Differences Between Non-Parental Male and Female Responses to Infant Crying

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***Keywords*: audio, auditory, baby, crying, emotion, EDA, EEG, pulse oximetry, sex, stress**

Abstract

The purpose of this study was to determine if there is a difference between how non-parental males and females between the ages of 20 and 24 respond physiologically to an audio recording of a crying infant. Based on previous research that investigated differences in physiological response of mothers and fathers to auditory stimuli of infants in distress, the difference between non-parental male and female physiological responses was studied. It was hypothesized that females would have a greater response in all three physiological variables studied. Within the experiment there were a total of 30 participants; 15 male and 15 female. While participants listened to a 30 second recording of an infant crying, measurements of brain activity, heart rate, and electrodermal activity were taken. Since a large number of studies measuring responses to infant stimuli were conducted using parents as subjects, the present experiment adds a new angle to a widely discussed topic. No significant difference was seen between males and females in any of the physiological variables that were measured.

Introduction

Differences between the male and female sexes are frequently studied on a variety of levels, and research has attempted to explain the biological and behavioral differences that exist between males and females. One of these commonly studied differences is the response of each sex to stressful and emotional stimuli. In 1996, Jezova et al. researched the neuroendocrine response to stress in relation to each sex, and showed that subjects introduced to stressful conditions, such as heat, exhibited changes in posterior pituitary hormone release, resulting in changes in oxytocin and corticosterone levels. Females had higher levels than males of the stress hormones ACTH and cortisol, suggesting a physiological difference between each sex when responding to stressful stimuli.

Researchers have examined male and female responses and interactions with children; research suggests that men and women respond differently to visual and auditory stimuli from an infant in distress. This topic has been explored in great depth, and numerous variables related to sex differences have been previously investigated in both a psychological and physiological capacity. (Jezova et al 1996). Johnson et al. (2014) showed that mothers responded more readily to their infant's vocal cues than fathers did. The study indicated that in the first seven months following birth, mothers were significantly more attentive to the infant. Some research suggests that this difference is attributable to a difference in male and female brain evolution. Because females have historically had a greater investment in pregnancy and caregiving, they have selectively evolved a brain more in tune with the parental response (Taylor et al, 2000)(Bjorkland & Jordan, 2013).

Notable differences have been found in caregiver response when researching a variety of different study groups. Research thus far has focused on differences between parents and non-parents, as well as between mothers and fathers. Fleming et al. (2002) demonstrated that alertness to infant crying was higher in fathers as opposed to non-fathers. Giardino et al. (2008) obtained similar results between mothers and non-mothers, showing that mothers were more sympathetic and alert than non-mothers and displayed more intense feelings of nurturance that is reflected in motherly behavior, which was correlated with the increased cortisol levels that they observed. As mentioned previously, Johnson et al. (2014) compared mothers and fathers directly. Their research revealed that mothers were more attentive to infant cries through the first seven months following birth.

Although most research has shown that sex differences exist in response to a baby crying, not all research has supported these conclusions. Frodi and Lamb (1978), for example, found that there was no psychophysiological sex differentiation in response to infant crying. While measuring blood pressure, skin conductance, and heart rate, there was no difference between sexes from ages 8 to 30, regardless of marital or parental status. Since the time of this study, research has contradicted this finding, however, much of this research has not addressed and compared non-parent subject groups. This apparent contradiction in conclusions brings to question whether there are significant physiological sex differences between non-parents in response to infant crying (Frodi and Lamb, 1978).

Therefore, this study aims to measure the difference in physiological stress responses to crying infants between non-fathers and non-mothers. In order to evaluate responses to auditory stimuli of an infant crying, measurements of brain activity, electrodermal activity, and heart rate were taken. The goal was to determine if females would show a heightened physiological stress response to a crying infant in comparison to males. Higher levels of estradiol directly increase parental response, and conversely lower levels of testosterone increase parental response (Fleming et al, 2002)(Bos et al, 2009). Research has indicated significant brain activity in response to infant vocalizations of distress (Bos et al., 2009)(Parsons et al., 2013)(Parsons et al., 2014). Based on the assumption that females have increased levels of estradiol and decreased levels of testosterone, it is hypothesized that female non-mothers between the ages of 20 and 25 will exhibit a greater increase in heart rate, brain activity, and electrodermal activity in response to the auditory stimulus of a crying infant as compared with their male non-father counterparts.

Materials & Methods

In order to quantify the results of this study, physiological parameters were monitored on each subject prior to and during exposure to audio recordings of an infant crying. Parameters were chosen for the purpose of evaluating the level of arousal that occurred in response to the auditory signal. To understand this level of arousal, brain activity was monitored using electroencephalography (EEG) technology, sympathetic nervous system responses was monitored by recording electrodermal activity using biofeedback instruments, and heart rate monitored using pulse oximetry readings. Before exposure to the stimulus, physiological recordings were taken for 10 seconds in complete silence. These measurements were used as a baseline to compare experimental data collected after the infant stimulus was introduced. Additional measurements were recorded for 30 seconds while subjects are exposed to the auditory stimulus of calming waves. The data collected during the wave stimuli served as a positive control to see if our responses as a whole were due to auditory stimuli. After data collection was complete, a questionnaire regarding the subject's previous experience with children was distributed. Information from this questionnaire was then used by experimenters to discern the impact of exposure to children on the responses recorded from each subject.

