

THE INFLUENCE OF PARENT MENTAL
HEALTH ON PARENTING AND CHILD
EMOTION REGULATION

by

Abigail Mather

Submitted in partial fulfillment of the
requirements for Departmental Honors in
the Department of Psychology
Texas Christian University
Fort Worth, Texas

December 10, 2018

THE INFLUENCE OF PARENT MENTAL
HEALTH ON PARENTING AND CHILD
EMOTION REGULATION

Project Approved:

Supervising Professor: Naomi Ekas, Ph.D.

Department of Psychology

Anna Petursdottir, Ph.D.

Department of Psychology

ABSTRACT

This study examined 56 families with preschool aged children. Mothers and fathers completed self-reports of depression, anxiety, and parenting behaviors (CES-D, STAI, and CCNES). The children completed the Lock Box task and their behavior and physiological data were collected and coded to evaluate their emotion regulation ability. The data collected from parent reports and child Lock Box task were analyzed and it was found that father anxiety is associated with more minimization of children's expressions of negative emotions. Mothers' mental health had no significant relationship with parenting behaviors and child emotion regulation. Mothers were found to encourage expression of negative emotion more than fathers. Fathers' minimization of negative emotions had a significant relationship with poor child emotion regulation.

What is Emotion Regulation?

The ability to effectively regulate emotions is critical during the preschool years. Calkins and Hill (2007) define emotion regulation as the ability to use strategies and control behavior, whether conscious or not, with varying amounts of effort to process and express emotions. Emotion regulation consists of biological and behavioral processes that work together to create varying abilities to regulate emotions and are responsible for the individual differences in emotion regulation (Perry, Calkins, Nelson, Leerkes, & Marcovitch, 2011). In addition to these two levels, there are thought to be environmental influences that can affect emotion regulation and lead to the development of other cognitive and emotional processes, which impact performance in academics, social competence, and overall behavioral problems (Blankson, O'Brien, Leerkes, Marcovitch, Calkins, & Weaver, 2012, Calkins & Dedmon, 2000, Perry et al., 2011). Children who have better emotion regulation are more likely to understand others' emotions and recognize their own emotions (Blankson, O'Brien, Leerkes, Marcovitch, & Calkins, 2011). Given the importance of emotion regulation, it is critical to examine the factors that influence the development of the biological and behavioral levels.

Since emotion regulation has both biological and behavioral levels, there are many ways that it can be influenced. Perry et al. (2011) proposes that both intrinsic and extrinsic factors influence the two levels of emotion regulation independently. Intrinsic factors can include physiological regulation and other biological influences, such as genetics and a child's disposition to emotion regulation. Intrinsic factors can influence both the behavioral and biological levels of emotion regulation. Conversely, parenting and other environmental factors and life events (*e.g.*, divorce, moving, home environment) are classified as extrinsic factors and

are predictive of the behavioral level of emotion regulation. These extrinsic factors are easier to observe and are commonly measured with parent reports.

Parenting and Emotion Regulation

Parenting is one extrinsic factor that can impact a child's ability to regulate his or her emotions. Parents' emotion socialization and the ways that they teach their children to understand emotions are factors that may impact the development of children's emotion regulation (Dunbar, Leerkes, Coard, Supple, & Calkins, 2016). When parents give encouragement to express emotions and discuss emotions with the child, the child will have a better understanding of emotions in general (Eisenberg, Cumberland, & Spinrad, 1998). Additionally, demonstrations of comfort and sensitivity to the child's emotions by parents predicts the child's emotion regulation and social functioning (Eisenberg et al., 1998). The parents' response to children's behaviors and negative emotions is critical, since negative emotions require a response that often entails more effort and, therefore, more regulation. Parents who respond harshly to children's negative emotions may be associated with the child expressing emotions fewer times, but on the occasion that the child does, the expression is more intense (Fabes, Leonard, Kupanoff, & Martin, 2001). Parents who punish their children for expressing negative emotions are associated with their children being avoidant instead of using coping strategies when dealing with difficult emotions (Eisenberg, Fabes, Carlo, Troyer, Speer, Karbon, & Switzer, 1992). Comforting a child who is experiencing negative emotions has been associated with the child's increased ability to use constructive reactions and coping mechanisms for anger and other emotions in the future (*e.g.*, self-soothing behaviors and constructive verbalization of emotions; Eisenberg, Fabes, Guthrie, & Reiser, 1994). The ways in which parents regulate their own emotions and respond to their children's emotions are associated with their child's ability to

regulate his or her own emotions. Since interactions between parents and their children play such a vital role in many developmental processes, it is important to understand the multiple styles of parent-child relationships and what is directly impacted by these relationships.

Parenting styles and the way parents interact with their children help the children develop coping strategies and skills to handle difficult emotions and situations (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Characteristics of parents, such as their own emotion regulation, mental health, and family history affect their ability to parent and the types of interactions they have with their children (Morris et al., 2007). The various parenting styles shape the environment and emotional climate of the home and therefore impact the development of the children who are exposed to it, both positively and negatively. Negative parenting, such as hostility and controlling behaviors, results in poor emotion regulation in children, both physiologically and behaviorally (Morris et al., 2007). Maternal responsiveness and interaction with the child has been associated with better self-regulatory skills (Morris et al., 2007). Parenting styles play a critical role in early development and can dictate a child's ability to regulate emotions in a healthy way. Positive and responsive parenting styles and other influencing factors create a family environment that allows for healthy emotional expression and support through difficult situations (Dunbar et al., 2016).

Parent Mental Health

Since parenting is an important determinant of children's emotion regulation abilities, it is important to understand the factors that influence parenting. Mental health problems have increased in prevalence and have become a focus of self-care. Mental health can impact many aspects of daily life and may affect a parent's ability to engage in positive parenting behaviors

(Mayberry, Horowitz, & Declercq, 2007). Specifically, anxiety and depression have been associated with new mothers and mothers of young children, who are more likely to experience depression than mothers over the age of 25 (Mayberry et al., 2007). Research shows that depressive symptoms in mothers are associated with lower maternal self-efficacy and lower involvement and interaction with their children (Norcross, Leerkes, & Zhou, 2017).

