

THE IMPACT OF ATTACHMENT, PARENTING ATTITUDES, AND
FAMILY HISTORY ON EMOTIONAL, BEHAVIORAL, AND
PHYSIOLOGICAL RESPONSES TO INFANT CRYING

by

Erin R. McKay

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Project Approved:

Supervising Professor: Naomi V. Ekas, Ph.D.

Department of Psychology

Ellen W. Broom, Ph.D.

Department of Psychology

Allison Owen, M.L.S., M.A.

Department of Mathematics

ABSTRACT

An important hallmark of the first year of life is the development of the parent-child attachment relationship (Ainsworth, 1967). As a result of this relationship, children develop working models that impact their representations of future relationships. Research suggests that securely attached caregivers respond consistently and sensitively to infant needs, which results in a secure attachment relationship (van IJzendoorn, 1995). When the attachment behavior system is activated, infants use crying as a means to gain proximity to their caregiver. This crying drives a change in emotion, which affects how caregivers respond to their infants (Leerkes, Parade & Gudmundson, 2011). The purpose of the current study was to examine the influence of attachment history, parenting history, and attitudes toward parenting on the emotional, behavioral, and physiological responses to infant cries in a sample of 120 emerging adults. To accomplish this, we asked participants to attempt to soothe a crying, simulated infant (Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013). The simulation lasted up to 20 minutes. Those with greater levels of attachment avoidance displayed greater caregiving behaviors, while those who displayed greater levels of attachment anxiety displayed fewer distraction behaviors. Furthermore, participants with a warm and accepting mother experienced less emotional reactivity. Finally, parenting attitudes significantly contributed to differences in all three categories of response. The simulated infant paradigm is clinically relevant and could be used to identify risky parents-to-be.

Keywords: infant crying, attachment, parenting, parenting attitudes, family history

The Impact of Attachment, Parenting Attitudes, and Family History on Emotional, Behavioral, and Physiological Responses to Infant Crying

An important hallmark of the first year of life is the development of the parent-child attachment relationship (Ainsworth, 1967). As a result of this relationship, children develop internal working models that impact their representations of future relationships. These working models are relatively stable across the lifespan (Bretherton & Munholland, 1999) and a parent's working model influences caregiving behaviors and the quality of the attachment relationship with their child (Sette, Coppola, & Cassibba, 2015). For example, research suggests that securely attached caregivers respond consistently and sensitively to infant needs, which results in a secure attachment relationship (van IJzendoorn, 1995). However, there may be other factors beyond a parent's attachment style that contribute to how and why caregivers respond including parenting attitudes and family history. In the current study, we examined how attachment style, parenting attitudes, and family history impact caregiving behaviors in emerging adulthood. We utilized a novel paradigm, a simulated crying infant doll, to examine behavioral and physiological (heart rate and skin conductance) responses.

Attachment

Within the first 12 months of life, infants develop a specific attachment relationship with a primary caregiver (Ainsworth, 1967), which can be defined as a strong emotional bond with a caregiver who provides comfort during times of stress (Bowlby, 1969). Following Bowlby's development of attachment theory, Mary Ainsworth developed the Strange Situation in order to measure the parent-child attachment relationship. The purpose of the task is to activate the infant's exploratory system and then the complimentary attachment system (Ainsworth, Blehar, Waters, & Wall, 1978). When the exploratory system is triggered, the infant is in proximity of

the secure base (e.g., caregiver) and can thus explore their surroundings since they feel secure. Conversely, if the infant's safety is intruded upon, the attachment system is activated while the exploratory system is deactivated. Therefore, the infant ceases exploration and instead seeks comfort from the attachment figure (Ainsworth, 1963). During the Strange Situation, the removal and reintroduction of the attachment figure elicits attachment behaviors, including proximity seeking, contact maintenance, resistance, and avoidance, in the infant. It is through these behaviors that the parent-child attachment relationship can be classified into one of four categories: secure, anxious-avoidant, anxious-ambivalent, and disorganized (Ainsworth et al., 1978).

Extensive research has shown that infants classified as secure seek and maintain proximity to their primary caregiver and desire close contact during the reunion (Waters, Wippman, & Sroufe, 1979; Ainsworth et al., 1978). Furthermore, the caregiver is able to quickly soothe the infant when the attachment system is activated, which allows for a quick transition back to the exploratory system (Ainsworth et al., 1978). It is important to note that the majority of infants (62%) in the United States of America are securely attached (van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). The remaining categories are considered insecure. Anxious-avoidant infants, which consist of 15% of the population (van IJzendoorn et al., 1999), typically show no visible distress during separation (Ainsworth et al., 1978); however, it has been found that their internal stress signals are elevated, including heart rate (Sroufe & waters, 1977) and cortisol levels (Spangler & Grossmann, 1993). During reunion, avoidant infants often ignore the caregiver. In summary, anxious-avoidant infants can be characterized as showing little to no emotional connection with the caregiver and also no distress. Next, anxious-ambivalent infants, also referred to as resistant, show great amounts of visible distress during

separation and seek proximity during reunion. However, after seeking proximity, the infant pushes the caregiver away and appears angry (Ainsworth et al., 1978). Anxious-ambivalent infants are the least frequently occurring attachment style, with only 9% of all infants (van IJzendoorn et al., 1999). The final observed category is disorganized. While the three previous categories are considered adaptive strategies for coping with stress, a disorganized attachment style is characterized by the lack of a strategy. These infants frequently show signs of fear along with high avoidance and resistance. A common quality is the presence of perplexing behavior such as rocking or head banging (Main & Solomon, 1990). Fifteen percent of infants are disorganized in their attachment (van IJzendoorn et al., 1999).