Subjects and Preparation

The subjects for this study were selected from the Spring 2015 Physiology 435 course at the University of Wisconsin-Madison. A total of 30 students, 15 males and 15 females, participated in the study. Once selected, each participant was asked to complete a consent form agreeing to participate in an experiment designed to evoke an emotional response. After filling out the consent form, the participant entered the room where the experiment took place and was seated for preparation. Before the test participants were asked whether they had consumed caffeine or exercised within one hour prior to the experiment, as these factors had the potential to skew physiological readings of EEG and EDA, and would be useful for later analysis.

All appropriate equipment was then set up. First, the Nonin Pulse Oximeter, used to read the subject's heart rate, was placed on the subject's right index finger. One experimenter was then responsible for monitoring and recording the subject's heart rate values in five-second intervals. Next, the BIOPAC Systems, Inc. EDA unit was connected to the subject's left index and middle fingers. The BIOPAC Isotonic Recording Gel was applied to each terminal of the biofeedback sensors and wrapped around the subject's fingers. These sensors were plugged into channel 1 of the BIOPAC Data Acquisition Unit, which was directly connected to the computer to be recorded. The BIOPAC Systems, Inc. EEG sensors were then placed on the subject's head. Signa Gel Conducting Gel was applied to each of the three EEG sensors (VIN+, VIN-, and GND) and as adhesive disc was used to attach the sensor to the subjects head. The GND sensor was placed directly behind the subject's left ear lobe, the VIN- sensor was placed 4 cm directly dorsal and 1 cm cranial to the GND sensor, and the VIN+ sensor was placed 4cm cranial and 1 cm ventral to the VIN- sensor. The experimenter attempted to isolate the subject's skin to the best of their ability so that the sensor was adhered directly to the subject's head. A generic latex swim cap was then placed on to the subject's skull to ensure the sensors' adherence throughout the experiment. The EEG sensors were plugged into channel 2 of the BIOPAC Data Acquisition Unit. Another experimenter was then responsible for monitoring the recording of both EDA and EEG units via the BIOPAC Systems, Inc. BSL 4.0 MP36 software. Once all BIOPAC equipment was set up, Dr. Dre Beats Solo over-ear headphones were placed onto the subject to isolate our stimuli and eliminate background noise.

Experimental Segment

Once the headphones were placed on the subject and equipment was set, the participant was asked to relax and close their eyes while experimenters turned off the lights. The experimental equipment was then calibrated using the BIOPAC 4.0 MP36 software while the participant was in this resting relaxed state with their eyes closed. Following calibration, the participant was subjected to the experimental audio recording while data was simultaneously recorded. For ease of analysis, the audio recording and the measurement devices were all started at the same time. Heart rate was recorded via the Nonin Pulse Oximeter and values were recorded every 5 seconds by an experimenter. EEG and EDA readings were taken continuously by the Biopac software throughout the length of the experimental segment.

The auditory volume and external environment were kept constant between all participants to ensure the testing conditions were constant throughout. The audio recording began with 10 seconds of silence which served as a negative control. The subject was then subjected to 30 seconds of calming ocean wave sounds, which served as a positive control. The waves were then followed by 10 seconds of silence and finally, the experimental stimulus, which was 30 seconds of non-distressed infant crying. The volume was set to 50% of the maximum volume on a MacBook Pro laptop. Once the audio recording completed and final measurements had been taken, the lights were turned back on and the participant was asked to reopen their eyes.

Following the collection of experimental data, subjects completed a questionnaire to help with the analysis of quantitative data (see appendix A). The questionnaire concerned the subject's feelings towards and experiences with children, how many siblings they have, and if they have any notable phobias. All of this information was then used to better understand the responses of individual subjects (Figure 1).

Analysis

The initial analysis started with finding the mean EEG, EDA, and heart rate values for each participant in response to silence, waves and infant crying for all three of our intervals. Next, each individual's average silence parameter readings were compared with his or her crying response reading in order to examine the change between the two. Absolute values were used for EEG and EDA differences because the analysis focused on the magnitude of change. Grubbs' tests were performed on each data set to identify outliers, which were then removed. These data were used to perform three separate two-sample T-tests to compare EEG, EDA, and heart rate responses to crying infants between the male and female subjects.

Results

The female and male EEG were averaged over each sound interval, and then the change in magnitude between the silence interval and crying interval was calculated and subjected to a t-test. The maximum increase in EEG magnitude of female subjects was 16.62 microvolts (uV) while the maximum male increase was 24.76 uV when exposed to the crying stimulus. The minimum increase in EEG magnitude for females was 0.28 uV and the minimum for males was 0.21 uV. The average change in magnitude for the females' EEG was 4.49uS with a standard deviation of 5.54 uV when exposed to the crying stimulus. The male EEG magnitude changed by an average of 7.37 uV with standard deviation of 6.61uV (Figure 2). A student's two-sample unpaired t-test using n_{female}=12 and n_{male}=13 was performed comparing the female and male average EEG magnitude changes in response to crying stimulus and resulted in a p-value of 0.25 (Table 1).

