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Gender Differences of Multimodal Responses to Child and Non-Child Stressors

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GENDER DIFFERENCES OF MULTIMODAL RESPONSES TO CHILD AND NON-CHILD STRESSORS

by

Meghan Michelle Kovar

A thesis submitted to the Department of Psychology in partial fulfillment of the requirements for the degree of

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COLLEGE OF ARTS AND SCIENCES

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To Mom, Dad, Nana, and Kibbee. I am eternally grateful for your unconditional love and support.
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Abstract

This investigation explored gender differences and relations among facets of adult stress measured by self-reported cognitive, emotional, and continuous psychophysiological responses to child and non-child stressors. The 46 male and 47 female participants displayed increased heart rate (HR) while watching a video of a happy infant and a decreased HR (associated with increased attentiveness) during a crying infant video. During a cold pressor task, males’ HR increased while females revealed a contrary decline in HR. No differences between hyperactive and non-hyperreactive participants were found regarding hypothetical parenting plans or self-reported emotionality. Findings suggest more gender similarity than dissimilarity, possibly due to the evolving nature of parenting (i.e., males and females sharing increasingly analogous parenting roles).
Gender Differences of Multimodal Responses to Child and Non-Child Stressors

The parenting of offspring can be a wonderful, rewarding role for an adult. However, the role of a parent also involves a sizable amount of challenge and stress. The way an adult handles their individual stress experiences influences the effectiveness of parenting behavior as well as shape the subjective experience of parenting (e.g., as pleasant or aversive) for adults (McBride, Schoppe & Rane, 2002). While males and females share more similarities than dissimilarities in behavior, observed gender differences might help to illuminate areas of effective parenting techniques that may be summarized and taught to individuals with less effective parenting skills.

Theories of Stress Response

Patterns of stress responses may be one such area of gender differences. Cannon (1932) developed the renowned “Fight or Flight” stress response model. According to Cannon’s traditional “Fight or Flight” model, when a human experiences stress, the sympathetic nervous system is activated, leading to a release of norepinephrine and epinephrine. While Cannon’s traditional model helps to explain much of the human stress response, it is not a complete depiction of stress response.

Taylor developed a supplementary “Tend-and-Befriend” stress response model – that specifically describes an additional pattern of female stress response (Taylor et al., 2000). In Taylor’s “Tend-and-Befriend” model, a female who experiences stress will be affected by changes in oxytocin levels, as well as within the traditional norepinephrine/epinephrine system. According to Taylor et al., a stressful situation triggers the hypothalamus to release oxytocin. While the release of oxytocin occurs in
males and females, the effect is noticeably influential in females. As a mediator in female stress response, oxytocin influences an increase in affiliative behavior as well as decreases in anxiety and blood pressure. Collectively, the effects of oxytocin are thought to promote the tending and befriending of others in times of stress.

According to Taylor et al. (2000), during stressful situations, females will demonstrate the befriending pattern approach by interacting with social groups. Females interaction with social groups is thought to successfully build, maintain, and utilize social support networks (Schachter, 1959). Females may respond to stress by evaluating the needs of their offspring and providing nurturance and care if perceived as warranted. This behavior would be representative of the “tending” pattern. Gustafson and Harris (1990) noted that during an observed simulation, mothers and non-mothers oriented toward and interacted with a baby manikin that began to “cry.” Mothers and non-mothers exhibited similar care-giving behaviors, 87% of women participating performed four out of five of the following care giving behaviors: picking up the baby manikin, talking to the baby manikin, tactile stimulation (i.e., hugging and patting), vestibular stimulation (i.e., moving the baby manikin's body in a rhythmic manner), and holding the baby manikin in the ventral position (i.e., belly toward adult female).

Gustafson and Harris (1990) explained the distress level hypothesis – as communications from the infant to the parent – infant cries reflect the arousal or distress that an infant is feeling, with cries varying along a continuum. Variations in infant cry pitch and duration are thought to communicate different infant needs, with sensitivity, allowing parents to receive or notice the intended message. For example, as an infant's cry pitch increases, female participants tend to rate the cry as more urgent, grating,
Gender Differences

arousing, aversive, or distressing (Dessureau, Kurowski, & Thompson, 1998; Zeskind & Marshall, 1988). Such sensitivity in parenting might allow capable mothers the ability to apply more intense or needed attention to their child as the need intensifies, leaving less important child requests to a lower “triage” level of care.

In a prior investigation of such sensitivity, primiparous, or first-time mothers, listened to prerecorded audio taped non-distressed (i.e., 400-500Hz) infant cries while their heart rate (HR) was measured (Del Vecchio, Walter, & O’Leary, 2009). The dependent variable was the latency time between mothers hearing a recorded cry play over a baby monitor and the time of starting to intervene on the baby’s behalf. About half of the mothers participating in this study responded to the non-distressed cry by intervening. Mothers with less emotional and physiological reactivity (as indicated by changes in HR) more accurately distinguished between distressed and non-distressed cries than did their more reactive counterparts. In other words, this study revealed less emotional and physiological reactivity was associated with greater sensitivity in parenting for first-time mothers.

In general, mothers show a higher HR than non-mothers to their own infant crying, suggesting that mothers may have a heightened sensitivity to their infants’ distress signals than do non-mothers to cries from unrelated infants (Hall & Morsbach, 1989). Also, Murray (1979) concluded that current mothers need fewer cues from their own infant to become aroused than do non-mothers.

Interestingly, Wood and Gustafson (2001) observed similar sensitivity patterns of response to distressed infant cries. Male and female non-parents respond quicker when
they judge an infant cry to be more distressed. They further suggest that response to infant distress cries might be a "universal perceptual phenomenon" (1292). Therefore, adult decisions to respond to an infant cry are likely based on perceived distress and context.

