding maternal personality and emotional expression, mothers who scored higher in conscientiousness and agreeableness showed more positive emotional expressions during mother-child interactions. In addition, mothers with higher levels of agreeableness, openness and extraversion reported more positive emotional expressions. In contrast, mothers with higher levels of neuroticism or lower levels of conscientiousness and agreeableness, both reported more negative emotional expressions.

In summary, the findings across studies are relatively consistent in indicating negative associations between both neuroticism and extraversion, and parenting quality. In addition, findings suggest that both agreeableness and conscientiousness are positively associated with parenting quality.

Parenting and Emotion Regulation

A number of studies have examined associations between parenting behavior and young children’s emotion regulation. Calkins et al. (1998) examined relations between maternal control and children’s emotion regulation. The participants of this study consisted of 65 mother-child dyads. Mother and child behavior was examined during a range of laboratory tasks, which were recorded and later coded. Maternal behavior was assessed during three mother-child tasks including a structured play task, a teaching task, and a pretend play task. Maternal negative control and maternal positive guidance were evaluated during these tasks. Children’s behavior was measured during an impulsivity task and two frustration-eliciting tasks (barrier and high chair tasks). During the impulsivity task, children’s latency to touch the crayons was coded. In addition,

the proportion of time children spent oriented toward the crayons, engaged in distraction, and displaying aggressive behavior was coded. During the frustration tasks, children's distress (negative reactivity) was coded.

Results indicated that maternal behavior was not related to children's negative reactivity during the high chair or barrier tasks, or to children's latency to touch the crayons during the impulsivity task. However, maternal behavior during the mother-child interactive tasks was related to some of the regulatory strategies that children used in the frustration and impulsivity tasks. Specifically, children of mothers who showed higher levels of negative control during the mother-child interactive tasks were less likely to use distraction during the high chair and barrier tasks. Children's distress during these tasks was negatively associated with the use of distraction. Although the direction of effects cannot be established from these analyses, one possibility is that distraction during a frustration-eliciting task may be an effective means of decreasing negative arousal. More controlling maternal behavior was also positively related to children's focus on the source of frustration during the barrier task, even though the use of this strategy was not associated with children's distress. With respect to the impulsivity task, children's focus on the crayons (the "forbidden" object) was positively associated with negative maternal control and negatively associated with children's use of distraction. Children's focus on the crayons was associated with shorter latencies to touch, suggesting that this strategy may not be effective in helping children control their behavior in a prohibition context. Thus, the findings suggest that more positive maternal behavior may be related to more effective emotion regulatory strategies, while negative maternal behavior may be associated with less effective emotion regulatory strategies.

In another study, Calkins and Johnson (1998) evaluated the relationship between frustration distress, emotional regulation, and maternal interactive style. The participants were 73 mothers and their 18-month-old children. Similar to their previous study, this study consisted of many tasks that were recorded and later studied. Measures of frustration distress were operationalized into four categories: latency to cry, intensity of distress, frequency of fussing, and duration of crying. These four measures were coded during four frustration tasks, in which children's movements were restricted or in which they were prevented from accessing a toy or treat. A summary frustration score was created by combining these four measures. In addition, regulatory measures were coded either as being present or absent, using several of the tasks. The final measure of this study was maternal interactive style. Based on maternal behavior in different interactive tasks, three maternal interactive styles were coded: maternal negative control, maternal positive guidance, and maternal preemptive interference.

The findings indicated that toddlers, who were more distressed during the frustration tasks, were more likely to act out aggressively. Children who showed

greater distress during the frustration tasks were also less likely to attend to their mothers or use distraction or constructive coping. There was an interaction effect indicating that as mothers engaged in more preemptive interference, the positive association between children's distress and aggression became stronger. In contrast, mothers who scored high in positive guidance, rather than preemptive interference, had toddlers who were more likely to use distraction during the frustration tasks, a regulatory behavior that was associated with lower distress. Thus, mothers' positive and negative behavior was not linked directly to the child's tendency to become distressed, but it was related to the regulatory behaviors displayed by the child, which in turn were associated with children's distress.

An additional study examined the mother-child relationship and how it is related to the development of emotion regulation in children (Smith, Calkins, & Keane, 2006). The participants included 154 mothers and their 24-month-old children. Emotion regulation was measured over four laboratory tasks, two of which were designed to elicit frustration by confining children to a high chair and by restricting their access to a toy (barrier task). Maternal positive behavior and maternal controlling behavior were the final measures of this study, which were examined over four different mother-child interactive tasks.

In this study, higher maternal control was positively correlated with negative emotion shown by girls during the high chair task. However, mothers who engaged in more positive behavior during the interactive tasks had boys who showed less positive emotion during the high chair task; there was no association for girls. With respect to mother-focused regulation, maternal positive behavior during the interactive tasks was positively related to mother-focused regulation for both boys and girls during the high chair task. Maternal positive behavior was also positively related to mother-focused regulation during the barrier task for girls. Although mother-focused regulation is considered an adaptive regulatory strategy for children of this age, there was no association between children's use of this strategy and their negative emotion.