The female and male EDA were averaged over each sound interval, and then the change in magnitude between the silence interval and crying interval was calculated and used for a t-test. The maximum increase in EDA magnitude of our female subjects was 76.3uS while the maximum of the males was 9.75uS when subjected to the crying stimulus. The minimum increase in EDA magnitude for females was 0.26uS and the minimum male was 0.01uS. The females' EDA changed by an average of 14.43 microsiemens (uS) with a standard deviation of 27.76uS when exposed to the crying stimulus compared to the silence control interval. The male EDA magnitude changed by an average of 1.47 uS with a standard deviation of 2.40uS (Figure 3). Using a student's two-sample unpaired t-test with n_{female}=12 and n_{male}=14 to compare the female and male average EDA change in magnitudes a p-value of 0.09 was obtained (Table 2).

The female and male heart rates were averaged over each sound interval, and then the change between the silence interval and crying interval was calculated. The maximum female heart rate increase of our 15 female subjects was 10.17 beats per minute (bpm) while the maximum male heart rate increase was 7.67 bpm when subjected to the crying stimulus. The maximum decrease in female heart rate was 10.17 bpm and the greatest male decrease was 13.4 bpm. The females' heart rate increased by an average of 0.25 bpm with a standard deviation of 5.51 bpm when exposed to the crying stimulus versus the silence control interval. The males' heart rate decreased by an average of 1.38 beats per minute with a standard deviation of 5.77 bpm when exposed to the crying stimulus (Figure 4). A student's two-sample unpaired t-test with n_{female}=15 and n_{male}=15 was performed comparing the male and female averages and a p-value of 0.43 was obtained (Table 3).

Discussion

The purpose of the study was to examine the difference in physiological stress response to infant crying between non-parental males and females age 20-25. Analysis of the data demonstrates that there is no significant physiological difference between non-parental females and males ages 20 to 24 in response to a crying infant, and therefore the initial hypotheses was not supported for any of the three parameters measured. P-values for each of the non-invasive parameters were greater than the 0.05 cutoff value for significance, and therefore the null hypothesis that female and male responses to a crying baby do not differ failed to be rejected. The hypothesis that non-parent females have a stronger physiological response to a crying baby than do non-parent males, therefore, cannot be supported.

Electroencephalograph data of females and males during each of the time intervals did not yield a significant difference (p=0.2511) in physiological response between the subject groups. Contrary to the hypothesis, results showed that, on average, males tended to experience a greater change in neural activity than did females when comparing their electric potential values during the silence and crying baby stimulus. Males had an average change of 7.375uV, whereas females only had a change of 4.489uV. This is the opposite of what was initially expected, however it is imperative to note that there is still no statistically significant difference between the two groups.

An important factor that influenced the data analysis for EEG were outliers. Of the 15 female and 15 male subjects in the experiment, only 12 females and 13 males were included in the data analysis because of extreme electric potential values for the others. Data for participants 6 and 28, both females, were excluded because of extremely large magnitudes for their electric potentials. Normal values for electric potential fell between about positive and negative 20uV, however participant 6 had a base level of -1094uV and participant 28 reached -131.32uV during the crying baby interval. Participant 26, a male, reached -96.55uV during this baby crying interval as well, so it was also excluded. Since these values are much greater than the normal range for EEG, the assumption is that there was an issue with calibrating the BioPac software at the beginning of the trial, and therefore these values were not included in the EEG t-test. Furthermore, after calculating the difference between the silence and baby crying intervals, a Grubbs' test was used to statistically identify additional outliers in the changes between the two intervals. Participant 29, a female, was identified as an outlier, with a difference of 30.01, and participant 25, a male, was also identified as an outlier, with a difference of 50.48. After excluding these data, the unpaired t-test was executed to obtain the p-value.

EDA data during the same time intervals also did not result in a statistically significant physiological difference between males and females. The general trend for the EDA data supported the hypothesis that females would have a stronger response to a crying baby, as the average difference was higher for females than for males. However, this conclusion was not statistically significant. The p-value was found to be 0.0938, which is again above the 0.05 cutoff. The average value for females was found to be 14.43uS, and the average value for males was 1.473uS, but the standard deviation for the female group was very large, 27.76uS. This large standard deviation is likely due to two of the participants' data. Their EDA change values were greater than 70uS, whereas the remaining participants were all below 15uS. A Grubbs' test did not identify either as outliers, so these data could not be omitted. This extremely large standard deviation likely caused a p-value above the significance cutoff, because standard deviation of each group is a factor of the t-test. If these two points were omitted, the female group standard deviation would be considerably lower. As was the case with EEG, certain participants were omitted from EDA data analysis because of large and abnormal conductance values. Three females were excluded from EDA analysis for having extremely large magnitudes of conductance in comparison to the others. Also, one male was excluded via a Grubbs' test identifying him as an outlier at 21.98uS.