Adult Hyperreactivity

Berkowitz (1974) suggested stimuli that are perceived as aversive have more potential to prompt aggression. Knutson (1978) also suggested that certain caregivers are more sensitive or hyperreactive to aversive stimuli than are other caregivers. Aversive child-related stimuli (e.g., crying, wailing) might trigger some caregivers to be aggressive or to distance themselves from the infant if the caregivers' emotional arousal or reactivity level is high. Caregivers who are hyperreactive exhibit an excessive response to naturally occurring noxious social stimuli. Such excessive responses could include the aforementioned aggressive behavior or inappropriate distancing from an infant in need. A crying infant arouses feelings of displeasure and prompts the caregiver to act to relieve the distress (Bell & Ainsworth, 1972). Bauer and Twentyman (1985) further investigated the concept of adult hyperreactivity to noxious stimuli. They suggested that abusive mothers possess hyperresponsivity to child-related and non-child related stressors. Child related stressors included a video of a child intentionally breaking rules or a child angry with his or her parent. They evaluated abusive and non-abusive mothers' reactions to child and non-child stimuli. On a self report of subjective reactions, abusive mothers were significantly more annoyed when experiencing child and non-child stressors. Bauer and Twentyman (1985) suggested that the characteristics of certain situations may serve as moderators for abusive mothers' annoyance ratings. For example, abusive mothers
reported being more annoyed when a child was misbehaving in front of others than when a child was hurt. Such differential patterns might help to explain ineffective parenting behavior within only certain challenging parenting situations.

Beyond emotional and behavioral differences between mothers with or without potential for abusive behavior, physiological differences have been noted. Abusive and non-abusive mothers were shown videotapes of stressful (i.e., parent/child conflicts, such as child refusing to go to bed or demanding attention) and non-stressful (i.e., child playing with blocks or reading) behavior in children. Abusive mothers showed greater arousal in skin conductance and respiration rate than non-abusive mothers while viewing stressful scenes (Wolfe, Fairbank, Kelly, & Bradlyn, 1983).

Similarly, abusive mothers and non-abusive mothers were shown videotapes of an infant crying and smiling. During the crying portion of the videotape, abusive mothers and non-abusive mothers showed HR acceleration, increase in diastolic blood pressure, and an increase in skin conductance. However, abusive mothers exhibited a greater increase in HR than non-abusive mothers (Frodi & Lamb, 1980). Casanova, Domanic, McCanne, and Milner (1992) expanded the research on adult’s reactions to various types of stressors. Casanova et al. used several types of non-child related stimuli: a stressful video, anagrams, a cold pressor and an audio recording of a car horn. Mothers who had high scores on the Child Abuse Potential Inventory (CAP; Milner & Wimberley, 1979, 1980) had greater increases in skin conductance during the stressful video and cold pressor than did mothers who scored low on the CAP. A cold pressor task is a common paradigm for exploring response to physically uncomfortable stimuli and involves the researcher securing a cold press to a participant’s forehead for a certain amount of time,
usually 120s or less. High-risk mothers also had a greater increase in HR during the stressful film than low-risk mothers. Such physiological differences between abusive and non-abusive mothers may depict genetic or long-standing hard wired variations in neural function or structure. However, it is important to not rule out additional explanations such as conditioned responses or heightened stress arousal due to childhood trauma. For example, Casanova, Domanic, McCance, & Milner (1994) observed during baseline periods (i.e., before the presentation of the video stimulus), mothers without a childhood history of abuse exhibited a decrease in skin conductance therefore habituating to the experimental condition. This effect was not observed in mothers with a childhood history of abuse. These latter possible explanations emphasize the need to further explore stress response among participants.

Similar results regarding high arousal have been found using non-parent participants. Non-parent participants were identified as high in potential for child abuse or low in potential for child abuse. Participants listened to pre-recorded normal infant cries and hyperphonated infant cries. Non-parent participants who were high in potential for child abuse had a greater physiological response than did low potential participants to child-related stressors (Crowe & Zeskind, 1992).

**Gender Differences**

Physiological and emotional gender differences in males and females who are not at risk for child abuse have been noted within responses to child related stressors. Male and female parents watched a video of an infant smiling and crying while the parent’s physiological activity (i.e., HR, skin conductance, and respiration) was measured. During
the crying section of the infant video, while fathers displayed a significant increase in physiological activity, mothers did not have a significant increase in physiological activity (Brewster, Nelson, McCanne, Lucas & Milner, 1998). Boukydis and Burgess (1982) found that, in response to infant cries, males gave higher irritation and anger ratings.

Despite some evidence for physiological and emotional gender differences in stress response, there is substantial overlap between the genders in stress response. Boukydis and Burgess (1982) compared multiparous parents (i.e., parents that have multiple children), primiparous parents (i.e., parents that have one child), and non-parents. Boukydis and Burgess noted that in primiparous parents the most distressed infant cries caused the highest levels of skin conductance response. Multiparous parents showed the least amount of physiological arousal. Boukydis and Burgess attributed this result to care taking experience. Green, Jones and Gustafson (1987) found supporting evidence that care giving experience modifies the cry perceived by parents and non-parents. After watching a video segment of an infant crying, parents were asked to record their emotional reactions to the video in an investigation by Frodi et al. (1978). Parents who displayed an increase in diastolic blood pressure during the cry segment of the video were more likely to report feelings of irritation, distress, and disturbance than were their counterparts without such diastolic blood pressure change. According to self report measures, male and female parents reported feeling more hostility, sadness, distress, and empathy during the crying video. During the happy video segment male and female participants reported feeling more happiness and quietness (Brewster et al., 1998).
Interestingly, young boys and girls ages 8 to 14 responded much like adults in stressful situations. An increase in automatic arousal (i.e., HR and skin conductance) in the boys and girls followed the cry stimulus (Frodi & Lamb, 1978). Boys and girls, ages 8 to 14 reported feeling less happy, more distressed and more irritated after watching a video clip of an infant crying than after watching a video clip of an infant smiling.

Currently there is little evidence for physiological gender differences (Frodi, et al., 1978; Frodi & Lamb, 1978; Frodi, Lamb, Leavitt, & Donovan, 1978). Frodi and Lamb (1978) suggest that the lack of physiological gender differences to infant cries in young children is evidence that "there are no biologically determined sex differences...but that societal expectations and pressures serve to bring about sex differences" (1187). Bauer and Twentyman (1985) suggest situational factors are a plausible alternative explanation for gender differences in physiological reactions to infant cries. In addition, Brewster et al. (1998) and Berman (1980) suggest the production of mixed results found in gender differences literature is due to the interaction of several factors: gender of participant, type of cognitive appraisal of the stressor, and type of stressor.

