"TOUCHING ON" POSITIVE AND NEGATIVE AFFECT

By

KATHERINE MONIQUE STAVOE

A Thesis Submitted to The Honors College

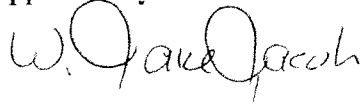
In Partial Fulfillment of the Bachelors degree
With Honors in

Psychology

THE UNIVERSITY OF ARIZONA

M A Y 2 0 1 3

Approved by:



Dr. William Jake Jacobs

Department of Psychology

The University of Arizona Electronic Theses and Dissertations
Reproduction and Distribution Rights Form

The UA Campus Repository supports the dissemination and preservation of scholarship produced by University of Arizona faculty, researchers, and students. The University Libraries, in collaboration with the Honors College has established a collection in the UA Campus Repository to share, archive, and preserve undergraduate Honors theses.

Theses that are submitted to the UA Campus Repository are available for public view. Submission of your thesis to the Repository provides an opportunity for you to showcase your work to graduate schools and future employers. It also allows for your work to be accessed by others in your discipline, enabling you to contribute to the knowledge base in your field. Your signature on this consent form will determine whether your thesis is included in the repository.

Name (Last, First, Middle)
Stavoe, Katherine

Degree title (eg BA, BS, BSE, BSB, BFA):
BS

Honors area (eg Molecular and Cellular Biology, English, Studio Art):
Psychology

Date thesis submitted to Honors College:
5/1/2013

Title of Honors thesis:
"Touching On" Positive and Negative Affect

The University of Arizona Library Release Agreement

I hereby grant to the University of Arizona Library the nonexclusive worldwide right to reproduce and distribute my dissertation or thesis and abstract (herein, the "licensed materials"), in whole or in part, in any and all media of distribution and in any format in existence now or developed in the future. I represent and warrant to the University of Arizona that the licensed materials are my original work, that I am the sole owner of all rights in and to the licensed materials, and that none of the licensed materials infringe or violate the rights of others. I further represent that I have obtained all necessary rights to permit the University of Arizona Library to reproduce and distribute any nonpublic third party software necessary to access, display, run or print my dissertation or thesis. I acknowledge that University of Arizona Library may elect not to distribute my dissertation or thesis in digital format if, in its reasonable judgment, it believes all such rights have not been secured.

☒ Yes, make my thesis available in the UA Campus Repository!

Student signature: Katie Stavoe Date: 5/1/2013

Thesis advisor signature: W. Jake Jacobs Date: 5/1/2013

☐ No, do not release my thesis to the UA Campus Repository.

Student signature: _____ Date: _____

Last updated: 04/01/13

Abstract

The current study investigates relations among touch, positive affect, negative affect and attachment style in romantically involved individuals. Touch is known to strengthen relationships in primates and is a key factor in mother-child bonds. Human touch has also shown regulatory effects in stressful situations.

It is hypothesized that a combination of touch factors, including duration and location, will decrease negative affect and increase positive affect in romantically involved females. It is predicted that male and female's individual attachment styles and relationship quality will mediate this effect.

One hundred and fifty-two participants, or 76 couples, were studied during a 5-minute segment where the couple discussed a topic of contention in their relationship. The duration and location of touch were coded independently for both the male and the female. The affect measure coded by SPAFF was also coded independently for each partner. Initial results have revealed differences within and between couples.

Acknowledgements

I would like to thank Professors W. Jake Jacobs and Aurelio Figueredo for their help and support. I would also like to thank Sally Olderbak for the use of her data, my research assistant Samantha Koushik, my family and friends who supported me through this process.

Introduction

Nonhuman primates' grooming habits have been conventionally attributed solely to hygiene (e.g., Reichard & Sommer, 1994). By this view, primates' self-grooming, or autogrooming, patterns consist of removing unhealthy objects such as insects, dead skin, dirt, branches, twigs, and leaves from their fur. Grooming others, called allogrooming, can be used to remove these unhealthy objects from areas that cannot be easily self-groomed. Allogrooming may, however, also include massaging, rubbing, or stroking along with the same components as autogrooming. Clearly, these additional components are not hygienically required, which suggests there are other benefits to allogrooming. Dunbar (2010) supports this idea by reporting that some primate species devote more time allogrooming than is hygienically necessary and that primates often allogroom with the same partners.