In summary, research generally indicates few direct relations between maternal behavior and children's distress during frustrating tasks (For an exception see Smith et al., 2006). However, the findings suggest that more positive and less controlling maternal behavior is associated with potentially more effective regulatory strategies.

Parenting and Behavior Problems

A number of studies have examined associations between parenting behavior and children's behavior problems. Mäntymaa et al. (2009) conducted a study that examined the mother-child relationship and mother-child interactions in relation to children's behavior problems. The participants consisted of 65 mother-child dyads that were assessed when the participants were 2 and 5 years of age.

During the assessment at age 2, the mothers and children were recorded during a feeding situation, and their behavior was later coded. The Emotional Availability Scale was used to code mother-child interaction. The EAS has five dimensions: parental sensitivity, parental structuring/non-intrusiveness, parental hostility, child responsiveness to the parent, and child involvement of the parent in interaction. The mothers also completed the Child Behavior Checklist, a measure of behavior problems, at both ages.

This study found no concurrent correlations between the emotional availability of the dyad and children's behavior problems at age 2. However, children who showed higher externalizing scores on the CBCL at age 5 were not as responsive and were less involved with their mothers during the feeding situation at age 2, than were children with lower externalizing scores. The mothers of children with higher externalizing scores at age 5 were also less sensitive and more intrusive during the feeding situation at age 2. Shaw et al. (1998) conducted a study on the development of externalizing problems in children. This study examined the relations between externalizing problems, maternal responsiveness, rejecting parenting, and child noncompliance. The participants included 130 low-income mother-child dyads. This study consisted of two laboratory assessments, one that occurred when the participants were 12 months, and the second when they were 24 months. When participants were 42 months old, the mothers completed the Child Behavior Checklist, a measure of children's behavior problems. The second measure of this study was maternal responsiveness, which was assessed during a task in which children were confined to a high chair. Thirdly, a measure of rejecting parenting was created by combining measures of maternal verbal/physical approval, warmth, critical statements, hostility, and punitiveness, displayed during a laboratory clean-up task at 24 months. Finally children's noncompliance was assessed at 24 months during three laboratory tasks.

This study found that low maternal responsiveness was correlated with greater externalizing behavior in boys at 24 and 42 months. In addition, rejecting parenting at 24 months was correlated with externalizing behavior at 42 months in both girls and boys. Further, the results indicated that the combination of high rejecting parenting and high child non-compliance were correlated with higher externalizing problems.

An additional study that examined the effects of a parenting intervention on parenting and children's behavior problems was conducted by Mesman et al. (2009). The participants consisted of 150 mother-child dyads. Half of the 150 children were 2 years old, and the other half were 3 years old. All children had high levels of externalizing behaviors. Following a pretest that involved a number of laboratory tasks (Time 1), participants were randomly assigned to the control group or the intervention group. During the home visits to the

intervention group, the researcher provided personal feedback to the mothers on the quality of their parenting using a video-feedback method called the VIPP-SD. This feedback method is geared toward improving parental sensitivity. In contrast, the control group did not receive feedback on their parenting. Time 2 consisted of a post-test approximately one year after the pre-test. Finally, Time 3 consisted of a second post-test that occurred one year after the first post-test. This took place at the laboratory for both the intervention and control groups, and consisted of the same procedures used in the pre-test.

Mothers reported on children's "difficult" temperament at Time 1. Maternal sensitivity was measured through observation of mothers' behavior while they completed very difficult puzzles with their children at Time 1 and Time 2. They reported on children's behavior problems at all three time points. Findings indicated that there was an average decrease in externalizing behaviors over time. For children with difficult temperaments, higher maternal sensitivity was related to larger declines in externalizing behaviors.

In summary, findings indicate that more sensitive maternal behavior is associated with lower levels of externalizing behaviors. In contrast, negative or highly controlling maternal behavior is associated with more externalizing behaviors.

Rationale and Hypotheses

Although there is a substantial amount of research on maternal personality, parenting behaviors, and children's emotion regulation and externalizing behaviors, few studies include all of these variables in a single study. In addition, studies have not examined maternal sensitivity as a mediator or moderator of associations between maternal personality and children's outcomes. The following hypotheses or questions were examined:

1. It was hypothesized that maternal personality would be related to maternal sensitivity. More specifically, the hypothesis was that maternal agreeableness and conscientiousness would be positively associated with maternal sensitivity, and that neuroticism and extraversion would be negatively associated with maternal sensitivity.
2. Maternal sensitivity was hypothesized to be positively related to children's emotion regulation skills and negatively related to their behavior problems. More specifically, it was hypothesized that maternal sensitivity would be negatively related to children's distress during a frustration-eliciting task as well as negatively related to children's externalizing behavior problems.
3. It was hypothesized that maternal personality would be related to children's emotion regulation skills and externalizing behaviors. More specifically, it was expected that maternal neuroticism and extraversion would be related to greater distress during a frustration-eliciting task and

more externalizing behaviors, while maternal agreeableness and conscientiousness would be related to less distress and fewer externalizing behaviors. Assuming that these three hypotheses were supported, we planned to examine whether there is a relationship between maternal personality and children's outcomes. If so, we planned to examine whether maternal sensitivity would mediate (account for) associations between maternal personality and children's frustration distress and externalizing behaviors.