McCanne and Hagstrom (1996) reviewed methodological issues in studies conducted on gender differences in stress response. The authors believe these methodological issues explain the variability of results found in many studies on gender differences to stress response. In brief, the production of mixed results on gender differences in parental stress response was attributed - in large part - to the following methodological variables: variations in stimuli presentation, length of stimuli presentation, sample size, and between-subjects research designs verses within-subject
research designs. McCanne and Hagstrom (1996) suggested comparison studies between different types of aversive child and non-child stimuli as well as non-aversive child and non-child stimuli. In addition to comparison between aversive and non-aversive stimuli, a further suggestion is to include a period of no stimulation or baseline. The current study included aversive child and non-child stimuli as well as a baseline period. McCanne and Hagstrom (1996) suggested the length of stimuli presentation should be extended considerably perhaps as much as 15 minutes. The authors reasoning behind this suggestion is an extended or more “chronic” period of stimuli exposure will resemble a situation experienced in a natural parenting environment. However, as it is important to ethically consider that exposing participants to aversive stimuli for an extended period of time might induce an unnecessary amount of stress for the participant, a compromise in duration of exposure was sought by the current investigators. Sample sizes of previous studies have ranged from under 20 participants to 100 participants. For statistical quality 93 participants (46 males and 47 females) participated in the current study. Zeskind and Huntington (1984) investigated the differences of within-group methodologies and between-group methodologies in relation to perceptions of infant crying. They conclude each method is not without advantages or disadvantages and the hypotheses involved should help researchers determine the appropriate design to use.

The current investigation evaluated the relations among physiological (e.g., HR), emotional, and cognitive responses to child and non-child stressors. The male and female adult participants helped the researchers to consider patterns of response common to both genders. This sample also helped the researchers to identify patterns of response delineated by gender differences. This investigation evaluated whether gender
differences were displayed by the participants through several self-report and continuous psychophysiological measures. It was hypothesized that:

1. Male and female participants will display greater physiological stress response (i.e., HR) to the child-related stressor than to the non-child related stressor.

2. Female participants will display greater physiological stress response (i.e., HR) to the child-related stressor than will their male counterparts.

3. Participants with patterns of physiological hyperreactivity will report less pro-social, appropriate parenting plans (e.g., plan to distance themselves from crying infant) and will report a subjective experience reflecting greater negative emotionality (e.g., anger, frustration, upset) than will their non-hyperreactive counterparts.

Method

Participant

In this investigation, 93 students were recruited from undergraduate psychology courses at a south eastern university in the United States for voluntary participation. An incentive of extra credit toward the participant's course grade was offered for the student participants. If participants chose not to participate, their course instructors provided participants with alternative ways to earn similar extra credit. Two exclusionary criteria were implemented for this study:

1) Participants who are victims of child abuse or maltreatment.

2) Participants who are currently overusing legal or illegal substances.
Participants in this study were 46 males and 47 females. The majority of the sample (62.4%) was Caucasian. All participants were at least 18 years of age ($M$ age = 25). See Table 1 and Table 2 for complete demographic information about the participant sample.

Table 1
*Means and Standard Deviations for Demographic Information*

<table>
<thead>
<tr>
<th>Demographic</th>
<th>$M$</th>
<th>$SD$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant Age</td>
<td>25.27</td>
<td>9.21</td>
</tr>
<tr>
<td>Estimated Annual Family Income</td>
<td>77,042.17</td>
<td>59836.07</td>
</tr>
<tr>
<td>Number of People in Household</td>
<td>3.48</td>
<td>1.58</td>
</tr>
<tr>
<td>Current Year in College</td>
<td>3.16</td>
<td>1.15</td>
</tr>
</tbody>
</table>

Table 2
*Percentages for Demographic Information*

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>14.0</td>
</tr>
<tr>
<td>Asian American</td>
<td>9.7</td>
</tr>
<tr>
<td>Caucasian</td>
<td>62.4</td>
</tr>
<tr>
<td>Hispanic</td>
<td>4.3</td>
</tr>
<tr>
<td>Other</td>
<td>9.7</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>16.1</td>
</tr>
<tr>
<td>Never Married</td>
<td>81.7</td>
</tr>
<tr>
<td>Divorced/Separated</td>
<td>1.1</td>
</tr>
<tr>
<td>Widow/Widower</td>
<td>1.1</td>
</tr>
<tr>
<td>Parent</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16.1</td>
</tr>
<tr>
<td>No</td>
<td>83.9</td>
</tr>
</tbody>
</table>

In comparison to the local city's population, the sample reflected similarity in ethnicity.
The majority of the local population is 63% Caucasian. In addition to the 93 participants included in the study, 18 individuals were discontinued due to their unwillingness to follow the study’s protocol (e.g., sit still, complete the measure, or equipment malfunction). A signed informed consent was obtained from all participants in this study. All participants were treated in accordance with the ethical principles and Code of Conduct (American Psychological Association, 2002).

A within-subjects design was implemented for this study. Participants were randomly assigned to one of the following four conditions: a) Cold Pressor-Happy Video-Crying Video b) Cold Pressor-Crying Video-Happy Video c) Happy Video-Crying Video-Cold Pressor d) Crying Video-Happy Video-Cold Pressor. Such random assignment of the three possible stimulus segments (Happy Video, Crying Video, Cold Pressor) within the conditions eliminated order effects from influencing the study’s results. An initial baseline period of 120s allowed the researchers to assess the participants prior to any condition presentation. The overall time-line was as follows: Initial Baseline (120s), Stimulus Segment 1 (120s), Recovery Period (120s), Stimulus Segment 2 (120s), Recovery Period (120s), and Stimulus Segment 3 (120s).

**Stimulus Materials**

*Video Stimuli.*

During the Happy Video segment of this study, an infant was wearing a plain orange sleeper and the video was in color. The infant was sitting in a car seat at a 30 degree angle to camera and was cooing and smiling. The infant was a 5-month-old
Caucasian female. The duration of the Happy Video was 120s. The same infant was used in the crying video with the only difference being the infant's mood. The duration of the crying video was 120s (Milner, Halsey & Fultz, 1995). As mentioned above, in addition to the happy and crying video segments, there was an initial baseline segment, two recovery periods, and the cold pressor stimulus segment. The duration of each baseline video segment was 120s. The Recovery periods consisted of the participant sitting quietly while looking at a blank black television screen.