The third parameter, heart rate, also showed no established statistical significance for a difference between females and males over the time intervals. The average change in heart rates for females was 0.254bpm, with a standard deviation of 5.512bpm. The average change in heart rates for males was -1.382bpm, with a standard deviation of 5.766bpm. This resulted in a p-value of 0.434, which is again above the 0.05 cutoff value. There was not a strong positive change in heart rate in either the female or male group when presented with the sound of a crying baby. Heart rate was expected to increase, however females only had an average increase of 0.254bpm, and males actually had a decrease in heart rate, -1.382bpm.

A couple of factors could explain why these results were insignificant in supporting the initial hypothesis. The sample only included 30 participants, making it harder to reach statistical significance with high power in the data set. Answers to the questionnaire also revealed notable information about test subjects that could explain data trends. It should be noted that no subjects consumed caffeine or exercised within one hour of testing, so these factors are not likely to be reasons for discrepancies in data. However, the majority of participants responded to the questionnaire answering that they liked children; 73% of the female subjects and 67% of the male subjects claimed to like children, which possibly explains the similar results in male and female responses to children in this experiment. Also not addressed by this study was the menstrual cycle of our female patients or the effects of hormonal contraception. As the sympathetic sensitivities of young females has been known to change throughout the 28-day menstrual cycle which can also be influenced by hormonal contraceptives (Minson et al., 2000). The sympathetic state of the female subjects could explain differences in heart rates, as well as, EDA values.

When analyzing EEG and EDA data, differing trends among the participants were observed. The raw data, which includes average electric potentials and skin conductance for each participant during each time interval, followed several patterns. For EEG, some participants began with a positive electric potential that continued to increase during the baby stimulus, but there were also individuals that began with negative electric potentials that would decrease. There also existed both male and female individuals whose EEG results increased and decreased within the same experiment and throughout the experimental intervals (Figure 5). A similar phenomenon was observed in the skin conductance data we collected (Figure 6). The lack of an obvious trend in these cases calls into question the accuracy of our collection equipment or possible sources of interference.

Limitations of the equipment could have also contributed to interference in the data. The accuracy of the data could be affected by the calibration of the equipment in the Biopac System. The EEG data may also have been affected by how accurately the electrodes were placed on the participant, as well as, exterior sounds and movements. The skin conductance data may have been affected by how well the equipment was applied to the participant and if good contact with the skin was established. Although testing conditions were monitored to keep consistency, all three parameter measurements were subject to outside interference in this experiment due to our space and classroom limitations.

The conclusions of this experiment are supportive of some previous research and contradictory to other research. Researchers including Jezova 1996 and Johnson et al. 2014, both mentioned previously, found statistical significance when looking at the sex differences and their response to stress and infant vocal cues. Conclusions of this study contradict these previous findings. However, the present study's results corroborate experiments like Frodi and Lamb 1978, also mentioned previously, which found no sex differences in physiological response to infant crying between young males and females.

Future research should address the discrepancies in these findings and look to explain these opposing conclusions. In order to ensure that external conditions are kept constant, baseline readings of the environment should be taken each day. A feasibility test could be run to determine the accuracy of the electrode readings. Future studies could expand the questionnaire used to encompass subject's full experience with children. Additionally, future work should examine mothers, fathers, non-mothers and non-fathers collectively.

References

Bjorklund, D.F. & Jordan, A.C. (2013). Human Parenting from an Evolutionary Perspective In Wilcox & Kline (Ed.), *Gender & Parenthood:Biological & Social Scientific Perspectives* (61-90). Columbia University Press, New York.

Bos, P.A., Hermans, E.J., Montoya, E.R., Ramsey, N.F., & van Honk, J. (2009). Testosterone administration modulates neural responses to crying infants in young females. *Psychoneuroendocrinology 35*(1)114-121.

Fleming, A.S., Corter, C., Stallings, J., & Steiner, M. (2002). Testosterone and prolactin are associated with emotional responses to infant cries in new fathers. *Hormonal Behavior* 42(4) 399-413.

Frodi, A.M., Lamb, M.E. (1978). Sex differences in responsiveness to infants: A developmental study of psychophysiological behavioral responses. *Child Development* 49(4) 1182-1188.

Giardino, J., Gonzalez, A., Steiner, M., Fleming, A.S. (2008). Effects of motherhood on physiological and subjective responses to infant cries in teenage mothers: acomparison with non-mothers and adult mothers. *Hormonal Behavior* 53(1) 149-158.

Jezova, D., Jurankova, E., Mosnarova, A., Kriska, M., & Skultetyova, I. (1996). Neuroendocrine response during stress with relation to gender differences. *Acta Neurobiologica Experimentalis* 56, 779-785.

Johnson, K.J., Caskey, M., Rand, K., Tucker, R., & Vohr, B. (2014). Gender differences in adult-infant communication in the first months of life. *Pediatrics* 134(6).

Minson, C.T., Halliwill, J.R., Young, T.M., & Joyner, M.J. (2000). Sympathetic activity and baroreflex in young women taking oral contraceptives. *American Heart Association* 102(13) 1473-1476.