While classification is dependent on behavior displayed by the infant, the development of attachment is directly influenced by interactions with the caregiver. According to Ainsworth et al. (1978), caregivers of secure infants are more affectionate during contact. Furthermore, they respond consistently and sensitively. In other words, when the infant expresses a need, the caregiver responds relatively quickly and follows the cues of the baby (Bigelow et al., 2010). These infants have determined that their needs will be met in times of distress and feel comfortable seeking the caregiver's assistance in regulating that distress. In contrast, anxious-avoidant infants are often responded to in a rejecting manner. These parents appear to be emotionally unavailable and initiate little physical contact (Cassidy, 2008). Infants of this attachment style have learned to show little stress, knowing that the caregiver is more likely to interact during times of calm. Caregivers of ambivalent infants, on the other hand, combine warm and rejecting responses. Sometimes they respond warmly; other times, they do not, leaving the child to guess which version of the parent they will encounter (Cassidy, 2008). Research suggests that these infants seek proximity to the caregiver to express their anger, which

explains their inconsistent proximity seeking behavior (Main & Solomon, 1990). Finally, disorganized infants encounter neglectful, abusive or mentally ill caregivers (Lyons-Ruth & Jacobvitz, 2008; Thompson, 2008). Their typical caregiving behavior is frightening to the infant (Main & Solomon, 1990). Together, these studies suggest that the quality of caregiving behaviors is a reliable predictor of infant attachment classifications.

The pattern of attachment established during infancy often persists into adulthood. Securely attached children frequently become secure, or autonomous adults, and experience more fulfilling and consistent relationships with others throughout life and are at a decreased risk for mental illness (Feeney, 1999; Thompson, 1999). In essence, security provides children an advantage in many developmental aspects. However, avoidance during infancy translates to dismissing attachment in adulthood, characterized by a lack of emotional connection with others (Bartholomew, 1990; Hesse, 1999). Preoccupied adults – previously resistant infants – experience unstable relationships and emotions (Feeney, 1999). Finally, disorganized infants tend to transition into fearful adults (Hesse, 1999). These individuals fear and withdraw from close relationships with others (Main & Solomon, 1990).

As stated previously, attachment is transmitted through generations; children maintain the attachment style of their caregivers at a 69-75% rate (Sette et al., 2015). When giving care to an infant, the adult relies on the internal working model that was established during infancy and throughout development. Therefore, caregivers use the same set of skills to respond to a child as were provided to them as infants. The importance of the transmission of attachment is twofold. First, by identifying adult attachment, risky parenting can be addressed before an attachment is formed with an infant. Second, 25-31% of individuals do not follow the pattern, which we seek to account for by examining other potential influences on caregiving.

Infant Crying

There is a growing body of research examining how responses to infant crying differ as a function of an individual's attachment style. As previously discussed, infant crying is a behavior that is part of the attachment system (Bowlby, 1973) and sends a signal of need to the caregiver (Ainsworth, 1978). Indeed, due to limited locomotion during the first months of life, crying is one of the only behaviors that infants can use to gain proximity to their caregiver. How the caregiver responds to this behavior plays a critical role in the development of infant attachment.

When a caregiver hears their infant cry, it evokes two types of responses: physiological and behavioral. A physiological response is a physical and often chemical reaction produced unconsciously by the body. At the sound of a cry, both parents and childless adults experience an increase in heart rate, skin conductance, and blood pressure (Parsons, Young, Parsons, Stein, & Kringelbach, 2012). In fact, these heightened responses were observed even when participants listened to audio recordings of unfamiliar infants. It is believed that experiencing this physiological change drives the caregiver to take action in an effort to stop the crying. Furthermore, multiple exposures to crying increases sensitization in the parent resulting in a greater stress reaction (Out, Pieper, Bakermans-Kranenburg & van IJzendoorn, 2010). That is, caregivers will not become accustomed to crying; instead, they will attempt to comfort the crying infant. Another aspect that motivates parents to tend to distressed infants is emotional responses. One study found that infant crying evokes negative emotions in parents, such as sadness, irritability, and hostility (Leerkes, Parade & Gudmundson, 2011). Contrary to what one might expect, negative emotions initiate appropriate caregiving (Chang & Thompson, 2011). One explanation for this phenomenon could be that calming the child decreases the negative emotions, which in turn alleviates stress signals within the caregiver, such as heart rate and skin

conductance. The combination of physiological and emotional responses to crying promotes an innate desire for caregivers to soothe the infant. However, these increases in physiological responses and negative emotions are only acceptable in low levels. Hyper-reactions, like extreme anger or anxiety due to crying, are associated with insecure attachment representations between the infant and its caregiver (Leerkes, Parade & Gudmundson, 2011). Also, the level in which the caregiver experiences and chooses to respond to these stimuli differs greatly between individuals. These individual differences are central to explaining responses to infant crying.