*Cold Pressor Stimulus.*

For purposes of the present study a cold press was filled with 190 g of crushed ice and 180 ml of water (Logan & Gedney, 2004). Researchers in the referenced Logan and Gedney article use 220 g of crushed ice and 180 ml of water. Researchers in the present investigation chose to reduce the amount of crushed ice due to the intention to produce temporary discomfort instead of temporary pain during the cold pressor task. Participants were asked to hold the cold press with their dominant hand so that the cold press covered the participant’s forehead and eyes for a total of 120s.

*Measures*

*Demographic Information:* Participants completed a demographics questionnaire that indexed information about themselves and their households, including the participant’s gender, age, date of birth, marital status, education level, religious affiliation, ethnicity, and annual family income.

*Symptom Checklist-90-Revised:* The Symptom Checklist 90 Revised (SCL-90-R) (Derogatis & Lazarus, 1994) was used to assess psychological distress. The SCL-90-R is
a 90 item self-report measure used to assess psychological distress. Alpha coefficients for the SCL-90-R range from .77 to .90. Test-retest coefficients ranged from .78 to mid .80's. Researchers evaluated a sample of subjects over a period of 10 weeks and found test-retest reliability coefficients of approximately .84 (Horowitz, Rosenberg, Baer, Unno, Villasenor, 1988). Convergent-discriminate validity was established by contrasting the SCL-90-R with the Minnesota Multiphasic Personality Inventory (MMPI). Dimensions on the SCL-90-R had high correlations with corresponding constructs on the MMPI (Derogatis, Rickels, & Rock, 1976).

*The Reactions to Stressors Questionnaire:* This questionnaire was created specifically for this study. Cognitive differences in the reactions to stressors between males and females were assessed using “The Reactions to Stressors Questionnaire.” The item format included: multiple choice, rank ordering and self-report (see Appendix A, B, C and D).

*The Relaxation Inventory:* Initial tension was assessed using The Relaxation Inventory (Crist, Rickard, Prentice-Dunn, & Barker, 1989). The Relaxation Inventory was created to measure increases and decreases in relaxation. The Relaxation Inventory used a 9-point Likert scale with possible options ranging from *strongly disagree*, *neutral*, and *strongly agree*. The Relaxation Inventory includes 15 statements that are worded such that agreement describes someone who is physiologically tense (e.g., “Some of my muscles seem to be on the verge of cramping”), 19 statements are worded such that agreement describes someone who is physiologically relaxed (e.g., “My muscles feel relaxed”) and nine statements are worded such that agreement describes someone who is cognitively tense (e.g., “I am really concerned about all of my problems right now”).
Participant’s responses to items that indicated physiological and cognitive tension were reverse scored. Higher scores indicated more relaxation. Participants were classified as relaxed or stressed.

Researchers found Kuder-Richardson reliability coefficients for the three subscales as follows: Physiological Tension .89, Physical Assessment .95, and Cognitive Tension .81 (Crist et al., 1989). Test-retest reliability coefficients were obtained across days, trials as well as trials and days for the three sub-scales. Crist et al. administered each scale to undergraduates (26) three consecutive days before and after class. The Physical Tension Scale test-retest reliability coefficients were .87 (days), .95 (trials), .80 (days and trials). The Physical Assessment Scale test-retest reliability coefficients were .87 (days), .97 (trials), .81 (days and trials). The Cognitive Tension Scale reliability coefficients were .95 (days), .99 (trials), and .92 (days and trials). Predictive validity of this measure was tested by conducting a study that measured the effects of induced relaxation and tension. Treatment and control conditions were used to observe the effects of induced relaxation. There was a significant condition by pre-posttest interaction. Further analysis revealed significant results for the Physical Tension Scale, Physical Assessment Scale, and Cognitive Tension Scale.

**Physiological Measures:** As tonic measures of physiological reactance, mean HR BPM (HR in beats per minute) were assessed. Tonic measures are used in research to assess long-term, subtle change in response, while phasic measures investigate brief transient responses to stimuli (Andreassi, 2000). Separate means for HR were calculated within each video and cold pressor experimental period.
Several extraneous factors appear to influence HR measurement (Andreassi, 2000), so precautions were made to guard against such confounding variables (i.e., participant movement and noise) contaminating the physiological measures. Participants were asked to move as little as possible during the experimental periods when not responding on the self-report questionnaires. Data marked as confounded by movement were deleted by removing as much as 5s of data prior to and 5s following each marker. To minimize extraneous noise, the experiment was conducted in a quiet laboratory. All physiological data were reviewed to remove data contradicted by movement and extraneous noise. To eliminate any orienting response (e.g., physiological changes following the presentation of a novel stimulus; Andreassi, 2000), 5s of data were removed from the beginning of each experimental period (El-Sheikh, Ballard, & Cummings, 1994).

Procedure

A within-subjects design was implemented for this study. Participants were randomly assigned to one of four conditions: a) Cold Pressor-Happy Video-Crying Video b) Cold Pressor-Crying Video-Happy Video c) Happy Video-Crying Video-Cold Pressor d) Crying Video-Happy Video-Cold Pressor. A researcher greeted participants at the door of a lab room and escorted them to a comfortable chair. The lab room was 2.6 m by 3.5 m. The participant sat 1.2 m from the TV monitor and the researcher sat approximately 1.2 m behind the participant. There was a table to the right of the participant and the researcher. This table provided an area for the ADI Instrument Powerlab 14SP interfaced with a Dell Optiplex GX620 computer as well as an area for participants to complete questionnaires. A researcher provided an informed consent and allowed adequate time for
the participant to read the informed consent. After the participant read the informed
consent a researcher reiterated the right to withdraw from this study at any time without
penalty, the anonymity of his or her responses to all questions, and confidentiality of
information provided. The participant was asked to complete a demographics
questionnaire, The Relaxation Inventory (Crist et al., 1989), The Symptom Checklist 90
Revised (Derogatis et. al, 1994), and Reactions to Stressors Questionnaire Baseline (See
Appendix A). A researcher checked the participants’ response to items 15 and 59 on the
SCL-90-R to ensure the participant did not endorse a three or a four. An endorsement of a
three or a four on items 15 and 59 might indicate the participant was highly stressed prior
to participation in the study.