Mothers with mental health problems are likely to have other aspects of their lives impacted by their depression or anxiety. Parenting seems to be impacted greatly by mental health, as mothers with mental health problems are less likely to be warm and loving toward their children. Mothers who have depressive symptoms typically interact with their children in one of two ways: (1) intrusive and controlling, or (2) withdrawn and passive (Field, 2010). Maladaptive parenting associated with depressive symptoms can also predict less overall interaction with children due to lower maternal self-efficacy (Leerkes & Crockenberg, 2002). Lower involvement and interaction is observed when children demonstrate not only negative emotions and behaviors, but also positive behaviors. These decreased interactions may continue even after the mother no longer exhibits depressive symptoms (Lovejoy, Graczyk, Ohare, & Neuman, 2000). In addition to less interaction with their children, mothers who suffer from mental health issues have been associated with expressing hostility towards their children (McCabe, 2014). Children of parents who suffer from mental health issues tend to have difficulty regulating their own emotions because their mothers do not always demonstrate effective coping strategies (McCullough & Schaffer, 2013). Coping strategies are not demonstrated to children when there is a general decrease in interaction with the children. This lower level of interaction may be associated with mental health because the mothers are focusing on their own emotional needs instead of their children's (Dix, Moed, & Anderson, 2014). Parental mental health

problems may be associated with children having a decreased ability to regulate their emotions, since they are not exposed to effective coping strategies (Mantymaa, Puura, Kuoma, Latva, Salmelin, & Tamminen, 2011).

Maternal mental health may be associated with parenting styles. Depressive symptoms in mothers can predict maladaptive behaviors that affect their interactions with their children. Less warmth is a common characteristic of withdrawn parenting seen in depressed mothers. Additionally, researchers observe overstimulation and intrusive parenting in mothers with depressive symptoms (Field, 2010). Intrusive parenting can limit a child's play and exploration, ultimately resulting in poor academic performance (Hart, Jones, Field, & Lundy, 1999). Maternal mental health has also been associated with less sensitive behaviors toward children and preferred low-effort responses that do not require a large display of emotion (Dix et al., 2014). Behaviors occurring due to depressive symptoms are associated with maladaptive parenting that can impact children's development during the mother's depression and even after her symptoms are gone (Lovejoy et al., 2000, McCabe, 2014).

Fathers and Children's Emotion Regulation

Most research on emotion regulation and the factors that may influence its development is limited to maternal influences on infants. Gender roles have become less distinct, and there is less of a solely maternal role in the development of children. Fathers are increasingly active in parenting and even becoming the main parental influence (Cannon, Schoppe-Sullivan, Mangelsdorf, Brown, & Sokolowski, 2008). Although the research conducted by Braungart-Rieker, Garwood, Powers, and Wang (2001) did not show an association between father-child relationships at four-months and twelve-months, this relationship could be more influential on

development during the preschool years. Studies have shown that family environment and dynamics have been associated with child emotion regulation (Brown, Mangelsdorf, Neff, Schoppe-Sullivan, & Frosch, 2009). The father-child relationship has been associated with the later agreeableness of the child, and thus the child's ability to regulate his or her behavior and emotions (Brown et al., 2009). Additionally, paternal parenting behaviors may influence maternal behavior, which has been shown to have a direct effect on child regulation (Cannon et al., 2008). Paternal behaviors and the ways the father regulates his emotions may be predictive of the way the child learns to cope and regulate his or her own emotions (Cumberland-Li, Eisenberg, Champions, Gershoff, & Fabes, 2003). The current study is the first to examine the impact of fathers on emotion regulation during the preschool years.

Not only do mothers and fathers independently influence their child's development, the ways in which they work together to parent may also be important. Exposing a child to positive emotion regulation can increase their own ability to regulate their emotions, since they will be able to see effective coping strategies (Eisenberg et al., 1994). Co-parenting, or the ways in which both mother and father work together to parent and interact with their child, may influence the child's ability to regulate emotions. Maternal emotion regulation also allows mothers to cope with their child's difficult behaviors and expressions of negative emotion and could predict their ability to interact with their spouse or partner (Barrett & Fleming, 2010). Additionally, parents who are not good regulators of their own emotions may find co-parenting more difficult. Parents serve as external regulators of the child's emotions while they continue to develop their own emotion regulation (Bernier, Carlson, Dechenes, & Matte-Gagne, 2011). Parents who respond harshly to their child's negative emotions are essentially teaching their children to not respond when they experience that emotion. In the short term, the child may have fewer outbursts, but his

or her few emotional expressions may be much higher in intensity (Fabes et al., 2001). The ways in which parents interact with each other also may be predictive of how the child learns to regulate his or her emotions. When the child is not exposed to good emotion regulation and responses, there is an association with poor child regulation, as opposed to positive parental responses (Zeytinoglu, Calkins, Swingler, & Leerkes, 2016). Children who are exposed to a substantial amount of conflict between parents in their home environments may have a more difficult time regulating emotions (Dunbar et al., 2016). Parenting and co-parenting behaviors and parent's responses to children are associated with the development of emotion regulation in children.