4. It was hypothesized that maternal sensitivity and maternal personality would interact to predict children's outcomes. This hypothesis was exploratory because previous studies have not typically examined interactive effects of maternal personality and maternal behavior on children's outcomes. We were specifically interested in whether relations between maternal personality and children's outcomes might depend on levels of maternal sensitivity.

Method

Participants

The participants in this study included 95 mother-child dyads living in a small city in the southeastern United States. These participants were part of a larger study on emotional development. They were recruited primarily through public birth records with a few participants recruited from local childcare centers. Subjects were paid \$20.00 for their participation in this study. All children were typically developing. This study included 51 males (53.7%) and 44 females (46.3%). The majority of the children in this study were European-American (88.8%). Other children in this study were African-American (4.5%), Hispanic (5.6%), and Native American (1.1%). The mean age of the child participants in this study was 25.15 months (range = 23.69-27.93 months). Mothers ranged in age from 19 to 45 years old ($M = 32.84$, $SD = 4.44$). The education level of our sample was high. Fifty-five percent of mothers held at least a bachelor's degree, 27.5% held an associate's degree, 12.1% of mothers had at least some college, and 5.5% held a high school diploma or GED. Most of the participants in this study had parents who lived in the same household (94.5%).

Procedure

At both 24 and 36 months, the children and their mothers were observed in a laboratory assessment that lasted approximately 2 hours. The current study included data from three questionnaires and two laboratory tasks administered when children were approximately 24 months old. One of these questionnaires was simply a form for parents to report demographic information including gender, ethnicity, age, education level, and the state of the parent's marriage. The other two questionnaires were the NEO Five Factor Inventory (NEO-FFI; Costa & McCrae, 1985) and the Child Behavior Checklist (CBCL 1.5-5; Achenbach &

Rescorla, 2000). The mothers were mailed a packet of questionnaires to complete prior to the assessment. The laboratory tasks used in this study were the “three boxes” task and the “goldfish” task. These tasks were conducted in a room that was visible through a two-way mirror. Using the mirror, a camera recorded the interactions between mother and child. The details of these tasks are described in detail below.

Measures: Predictors

NEO Five Factor Inventory. Maternal personality was examined through the use of the NEO Five Factor Inventory. This questionnaire contains 60 questions that assess maternal personality and has demonstrated reliability and validity (Costa & McCrae, 1985). Five aspects of personality are evaluated: neuroticism, extraversion, openness, agreeableness and conscientiousness. Neuroticism is the tendency to encounter negative moods; extraversion is the tendency to be outgoing and social; openness is the tendency to have curiosity, be independent, and have an active imagination; agreeableness is the tendency to have sympathy for others and desire to help them; and conscientiousness is the tendency to be organized, purposeful, and diligent. Scores on each dimension range from 0 to 48. Mothers filled out this questionnaire at home and brought it with them to the 24 month assessment.

“Three Boxes” Task. A task labeled the “three boxes” task was used during the 24-month assessment to measure maternal sensitivity. This task was adapted from the Study of Early Childcare and Youth Development conducted by the National Institute of Child Health and Human Development (NICHD ECCRN, 1998). This task involved both the mothers and children participating in semi-structured play for 15 minutes. It was labeled the “three boxes” task because it consisted of three plastic boxes, each of which contained a different toy. This task was not considered free play because instructions were given to the mothers to have their children play with every toy in sequential order, starting with the toy in box 1 and ending with the toy in box 3. Other than following that order, there was no other restriction on how the time during this 15 minute task should be divided. Mothers were also told that they could play with their children if they wished. The toys in each box were covered with a towel to prevent the children from seeing them. The first box contained a children’s book; the second included a toy kitchen which consisted of a toaster, bread, a coffee pot, and utensils; and the third box included a toy zoo.

Maternal behavior was coded using the video recordings of the assessments. The scoring was adapted using a system created by the NICHD ECCRN (1998). Sensitivity was rated using a 4-point scale. The middle segment of the interaction, from 5-10 minutes, was divided into 1 minute intervals. Each of these intervals was given a rating, and these five ratings were averaged to create a global sensitivity rating. The reason that the middle segment was used

was because this time segment was most likely to include a transition between the boxes of toys. Mothers often initiated the transitions between boxes of toys, during which children sometimes displayed resistance. Accordingly, coding the middle segment gave the observers a good opportunity to observe maternal sensitivity. Our definition of maternal sensitivity/responsiveness reflected the extent to which the mother displayed behavior that was child-centered, as well as the extent to which the mother adapted her behavior to accommodate the child's interests and responded to the child's signals appropriately. Inter-rater reliability was initially established on 33.3% of the total number of participants using intra-class correlations. The original pair of coders had an intra-class correlation for average maternal sensitivity of .70. The original coder and a new coder completed additional coding of new participants. Reliability for this pair of coders was established on 15% of the total number of participants and was .92. A copy of the coding manual is provided in Appendix A.