Parsons, C.E., Stark, E.A., Young, K.S., Stein, A., & Kringlebach, M.L. (2013) Understanding the human parental brain: A critical role of the orbitofrontal cortex. *Social Neuroscience 8*(6)525-543.

Parsons, C.E., Young, K.S., Morten, J., Brattico, E., Hyam, J.A., Stein, A., Green, A.L., Aziz, T.Z., & Kringlebach, M.L. (2013). Ready for action: a role for the human midbrain in responding to infant vocalizations. *Social Cognitive Affective Neuroscience 9*(7)977-984.

Taylor, S.E., Klein, L.C., Lewis, B.P., Gruenewald, T.L., Gurung, R.A.R., & Updegraff, J.A. (2000). Biobehavioral responses to stress in females: tend-and-befriend, not fight-or-flight. *American Psychological Association, Inc.* 107(3) 411-429.

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Tables

Table 1:

T-test: EEG (uV) (2-sample, unpaired, equal variance)		
Female silence avg:		-0.126
Female crying avg:		-0.6232230769
Female avg change:		4.48949167
Female std:		5.5392898
Male silence avg:		-4.9035
Male crying avg:		-5.864507143
Male avg change:		7.37493077
Male std:		6.61218063
P-value:		0.25113253

Table 2:

T-test: EDA (uS) (2-sample, unpaired, equal variance)		
Female silence avg:		6.987083333
Female crying avg:		8.4217675
Female avg change:		14.4310175
Female std:		27.7553966
Male silence avg:		8.9037
Male crying avg:		10.00093333
Male avg change:		1.47296429
Male std:		2.49265258
P-value:		0.09383978

Table 3:

T-test: Heart Rate (bpm) (2-sample, unpaired, equal variance)		
Female silence avg:		74.96666667
Female crying avg:		75.22066667
Female avg change:		0.254
Female std:		5.511634189
Male silence avg:		72.43333333
Male crying avg:		71.05133333
Male avg change:		-1.382
Male std:		5.766412849
P-value:		0.433686349

Figures and Legends

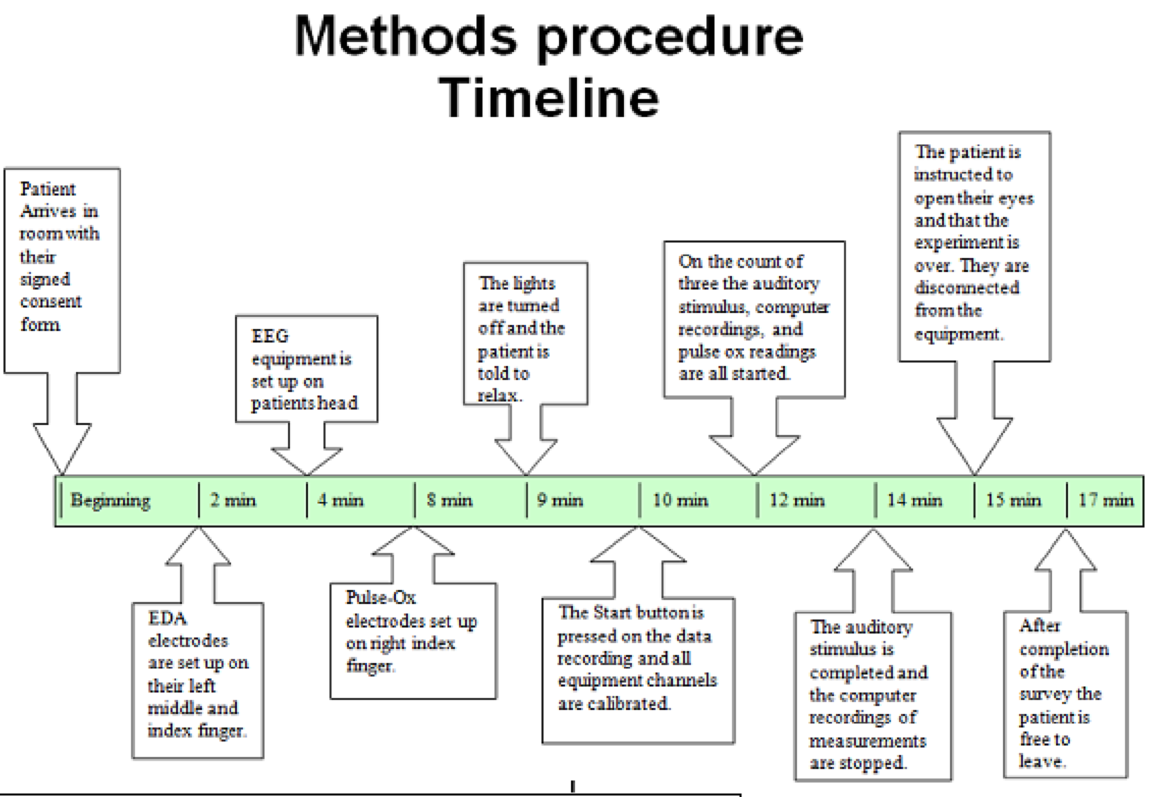

Figure 1: Timeline of the sequence of events that our participants encountered from the beginning to the end of our experiment.