Before attaching the recording sensors participants were asked to remove jewelry,
watches, and rings from the non-dominant hand. Participants were also asked to remove
any bulky clothing such as sweatshirts, sweaters or jackets as this could interfere with the
MLT1132 respiratory belt transducer. The participant sat in a comfortable chair while a
researcher attached the physiological recording equipment to the non-dominant hand.
This equipment measured the participant’s physiological responses to the child behavior
videotapes and cold pressor task using an ADInstrument Powerlab/4SP interfaced with a
Dell Optiplex GX620 computer. A MLT1010 Pulse Transducer was attached to the volar
surface of the distal phalange of the participants’ third finger on the non-dominant hand
to measure cardiac function. A researcher continuously measured cardiac function during
all baselines, cold pressor task, and video segment conditions with the aforementioned
equipment and a Powerlab/4SP. After the sensors were attached a researcher instructed
the participant to “Please sit quietly and comfortably in the chair. I will let you know
when we are ready for the next part of this study”. To verify proper adjustments to the recording sensors a researcher collected 120s of an initial baseline, prior to the beginning of the stimuli, to assure the recording equipment adjusted properly and stabilized before continuing with the study.

For the video condition, the participant focused on a blank black TV screen for 120s while baseline data was collected. The volume on the RCA 12 inch x 24 inch model F19436 television was set at 14. During the baseline of the video participants were instructed to relax. Next the participant viewed the happy or crying video segment depending on condition. After the happy or crying video segment was completed, a researcher paused the video and instructed the participant to complete the Reactions to Stressors Questionnaire Post Video Clip 1 (See Appendix B). Once the participant completed the Reactions to Stressors Questionnaire Post Video Clip 1 a Researcher started the video and the participant was instructed to relax while focusing on a blank black TV screen for 120s while baseline data was collected. Next, the participant viewed the happy or crying video segment depending on which segment was previously viewed. After the second video segment, the participant completed the Reactions to Stressors Questionnaire Post Video Clip 2 (See Appendix C) during the final 120s baseline.

Prior to the cold pressor task, a researcher collected 120s of baseline data. During the baseline participants were instructed to relax. For the cold pressor condition participants secured a cold pressor to their forehead using the dominant hand to hold the cold pressor on their forehead for the duration of the cold pressor task. The cold pressor was filled with 190 g of crushed ice and 180 ml of water to maintain a temperature of 2°C for the duration of this 120s cold pressor task. A researcher gave the following
instructions: "Please leave the ice pack on for 120s. Please keep your eyes closed during the 120s and try not to move the ice pack. You may warn me if it is really unbearable and, in that case, you may remove the ice pack." After completion of the 120s cold pressor task, the participant removed the cold-pressor from his or her forehead. Immediately following removal of the cold pressor pack, the participant completed The Reactions To Stressors Questionnaire Post Cold Pressor Task (See Appendix D).

A researcher carefully detached all sensors from the participant then asked if the participant had any additional questions about the study. The participants completed a Study completion Questionnaire that consisted of two questions: 1) "What do you think we were looking for in this study?" 2) "Describe your experience in this study." During the participant debriefing, the researcher provided participants with information for mental health services in case they experienced any distress associated with this study.

Results

Data Cleaning Procedures

Data for all participants was recorded at 200 data points per second. The increased points per second allow for more accurate cleaning of the HR data. Due to the sensitivity of the physiological sensors, any movement by the participant caused noise to appear in the data. Thus, sections of data were cut out of the data set according to the notes taken by a researcher during physiological data collection. Specifically, data marked as confounded by movement were deleted by removing as much as 5s of data prior to and 5s following each marker. In most cases, no more than 10s of data were cut out. Heart rate was calculated for epochs using the remaining valid data. In order to
maintain reliability a researcher who was blind to the hypotheses cleaned the physiological data. Respiration rate was used as an additional check if HR data was extreme.

In a few extreme cases, an epoch was invalid. For these, means were calculated from the epochs during the same video segment that directly precedes and follows the invalid data. This mean was entered in place of the invalid data. A researcher highlighted the appropriate data segment (e.g., 4:00-4:15) and used the “Add to Data Pad” function from the “Command” menu. The settings of the data pad were adjusted so that HR data were displayed in beats per minute. Along with these, the data pad displayed the start time, end time, and duration of the selected segment. In general, the first quiescent video segment started at the beginning of the fourth minute of data collection.

After each segment of data was highlighted and added to the data pad, a researcher checked for accuracy. Viewing the “Options” within the “Column Setup” window for each piece of HR and respiratory rate data, a researcher was able to visually examine wave cycles recorded by the physiological sensors. The Chart program calculates an estimate of beats per minute by counting the number of wave cycles in the selected period of time. By adjusting the “Noise Threshold” within the “Options” window, it was possible to control which peaks the Chart program counted. The program indicated which peaks were being counted for a given calculation by placing a black dot on the peak. The noise threshold adjustments were the same for each piece of HR and respiratory rate data collected. In the event that the noise threshold could not be adjusted to count all peaks and none of the noise in a given segment, a researcher counted the peaks then multiplied this number by an appropriate number to calculate beats per
minute. For example, if a researcher counts 18 peaks within a 15-second period, a researcher multiplied 18 by 4 to estimate a HR of 72 beats per minute. Once all of the data were cleaned, the data was entered into SPSS for statistical analyses.

*Group Composition and Correlates of Stress Response*

This investigation involved random assignment of subjects to one of four experimental conditions (a) Cold Pressor-Happy Video-Crying Video b) Cold Pressor-Crying Video-Happy Video c) Happy Video-Crying Video-Cold Pressor d) Crying Video-Happy Video-Cold Pressor). Initial analyses were carried out to ensure that these conditions did not differ regarding key demographic variables. No significant differences by condition were found on demographic characteristics. An independent samples *t* test conducted on continuous demographic variables (Age, Estimated Yearly Family Income, Number of People in Household, Year in College) found no significant differences by condition, *p* > .10.