Measures: Outcomes

Goldfish Task. Children's emotion regulation was assessed using a frustration task that occurred during the 24 month laboratory assessment. This task began when the experimenter gave the child a clear container that held goldfish crackers. This container could not be opened by the child without assistance from an adult. At the time the child was presented with this container, the experimenter said, "There's a treat in here for you. You can have it in a few minutes." Following this presentation, the experimenter left the room for a period of 3 minutes. During this task, mothers were asked to sit and read a magazine that was provided. Prior to the task, mothers were asked not to initiate any interaction with the child. They were also asked to respond to children's bids as briefly as possible (e.g., "I'm busy right now,").

The 3 minute task was divided into 5 second intervals, and a rating from 0-3 was given to each interval. A score of 0 was assigned if the child exhibited no vocal indicators of distress. If the child displayed any negative affect, then they were not given a score of zero. A score of 1 signified mild distress, and was defined by the child making low-level vocalizations that indicated distress, such as whining, moaning, or grunting. A score of 2 indicated moderate distress, shown by soft crying. Finally, a score of 3 was chosen when crying was exacerbated and included hard crying or screaming. Inter-rater reliability was established on at least 15% of the total number of participants before data were coded independently. Three observers were utilized and reliability was calculated using Cohen's kappa. Average reliability across all pairs of raters was .86. A copy of the coding manual for negative affect is provided in Appendix B.

The average frustration intensity during the goldfish task was determined by adding the intensity ratings (i.e., 0-3) across all intervals, and dividing by the number of intervals coded. Latency to frustration was determined by counting the

number of intervals it took to reach a frustration intensity level greater than zero. This number was then converted into seconds; each interval was 5 seconds long and children who showed no distress over the course of the task had latencies of 185 seconds. Lastly, peak intensity was the highest intensity rating reached by the child during the frustration task, regardless of when it took place during the task.

Child Behavior Checklist. Externalizing behavior problems were assessed through the Child Behavior Checklist (Achenbach & Rescorla, 2000; CBCL 1.5-5 years). This evaluation includes 100 questions about the child's behavior in the last month. Each of these questions is answered by having the mother rate each statement from 0-2. On this scale, 0 means the item is not true of the child, 1 means the item is somewhat true, and 2 means the item is very true of the child. The CBCL measures internalizing and externalizing problems. The validity and reliability of the CBCL was examined by Achenbach and Rescorla (2000). The CBCL displayed high test-retest reliability over the course of a 1 year period. To assess criterion validity, they matched referred and non-referred children and examined their scores on the CBCL. The referred children were children who had previously been referred for mental health or special education services, and accordingly their total behavior problems scores should have been higher than non-referred children. As expected, referred children did show significantly higher scores on the CBCL. A copy of the CBCL is provided in Appendix C.

Results

Descriptive statistics for maternal sensitivity, maternal personality, child emotion regulation and child externalizing behavior problems are reported in Table 1.

Preliminary analyses were conducted to examine relations between the five factors in the NEO-FFI and to examine relations between variables derived from the frustration task. Additional analyses were conducted to examine how both maternal sensitivity and the five NEO personality variables were related to emotion regulation and externalizing behavior problems in children. These analyses are reported below.

Preliminary Analyses

Relations between NEO personality factors. Pearson zero-order correlations were calculated to examine relations between the NEO personality factors. These findings indicated that neuroticism was positively correlated with agreeableness. Neuroticism also showed a marginally significant negative correlation to conscientiousness. Finally, extraversion was positively correlated with conscientiousness (see Table 2).

Table 1

Descriptive Statistics for Maternal Behavior, Maternal Personality, Child Emotion Regulation and Child Externalizing Behavior Problems

	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
<u>Maternal Behavior</u>					
Maternal Sensitivity	90	3.16	.63	1.6	4
<u>Maternal Personality</u>					
Neuroticism	86	19.09	4.97	10	41
Extraversion	86	27.34	3.73	19	36
Openness	86	23.80	2.99	18	30
Agreeableness	86	21.87	3.77	16	33
Conscientiousness	86	29.84	2.97	19	37
<u>Child Emotion Regulation</u>					
Peak Frustration Intensity	92	1.63	1.11	0	3
Latency to Frustration (secs)	92	65.26	74.57	5	185
Average Frustration Intensity	92	.73	.82	0	2.92
<u>Child Behavior Problems</u>					
Externalizing Behaviors	91	48.82	9.49	28	80

Note. Score for externalizing behaviors is a t-score.

Table 2

Zero-order Pearson Correlations between NEO Personality Factors

	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness
Neuroticism	-	-.10	-.18	.34**	-.21
Extraversion	-	-	-.17	.01	.26*
Openness	-	-	-	.20	.15
Agreeableness	-	-	-	-	.01
Conscientiousness	-	-	-	-	-

* $p < .05$. ** $p < .001$.

Relations between emotion regulation variables. Pearson zero-order correlations were calculated to examine the relations between peak frustration intensity, latency to frustration, and average frustration intensity. These findings indicated that highest frustration intensity was negatively correlated with latency to frustration ($r = -.80, p = .00$), and positively correlated with average intensity ($r = .81, p = .00$). Latency to frustration was also negatively correlated with average frustration intensity, $r = -.58, p = .00$.