Measuring Emotion Regulation

The two levels of emotion regulation are measured in different ways; biological components, influenced solely by intrinsic factors, are measured physiologically, while the behavioral level is measured through self-report and observation. The parasympathetic nervous system helps with regulation of emotions and coping ability (Calkins, Graziano, & Keane, 2008). Environmental challenges demand increased internal processing, by way of the vagus nerve, to control arousal and create coping strategies (Porges, 2007). For this system, researchers have studied the role of the vagus nerve and its control over heart rate. Porges (1995) introduced this as the polyvagal theory. Additionally, changes in heart rate affects the respiratory sinus arrhythmia (RSA), or breathing rate. The ability to control the RSA is associated with the mobilization and inhibition of the vagus nerve through the parasympathetic nervous system (Perry et al., 2011). By measuring the vagus nerve, researchers can observe the inhibition or activation of the vagal tone and predict the individual's reaction. This "vagal brake" in which the vagus nerve is mobilized, causes heart rate to decrease. Suppression of the vagus nerve causes

increased heart rate (Porges, 1995). Research shows that increased heart rate allows the individual to engage in coping strategies to deal with challenging situations. Therefore, less vagal suppression (which causes decreased heart rate) can be an indicator of poor emotion regulation (Calkins & Keane, 2004). According to Calkins and Dedmon (2000), children that are at risk for problem behaviors and poor emotion regulation show lower levels of vagal suppression. Optimal emotion regulation typically is evidenced by high levels of vagal suppression and increased heart rate which, in turn, is linked to positive coping abilities.

The behavioral level of emotion regulation can be measured through parent reports and observation. Parent reports of child emotion regulation allow researchers to measure how children react daily to negative emotions and frustrating situations. Parental reports can be used in conjunction with observable behaviors in a laboratory setting to measure a child's emotion regulation. In addition, behavioral measures of emotion regulation observe the relationship between both behavioral and physiological levels emotion regulation. Physiological measures can help predict the child's ability to regulate behavior and, conversely, behaviors to predict their physiological regulation of emotion. By looking at both, researchers can achieve a more thorough measure of emotion regulation, since biological and environmental factors contribute to one's ability to regulate emotions.

The Current Study

Research surrounding both mothers' and fathers' impacts on child development in the preschool years is limited. The purpose of the current study was to fill this gap by examining how parenting (maternal and paternal) impacts emotion regulation in 3-year-olds. The following research questions were examined:

1. Are positive and negative parenting behaviors associated with behavioral and physiological indices of emotion regulation? Based on previous research (Eisenberg et al., 1998), I predicted that positive parenting behaviors would be associated with better emotion regulation skills. Negative parenting behaviors were expected to be associated with worse emotion regulation skills. The direction of effects was hypothesized to be similar for mothers and fathers; however, we explored the extent to which the strength of the effect was similar between parents.
2. Does parent mental health (anxiety and depressive symptoms) predict positive and negative parenting behaviors? I expected that increased levels of anxiety and depressive symptoms would be associated with poorer parenting behaviors. This effect was expected to be similar for mothers and fathers.
3. Does the quality of the coparenting relationship impact preschooler's emotion regulation skills? Bases on previous research (Zhou, Cao, & Leerkes, 2017), it was hypothesized that when parents reported greater alliance in their coparenting, their children would engage in more effective emotion regulation.

Methods

Participants

Sixty-three families with three-year-old children agreed to participate in the study with sixty-two father-child dyads and sixty-eight mother-child dyads. One participant received a diagnosis of Autism Spectrum Disorder resulting in removal from the primary study sample. An additional participant did not speak English as their primary language and had trouble understanding directions for visit and therefore was removed from the study. There were five participants that did not complete the visit and their data was removed from the study. Thus,

fifty-six families were considered the primary study sample. The primary study sample consisted of fifty-four father-child dyads and fifty-six mother-child dyads.

Demographic data were collected through parent report prior to the visit. Mothers were 34.63 years old ($SD = 4.17$), on average, while fathers were 36.04 years of age ($SD = 4.26$), on average. The children in this study were, on average, 3.21 years of age ($SD = 0.25$). In the study, 62.5% of the children were female ($n = 35$) and 37.5% were male ($n = 21$). Other demographic data, such as household income and education level were collected. Over half of the families reported earning over \$100,000 annually and considered themselves in the middle class or higher. The majority of parents completed at least a Bachelor's degree with 38.46% having completed a graduate degree (e.g., M.D., J.D., Ph.D.). Of the participants and their families, 87.5% were Caucasian ($n=49$).

Procedure

Participants in this study were part of a larger longitudinal study in which parents visited the research lab when their child was 6-, 12-, and 13-months of age. Recruitment for the larger study was conducted through the use of flyers throughout the community, publication in the university newsletter, and at a local fair for expecting parents. Interested families were screened to ensure that the parents were cohabiting. Adoptive parents were allowed to participate as long as they had adopted the child within the first few weeks after birth. Participants were then contacted shortly before their child's third birthday to participate in this portion of the study.

Both parents were asked to fill out several surveys online including demographic information, parent depressive and anxiety symptoms, parenting involvement, and coparenting. The lab visit occurred with the mother, father, and child present. Each parent signed an informed consent as well as permission for their child to participate. Once this was completed, the child

had physiological sensors attached to their chest, back, and hands. The physiological sensors were connected to lead wires connecting to a portable electronic device (PDA). The PDA connected wirelessly to the computer software which collected the physiological data from the child. The sensors were applied with at least one parent in the room. Cameras in the room recorded the child's behavior.

The child was shown a short video of nature, for about 2 minutes, to measure a sitting baseline for physiological measures. The child then completed game-like tasks that were intended to invoke the child's emotion regulation. At the end of the visit, the child could choose a toy for their participation in the study and the parents were compensated for their time with a gift certificate to a local retailer and provided with a video recording of their child's visit.