Chi-square analyses carried out on categorical demographic variables (Religious Affiliation, Ethnicity, Employment Status, Marital Status, Parent, Sex) also found no significant differences by condition, *p* > .10. As the key hypotheses of this investigation was to explore gender differences, the potential for confounding influence of demographic variables by gender also were evaluated, *p* > .10. An independent samples *t* test conducted on continuous demographic variables (Age, Estimated Yearly Family Income, Number of People in Household, and Year in College) found no significant differences by gender, *p* > .10. Chi-square analyses by gender in the categorical demographic variables (Religious Affiliation, Ethnicity, Employment Status, Marital Status, Parent) also were not significant, *p* > .10. See Table 3 and 4 for more detail.
Table 3

*Condition and Gender by Categorical Demographic Characteristics*

<table>
<thead>
<tr>
<th>Demographic by Condition</th>
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<th>$df$</th>
<th>$N$</th>
<th>$p$</th>
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<td>.73</td>
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<td>.70</td>
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<td>Marital Status</td>
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<td>Parent</td>
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<table>
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<td>.93</td>
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<td>93</td>
<td>.26</td>
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<td>Employment Status</td>
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<td>.70</td>
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<td>Marital Status</td>
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<td>.56</td>
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<tr>
<td>Parent</td>
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<td>93</td>
<td>.37</td>
</tr>
</tbody>
</table>

Table 4

*Condition and Gender by Continuous Demographic Characteristics*

<table>
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<th>$df$</th>
<th>$p$</th>
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</thead>
<tbody>
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<td>Age</td>
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<td>91</td>
<td>.72</td>
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<tr>
<td>Estimated Yearly Family Income</td>
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<td>.29</td>
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<tr>
<td>Number of People In Household</td>
<td>-1.32</td>
<td>90</td>
<td>.19</td>
</tr>
<tr>
<td>Year in College</td>
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<td>90</td>
<td>.88</td>
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</table>

<table>
<thead>
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<th>Demographic by Gender</th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-.49</td>
<td>91</td>
<td>.63</td>
<td></td>
</tr>
<tr>
<td>Estimated Yearly Family Income</td>
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<td>81</td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>Number of People in Household</td>
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<td>90</td>
<td>.69</td>
<td></td>
</tr>
<tr>
<td>Year in College</td>
<td>-1.00</td>
<td>90</td>
<td>.32</td>
<td></td>
</tr>
</tbody>
</table>
To ensure that the participants possessed normative psychological functioning and stress level participant's self-reported response patterns on the Symptom Checklist 90 Revised (SCL-90-R) were evaluated, with both genders and all conditions falling below the clinical level of significance for psychological difficulties on each of the subscales and overall summary score, \( p > .10 \). No differences by gender or condition were found for baseline levels of self-reported Reactions to Stress and Relaxation Inventory scores. In terms of physiological stress indicators, a one way ANOVA by gender on participants' initial baseline heart rate (HR) (i.e., the HR of participants while they sat at rest prior to any stimulus presentation) found no differences, \( F(1, 76) = 0.58, \ p = .45 \), between males' \( (M = 96.3, SD = 35.9) \) and females' \( (M = 90.9, SD = 25.7) \) initial baseline HR.

For hypothesis three, a median split was calculated to categorize participants as hyperreactive or non-hyperreactive. Participants were classified as hyperreactive if their HR beats per minute (HR BPM) was 90 or above. Participants were classified as non-hyperreactive if their HR BPM was 80 or below. Participants with a HR BPM between 81-89 were excluded from hypothesis three analyses.

Hypotheses Tests

Hypothesis 1): Male and female participants would display a greater physiological stress response (i.e., HR) to the child-related stressor than to the non-child related stressor. To test this hypothesis a 2 (Gender) x 3 (120s Conditions: Happy Infant, Crying Infant, Cold Pressor) repeated measures analysis of covariance (RM-ANCOVA) was conducted on HR, using initial Baseline HR as a covariate. This analysis revealed a Gender by Condition interaction that approached significance, \( F(2, 73) = 3.02, \ p = .055 \). Each condition (i.e., initial baseline, happy video, crying video and cold press) was
compared over time using initial baseline HR as a covariate. Males ($M = 101.23, SD = 34.65$) and females ($M = 94.13, SD = 30.71$) showed an increase in HR for the happy video stimulus. Males ($M = 94.40, SD = 32.77$) and females ($M = 89.28, SD = 30.44$) showed a decrease in HR for the crying video stimulus. Post-hoc analyses found that the difference in HR between males and females during the cold pressor stimulus approached significance $F(2, 73) = 3.02, p = .06$ (See Figure 1).

**Figure 1**

*Participants HR BPM During Stimuli*

As trends, males appeared to increase in HR from initial Baseline to the cold pressor stimulus ($M = 106.85, SD = 40.59$) while females showed an opposite or decreasing trend in HR from initial Baseline to the cold pressor stimulus ($M = 84.39, SD = 19.39$) (See Table 5).

**Table 5**

*Means and Standard Deviations for Participants HR BPM During Stimuli*

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy Video Stimulus</td>
<td>101.23</td>
<td>94.13</td>
</tr>
<tr>
<td>Crying Video Stimulus</td>
<td>94.40</td>
<td>89.28</td>
</tr>
<tr>
<td>Cold Pressor Stimulus</td>
<td>106.85</td>
<td>84.39</td>
</tr>
<tr>
<td></td>
<td>34.65</td>
<td>30.71</td>
</tr>
<tr>
<td></td>
<td>32.77</td>
<td>30.44</td>
</tr>
<tr>
<td></td>
<td>40.59</td>
<td>19.39</td>
</tr>
</tbody>
</table>
Hypothesis 2: Female participants would display greater physiological stress response (i.e., HR) to the child-related stressor than would their male counterparts. This hypothesis was not supported. An independent samples t test was conducted on the child related stimuli by gender on HR. There was no significant difference between females HR ($M = 90.54, SD = 25.92$) during the child stressor stimuli and the males HR ($M = 97.55, SD = 30.23$) during the child stressor stimuli $t(1, 74) = -1.09, p = .28$. Another independent samples $t$ test was conducted on the cold pressor stimulus by gender on HR. There was a significant difference between females HR during the cold pressor stimuli and the males HR during the cold pressor stimuli $t(1.74) = -2.82, p = .01$. Males had a significantly higher HR ($M = 105.95, SD = 40.42$) during the cold pressor stimuli than females ($M = 85.42, SD = 19.39$). In addition to the aforementioned independent samples $t$ test an ANCOVA analysis was conducted on the child stimulus by gender on HR using initial HR baseline as a covariate. There was no significant difference between females HR ($M = 91.14, SD = 26.01$) during the child stressor stimuli and the males HR ($M = 97.55, SD = 30.23$) during the child stressor stimuli $F(1, 74) = .38, p = .54$. Another ANCOVA analysis was conducted on the cold pressor stimulus by gender on HR using initial baseline HR as a covariate. There was a significant difference between females HR during the cold pressor stimuli and the males HR during the cold pressor stimuli $F(1, 74) = 7.14, p = .01$. Males had a significantly higher HR ($M = 105.95, SD = 40.42$) during the cold pressor stimuli than females ($M = 84.82, SD = 19.29$).