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Relations between children's emotion regulation and externalizing behavior problems. Pearson zero-order correlations were calculated to examine relations between children's emotion regulation and externalizing behavior problems. Externalizing problem scores were not related to average frustration intensity ($r = -.12, p = .27$) or to latency to frustration ($r = .15, p = .16$). There was a marginally positive correlation between externalizing problems and peak frustration intensity, $r = .20, p = .067$.

Major Analyses

Relations between maternal sensitivity and maternal personality. Pearson zero-order correlations were calculated to examine the relations between maternal sensitivity and maternal personality. Contrary to our hypothesis, none of the NEO personality factors were related to maternal sensitivity. Sensitivity was not related to neuroticism ($r = -.08, p = .51$), extraversion ($r = .09, p = .41$), openness ($r = -.06, p = .61$), agreeableness ($r = -.16, p = .15$), or conscientiousness ($r = .01, p = .94$).

Relations between maternal sensitivity and children's emotion regulation and externalizing behavior problems. Pearson zero-order correlations were calculated to examine the relations between maternal sensitivity and children's emotion regulation. Contrary to our hypothesis, maternal sensitivity was not related to the three measures of emotion regulation. Maternal sensitivity was not related to peak frustration intensity ($r = .05, p = .66$), average frustration intensity ($r = .02, p = .86$), or latency to frustration ($r = -.07, p = .54$). A Pearson zero-order correlation was also calculated to examine the relationship between maternal sensitivity and children's externalizing behaviors. The results indicated that maternal sensitivity was not related to externalizing problems in children, $r = -.13, p = .24$.

Relations between maternal personality and children's emotion regulation and externalizing behavior problems. Pearson zero-order correlations were calculated to examine the relations between maternal personality and children's emotion regulation. The only significant correlation indicated that the maternal personality trait of conscientiousness was negatively correlated with children's average frustration intensity (see Table 3). Pearson zero-order correlations were also calculated to examine the relations between maternal personality and children's externalizing behavior problems. The results indicated that externalizing behavior problems were positively correlated with neuroticism ($r = .36, p = .001$) and agreeableness ($r = .25, p = .02$). Externalizing problems were negatively correlated with conscientiousness ($r = -.23, p = .04$). There was no relation between externalizing problems and openness ($r = -.09, p = .42$), or extraversion ($r = .17, p = .12$).

Although it was hypothesized that maternal sensitivity might mediate relations between maternal personality and children's outcomes, there were no associations between maternal personality and maternal sensitivity, or between maternal sensitivity and children's outcomes. The conditions for mediation were not met because our hypothesized mediator was not associated with our predictor or outcome variables.

Table 3

Zero-order Pearson Correlations between NEO Personality Factors and Children's Emotion Regulation

	Peak Intensity	Average Intensity	Frustration Latency to Frustration
Neuroticism	.05	.03	-.08
Extraversion	.14	.03	-.03
Openness	-.16	-.13	.15
Agreeableness	.04		.04
Conscientiousness	-.12	-.25*	-.06

* $p < .05$.

Maternal sensitivity as a moderator of relations between maternal personality and children's outcomes. The final hypothesis of the present study was an exploratory hypothesis examining whether relations between maternal personality and children's outcomes might be moderated by maternal sensitivity. In order to examine whether maternal sensitivity interacted with maternal personality to predict children's outcomes, a series of hierarchical regressions were conducted. In each regression, maternal sensitivity was entered with one of the five maternal personality factors on the first step of the model. Predictors were centered to avoid multicollinearity with the interaction term. The interaction term was entered on the second step of the model. The outcome variables were externalizing behavior problems and average frustration intensity. Average frustration intensity was chosen because it was the variable of most interest. In addition, because average frustration intensity was highly correlated with both peak intensity and latency to frustration, it would have been redundant to include all three variables as outcomes. Thus, a total of ten regression analyses were conducted. Only one of these regression analyses indicated a significant interaction between the maternal personality factor of agreeableness and maternal sensitivity, in predicting children's externalizing problems. The regression predicting externalizing problems from maternal sensitivity, maternal agreeableness, and their interaction, was significant with all predictors in the model, $F(3, 75) = 3.67, p = .016$. In order to investigate the nature of the interaction, the data were plotted following recommendations by Aiken and West (1991), and is shown in Figure 1. Because it was hypothesized that maternal sensitivity would moderate associations between the maternal personality factor of agreeableness and children's externalizing behavior problems, separate regression equations were derived for three levels of maternal sensitivity. Regression equations representing the relationship between maternal agreeableness and children's externalizing behavior problems were plotted for each level of sensitivity using maternal agreeableness scores at the sample mean and at ± 1 standard deviations. As shown in Figure 1, there was a positive relationship between maternal agreeableness and children's externalizing behavior problems when maternal sensitivity was low. When maternal sensitivity was average or high, the relationships appeared much weaker.

Follow-up analyses were conducted to determine whether the slope of each regression differed significantly from zero following procedures outlined by Aiken and West (1991). These analyses indicated that when maternal sensitivity was low, there was a statistically significant positive relationship between maternal agreeableness and children's externalizing behavior problems, $b = 1.07, t = 3.17, p = .002$. When maternal sensitivity was average, there was not a significant relationship between maternal agreeableness and children's externalizing behavior problems, $b = .45, t = 1.61, p = .11$. Similarly, when

maternal sensitivity was high, there was not a significant relationship, $b = -.17$, $t = -.40$, $p = .69$. Thus, higher agreeableness was correlated with higher externalizing problems but only when maternal sensitivity was low.