Extending the idea, Dunbar (1980) classified pairs of primates as "grooming partners" when they spent more than ten percent of their available social time interacting. Dunbar (1980) studied the interactions of 14 gelada baboons and measured the females' grooming habits, dominance, aggressiveness, and tendency to aid others who were attacked. The grooming partners' total time allogrooming was compared to attacked females' consistent wins and losses. When attacked, "females who interacted socially were more likely to support each other than were females who rarely interacted" (Dunbar, 1980, p.257). Aggressive females were more likely to aid nonaggressive females when

the pair spent at least 5% of their time allogrooming. These findings demonstrate that grooming time and aid are correlated.

Grooming relationships also appear to benefit primates' offspring. Silk et al. (2003) found that infants of female primates with more social bonds have higher survival rates. The genetic endurance and aid offered to grooming partners highlights the importance of forming social bonds by allogrooming.

Other than survival benefits, allogrooming also has stress-reducing behavioral effects on the groomee. Schino et al. (1988) measured "displacement activity rate" (DAR) of 12 pairs of Java macaques (11 females and 2 males) during various interactions. The stress measure, DAR, assessed the frequency of autogrooming, yawning, body shake, and scratching. DARs were recorded for both males and females during four time periods determined by the female's allogrooming. The first period was the time it took for the female to begin allogrooming the male after being released from her cage, the second was the total time the female spent allogrooming the male, the third was 10 seconds after she stopped allogrooming, and the fourth was all other times (time not grooming). While the female was grooming the male, male DAR was significantly lower than during the non-grooming time. Not only did allogrooming reduce DAR throughout the interaction, it also decreased DAR following allogrooming.

Similar behavioral changes due to touch have been observed in human infants. For example, Peláez-Nogueras (1996) successfully used touch as a reinforcer. Infants

displayed a desired behavior, holding eye contact, more often when touched compared to not being touched. In the same study, the author measured positive affect by recording the infants' smiling and vocalizations and negative affect by infants' cries and protests. Infants had higher positive affect with touch ($M = 48.6$, $SD = 24.6$), than the no-touch condition ($M = 16.2$, $SD = 16.1$) ($F(1,234) = 169.4$, $p < .001$). There were higher rates of negative affect during the no-touch condition ($M = 24.0$, $SD = 27.3$) than the touch condition ($M = 3.0$, $SD = 7.9$; $F(1,234) = 85.6$, $p < .001$).

The behavioral changes observed in primates and human infants, or affect, encompass both feeling and emotion. Affect may be related to underlying changing physiological mechanisms. LeDoux (2012) argued that one type of physiological mechanism, termed "survival circuits" reflects functions related to the organism's survival. These survival circuits, however, may or may not correlate with an organism's subjective feelings. Survival circuits are "sensory motor integrative devices that serve specific adaptive purposes" (LeDoux, 2012, p. 655). This definition is similar to some definitions of "emotion." Scherer (2005), for example, defines emotion as "an episode of interrelated, synchronized changes in the states of all or most of the five organismic subsystems in response to the evaluation of an external or internal stimulus event as relevant to major concerns of the organism" (p. 697). These five subsystems include: Information processing (Central Nervous System) which is a cognitive component, Support (Central Nervous System, Neuro-endocrine System and Autonomic Nervous

System) which are neurophysiological components, Executive (Central Nervous System) which is a motivational component, Action (Somatic Nervous System) which is a motor expression component, and Monitor (Central Nervous System) which is a subjective component called feeling. This definition clearly distinguishes emotion/survival circuits and feelings, permitting the inference that they are (or are not) causally interrelated. Some survival circuits and feelings can be learned, sparking a debate regarding whether either or both of these phenomenon are "natural kinds."