Measures

Parental mental health. Parent mental health, specifically anxiety and depression, were measured using self-report questionnaires. These reports included the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) and the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). The CES-D asked the parents to recall how often they felt or acted in a certain way over the past week (e.g., *I did not feel like eating, my appetite was poor, and, I felt that everything I did was an effort.*) To assess depressive behaviors and feelings, the parents answered 20 questions with a Likert-scale of zero to three (0-rarely to 3-most of the time). The STAI consists of 20 questions that measured the anxiety levels of each parent at the current moment. Parents rated how they felt on a four point Likert-scale (1 to 4; 1 being not at all, 4 being very much so) in response to questions of how they felt right then (e.g., *I feel calm, and, I am presently worrying over possible misfortunes.*)

Parenting. Parenting behaviors were measured through the Coping with Children's Negative Emotions Scale (CCNES; Fabes, Poulin, Eisenberg, & Madden-Derdich, 2002). The CCNES uses a seven point Likert-scale in which the parent responds to statements indicating how they would react to specific situations (1-very unlikely to 7-very likely). Twelve scenarios listed six different responses and the parent circled one through seven to designate how likely they would be to respond in that way. Scenarios included, "*If my child becomes angry because he/she is sick or hurt and can't go to his/her friend's birthday party, I would:*" Responses to each item included statements such as, *send my child to his/her room to cool off* and *tell my child not to make a big deal out of missing the party*. The parent scored each response according to the likelihood of that reaction occurring.

Coparenting. The Parenting Alliance Inventory (PAI; Abidin & Brunner, 1995) quantified parents' relationship with each other and their ability to co-parent their child. It assesses the parent's thoughts about how well their relationship with the other parent is (e.g., *My child's other parent enjoys being alone with our child* and *My child's other parent and I are a good team*). It asks parents to answer twenty questions on a five point Likert-scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Emotion regulation. Emotion regulation of the children in the study was measured with the Behavior Assessment System for Children-Externalization (BASC; Reynolds, Kamohaus, & Vannest, 2011) and observation of the child while they completed the Lock Box Task. The BASC was completed by the parents according to how often certain behaviors occur. The scale had four options (*N- never, S-sometimes, O-often, and A-almost always*). The statement covered a variety of behaviors and scenarios that associate with children externalizing emotions (e.g., *offers help to other children* and *gets very upset when things are lost*).

The lock box task was used to observe children's ability to regulate difficult emotions. This task was created to induce anger and frustration for the child. This is a commonly used task for preschool age children to assess emotion regulation and was taken, along with a behavioral coding system, from the Preschool version of the Laboratory Temperament Assessment Battery (Lab-TAB; Goldsmith, Reilly, Lemery, Longley, & Prescott, 1999). In this task, the child was given an option of two toys to play with. The chosen toy was then placed in a transparent box after then child was allowed to play with the toy briefly. Once in the box, the experimenter demonstrated that the lock that was placed on the box could be opened using a key. The experimenter then handed the child a set of keys and instructed them to try to get the box unlocked so they could play with the toy. They then left the child participant alone in the room for four minutes while the child attempted to open the box with keys that did not fit the lock.

The child's behavior during the lock box task was coded manually while the video footage from the study was reviewed. The children were coded separately on intensity of anger facial expressions and intensity of sadness facial expressions. The facial expressions were coded for using the scale of 0 (no facial expression expressing anger or sadness) to 3 (an impression of strong anger or sadness due to facial region change). Frustration intensity during the lock box task was coded of a scale of zero to three (0-no detectable frustration to 3-intense or extreme frustration). Demonstrations of bodily anger, sadness, and protest vocalizations were each coded as a dichotomous variable, either present (1) or absent (0). A minimum of 20% of the lock box task videos were coded for interrater reliability. Each child's composite emotion regulation variable value was computed by summing the Z-scores of each child's mean facial anger intensity, mean facial sadness intensity, mean frustration level, and the proportion of time during which the child made protest vocalizations during the task. A higher score indicated poorer

emotion regulation ability and lower scores indicated a child with higher regulatory skills. Due to the non-normality, the emotion regulation variable was transformed by adding a constant to eliminate negative and zero scores, then the log 10 function was used to take the log of each score.

Physiological activity. During the lock box task the child's physiological responses were measured. Seven electrodes were placed on each child's torso, neck, and back. MindWare mobile impedance cardiographs were used to monitor physiology and the MindWare Biolab software was used to collect the data from the electrodes. The data collected included electrocardiogram (ECG), skin conductance (or electrodermal activity (EDA)), and respiration signals. A primary coder examined each file for errors that were detected by the MindWare software. The bandwidths were set at 0.003 to 0.040 Hz for the VLF, 0.040 to 0.240 Hz for the LF band, and 0.240 to 1.040 Hz for the HF/RSA band. From these measures, the MindWare Heart Rate Variability (HRV) software (MindWare Technologies, 2018), HRV Analysis version 3.1.3 was used to determine values for raw heart rate, respiratory sinus arrhythmia (RSA) for each period of 60 seconds, and the length of time between heart beats (inter-beat interval (IBI)). Primary and secondary coders overlapped for reliability for a minimum of 20% of the physiological data. The coded data was considered reliable if the coders were no more than 0.1 away from each other (Scrimgeour, Davis, & Buss, 2016).

Results

A one-way between subject analysis of variance (ANOVA) examined the effects of parent gender (mothers vs. fathers) on depressive symptoms, state anxiety, coping with children's negative emotions scale (CCNES) expressive encouragement, CCNES minimization reactions, and parental alliance. There was not a significant effect of parent gender on parent

mental health, specifically depressive symptoms, $p = .70$, with mothers and fathers having equivalent symptoms. Similarly, there was not an effect of gender on state anxiety, $p = .65$. There was an effect of gender on the CCNES expressive encouragement, $F(1, 125) = 15.86, p = .00, \eta^2_p = .10$. Fathers expressed less encouragement ($M = 4.20, SD = 1.87$) than mothers ($M = 5.02, SD = 1.00$). On the CCNES minimization of reactions subscale, there was also an effect of parent gender, $F(1, 125) = 13.28, p = .00, \eta^2_p = .09$. Fathers scored higher ($M = 2.52, SD = .98$) than mothers ($M = 1.99, SD = .59$) for minimization of reactions. There was not a significant effect of parent gender on parenting alliance, with fathers and mothers performing equally, $p = .31$.