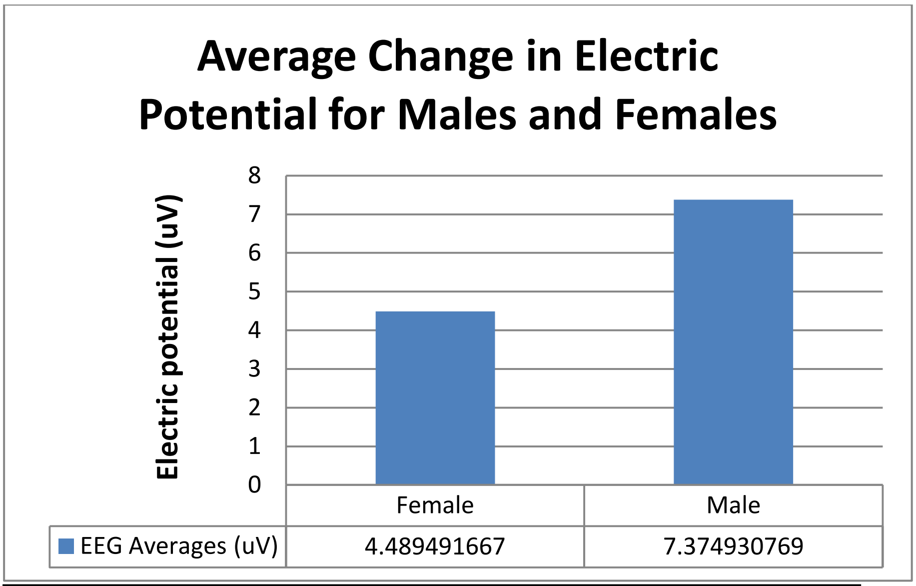

Figure 2: this is the average value recorded for electric potential (EEG) in males and females

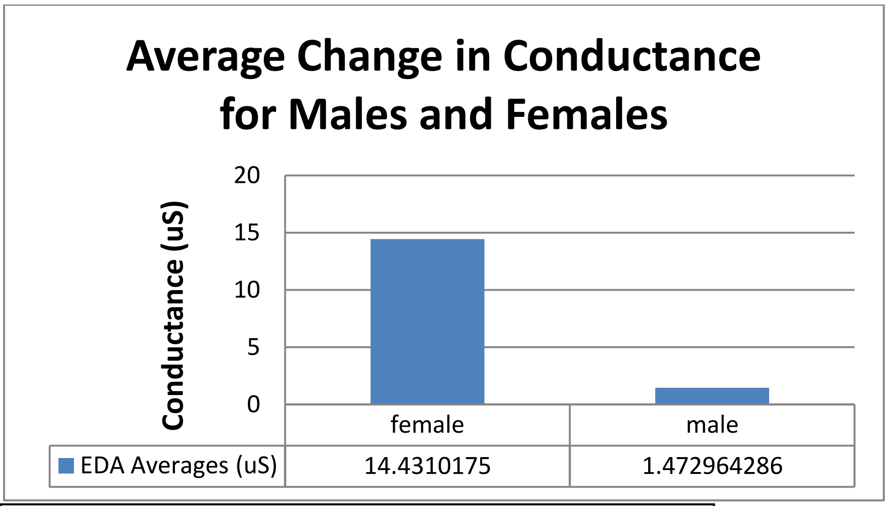

Figure 3: this is the average value recorded for skin conductance (EDA) in males and females.