Regardless, feeling and emotion are not synonymous terms. Although it is tempting to link survival circuits/emotion to feeling, the two may not closely correlated. LeDoux (2012) proposed that feelings associated with survival circuit activation occur in humans when "consciousness detects that a survival circuit is active or witnesses the existence of a global organismic state initiated by the activation of a survival circuit in the presence of particular kind of challenge or opportunity and appraises and labels this state" (p. 664). Scherer (2005) suggests that "…'feelings integrate the central representation of appraisal-driven response organization in emotion,' thus reflecting the total pattern of cognitive appraisal as well as motivational and somatic response patterning that underlies the subjective experience of an emotional episode." In other words, feelings fluctuate with changes in self-report. Scientists at this point must rely on the "outward expression of emotional responses, or on verbal declarations by the person experiencing the feeling, as ways of assessing what that person is feeling" (LeDoux,

2012, p. 665). Scherer (2005) points out that because feelings consist of subjective cognitive representations, there is currently no known way to measure feelings other than asking the individual to report on their subjective experience. This, therefore, currently limits research on feelings to the human species.

Both emotions/survival circuits and feelings, grouped together as affect, can change in response to touch in adult humans (Coan, Schaefer, & Davidson, 2006). Coan et al. (2006) studied the effect of hand holding on self-reported levels of unpleasantness (valence) and agitation (arousal) following threat. Sixteen highly satisfied married couples participated in the study; the couples' Dyadic Adjustment Scale (DAS) scores determined satisfaction. The study consisted of three segments, presented in random order, each including the threat of an electric shock. The segments consisted of the wife (the participant of interest) holding her husband's hand, holding the hand of an anonymous male experimenter, or not holding a hand. At the end of each segment, wives reported levels of unpleasantness and agitation using the Self-Assessment Manikin scale (SAM). ANOVA analyses showed decreases in both unpleasantness ratings…($\eta p^2 = .54$), and agitation ratings ($\eta p^2 = .34$) in the hand holding conditions. The unpleasantness ratings were "significantly lower in the spousal-hand-holding condition than in both the stranger handholding condition…($\eta p^2 = .24$), and the no-hand condition ($\eta p^2 = .52$)" (Coan et al., 2006, p.1035). The agitation ratings followed the same pattern as the

unpleasantness ratings in the spouse condition ($\eta p^2 = .20$), and the no-hand condition ($\eta p^2 = .19$), but were not significantly different.

Although spousal touch was especially influential, any handholding (spousal or stranger) decreased threat response. Additionally, a repeated measure ANCOVA demonstrated the wife's DAS score predicted unpleasantness ratings ($\eta p^2 = .44$). Pearson correlations between the wife's DAS and unpleasantness ratings were not statistically significant for the no-hand condition or the spouse condition, but was significant for the for the stranger condition (r=-.82) This revealed that the decreased threat effect is greater with higher quality relationships.

In addition to the Coan et al. (2006) study, other studies have also reported the effects of handholding (e.g., Fisher, Rytting & Heslin, 1976). However, many other varieties of touch besides handholding occur in naturalistic settings. The location of the touch (i.e., on the hand versus on the lips) may also alter positive and negative affect. Nguyen et al. (1975) attempted to divide touch into distinct categories based on location and reported perception of the touch. According to the author, the differences in perception due to the location of touch may be due to differences in skin sensitivity or other factors. Generally, both female and male touching on "the legs were most playful; the hands were loving, friendly, and pleasant, while the genital area indicated sexual desire" (Nguyen et al., 1975). Jones & Yarbrough (1985) also separated type of touch into various categories, including positive affect. The types of touch that fall under this

category include support, appreciation, inclusion, sexual, and affection. Most of the time, touches that fall under the category of positive affect include touching of the hand. A hand touch is a "key feature" of a "support" touch, which is consistent with the Coan et al. (2006) findings discussed earlier. A key feature of the "inclusion" touch is sustained touch, which included pressing against, holding, and sustained holding. This illustrates the importance of the touch duration.

Both the perception and the intensity of the touch may be related to the area of cortex in the somatosensory region related to that particular receptive field. Studies in vision have demonstrated the importance of the amount of cortical area devoted to a particular task (e.g. Cragg, 1974), as well as in touch (e.g. Bara-Jimenez et al., 1998). There are individual differences in the amount of cortex devoted to each receptive field, but this should be normalized across a random sample of subjects. According to the well-known sensory homunculus (Kass, 1983), the amount of cortex dedicated to the lips and mouth and the rest of the face is roughly the greatest followed by the hands. The arms, feet and genitalia roughly come next; finally followed by the rest of the leg, back, and belly. Thus, dividing the body into different zones based on somatosensory area may give an approximation of how much cortical area is activated.