A multiple mediation using Preacher and Hayes' PROCESS Macro (2013) with 5,000 bootstrap samples was performed to examine the relationship between fathers' anxiety and child facial anger during the Lock Box task mediated by father's CCNES encouraging and CCNES minimization reactions. A significant positive relationship was found between father anxiety and CCNES minimization reactions, $b = .04 (SE = .02), t = 2.47, p = .02$. However, a significant negative relationship was found between father anxiety and CCNES encouraging reactions, $b = -.05 (SE = .02), t = -2.48, p = .02$. There was no significant relationship between CCNES encouraging reactions and child facial anger, $b = -.02 (SE = .04), t = -.58, p = .57$. However, there was a significant positive relationship between CCNES minimization reactions and child facial anger, $b = .12 (SE = .05), t = 2.70, p = .01$. There was not a significant relationship between father anxiety and facial anger with both mediators in the model, $b = .00 (SE = .00), t = .84, p = .40$. The 95% confidence interval obtained for the indirect effect of CCNES minimization reactions on father anxiety and child facial anger were statistically significant (.00 to .01). CCNES encouraging was not a significant mediator for the relationship between father

anxiety and child facial anger (-.00 to .01). Overall, father anxiety increases CCNES minimization reactions, which in turn increased child facial anger.

The same analysis was run for the relationship between mothers' anxiety and child facial anger mediated by CCNES encouraging and CCNES minimization reactions. There were no significant relationships found, ($ps \geq .05$).

A second multiple mediation using Preacher and Hayes' PROCESS Macro (2013) with 5,000 bootstrap samples was performed to examine the relationship between fathers' anxiety and child heart rate reactivity during the same Lock Box task, mediated by CCNES encouraging and CCNES minimization reactions. No relationship was found between father anxiety and CCNES encouraging reactions, $b = -.04$ ($SE = .02$), $t = -1.73$, $p = .09$. A significant positive relationship was found between father anxiety and CCNES minimization reactions, $b = .04$ ($SE = .02$), $t = 2.27$, $p = .03$. There was no significant relationship between CCNES encouraging reactions and child heart rate reactivity, $b = -.38$ ($SE = .89$), $t = -.438$, $p = .67$. However, there was a significant positive relationship between CCNES minimization reactions and child heart rate reactivity, $b = 2.42$ ($SE = 1.08$), $t = 2.24$, $p = .03$. With both mediators in the model, there was not a significant relationship between father anxiety and heart rate reactivity, $b = -.25$ ($SE = .13$), $t = -1.90$, $p = .06$. The indirect effect with CCNES minimization reactions was not statistically significant (95% CI: -.00 to .28). However, the model containing both mediators was statistically significant (95% CI: .01 to .28). Overall, father anxiety increases CCNES minimization reactions, which in turn, with CCNES encouraging, increase child heart rate reactivity. Independently, these mediators are not significant, but when both CCNES minimization reactions and CCNES encouraging are in the model, they have a significant relationship mediating the relationship between father anxiety and child heart rate reactivity.

The same analysis was run on the relationship between mothers' anxiety and child heart rate reactivity mediated by CCNES encouraging and CCNES minimization reactions. There were no significant relationships found ($ps \geq .05$).

Discussion

Prior to this study, it was hypothesized that mothers would have a more positive impact on their children's ability to regulate emotions. Although this was not supported, as mothers' responses had no relationship with regulatory ability, they were seen to encourage their children more when they expressed negative emotions. Additional hypotheses about the relationship of mental health on parenting were not fully supported. It was hypothesized that depression would have more of an effect on parenting responses than anxiety. This study showed that depression had no significant relationship directly with child emotion regulation nor when mediated by CCNES encouraging and minimization reactions. The hypothesis that mental health would be negatively associated with a child's emotion regulation was supported in terms of father anxiety and child heart rate reactivity and facial anger.

The aim of this study was to discover the relationship between parents' mental health and their child's ability to regulate their emotions. The relationships that were found were mediated by parenting behaviors such as encouraging and minimization of the child's emotions. For these parenting behaviors, mothers were found to offer more encouragement than fathers when their child expressed emotions. Additionally, fathers minimized their child's negative emotional behaviors significantly more than mothers did. This finding was consistent with that of Cassano, Perry-Parrish, and Zeman (2007) who found that fathers reported more minimization of expressions of sadness than mothers. Ultimately, it appears that mothers and fathers approach

parenting differently when it comes to their children's emotional regulation. These differences were associated with the mental health of the parents, specifically anxiety.

Fathers' anxiety has a positive relationship with minimizing children's negative emotions. The same relationship was not found with mothers' anxiety. There was no significant relationship found between mothers' mental health and responses to their child's negative emotions. This relationship was specific to father anxiety and CCNES minimization reactions. It has been found that fathers are worse at compartmentalizing than mothers when it comes to marital conflict (Mastrotheodoros, Graaff, Dekovic, Meeus, & Branje, 2018). Their findings suggest that the father-child relationship was more impacted by interparental conflict than the mother-child relationship due to this difference in the parents' ability to compartmentalize different aspects of their lives. This difference in compartmentalization could be an explanation for the difference seen between mothers' and fathers' minimization and encouraging of children's negative emotion expressions. There was no relationship found between mothers' mental health and their responses to their child's negative emotions. Mothers may be better equipped to compartmentalize their symptoms of anxiety than fathers and respond more positively.

Fathers' responses to their child's negative emotions were correlated with increased facial anger of the child as well as increased heart rate reactivity. This negative, minimization response to emotional expressions decreases the ability of the child to regulate their emotions since an increase in facial anger and heart reactivity were seen and are indicators of emotion regulation. The child's emotion regulation was not just related to the presence of minimization by the father, but also the lack of encouragement. As seen through the analysis of the mediation model for father anxiety and child heart rate reactivity, there is only a significant relationship

with this combination of increased minimization and decreased encouragement. The lack of an encouraging response from fathers seems to play a critical role when looking at the relationship between father anxiety and child emotion regulation.