Hypothesis 3: Participants with patterns of physiological hyperreactivity would report less pro-social, appropriate parenting plans (e.g., plan to distance themselves from crying infant) and would report greater negative emotionality (e.g., anger, frustration,
upset) following the crying infant than would participants categorized as non-hyperreactive counterparts. This hypothesis was not supported. There was no significant difference between non-hyperreactive and hyperreactive participants reported parenting plans $\chi^2(2, N=86) = .42, p = .81$. There was no significant difference between non-hyperreactive and hyperreactive participants reported negative emotionality $\chi^2(1, N=81) = .27, p = .60$.

Discussion

The hypotheses for this investigation were as follows: 1). Male and female participants would display greater physiological stress response (i.e., HR) to the child-related stressor than to the non-child related stressor. 2). Female participants would display greater physiological stress response (i.e., HR) to the child-related stressor than will their male counterparts. 3). Participants with patterns of physiological hyperreactivity would report less pro-social, appropriate parenting plans (e.g., plan to distance themselves from crying infant) and would report a subjective experience reflecting greater negative emotionality (e.g., anger, frustration, upset) than will their non-hyperreactive counterparts.

Hypotheses one, two, and three were not supported by this investigation, but an interesting pattern was observed. Males and females showed an increase in HR during the happy video. Zeskind and Lester (1981) observed a similar pattern that some adult participants showed HR acceleration while others showed HR deceleration during stressful situations. Andreassi (2000) states that “HR acceleration indicates that processing capacity is allocated to ongoing mental…activities” (276). Brewster et al.
(1998) found that males and females showed an increase in HR during a smiling infant stimulus. It is possible this HR acceleration occurred because the participants were enjoying the experience of watching an infant smile and coo.

Males and females experienced HR decelerations during the crying infant stimulus. Stimuli that are thought to be “attention provoking” elicit HR decelerations (Donovan, Leavitt, & Balling, 1978). Researchers from several studies have observed that a crying infant elicited a HR deceleration (Donovan, et al.; Frodi et al., 1978; Frodi & Lamb, 1978). Perhaps, participants experienced HR deceleration while viewing the crying infant because a crying infant requires an “attention seeking” response. This idea corresponds with Donovan et al.’s (1978) conclusion that an infant cries in order to communicate that a response from the caregiver is required. Further, “this attentive response is then followed by...behaviors aimed at terminating the signal” (i.e., infant cry) (73). Andreassi (2000) states that HR decelerations indicate a “somatic quieting” within the individual. This “somatic quieting” occurs so the individual can appropriately appraise and judge certain situations. Males and females physiological reactions in this investigation reflected a “somatic quieting” that allowed them to appropriately assess the situation.

Females showed a decrease in HR during the cold pressor stimulus and males showed an increase in HR during the cold pressor stimulus (See Figure 1). Logan et al. (2004) suggest that there are gender differences in the way males and females interpret pain. According to their study, females are more likely to draw on prior pain situations than men. Therefore, females have greater expectations of experiencing pain than do males. In the current findings, male and female participants may have differed in the way
they processed their discomfort. Heart rate deceleration occurs when there is notable anticipation of an event (Andreassi, 2000). Perhaps females in this investigation experienced more perceived discomfort and had more anticipation about the end of the cold pressor task.

The majority of the participants reported neutral feelings after viewing the crying infant video. This suggests that participants did not experience a significant amount of stress while viewing the crying video. If participants experienced a significant amount of stress during the child stimuli then they might have been more likely to report negative or positive emotions. According to the participants response to the hypothetical plan regarding what they would do if they were caring for the crying infant they reported pro social plans to approach the crying infant.

It may be that the participants reverted to a response set (i.e., choosing the middle neutral option on a Likert scale) rather than claiming either positive or negative emotions in response to the distressed infant video. Such a neutral choice might also indicate that the stimulus insufficiently stressed the participants. However, the wealth of prior findings (Bell & Ainsworth, 1972; Boukydis & Burgess, 1982; Brewster et al., 1998; Crowe & Zeskind, 1992; Dessureau et al., 1998; Donovan et al., 1978; Frodi et. al., 1978; Frodi & Lamb, 1978; Frodi, Lamb, Leavitt, & Donovan, 1978; Green & Gustafson, 1987; Hall & Morsbach, 1989; Wood & Gustafson, 2001; Zeskind & Marshall, 1988) that show adults to be “hard-wired” to respond to infant distress with notable arousal and reports of aversion to the crying opens the possibility of a response set. Response sets can be used by participants when the content or issue being assessed is challenging or distressing (Sattler & Hoge, 2006). While it is reasonable to consider a crying infant to be
challenging or distressing, consideration of the possibility of a response set is an issue to be explored by future research via manipulation of the Likert scale in use.

An attempt to include a measure for GSR was made for this study. However, due to equipment malfunction GSR was not included as a measure for analysis in this study. Environmental issues were experienced while conducting this study. Extraneous noise can influence HR and careful consideration was taken to conduct this study inside a quiet laboratory room (Andreassi, 2000). However, nearby building construction took place during the collection of data from some participants. This caused uncontrollable outside noise that could have affected the participants’ response. This highlights an important condition that should be met in conducting research of this type. Namely, to explore ways to further sound-proof laboratory rooms in order to protect future studies from possible contamination due to extraneous noise.