While no research has documented the impact adult attachment representations have on the physiologic response to infant crying, the existing research on physiological responses of parents lead us to believe it is an important construct to examine. For example, recent research has determined that insecure adults experience greater physiological responses to relational conflict (an external stressor) compared to secure adults (e.g., Roisman, 2007). Specifically, elevated skin conductance responses are correlated with deactivating strategies such as avoiding the stressor, or in this study the crying infant. Comparatively high heart rates were seen to parallel hyperactive responses (Roisman, 2007). However, secure adults were shown to react more positively to negative attachment-related stressors, such as crying (Dias, Soares, Klein, Cunha & Roisman, 2011). In an additional study, insecurely attached parents were not able to regulate emotional and behavioral responses to infant crying as well as secure parents (Schoenmaker et al., 2014). Collectively, these studies suggest that physiological responses to infant crying could be influenced by attachment.

Family History

In addition to examining the role of attachment history in response to infant crying, there are other closely related constructs, which may impact responses, including child-rearing history of the participant. Child rearing history refers to the way in which an individual's parents interacted with her/him. The importance of this construct is that adults often parent the way in which they were parented. For example, mothers who had a positive upbringing, with respect to interactions with parents, respond more sensitively and warmly to their children (Hammond, Landry, Swank, & Smith, 2000). Conversely, mothers growing up with parents with poor responsiveness had worse developmental outcomes and in turn exhibited less positive parenting behaviors as adults. Another study found that mothers experiencing mild anxiety and loneliness struggled to respond sensitively to their children's needs (Assel et al., 2002). Furthermore, they showed little attention in the interests of their children. Assel et al. (2002) also found that children whose mothers placed greater amounts of restrictions on them acted out more, which stressed the importance of explaining restrictions to children. Because the majority of mothers model their parenting on the way in which they were treated as a child, it is important to identify risk factors and develop successful interventions, or the cycle of unresponsive parenting will continue.

Parenting Attitudes and Beliefs

Attitudes and beliefs towards parenting influence behaviors towards children (Leerkes, Parade, & Burney, 2010). Although the two are not always aligned, parental ideas about how to respond to infant crying and physical discipline significantly impact child development. For example, research suggests that parents who hold infant-oriented views on infant crying are more likely to respond responsively and in a timely manner (Zeifman, 2003), which is related to secure attachment. The second common attitude towards crying is that it is used to manipulate parents

instead of communication, referred to as parent-oriented views (Leerkes et al., 2010). Furthermore, infant-oriented parents are more likely to give reasoning to decisions and support their child, and the opposite is true for parent-oriented parenting (Hastings & Grusec, 1998). Research has also found that beliefs towards crying determine how long parents wait to respond to crying. Adults with negative views towards crying wait significantly longer than those who view crying as communication of a need (Zeifman, 2003). Moreover, the physiological reactions of parents differ depending on their perception of their child. Frodi, Bridges, and Shonk (1989) determined that perceiving your infant as difficult resulted in a greater heart rate and skin conductance responses. This same group of parents seemed to hold more punitive child-rearing attitudes. Those with rigid parenting attitudes, view their children as difficult, have a negative understanding of crying, and experience a greater increase in physiological responses to crying. Finally, parental reflective functioning was evaluated in regards to responses to an inconsolable simulated baby (Rutherford, Goldberg, Luyten, Bridgett, & Mayes, 2013). The research found that those who were able to take interest in the infant's mental state provided high quality care and experienced a less pronounced physiological response, suggesting that identifying the infant's objective for crying allows the mother to better regulate herself. It is clear that the ways in which parents perceive their infant and develop attitudes towards crying influence their responses. We predict that participants with harsh attitudes towards infant crying will respond more negatively to the crying infant and have a greater physiological response. Because the participant has no preconceived notions of the infant, perception of the infant is controlled.

Current Study

Currently 60% of children are securely attached (Ainsworth, 1985), which, as discussed before, has lasting positive effects. This study sought to examine the effect of attachment history

on the emotional, behavioral, and physiological responses to infant crying. We hypothesized that all participants will have a negative reaction to the experience, but those with high levels of attachment anxiety or attachment avoidance would exhibit more extreme emotional responses as well as poorer caregiving skills (behavioral response). The secondary goal of this study was to determine the effects of family history, and parenting attitudes on participants' responses to infant crying. We predicted that those growing up with highly supportive parents would exhibit emotion regulation and higher quality interactions with the infant. Because of the lack of research, we are particularly interested in studying emerging, childless adults. Including this population could inform potential interventions to screen for risky parenting. Furthermore, including emerging adults would give clues to whether physiological and behavioral responses are merely engrained into the human psyche or if they develop with the presence of a bond between caregiver and child.