The difference in the way that mothers and fathers respond to their child's negative emotions may be influenced by the amount of interactions and emotional displays that children have with each parent. According to Cassano et al. (2007), mothers reported using more positive responses to sadness, such as encouragement. This positive response could cause children to be more likely to express negative emotions with their mothers. Therefore, mothers would be more likely to have interacted with their children more when they display negative emotions. In this study, it was found that mothers' minimization and encouragement did not have any relationship with child emotion regulation. This could be due to the child's relationship with their mothers. The child is not effected by their mother's response because they know that they will receive encouragement more than minimization. Fathers' responses to their child's negative emotions seem to be more influential on their child's ability to regulate emotions than that of mothers'.

There were no significant relationships found between maternal mental health and child emotion regulation when analyzed independently nor when mediated by CCNES encouraging and minimization reactions. This finding not only suggests that fathers' mental health influences their parenting behaviors, but also that fathers' responses to child emotions are more influential than mothers'. More research needs to be done in this area to fully understand why fathers have a more salient influence on child emotion regulation than mothers do.

There are several limitations to note in this study. The sample size for this study was small, as some families dropped out or were not included in the study sample. It is difficult to

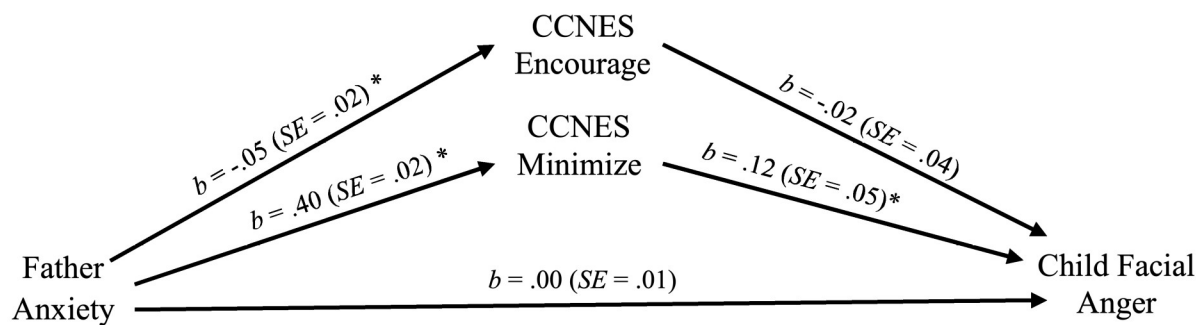
obtain participants and conduct a study that includes the mother, father, and child. The age of the children posed challenging to this study. Some preschoolers refused to participate or interfered with the collection of physiological data. Additionally, the Lock Box task did not elicit much frustration in some of the preschoolers. Future research might need to use a more frustrating task to elicit more of an emotional response. There was also a lack of diversity within the study. Many of the participants came from the same city and were of similar wealth status.

Future research should look at the effect of additional mental health disorders, such as obsessive compulsive disorder, on parenting responses to negative emotions and child emotion regulation. This would allow for a better understanding of what types of mental health influence parent responses. Additionally, it would be beneficial to look at other child emotions in addition to frustration. Researching how children regulate sadness, jealousy, shame, and guilt would be beneficial in creating a more complete understanding of the effects of parent responses on more types of negative emotions. Other tasks could also be used to elicit more intense emotions.

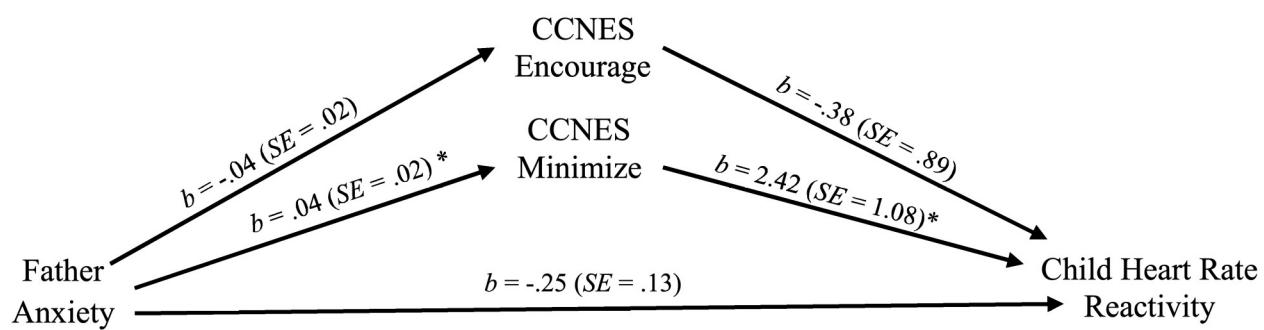
To improve fathers' responses to children's negative emotions, it may be beneficial for them to learn how to compartmentalize other aspects of their lives more effectively. Fathers may be able to parent more effectively if they seek treatment for their anxiety and other mental health disorders. Since mothers are better at compartmentalizing, researchers could examine how they do this effectively and teach fathers similar strategies. Additionally, children could be taught strategies to cope with negative emotions and improve their ability to regulate emotions.