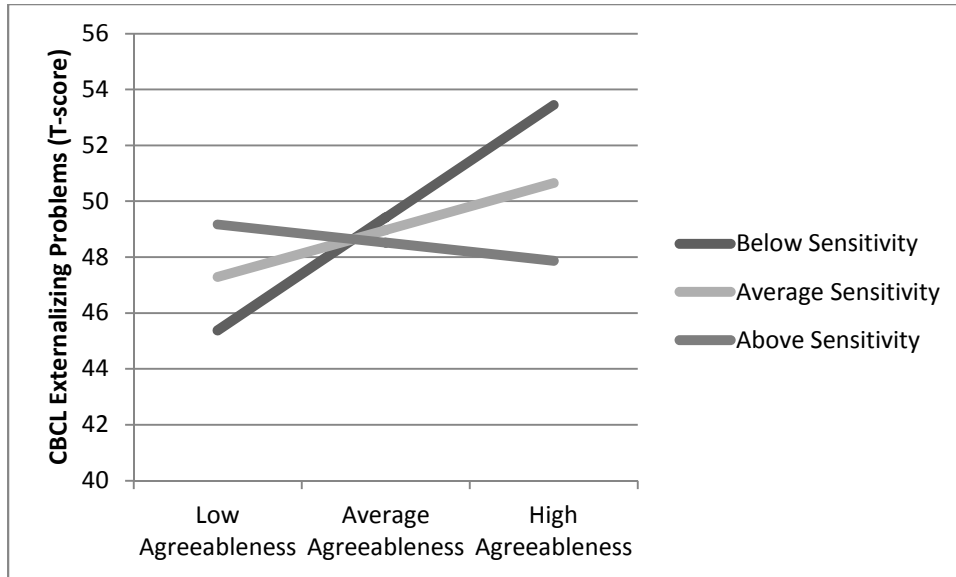


Figure 1. Relations between the maternal personality factor of agreeableness and child externalizing problems when moderated by maternal sensitivity.

Discussion

The purpose of this study was to examine whether maternal personality was related to parenting behavior, and whether parenting behavior was related to children's emotion regulation skills and externalizing behavior problems. We also examined the potential mediating and moderating effects of maternal sensitivity on associations between maternal personality and children's outcomes. The following sections summarize the major findings and place them in the context of other research on this topic.

Relations between maternal sensitivity and maternal personality. We hypothesized that maternal agreeableness and conscientiousness would be positively correlated with maternal sensitivity, and that neuroticism and extraversion would be negatively correlated with maternal sensitivity. Contrary to our hypothesis, none of the five NEO personality factors were related to maternal sensitivity. This discrepancy between our findings and past literature could be due to a number of limitations of the present study. First, the measure this study used to examine maternal sensitivity is limited in comparison to other measures used in the literature to examine maternal sensitivity or other aspects of parenting. The measure of sensitivity in the present study was based on a short, 5 minute mother-child interaction in the laboratory. Other measures of parenting used in past research, involve lengthier observation periods and/or multiple observations, which is likely to increase the representativeness of the data collected. Further, other studies have assessed multiple dimensions of parenting in addition to sensitivity (e.g., positive and negative affect, intrusiveness, detachment, cognitive stimulation, and power assertion), some of which may be more predictive of children's outcomes. Finally, some studies use naturalistic observation to assess maternal behavior, which may decrease participant reactivity and increase the accuracy of the data. In summary, the short length of time in which maternal sensitivity was measured and artificial setting where the measurement took place, reduced the quality of this measure. Further, maternal sensitivity is not the only behavior involved in parenting. Accordingly, the reduced quality of our measure of maternal sensitivity, added to the small scope it covers in relation to parenting, may explain why our results differ from past findings.

Relations between maternal sensitivity and children's emotion regulation and externalizing behavior problems. We hypothesized that maternal sensitivity would be positively related to children's emotion regulation skills. More specifically, it was hypothesized that maternal sensitivity would be negatively related to children's distress during a frustration task. The results indicated that, contrary to our hypothesis, maternal sensitivity was not related to average frustration intensity. Our findings are not entirely consistent with past research. One explanation, as discussed above, is that our measure of maternal

sensitivity was limited. A second explanation for this discrepancy between the literature and our results is that our measure of emotion regulation was also limited when compared to other measures of emotion regulation used in past literature. The measure used by the present study to assess emotion regulation consisted of a short, 3 minute laboratory task that was designed to elicit frustration in the child. Other studies have used multiple tasks to elicit frustration and have combined children's data across tasks, potentially creating a more reliable measure (e.g. Calkins & Johnson, 1998).