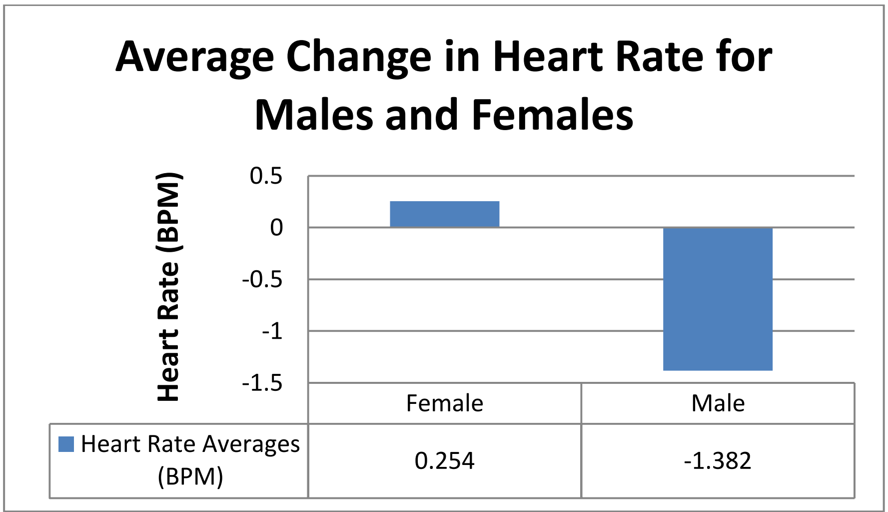

Figure 4: This is the average value recorded for heart rate in males and females

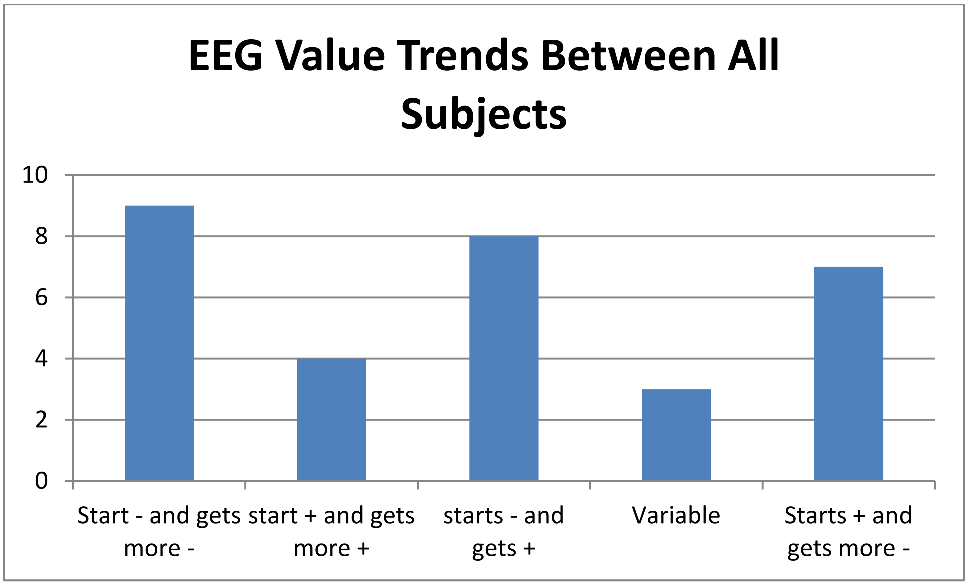

Figure 5: This graph displays the trends in values that were recorded throughout the experiment for EEG. It is comprised of and describes changes within the silence, infant stimuli and the change between the two.

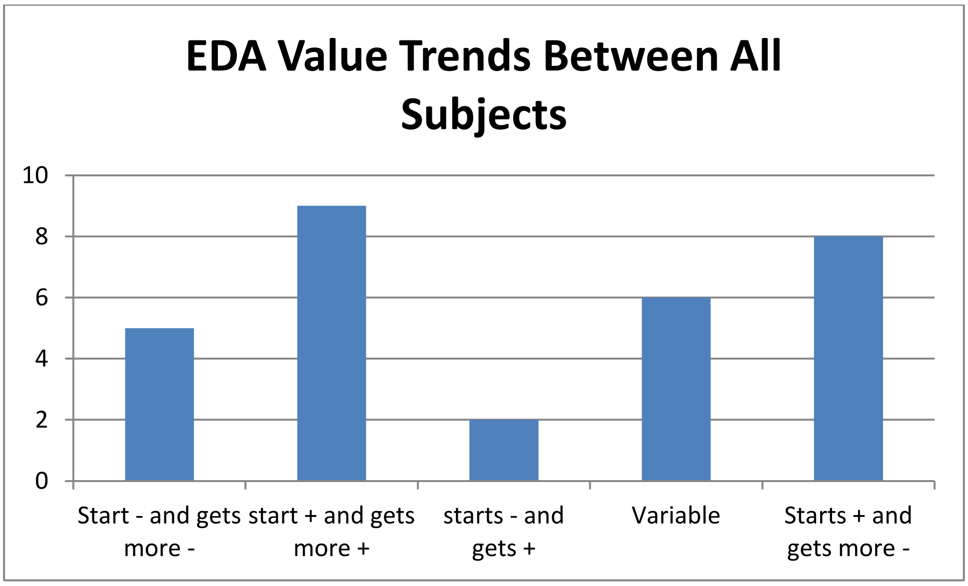

Figure 6: This graph displays the trends in values that were recorded throughout the experiment for EDA. It is comprised of and describes changes within the silence, infant stimuli and the change between the two.

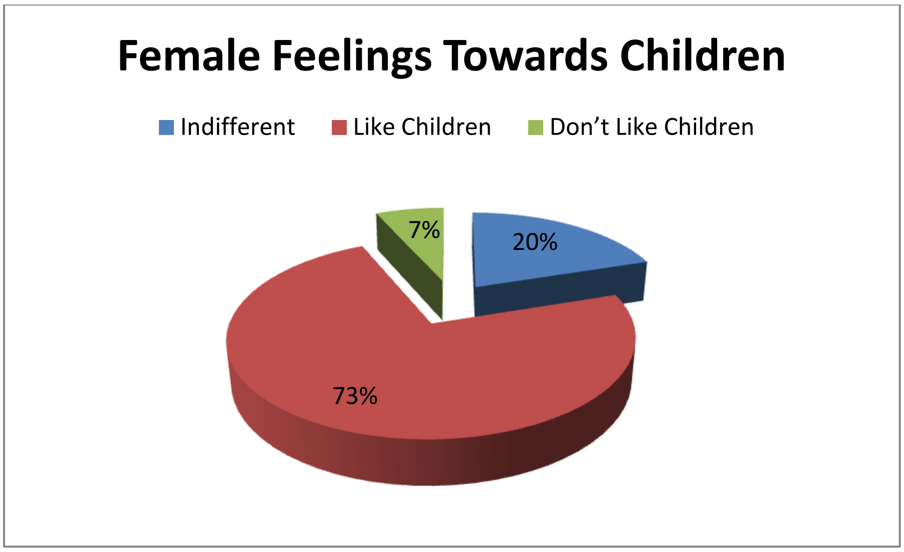

Figure 7: These are the responses from females regarding their feelings towards children.