Table 1
Descriptive statistics

Variable	Range	Mean (SD)
Father Depressive Symptoms	.00-34.00	7.88 (7.14)
Father Anxiety	20.00-53.00	29.43 (8.00)
Father Minimization Reactions	1.33-5.33	2.52 (.98)
Father Encouragement	1.33-6.42	4.19 (1.19)
Father Parental Alliance	72.00-100.00	90.15 (8.21)
Paternal Report of Maternal Gate Closing Behaviors	1.00-4.56	2.53 (.97)
Mother Depressive Symptoms	.00-54.00	9.26 (9.48)
Mother State Trait Anxiety	20.00-69.00	31.10 (10.29)
Mother Minimization Reactions	1.00-3.33	1.99 (.59)
Mother Encouragement	2.67-6.75	5.01 (1.00)
Maternal Self-Report Gate Closing Behaviors	1.00-4.44	2.44 (.82)
Lock Box Heart Rate Average	87.07-139.70	111.21 (9.02)
Lock Box RSA Average	3.29-8.01	5.81 (1.07)
Face Anger Average	.00-1.07	.34 (.30)



* $p \leq .05$



* $p \leq .05$

References

- Abidin, R. R., & Brunner, J. F. (1995). Parenting Alliance Inventory. *PsycTESTS Dataset*.
doi:10.1037/t02441-000
- Barrett, J., & Fleming, A. S. (2010). Annual Research Review: All mothers are not created equal: Neural and psychobiological perspectives on mothering and the importance of individual differences. *Journal of Child Psychology and Psychiatry*, 52(4), 368-397. doi:10.1111/j.1469-7610.2010.02306.x
- Bernier, A., Carlson, S. M., Deschênes, M., & Matte-Gagné, C. (2011). Social factors in the development of early executive functioning: A closer look at the caregiving environment. *Developmental Science*, 15(1), 12-24. doi:10.1111/j.1467-7687.2011.01093.x
- Blankson, A. N., O'Brien, M., Leerkes, E. M., Marcovitch, S., & Calkins, S. D. (2011). Differentiating Processes of Control and Understanding in the Early Development of Emotion and Cognition. *Social Development*, 21(1), 1-20. doi:10.1111/j.1467-9507.2011.00593.x
- Blankson, A. N., O'Brien, M., Leerkes, E. M., Marcovitch, S., Calkins, S. D., & Weaver, J. M. (2012). Developmental Dynamics of Emotion and Cognition Processes in Preschoolers. *Child Development*, 84(1), 346-360. doi:10.1111/j.1467-8624.2012.01841.x
- Braungart-Rieker, J. M., Garwood, M. M., Powers, B. P., & Wang, X. (2001). Parental Sensitivity, Infant Affect, and Affect Regulation: Predictors of Later Attachment. *Child Development*, 72(1), 252-270. doi:10.1111/1467-8624.00277
- Brown, G. L., Mangelsdorf, S. C., Neff, C., Schoppe-Sullivan, S. J., & Frosch, C. A. (2009). Young Children's Self-Concepts: Associations with Child Temperament, Mothers' and Fathers' Parenting, and Triadic Family Interaction. *Merrill-Palmer Quarterly*, 55(2), 184-216.
doi:10.1353/mpq.0.0019

- Calkins, S. D., & Dedmon, S. A. (2000). Physiological and behavioral regulation in two-year-old children with aggressive/destructive behavior problems. *Journal of Abnormal Child Psychology*.
- Calkins, S. D., Graziano, P. A., Berdan, L. E., Keane, S. P., & Degnan, K. A. (2008). Predicting cardiac vagal regulation in early childhood from maternal-child relationship quality during toddlerhood. *Developmental Psychobiology*, *50*(8), 751-766. doi:10.1002/dev.20344
- Calkins, S., & Hill, A. (2007). Caregiver influences on emerging emotion regulation. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 229–248). New York, NY: Guilford.
- Calkins, S. D., & Keane, S. P. (2004). Cardiac vagal regulation across the preschool period: Stability, continuity, and implications for childhood adjustment. *Developmental Psychobiology*, *45*, 101–112.
- Cannon, E. A., Schoppe-Sullivan, S. J., Mangelsdorf, S. C., Brown, G. L., & Sokolowski, M. S. (2008). Parent Characteristics as Antecedents of Maternal Gatekeeping and Fathering Behavior. *Family Process*, *47*(4), 501-519. doi:10.1111/j.1545-5300.2008.00268.x
- Cassano, M., Perry-Parrish, C., & Zeman, J. (2007). Influence of Gender on Parental Socialization of Children's Sadness Regulation. *Social Development*, *16*(2), 210-231. doi:10.1111/j.1467-9507.2007.00381.x
- Cumberland-Li, A., Eisenberg, N., Champion, C., Gershoff, E., & Fabes, R. A. (2003). The relation of parental emotionality and related dispositional traits to parental expression of emotion and children's social functioning. *Motivation and Emotion*, *27*, 27–56. <http://dx.doi.org/10.1023/A:1023674308969>

- Dix, T., Moed, A., & Anderson, E. R. (2014). Mothers' Depressive Symptoms Predict Both Increased and Reduced Negative Reactivity. *Psychological Science*, *25*(7), 1353-1361. doi:10.1177/0956797614531025
- Dunbar, A. S., Leerkes, E. M., Coard, S. I., Supple, A. J., & Calkins, S. (2016). An Integrative Conceptual Model of Parental Racial/Ethnic and Emotion Socialization and Links to Childrens Social-Emotional Development Among African American Families. *Child Development Perspectives*, *11*(1), 16-22. doi:10.1111/cdep.12218
- Eisenberg, N., Fabes, R. A., Carlo, G., Troyer, D., Speer, A. L., Karbon, M., & Switzer, G. (1992). The Relations of Maternal Practices and Characteristics to Childrens Vicarious Emotional Responsiveness. *Child Development*, *63*(3), 583. doi:10.2307/1131348
- Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (1994). The role of emotionality and regulation in children's social competence and adjustment. *Paths to Successful Development*, *46*-70. doi:10.1017/cbo9780511489761.003
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry*, *9*, 241-273.
- Fabes, R. A., Leonard, S. A., Kupanoff, K., & Martin, C. L. (2001). Parental Coping with Childrens Negative Emotions: Relations with Childrens Emotional and Social Responding. *Child Development*, *72*(3), 907-920. doi:10.1111/1467-8624.00323
- Fabes, R. A., Poulin, R. E., Eisenberg, N., & Madden-Derdich, D. A. (2002). The coping with children's negative emotions scale (CCNES): Psychometric properties and relations with children's emotional competence. *Marriage & Family Review*, *34*(3/4), 285-310.
- Field, T. (2010). Postpartum depression effects on early interactions, parenting, and safety practices: A review. *Infant Behavior and Development*, *33*(1), 1-6. doi:10.1016/j.infbeh.2009.10.005