In addition, most of the studies linking maternal behavior to children's emotion regulation have not found direct associations between maternal behavior and children's frustration distress (e.g., Calkins & Johnson, 1998; Calkins et al., 1998). Although, associations between maternal behavior and children's regulatory strategies have been obtained (Calkins & Johnson, 1998; Calkins et al., 1998; Smith et al., 2006). The fact that the current study did not have measures of children's regulatory behaviors may be one reason that our findings differ from the results of past research. These multiple measures of different self-regulatory behaviors, seen through different tasks, give a more accurate picture of emotion regulation than a single behavior examined during a single task.

We also hypothesized that maternal sensitivity would be negatively related to children's externalizing behavior problems. The results indicated that maternal sensitivity was not related to externalizing problems in children. In past studies, more sensitive parenting has been correlated with fewer externalizing behavior problems. In our sample, no such relation was found. This may be due in part to the limited measure of parenting as discussed above. Another factor that may be relevant is that very few children in our sample showed high levels of externalizing behaviors, restricting the range of this variable and potentially limiting the ability to obtain significant associations with maternal sensitivity.

Relations between maternal personality and children's emotion regulation and externalizing behavior problems. The third hypothesis of this study was partially supported. With respect to maternal personality and children's emotion regulation, the only finding was that maternal conscientiousness was negatively correlated with children's average frustration intensity. However, there were associations between maternal personality and children's behavior problems. The results indicated that externalizing behavior problems were positively correlated with neuroticism and agreeableness, and negatively correlated with conscientiousness. Compared to past research linking personality and parenting, as well as parenting and children's outcomes, our findings were generally in the expected direction. In past research, neuroticism has been associated with less sensitive and more negative, controlling parenting and lower quality parenting has been associated with externalizing behavior problems. Research has also shown that conscientiousness is related to more responsive

parenting. The one exception to this pattern was the positive correlation between agreeableness and externalizing problems. However, as discussed below, the relationship between maternal agreeableness and child externalizing problems was moderated by maternal sensitivity. Thus, the main effect of maternal agreeableness on externalizing problems was qualified by a significant interaction. Given that mothers completed the measure of personality as well as the measure of children's externalizing behavior problems, shared method variance may have inflated the associations between these variables.

Although maternal personality was related to children's behavior problems, we could not test whether maternal sensitivity mediated these associations because maternal sensitivity was not related to either maternal personality or children's externalizing behavior problems. As noted above, the lack of associations may be due to our measure of sensitivity. However, it should be noted that even though parenting behavior has been linked to both maternal personality and children's outcomes, it is still possible that parenting may not mediate associations between these variables. For example, shared genetic factors between mothers and children may partially account for relations between maternal personality and children's externalizing behavior, including their tendency to experience anger/frustration and their likelihood of displaying externalizing behavior problems.

Maternal sensitivity as a moderator of relations between maternal personality and children's outcomes. The final hypothesis of the present study was an exploratory hypothesis examining whether relations between maternal personality and children's outcomes might be moderated by levels of maternal sensitivity. The results indicated that higher maternal agreeableness was correlated with higher externalizing problems only when maternal sensitivity was low. When mothers were average or above average in sensitivity, there was no association between maternal agreeableness and children's externalizing problems. Even though maternal personality and parenting behavior tend to be correlated, this finding suggests that data on maternal personality may be of limited value in predicting children's outcomes in the absence of direct measures of maternal behavior. This finding highlights the importance of examining the "whole picture" before coming to a conclusion about the meaning of a correlation between two variables. In this case, it reveals the importance of parenting behavior in the form of maternal sensitivity, in understanding the relationship between maternal personality and externalizing behavior problems in children.

General Limitations

This study had a number of limitations. First, the sample was fairly homogeneous with respect to ethnicity and maternal education. A majority of the sample consisted of European-American, college-educated mothers, and most of

the children lived in two-parent households. The ability to generalize our findings is therefore limited.

There were also limitations that stemmed from data collection methods. The tasks were filmed through a one way mirror and the mothers were aware that they were being filmed, leading to possible participant reactivity. Because mothers knew that they were being watched and filmed, they may have been less likely to show negative behavior toward their children. A second limitation with regard to data collection is the uncontrolled variability in maternal behavior toward the child during the frustration task. While mothers were told to stay relatively uninvolved by pretending to read a magazine and not conversing much with the child, there was still variability in the extent to which mothers interacted with their children, and this variability was not accounted for in the current study. This variability may have influenced the children's behavior and accordingly their frustration data. Further, because the data were collected in a laboratory, the context is inherently more artificial than the child's natural environment. Accordingly, the children's behavior in this situation may have been unrepresentative of their typical behavior.

Significant Findings

Despite these limitations, this study contributes to the existing literature by revealing associations between maternal personality and children's externalizing behaviors. The results indicated that children's externalizing problems were positively correlated with maternal neuroticism and agreeableness and negatively correlated with maternal conscientiousness. This study also examined the possible role of maternal sensitivity as a mediator of these associations, and found no evidence for mediation. Finally, this study found that maternal sensitivity moderated the relationship between maternal agreeableness and child externalizing problems. The results indicated that higher maternal agreeableness was correlated with higher externalizing problems in children only when maternal sensitivity was low. This moderating relationship was found through an exploratory hypothesis and future research could benefit from further examining interactive models of maternal personality and maternal behavior in predicting children's outcomes.