METHODS

Participants

Study participants consisted of 120 childless female, first-year college students. The participants were primarily Caucasian (79.8%); 7.6% identified as African American, 7.6% as Hispanic or Latino, 2.5% Asian, and 2.5% other. Eight tenths of a percent reported a parental income of \$20,000 per year or less, .8% between \$20,001 and \$30,000 per year, 1.7% between \$30,001 and \$40,000 per year, .8% between \$40,001 and \$50,000 per year, 1.7% between \$50,001 and \$60,000 per year, 1.7% between \$60,001 and \$80,000 per year, 7.5% between \$80,001 and \$100,000 per year, 18.3% between \$100,001 and \$150,000 per year, 50% over \$150,000 per year, and 16.7% did not know.

Procedure

The sample was recruited using the Department of Psychology's subject pool. After completing a pre-screen, participants meeting the prerequisites of year in school (first year), sex (female), and motherhood status (no children) were selected. In order to obtain variability in attachment history, we used student scores on the Experiences in Close Relationships-Revised (ECR-R; Fraley, Waller, & Brennan, 2000) to select an equal distribution of students scoring high on the anxious subscale, high on the avoidance subscale, and scoring low on both the anxious and avoidance subscales. These participants were then invited to complete a series of questionnaires online via Qualtrics. Upon completion, participants were then invited to the research lab to perform a caregiving task individually in a controlled laboratory setting. Participants were compensated through course credit.

Prior to the caregiving task, the participant rated her emotions on a 7-point Likert scale. Then, the experimenter connected the participant to electrodes to collect heart rate and skin conductance data. Next, baseline data was collected. For this portion of the task, the participant was instructed to stand for 60 seconds, sit still for 600 seconds, and walk around the room for 300 seconds. The experimenter then introduced the simulated infant to the participant. The gender of the infant was randomly assigned before the task. The participant was told that the infant would respond to facial expressions, voice quality, touching, and general handling. The experimenter further explained that the infant will cry in order to express a need and that the participant will need to try different techniques to soothe the infant. The experimenter briefly demonstrates how to successfully soothe the infant. The experimenter then instructed the participant to do the same upon hearing the infant cry. However, unbeknown to the participant, the simulated infant was reprogrammed to be inconsolable. The participant was given access to

all objects in the room that might assist in caring for the infant including a chair, changing table, extra diaper, blanket, bottle, book, two rattles, and high chair. The experimenter instructed the participant to knock on the door in the room if they wanted to end the task. The experimenter left the room and the infant began crying immediately after. The task lasted for a maximum of 1200 seconds or until the participant terminated the task. After completing the task, the participant rated her emotions using the same measure as the pre-task assessment of emotion. Finally, the participant was thoroughly debriefed that the infant was inconsolable and that her inability to console the infant was not reflective of her caregiving skills.

Measures

Emotions. Participants assessed their emotions before and after the task using the How Are You Feeling? questionnaire. Specifically, the questionnaire prompted participants to rate their current levels of happiness, anger, fear, sadness, and anxiety on a 7-point Likert scale (1 = *not at all*; 7 = *a whole lot*).

Attachment. Participants completed the 36-item Experiences in Close Relationships – Revised (ECR-R), which is a valid and reliable measure of the attachment related anxiety and avoidance (Fraley et al., 2000). Each item was rated on a 7-point Likert scale (1 = *disagree strongly*; 7 = *agree strongly*) resulting in two subscales, attachment related anxiety and avoidance. The avoidant subscale was reported as the mean of 18 items, for example, “I tell my partner just about everything.” The anxious subscale was also reported as the mean of 18 items, for example, “I worry a lot about my relationships.” Higher scores reflect high levels of avoidance and anxiousness. Collectively, 14 items were reverse coded (anxiety $\alpha = .91$, avoidant $\alpha = .94$).

Parenting History. Participants completed the 13-item Risky Families Questionnaire (RFQ), a valid and reliable measure that assesses the riskiness of the participants' upbringing (Taylor, Lerner, Sage, Lehman, & Seeman, 2004). Each item was rated on a 5-point Likert scale (1 = *not at all*; 5 = *very often*). Three items were reverse coded, and the scores were summed. Higher scores reflect growing up in risky families. An example item asked, "How often would you say you were neglected while you were growing up, that is, left on your own to fend for yourself?" The internal consistency for the sample was .81.

Participants completed the 37-item Security in the Interparental Subsystem (SIS), which validly and reliably assesses the level of emotional security felt by the participants during childhood (Davies, Forman, Rasi, & Stevens, 2002). Each item was rated on a 4-point Likert scale (1 = *not at all true of me*; 4 = *very true of me*). The SIS contains subscales including emotional reactivity ($\alpha = .80$), behavioral dysregulation ($\alpha = -.14$), avoidance ($\alpha = .82$), involvement ($\alpha = .74$), constructive family representations ($\alpha = .92$), destructive family representations ($\alpha = .88$), and conflict spillover representations ($\alpha = .65$). All subscales are summed for analysis where higher scores correspond with higher levels of the attribute.