- Goldsmith, H. H., & Reilly, G. (1993). *Laboratory assessment of temperament*. Madison, WI: University of Wisconsin-Madison.
- Goldsmith, H. H., Reilly, J., Lemery, K. S., Longley, S., Prescott, A., (1999). *Laboratory temperament assessment battery, preschool version technical manual*. Madison, WI: University of Wisconsin-Madison.
- Hart, S., Jones, N. A., Field, T., & Lundy, B. (1999). One-year-old infants of intrusive and withdrawn depressed mothers. *Child Psychiatry and Human Development*, 30, 111–123.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: The Guildford Press.
- Leerkes, E. M., & Crockenberg, S. C. (2002). The Development of Maternal Self-Efficacy and Its Impact on Maternal Behavior. *Infancy*, 3(2), 227-247. doi:10.1207/s15327078in0302_7
- Lovejoy, M., Graczyk, P. A., Ohare, E., & Neuman, G. (2000). Maternal depression and parenting behavior. *Clinical Psychology Review*, 20(5), 561-592. doi:10.1016/s0272-7358(98)00100-7
- Mastrotheodoros, S., Graaff, J. V., Deković, M., Meeus, W. H., & Branje, S. J. (2018). Interparental Conflict Management Strategies and Parent-Adolescent Relationships: Disentangling Between-Person From Within-Person Effects Across Adolescence. *Journal of Marriage and Family*. doi:10.1111/jomf.12528
- Mayberry, L. J., Horowitz, J. A., & Declercq, E. (2007). Depression symptom prevalence and demographic risk factors among US Women during first 2 years postpartum. *Journal of Obstetric, Gynecologic, & Neonatal Nursing: Clinical Scholarship for the Care of Women, Childbearing Families, & Newborns*, 36, 542–549. <http://dx.doi.org/10.1111/j.1552-6909.2007.00191.x>.

- McCabe, J. E. (2014). Maternal personality and psychopathology as determinants of parenting behavior: A quantitative integration of two parenting literatures. *Psychological Bulletin*, *140*(3), 722-750. doi:10.1037/a0034835
- Mccullough, C., & Shaffer, A. (2013). Maternal Depressive Symptoms and Child Externalizing Problems: Moderating Effects of Emotionally Maltreating Parenting Behaviors. *Journal of Child and Family Studies*, *23*(2), 389-398. doi:10.1007/s10826-013-9804-4
- MindWare Technologies (2108). *MindWare Heart Rate Variability Analysis Application Manual*. Gahana, OH: MindWare Technologies.
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The Role of the Family Context in the Development of Emotion Regulation. *Social Development*, *16*(2), 361-388. doi:10.1111/j.1467-9507.2007.00389.x
- Mäntymaa, M., Puura, K., Luoma, I., Latva, R., Salmelin, R. K., & Tamminen, T. (2011). Predicting Internalizing and Externalizing Problems at Five Years by Child and Parental Factors in Infancy and Toddlerhood. *Child Psychiatry & Human Development*, *43*(2), 153-170. doi:10.1007/s10578-011-0255-0
- Norcross, P. L., Leerkes, E. M., & Zhou, N. (2017). Examining pathways linking maternal depressive symptoms in infancy to children's behavior problems: The role of maternal unresponsiveness and negative behaviors. *Infant Behavior and Development*, *49*, 238-247. doi:10.1016/j.infbeh.2017.09.009
- Perry, N. B., Calkins, S. D., Nelson, J. A., Leerkes, E. M., & Marcovitch, S. (2011). Mothers responses to childrens negative emotions and child emotion regulation: The moderating role of vagal suppression. *Developmental Psychobiology*, *56*(6), 1438-1438. doi:10.1002/dev.21120

- Porges, S. W. (2007). The polyvagal perspective. *Biological Psychology*, *74*(2), 116-143.
doi:10.1016/j.biopsycho.2006.06.009
- Porges, S. W. (1995). Orienting in a defensive world: Mammalian modifications of our evolutionary heritage. A Polyvagal Theory. *Psychophysiology*, *32*(4), 301-318. doi:10.1111/j.1469-8986.1995.tb01213.x
- Radloff, L. (1977). The CES-D scale a self-report depression scale for research in the general population. *Applied Psychological Measurement*, *1*(3), 385-401. doi: 10.1177/014662167700100306
- Reynolds, C. R., Kamphaus, R. W., & Vannest, K. J. (2011). Behavior Assessment System for Children (BASC). *Encyclopedia of Clinical Neuropsychology*, 366-371. doi:10.1007/978-0-387-79948-3_1524
- Scrimgeour, M. B., Davis, E.L., & Buss, K.A. (2016). You get what you get and you don't throw a fit!: Emotion socialization and child physiology jointly predict early prosocial development. *Developmental Psychology*, *52*(1), 102-116. doi: 10.1037/dev0000071
- Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R. and Jacobs, G. A. 1983. Manual for the State-Trait Anxiety Inventory (Form Y), Palo Alto, CA: Consulting Psychologists Press.
- Zeytinoglu, S., Calkins, S. D., Swingler, M. M., & Leerkes, E. M. (2016). Pathways from maternal effortful control to child self-regulation: The role of maternal emotional support. *Journal of Family Psychology*, *31*(2), 170-180. doi:10.1037/fam0000271
- Zhou, N., Cao, H., & Leerkes, E. M. (2017). Interparental conflict and infants' behavior problems: The mediating role of maternal sensitivity. *Journal of Family Psychology*, *31*(4), 464-474.
doi:10.1037/fam0000288