Directions for Future Research

The findings of this study showed some inconsistencies with previous research. In order to attempt to reduce these inconsistencies, future studies should be conducted that improve upon the limitations seen in this study. Researchers should aim to have more diverse samples in terms of ethnicity, socioeconomic status, and education level. This research may also be more informative if the sample also possesses greater variability in maternal and child behavior. For example, if behavior problems are one of the factors being examined, it would be helpful to have children who are both low and high in externalizing behavior

problems. Additional control over maternal behavior during tasks examining emotion regulation is another aim that future research should try to achieve. The final limitation that future research could seek to prevent is the bias that comes from maternal report. By aiming to use questionnaires filled out by other parties such as childcare providers, as well as other data collection methods for the variables under examination, the researchers will get more accurate results.

Appendix A

Coding Manual for Maternal Sensitivity/Responsiveness

Sensitivity/Responsiveness:

The sensitive mother demonstrates the ability to adapt his/her behavior to the child's mood and level of development. The mother neither over- nor underestimates the child's capacities. The mother knows when it is time to increase or reduce the amount of stimulation the child is experiencing. For example, the mother discontinues an activity that is beyond the child's capacity for response or introduces a new activity when the child appears bored. Markers of sensitivity include (a) acknowledging the child's affect; (b) mother conversation that is responsive to the content of the child's talk and or activity; (c) facilitating, but not over controlling the child's play with objects or his/her motor activity; (d) evidence of good timing paced to the child's interest, activities, and arousal level; (e) changing the pace when the child appears under stimulated, overexcited, or tired; (f) picking up on the child's interest in toys or games; (g) shared positive affect; (h) encouragement and praise of the child's efforts; (i) providing an appropriate level of stimulation and appropriate range and variety of activities; (j) timely discipline that matches the nature of the violation under consideration and the child's ability to understand and benefit from whatever reprimand is offered (nail-biting and telling the child not to put the toys in his/her mouth were considered appropriate discipline); and (k) general flexibility in handling compliance and autonomy issues, including not reacting to noncompliance and supporting autonomy while permitting dependence. If the mother picks up the child to move him/her so that they are facing the one-way mirror, this should not count against sensitivity since the experimenter instructed her to do so; the only exceptions are if the mother repeatedly moves the child or does so in a harsh manner. The manner in which the mother negotiates the transitions from one box to another (particularly how she responds to the child's cues with respect to cleaning up and moving on) should be taken into account in coding sensitivity. Generally, the most sensitive way of negotiating the transition is if the mother brings down the next box or starts to clean up toys the child is not playing with without saying anything. If the mother suggests or tells the child it's time to move on or clean up, the child's focus of attention should be considered.

If the mom corrects the child for mislabeling a toy or object, and does so positively, her sensitivity measure should not change. If the mother picks up the child to move him/her so that they are facing the one-way mirror, this should not count against them since the experimenter instructed her to do so; the only exceptions are if the mother repeatedly moves the child or does so in a harsh manner.

Rating System:

1. Not at all characteristic: There are no signs of mother sensitivity. The mother may be either predominantly intrusive or detached. The mother rarely responds appropriately to the child's cues, and does not manifest an awareness of the child's needs. Interactions, if they occur at all, are characteristically ill timed or inappropriate.
2. Minimally characteristic: This should be given to mothers who display infrequent or weak sensitivity/responsiveness. While the mother is sometimes sensitive, the balance is clearly in the direction of insensitivity.
3. Moderately characteristic: This rating should be given to mothers who are predominately sensitive/responsive. The mother demonstrates sensitivity in many interactions but not in others, or may show some insensitivity while being predominantly sensitive (e.g., available and responsive to child's needs but some responses are more adult-driven than child-driven).
4. Highly characteristic: This rating should be given to mothers who are exceptionally sensitive and responsive. Instances of insensitivity are rare and never striking. Interactions are characteristically well timed and appropriate.

Appendix B

Coding Manual for Negative Affect (Frustration Distress)

Goldfish Task:

Start time is once the sound of the door closing can be heard from the research assistant leaving the observation room until there is a knock on the one-way mirror for the mother to interact with the child again. Each intensity rating will be coded in 5 second intervals and lasting for approximately 3 minutes. If the mother opens the snack container for the child then the experiment will end promptly.

Distress is coded based on the child's vocalizations, but if facial expressions help to clarify an ambiguous vocalization they may also be used.

Note:

- If child says "no", this should *not* automatically count as negative affect unless the child's tone reflects negative affect (e.g., whining)
- Sounds that reflect effort or are ambiguous should not be counted as negative affect
- Within each interval please note the highest level of distress shown, no matter how long it lasts within any given interval
- For levels of distress that last longer than one interval, please continue to indicate their ratings in each of the proceeding intervals.

Peak Intensity Ratings:

0. **Neutral or Positive-** The child exhibits no vocal indicators of distress (If child shows any negative affect then it cannot be 0)
1. **Mild Distress-** The child makes some vocalizations indicating distress, but they are low-level (i.e., sound like a whine, moan, grunt of anger)
2. **Moderate Distress-** Soft crying
3. **Extreme Distress-** Hard crying or screaming

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