Participants completed the 24-item Child's Report of Parental Behavior Inventory (CRPBI; Schaefer, 1965) warmth and acceptance subscale, which validly and reliably determines the degree to which each parent of the participants accepted and interacted warmly with the participant as a child. Each item was rated as *very true* (1), *somewhat true*, or *not true at all* (3) with respect to how well the participant's mother and father separately met the criteria. For example, the inventory asked participants to rate how true the following statement is, "My father almost always speaks to me with a warm and friendly voice." No items were reverse coded, and

the questionnaire was summed for analysis ($\alpha_{\text{father}} = .97$, $\alpha_{\text{mother}} = .96$). High scores reflected high levels of warmth and acceptance.

Participants completed the valid and reliable, Coping with Children's Negative Emotions Scale (CCNES), a 54-item scale (Fabes, Eisenberg, & Bernzweig, 1990). Each item was rated on a 7-point Likert scale (1 = *very unlikely*; 7 = *very likely*) to describe the behaviors of each participant's mother and father independently. For example, the questionnaire asked participants to rate the degree to which the following statement applies, "My mother makes me feel better after I talk over my worries." The same statements were asked about the relationship with the father. Two items were reverse coded. Mean scores were calculated for analysis of eight subscales including distressed reactions ($\alpha_{\text{father}} = .82$, $\alpha_{\text{mother}} = .73$), expressive encouragement ($\alpha_{\text{father}} = .94$, $\alpha_{\text{mother}} = .90$), problem-focused reactions ($\alpha_{\text{father}} = .90$, $\alpha_{\text{mother}} = .88$), punitive reactions ($\alpha_{\text{father}} = .84$, $\alpha_{\text{mother}} = .67$), emotion-focused reactions ($\alpha_{\text{father}} = .91$, $\alpha_{\text{mother}} = .89$), minimization reactions ($\alpha_{\text{father}} = .81$, $\alpha_{\text{mother}} = .68$), supportive ($\alpha_{\text{father}} = .96$, $\alpha_{\text{mother}} = .95$), and non supportive ($\alpha_{\text{father}} = .92$, $\alpha_{\text{mother}} = .83$). Higher scores reflect greater alignment with the subscale.

Participants completed the valid and well-established, 36-item Family Environment Scale – Child (FES-C; Moos, 1994). Each item was rated as true or false (*true* = 1, *false* = 0). For example, the questionnaire asked participants to rate whether the statement is true or false, "Family members really help and support one another." Eleven items were reverse coded, and sum scores were calculated for analysis. The scale was broken down into three subscales with a fourth overall score, including cohesion ($\alpha = -.04$), expressivity ($\alpha = .172$), conflict ($\alpha = -.13$), and the family relationship overall score (cohesion + expressive – conflict). High scores reflect high cohesion, expressivity, or conflict.

Parenting Attitudes. Participants completed the 22-item Infant Crying Questionnaire (ICQ; Haltigan et al., 2012). The ICQ is a valid and reliable measure that determines one's attitudes towards infant crying. Each item was rated on a 5-point Likert scale (1 = *never*; 7 = *always*) with one item being reverse coded. For example, one item stated, "When my baby cries, I will want to make my baby feel secure/cared for." The questionnaire results in two main subscales and an additional five within the two. The infant-oriented subscale ($\alpha = .83$) includes two subscales including attachment ($\alpha = .84$) and crying as communication ($\alpha = .69$). The parent-oriented subscale ($\alpha = .82$) includes three subscales including spoiling ($\alpha = .79$), minimization ($\alpha = .73$), and directive control ($\alpha = .78$). Mean scores were calculated for analysis, and high scores revealed higher infant-oriented and parent-oriented attributes towards crying.

Participants completed the 25-item Intensive Parenting Attitudes Questionnaire (IPAQ), which is a valid and well-established measure that evaluates the participants' opinions on which parent is more essential, the mother or father; the importance of intellectual stimulation; the extent to which the child should be a parent's priority; the level of fulfillment children bring to parents; and the degree to which parenting is challenging (Liss, Schiffrin, Mackintosh, Miles-McLean, & Erchull, 2013). Each item was rated on a 6-point Likert scale (1 = *strongly disagree*; 7 = *strongly agree*). For example, the questionnaire asked participants to rate the degree to which they agree with the statement, "Both fathers and mothers are equally able to care for children." Three items were reverse coded. Mean scores were calculated for analysis. The questionnaire resulted in five subscales, including essentialism ($\alpha = .83$), stimulation ($\alpha = .42$), child-centered ($\alpha = .73$), fulfillment ($\alpha = .61$), and challenging ($\alpha = .52$). High scores suggest high alignment with the subscale.

Participants completed the valid and reliable Parenting Questionnaire (PQ; Budd et al., 2012), a 63-item questionnaire that assesses what participants believe to be acceptable parenting techniques. Each item was rated on a 5-point Likert scale (1 = *I don't know*; 2 = *unacceptable*; 7 = *acceptable*); 'I don't know' items were excluded. For example, the questionnaire asked participants to rate the degree to which they find the scenario acceptable, "A 5-year-old boy is overweight compared to his siblings. His parents call him 'the little fat one'." The questionnaire results in three subscales including critical feedback ($\alpha = .91$), supportive feedback ($\alpha = .94$), and physical discipline ($\alpha = .88$). Mean scores were calculated for the analysis of each subscale, and high scores reflect high critical feedback, supportive feedback, and physical punishment.