Based on this research, there seems to be a link between these different types of touch and both positive and negative affect. It is therefore hypothesized that in romantically involved couples, a combination of touch factors will alter affect after

stressful events for both the male and female. These touch factors include the duration and location of touch. With an increase in duration of touch as well as somatosensory area activated by total location of touch, negative affect will decrease affect and positive affect will increase.

Within a couple, the hypothesized relationship between touch and affect may be regulated by the couple's attachment style. John Bowlby (1969) originally proposed Attachment Theory to describe behavior patterns between a mother and her child. Ainsworth et al. (1978) tested for individual differences in attachment behaviors. These researchers found three types of individual "attachment styles" in infants: secure attachment, avoidant attachment, and anxious attachment. Secure attached infants felt, as the name suggests, secure in their relationships and turned to their caregiver when stressed. Avoidant attached infants were insecurely attached, and turn away from their caregiver when stressed. Anxious attached infants were also insecurely attached, and always maintain close proximity to their caregiver. A final type of attachment style was later added, called disoriented attachment. These infants displayed inconsistent behavior patterns such as retreating from a caregiver and then approaching again.

Hazan & Shaver (1987) extended the attachment style research from infants to adult romantic relationships. With adults, Fraley & Shaver (2000) demonstrated that attachment style can be measured through self-report questionnaires. Since attachment theory focuses on individuals and individual-level attachment styles, relations between

attachment style and other behavior are generally observed at the level of the individual-participant, and not for the couple as a unit. However, an individual's attachment style can be compared to the individual's relationship partner. If the individuals in the couple have similar attachment style, it is predicted that the duration and location of touch will decrease negative affect and increase positive affect after stressful events for both the male and female. However, if the couples' attachment styles differ, it is predicted that the duration and location of touch will not change positive affect and either increase or have no effect on negative affect after stressful events for both the male and female. In sum, it is predicted that the couple's attachment style mediate relations between touch and affect.

Methods

The study involves the analysis of pre-existing data obtained for Sally Olderbak's dissertation study (Olderbak, 2011).

Participants

The current study used data obtained from 76 non-married couples ($n_{total} = 152$), recruited from the University of Arizona's Introductory Psychology classes. Of the selected participants, the majority of females (n = 51) and males (n = 50) were White non-Hispanic. The participants were required to be at least 18 years of age and currently involved in a heterosexual romantic relationship. The term "romantic relationship" was

not explicitly defined while recruiting participants to prevent systematic bias. To be retained for the final sample, the participant's romantic partner was also required to be at least 18 years of age. The average age for females was 18.6 years (*SD* = .7), with their partner at 19.5 years (*SD* = 1.9). The participants who were enrolled in the introductory Psychology course earned 3 or 4 experimental credits depending on the stage of the study. The participants not enrolled in the class received a $10.00 gift certificate to Target.

Couples were not screened prior to the study for levels of commitment to the relationship, intimacy, or length of romantic involvement to also prevent systematic bias. These measures were, however, measured and taken into account during the study, and the average length of romantic involvement was 545.5 days (*SD* = 472.9).

Apparatus

Rooms: Data collection took place in the Lang Children and Family Observation Laboratory housed in the Frances McClelland Institute for Children, Youth, and Families. Four rooms were used for the study (see Appendix Figure 1). One room was used solely for observation, termed the "Observation Room." All video measures took place in one room named the "Camera Room." The Camera Room had two chairs angled toward each other perpendicularly so that participants could be as close or far from their partner as they desired. The Camera Room was also equipped with three inconspicuous video

cameras. One camera was directed toward both participants from an upward angle in the corner of the room, and the other two cameras were directed at the side of each of the participant's chairs. These camera angles can be seen in Figure 1.

Figure 1: The three camera angles used for touch and SPAFF behavioral coding

A separate room was used for the stress manipulation. The female underwent the stress task in the "Stress Room." Finally, the "Questionnaire Room" was used solely for

completing online questionnaires. For the online questionnaires, standard Gateway PC computers were used.

Questionnaires:

PANAS (outcome measure): The positive affect negative affect scale (PANAS) (Watson, Clark & Tellegen, 1988) was used to measure self-reported positive and negative affect. The scale is accessible and easy to understand (see Appendix Figure 2). The scale is shown to be sensitive to fluctuations in short-term feeling, and correlate well with related constructs that have been used in other studies. Watson, Clark and Tellegen (1988) describe the scale as "internally consistent and have excellent convergent and discriminant correlations with lengthier measures of the underlying mood factors" (p.1069).