Future researchers should consider using multiple measurements of physiological reactivity. For example, respiration rate, skin conductance, and ECG are common ways to assess physiological reactivity and including these measurements in a future study would likely increase the validity of the study as well as provide insight to how participants physiological reactions (i.e., respiration rate, skin conductance, and ECG) are similar or different. Calculating HR variability would provide insight into participants’ sympathetic and parasympathetic activation which could provide a more in depth explanation of the findings. Increasing sample size in a replica of this study might illuminate and provide statistical power to patterns observed in this study. Future researchers should also consider exploring different coping strategies participants use or would hypothetically use in similar stressful situations.
In this investigation males and females responded similarly to child stressors. The results in this investigation are in accordance with previous research regarding the similarities between males and females physiological response. This suggests that if males and females were in a care-giving situation they would respond to the infant's signals in a similar way. As with other investigations on gender differences, these findings suggest that women and men have much more similarity and overlap than difference in function. These gender similarities are applicable to the evolving nature of family structure.
Appendix A

Subject Number: ______________

Stimulus Order: 1 2 3 4

Directions: Please select an answer from the available choices for each item.

1. How are you feeling right now?
   a. Angry
   b. Sad
   c. Neutral
   d. Excited
   e. Happy

2. Please circle a number that corresponds to the level of intensity that describes how you are feeling right now:

<table>
<thead>
<tr>
<th>Intensity:</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>
Appendix B

Subject Number: ________________

Stimulus Order: 1 2 3 4

Directions: Please select an answer from the available choices for each item.

1. What is the gender of the infant in the video?
   a. Male
   b. Female

2. Choose a emotion that best describes how the observed infant is feeling?
   a. Angry
   b. Sad
   c. Neutral
   d. Excited
   e. Happy

3. Please circle a number that corresponds to the level of intensity that best describes the emotion of the observed infant.

   **Intensity:**
   Low ___ Moderate ___ High
   1 2 3 4 5

4. How are you feeling right now?
   a. Angry
   b. Sad
c. Neutral

d. Excited

e. Happy

5. Please circle a number that corresponds to the level of intensity that best describes how you are feeling right now:

<table>
<thead>
<tr>
<th>Intensity:</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

6. If you were in charge of this infant, what would you do? Please rank-order the following items from 1 being the first thing you would do if you were in charge of this infant to 7 being the last thing you would do if you were in charge of this infant.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. Walk away to a quiet place.</td>
</tr>
<tr>
<td></td>
<td>b. Pick up the infant to comfort.</td>
</tr>
<tr>
<td></td>
<td>c. Pick up the infant to play.</td>
</tr>
<tr>
<td></td>
<td>d. Continue with my activities; the infant is fine</td>
</tr>
<tr>
<td></td>
<td>e. Explore the infant’s situation to see if there is a problem</td>
</tr>
<tr>
<td></td>
<td>f. Try to discipline the infant to encourage quiet.</td>
</tr>
<tr>
<td></td>
<td>g. Look for the infant’s mother or father.</td>
</tr>
</tbody>
</table>

Directions: Please share any additional thoughts you have about this infant.

7. Use the lines provided below to list any additional thoughts you have about this infant. If you run out of space to write you can use the back of this page.
Appendix C

Subject Number: __________

Stimulus Order: 1 2 3 4

Directions: Please select an answer from the available choices for each item.

1. What is the gender of the infant in the video?
   a. Male
   b. Female

2. Choose a emotion that best describes how the observed infant is feeling.
   a. Angry
   b. Sad
   c. Neutral
   d. Excited
   e. Happy

3. Please circle a number that corresponds to the level of intensity that best describes the emotion of the observed infant.

   Intensity:  
   \[
   \begin{array}{cccc}
   \text{Low} & 1 & \text{Moderate} & 3 & \text{High} & 5 \\
   \end{array}
   \]

4. How are you feeling right now?
   a. Angry
   b. Sad
c. Neutral

d. Excited

e. Happy

5. Please circle a number that corresponds to the level of intensity that best describes how you are feeling right now:

<table>
<thead>
<tr>
<th>Intensity:</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>5</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

6. If you were in charge of this infant, what would you do? Please rank-order from 1 being the first thing you would do if you were in charge of this infant to 7 being the last thing you would do if you were in charge of this infant.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>Walk away to a quiet place.</td>
</tr>
<tr>
<td>b.</td>
<td>Pick up the infant to comfort.</td>
</tr>
<tr>
<td>c.</td>
<td>Pick up the infant to play.</td>
</tr>
<tr>
<td>d.</td>
<td>Continue with my activities; the infant is fine</td>
</tr>
<tr>
<td>e.</td>
<td>Explore the infant’s situation to see if there is a problem</td>
</tr>
<tr>
<td>f.</td>
<td>Try to discipline the infant to encourage quiet.</td>
</tr>
<tr>
<td>g.</td>
<td>Look for the infant’s mother or father.</td>
</tr>
</tbody>
</table>

Directions: Please share any additional thoughts you have about this infant.

7. Use the lines provided below to list additional thoughts you have about this infant.

If you run out of space to write you can use the back of this page.
Appendix D

Subject Number: ______________

Stimulus Order: 1 2 3 4

Directions: Please select an answer from the available choices for items 1 and 2.

1. How are you feeling right now?
   a. Angry
   b. Sad
   c. Neutral
   d. Excited
   e. Happy

2. Please circle a number that corresponds to the level of intensity that best describes how you are feeling right now:

   Intensity:
   
   Low  Moderate  High
   1  2  3  4  5
References


Vita

Meghan Kovar was born in on . She completed her undergraduate studies at the University of North Florida and received a Bachelor of Arts in Psychology and a Bachelor of Arts in English. She also received a Master of Arts in General Psychology from the University of North Florida. During her education at University of North Florida she successfully completed a counseling internship and was subsequently employed at a local non-profit organization. Additionally, she conducted mental health evaluations for at risk juveniles for a local non-profit organization in conjunction with Department of Juvenile Justice. Her goal is to acquire a position in research coordination as well as continue her education in this domain.