Task Duration. During the caregiving task, the total amount of time that participants remained in the room with the inconsolable baby was measured in seconds. The maximum duration possible was 1200 seconds.

Skin Conductance. Using MindWare electrodermal activity (EDA) technologies, skin conductance measures were collected from each participant. Skin conductance level (SCL) was recorded for each participant during the four tasks, including standing, sitting, walking, and the behavioral task using a constant voltage method of .05V. These practices are in line with the guidelines set by the Society for Psychophysiological Research (Boucsein et al., 2012). In order to calculate skin conductance response (SCR), the mean tonic SCL was calculated for each of the four tasks. Next, the difference was found between the mean tonic SCL of the behavioral task and the mean tonic SCL of each of the three baselines, walking, standing, and sitting. High scores represent a greater skin conductance response to the simulated infant task.

Caregiving Behaviors. Caregiving behaviors were coded offline by two individuals who were trained independently. Over the course of training they established inter-rater reliability

(Kappa > .80). The coding scheme aimed to assess the length of time the participants spent meeting the physical needs of the infant (e.g., feeding the infant) rather than providing comfort or play. Coders indicated and timed each caregiving event using Noldus Observer. The caregiving behaviors included feeding (K = .981), changing the diaper and clothing (K = .97), swaddling with a blanket (K = 1.00), non care (K = 1.00), and other care (K = 1.00), which was a combination of the listed behaviors. The frequency and duration of each behavior was calculated as well as the total duration and number of behaviors performed during the task.

Distracting Behaviors. Observations of participants' distracting behaviors while interacting with the crying doll were coded offline by two individuals who were trained independently. Over the course of training they established inter-rater reliability. The coding scheme aimed to assess the length of time the participants spent distracting the infant (e.g., shaking a rattle) rather than providing comfort or care. Using Noldus Observer, coders indicated and timed each distraction event. The distraction behaviors included using an auditory toy (K = .86), using a quiet toy (K = 1.00), showing the infant its face in the mirror (K = .96), reading a book (K = .99), non distraction (K = 1.00), and other distraction (K = .89), which was a combination of the listed behaviors. When no caregiving behaviors were observed, the *not distracting* code was chosen. The frequency and duration of each distracting behavior was calculated as well as the total duration and number of distracting behaviors performed during the task.

RESULTS

In an effort to control for covariates, analysis of variance (ANOVA) tests were conducted to determine if any demographic variables (e.g., family income, relationship status) were related to any outcome measure. It was found that ECR-R attachment-related anxiety significantly

differed by participant relationship status, $F(1,118) = 5.18, p < .05$, where those who were single had higher anxiety ($M = 3.23, SD = 1.04$) than those in a relationship ($M = 2.72, SD = 1.24$). Furthermore, ECR-R attachment-related avoidance significantly differed by participant relationship status, $F(1,118) = 27.47, p < .001$, where those who were single exhibited higher avoidance ($M = 3.76, SD = 1.30$) than those in a relationship ($M = 2.36, SD = 1.28$). All future analyses involving attachment-related anxiety or avoidance were controlled for relationship status.

Next, correlation analyses were used to determine the relationship between predictor variables (e.g., attachment-related anxiety and avoidance) and outcome variables (e.g., proportion of caregiving and distraction behaviors; see Table 1). First, attachment related measures were examined. It was found that ECR-R attachment-related anxiety was correlated with the proportion of time spent using distracting behaviors, $r = -.24, p < .01$. In regard to family history, lower levels of CRPBI warmth and acceptance was correlated with an increase in the change of anger between the beginning and end of the task, $r = -.20, p < .05$. Finally, parenting attitudes were analyzed. The attitude that raising a child is challenging (IPAQ challenging subscale) was negatively correlated with the proportion of time spent using distraction behaviors, $r = -.23, p < .05$, and positively correlated with a greater change in anger between the beginning and end of the task, $r = .26, p < .01$. A child-centered attitude towards child-rearing was associated with an increase in the proportion of time spent employing caregiving behaviors, $r = .28, p < .01$. There was a negative correlation between PQ critical feedback and skin conductance reactivity, $r = -.24, p < .05$, as well as a positive correlation between PQ supportive feedback and skin conductance reactivity, $r = .22, p < .05$. Correlations

between task variables and the remaining questionnaires were not significant and no further analyses were conducted with those variables.