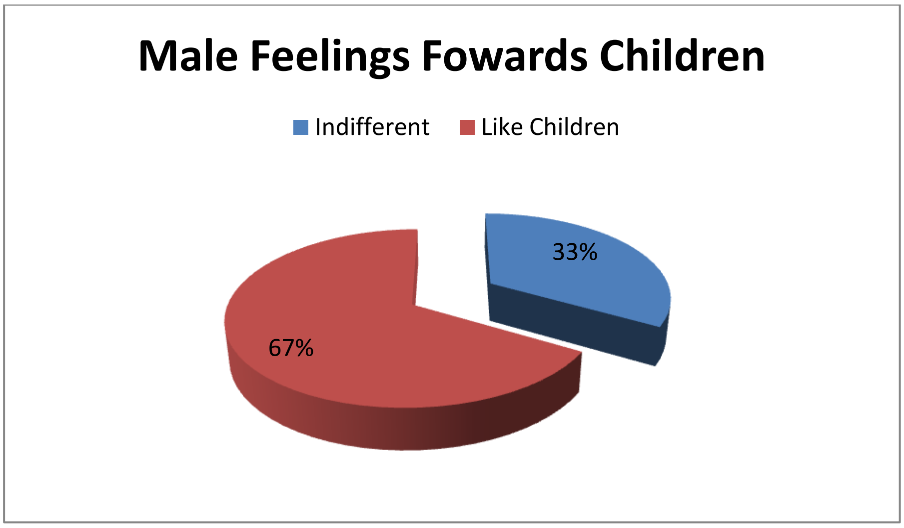

Figure 8: These are the responses from males regarding their feelings towards children. It is worth noting that 0% of males said that they did not like children

Appendix

a. Consent Form

UNIVERSITY OF WISCONSIN-MADISON
Research Participant Information and Consent Form

Title of the Study: Measuring Physiological Differences in Responses to Emotionally Evocative Auditory Stimuli

Principal Investigators: India Anderson-Carter, Alenna Berota, Alex Crain, Carly Gubernick, Elly Ranum, Ross Vitek

DESCRIPTION OF THE RESEARCH

You are invited to participate in a research study about Physiological responsiveness to auditory stimuli.

You have been asked to participate because you are enrolled in Physiology 435.

The purpose of the research is to understand the differences in physiological responses to auditory stimuli.

This study will invite the participation of all students enrolled in Physiology 435.

This research will take place within Physiology 435 laboratory sections.

WHAT WILL MY PARTICIPATION INVOLVE?

If you decide to participate in this research you will be asked to listen to an audio clip while having your brain activity, heart rate, and electrodermal activity measured.

Your participation will last approximately 15 minutes.

After the semester is completed, a detailed study of our results will be published in the Journal of Advanced Student Science.

No credit will be assigned for your complete and voluntary participation. If you do not wish to participate, simply return this blank consent form.

.**ARE THERE ANY RISKS TO ME?**
Subjects will be presented with auditory material that may be considered emotionally evocative.

ARE THERE ANY BENEFITS TO ME?

While there are no immediate benefits, your participation and data will be used to gain a better understanding of the physiological processes being studied.

HOW WILL MY CONFIDENTIALITY BE PROTECTED?

While there may be printed reports as a result of this study, your name will not be used. Both gender and subject number will be used to organize and analyze results. Only group characteristics will be reported – that is results with no identifying information about individuals will be used in any reported or publicly presented work.

WHOM SHOULD I CONTACT IF I HAVE QUESTIONS?

If you are not satisfied with response of research team, have more questions, or want to talk with someone about your rights as a research participant, you should contact Dr. Andrew Lokuta, 608-263-7488, ajlokuta@wisc.edu.

Your participation is completely voluntary. If you decide not to participate or to withdraw from the study it will have no effect on your grade in this class.

Your signature indicates that you have read this consent form, had an opportunity to ask any questions about your participation in this research and voluntarily consent to participate.

Name of Participant (please print):______________________________

____

Signature Date

b) Questionnaire

Participant #:
Last time caffeine consumed:
Last time exercised:

Questionnaire

1. Sex:
    a. Male/female/prefer not to disclose

2. Age:

3. What are your feelings towards kids?
    b. Like kids/Don't like kids/Indifferent

4. Do you have children?
    a. Yes/no
        i. If yes, how many:
        ii.
5. Are you an only child?
    a. Yes/no
        i. If no, how many siblings do you have and what ages:
        ii.
6. How much time do you spend around children (hours/week)?

7. Do you have any phobias?