The correlational analyses were followed by simple linear regressions. It was found that ECR-R attachment-related anxiety was negatively associated with the proportion of time spent employing distraction behaviors during the task, $b = -.02$, $SE = .01$, $p < .05$. ECR-R attachment-related avoidance was marginally associated with an increase in the proportion of time spent using caregiving behaviors during the task, $b = .03$, $SE = .02$, $p = .08$. Next, CRPBI maternal warmth and acceptance was negatively associated with a change in anger, $b = -.02$, $SE = .01$, $p < .05$. Higher levels of IPAQ stimulation was associated with greater anger reactivity, $b = .45$, $SE = .14$, $p < .01$, while higher levels of IPAQ challenging was associated with a decreased proportion of time spent employing distracting behaviors, $b = -.04$, $SE = .02$, $p < .01$. Increased scores on the IPAQ child-centered scale were positively associated with the proportion of time spent employing caregiving behaviors, $b = .08$, $SE = .02$, $p < .01$, as well as a decrease in the change in anger between the beginning and end of the task, $b = -.15$, $SE = .09$, $p = .08$. Finally, greater PQ critical feedback scores were related to a decrease in skin conductance reactivity, $b = -4.55$, $SE = 2.02$, $p < .05$, while PQ supportive feedback was related to an increase in skin conductance reactivity, $b = 5.28$, $SE = 2.50$, $p < .05$.

DISCUSSION

Decades of research have supported the contention that the quality of parent-child interactions has significant effects on the developmental path of a child, especially within the first 12 months of life (e.g., Bretherton & Munholland, 1999; Feeney, 1999; Thompson, 1999). However, no study has examined the individual characteristics (e.g., attachment, family history, and parenting attitudes) of emerging adults and how those differences interact with three specific

responses to infant crying (behavioral, physiological, and emotional) until now. Our study found that attachment, family history, and parenting attitudes are significantly associated with differing responses to infant crying. Although the current study was novel, our findings are also supported by previous research.

Consistent with our hypotheses, an individual's attachment-related avoidance and anxiety were associated with responses to infant cries. Specifically, highly avoidant individuals were more likely to perform caregiving behaviors, including feeding the infant doll, changing the simulated infant's diaper, and wrapping the infant doll in a blanket. Previous research states that avoidant parents have been found to care for their children in order to meet social obligations and, in turn, avoid emotional connection with the infant (Feeney & Collins, 2004). Caregiving behaviors merely meet physical needs, while distraction behaviors require more emotional investment. For example, playing with a rattle usually employs eye contact as well as expressive voice inflection and facial expressions. By focusing on caregiving behaviors, avoidant adults can emotionally detach yet still meet social obligations of caring for their child. In contrast, attachment-related anxiety was negatively associated with distraction behaviors. There was also a marginally significant, negative relationship between anxiety and caregiving behaviors. Together, these results support the previous research that anxious adults respond inconsistently to infant needs and more specifically, infant crying (van IJzendoorn, 1995). Unfortunately, there were no further findings associated with attachment representations when we expected to find significant differences between attachment and physiological responses. One explanation could be that the quality of our physiological data was poor. Due to extreme movement, 26 participants' data had to be removed from analyses. This may have impacted our ability to detect significant relationships.

We also examined whether the quality of parenting that the participants' received earlier in life would impact how they responded to infant crying. Previous studies have found that low levels of maternal warmth and acceptance are associated with greater levels of anger in children as young as seven months and throughout toddlerhood (Conway & McDonough, 2006). Our results suggest that this continues into adulthood, as we found that those who experienced less maternal warmth and sensitivity when they were younger also reported more anger reactivity after interacting with the inconsolable infant. One possible explanation is that displaying sensitivity, or being warm and accepting, models emotional regulation for young children. Lacking this skill could impair a child's opportunity to learn emotion regulation as well as their peers. Beyond maternal warmth and acceptance, there were no further findings related to family history. It is possible that the remaining measures assessing family history were unrelated due to the homogeneity of the sample. Therefore, we believe a more diverse sample may have resulted in more statistically significant findings.

Finally, the current study found that parenting attitudes were a robust predictor of emotional, behavioral, and physiological responses to infant crying. We found a link between possessing the attitude that parenting is challenging and an increase in anger during the task. However, this association was not present in our regression analyses. The direction of the relationship is unclear and future analyses are needed to determine if there is a mediating or moderating variable that accounts for the association. Additionally, there was a significant association between beliefs that parenting is challenging and using less distraction behaviors with the crying infant. It is possible that having the attitude that parenting is the most difficult task one could face results in a self-fulfilling prophecy. In other words, this group might believe that good parenting is unattainable; therefore, they do not invest in parenting. However, there

could be further explanations. A previous study suggests that strong beliefs that parenting is challenging is related to significant parent mental health issues, such as high stress and depression (Rizzo, Schiffrin, & Liss, 2012). Unfortunately, we did not examine the mental health status of participants in this study.

Next, we found that having the belief that children need extensive intellectual stimulation was associated with a greater change in anger across the task. It is possible that these participants believed that they were trying as hard as they could to intellectually stimulate the crying infant, but the infant never ceased crying. Therefore, their lack of success was incongruent with their attitudes, leading to more anger. Finally, we found that child-centered attitudes towards parenting were associated with both an increase in caregiving behaviors and a decrease in anger reactivity. The former finding was expected, as it is supported by previous research. Conversely, the latter finding was not expected. Those with child-centered attitudes believe that life with a child should revolve around that child. Typically, a child-centered parent is willing to make any sacrifice for their child (Rizzo et al., 2012). Therefore, it is not surprising that child-centered participants exhibited more caregiving behaviors in an effort to go above and beyond what is expected of parents. However, this type of sacrificial parenting is associated with lower levels of life satisfaction, greater occurrences of depression, and greater stress (Rizzo et al., 2012). With this in mind, we would expect to see greater changes in anger, but this was not the case. Perhaps this is due to the fact that the participants are not parents and do not exhibit this child-centered behavior on a daily basis. Consequently, they have not experienced the negative outcomes that co-occur with this parenting attitude over a long period of time, so, in turn, they do not experience the emotional reactivity that accompanies the negative effects of child-centered parenting attitudes.

We found that those who share the attitude that parents should be supportive of their children experienced a greater physiological response as a result of the task. However, those who share the attitude that critical feedback is acceptable experienced less physiological reactivity in response to the task. While these results may seem counter-intuitive, they align with previous research. As noted earlier, experiencing a physiological response to crying encourages adults to soothe the infant in an attempt to regulate the physiological discord within the adults (Parsons, Young, Parsons, Stein, & Kringelbach, 2012). Supportive parenting attitudes seem to be evident of concern for the child, which aligns with a greater physiological response. However, this may be an indication of parental reflective functioning, or the ability to understand the emotional needs of the child, rather than a supportive parenting attitude. In other words, understanding that an infant's cries are communicating a need may be driving the difference between physiological responses. Nonetheless, more research is needed to determine the causality behind this seemingly innate, biological response system.

Although we discovered significant findings regarding responses to infant crying, there are three limitations of the current study that warrant discussion. First, we relied on a self-report measure of attachment. Future studies should incorporate a gold-standard assessment of attachment, such as the Adult Attachment Interview (AAI). This would give us a more reliable measurement and allow us to categorize participants based on their attachment representations. Unfortunately, it was not possible for us to administer the AAI due to budgetary restrictions. Second, our sample consisted of college students who were predominantly Caucasian and reported their families were upper-middle class. Future studies should recruit a sample that is more representative of the U.S in order to elicit more significant individual differences. In this study we did not measure the participant's previous childcare experience. Those with an

extensive background interacting with children or infants could significantly skew the results. Including this measure would allow us to control it as a possible covariate as well as compare groups with differing levels of experience.

In the future, we hope to extend this study to emerging adult men as well as parents of infants. Introducing these groups would allow us to parse out gender differences and hopefully determine if behavioral responses to infant crying are innate, experience dependent, or flexible. This study could continue in many directions, including the possibility of becoming a clinical measure or intervention strategy. As we have demonstrated, the simulated infant paradigm can elicit genuine responses to crying even when the caregiver does not have children. This paradigm could be used to identify risky parents and result in customized prevention programs, and, in turn, bypass parenting intervention. Furthermore, by participating in a simulated infant crying episode and receiving feedback could serve as a simple and inexpensive intervention program. Simply understanding one's caregiving strengths and weaknesses could prepare parents to be mindful about which aspects they lack and then compensate for those deficits. Overall, this novel paradigm has significant research and clinical implications for the future.

The goal of our study was to examine which factors could be responsible for differing responses to infant crying, including attachment, family history, and parenting attitudes, and to examine which factors contribute to the differential in generational attachment dissemination. We found that all of the aforementioned variables significantly contributed to the way in which emerging adult females respond to infant crying behaviorally, emotionally, and physiologically. The journey from infancy to adulthood impacts the way in which adults interact with crying infants and further supports the research that suggests parenting is learned and flexible over time. Although our study had some limitations, this novel paradigm can be used for future research

ideas as well as prevention and intervention programs.

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Table 1

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. ECR Anxiety	-													
2. ECR Avoidance	.13	-												
3. CRPBI Mat. Warmth & Acceptance	-.06	-.07	-											
4. SIS Behav. Dysreg.	.17	.06	.09	-										
5. IPAQ Stimulation	-.06	-.15	.04	.02	-									
6. IPAQ Challenging	.16	-.03	.15	.17	.30**	-								
7. IPAQ Child-Centered	-.12	-.15	.14	.02	.22*	.30**	-							
8. PQ Critical Feedback	.13	.09	.04	.10	.01	.01	.04	-						
9. PQ Supportive Feedback	.16	-.03	-.01	.11	.10	.12	.23*	-.15	-					
10. Time Proportion of Distracting Behaviors	-.24**	-.12	.05	.20*	.03	-.23*	-.01	.04	.03	-				
11. Time Proportion of Caregiving Behaviors	-.07	.09	-.10	.01	-.02	.09	.28**	.14	.06	-.13	-			
12. Change in Anger	.02	-.02	-.20*	.01	.26**	.04	-.10	-.01	.10	.03	.03	-		
13. Change in Anxiety	.02	.03	.02	.20*	-.07	.07	-.10	.10	-.09	.05	-.18*	.22*	-	
14. Skin Conductance (Sit - Task)	-.07	.05	-.01	-.09	.07	-.10	-.15	-.24*	.18	.13	-.10	-.01	-.14	-
15. Skin Conductance (Stand - Task)	.02	.10	.00	-.04	-.01	-.04	-.07	-.18	.22*	.09	-.13	-.05	-.07	.84***

Note: * $p < .05$, ** $p < .01$, *** $p < .001$