Attachment Style Questionnaires (mediating variable): The first questionnaire used to measure adult attachment style is called the "Adult Attachment Questionnaire" (Simpson, Rholes, & Nelligan, 1992), which measures avoidance and ambivalence. Secure attached individuals score low on both scales, avoidant attachment individuals score high on avoidance and anxious attached individuals score high on ambivalence. Avoidant/Secure Attachment Index: α= 0.76; Anxious Attachment Index: α= 0.64.

Collins & Read (1990) developed the second attachment style questionnaire, called the Adult Attachment Scale (AAS). It measured individuals through three continuous scales: Depend α= 0.84; Anxiety α= 0.64; Close α= 0.69.

The third attachment style questionnaire, called Experience in Close Relationships (ECR), was developed Brennan et al. (1998). It measures an individual's level on two dimensions of attachment, anxiety (Anxious Attachment: α= 0.85) and avoidance (Avoidance Attachment: α= 0.87).

The final attachment style questionnaire used was the Measure of Attachment Qualities (MAQ) (Carver, 1997), which measures attachment style through four continuous subscales: Avoidance: α= 0.78; Ambivalence-Worry: α= 0.66; Ambivalence-Merger: α= 0.76, Security: α= 0.72.

Stress task: This portion of the original study was not used in the present study. In the original study, an anagram task was used for the stress task. Deffenbacher (1978) previously used these tasks to successfully induce anxiety. The participant was given a pencil and paper to help her with the task. A Microsoft PowerPoint slideshow on a laptop computer was used to display the anagrams. Twenty anagrams played on the slideshow in front of the participant. Using a slide show allowed for maximum consistency across trials and reduced experimenter interference. Thirteen of these anagram words were from Sarason (1984), and all words were scrambled. The anagram task instructions given to the experimenter are shown in Appendix Figure 3.

Design

The predictor variables include the location and duration of touch. Touch was recorded in 30-second segments throughout the entire last five-minute portion of the study where the couples discussed a topic of contention in their relationship (see Figure 3). A general map was given to the coders to code location of touch. Various sections of the body correspond to the number entered as code (see Figure 2).

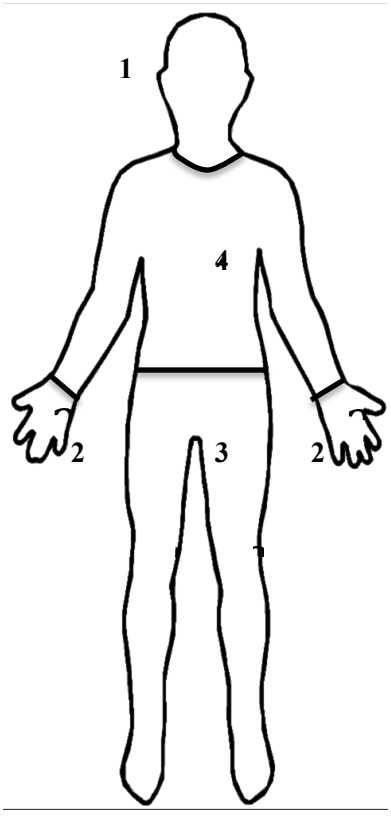


Figure 2: Mapping to code the body

The map was constructed by dividing the body into approximately equal zones of cortically expressed somatosensory area. For example, a touch anywhere on the hand will be coded as "2," and a touch anywhere on the thigh, calf, or foot will be coded as "3" since the somatosensory area devoted to the hand roughly parallels the somatosensory area devoted to the entire leg. If the individuals were touching a body region during the 30-second time period within the 5-minute portion of the study, that box was checked. The total of checked boxes for each 30-second segment was summed over the 5-minute coded section to provide a molar view of touching behavior. The coding sheet is attached in Appendix Figure 4. Coding this way leads to an independent touch measure for both the male and female.

The outcome variables include the Positive Affect Negative Affect Scale (PANAS) scale and SPAFF coding. The PANAS scale was distributed 3 times to the male, and 4 times to the female. The first was during the questionnaire portion, the next was following the female's stressful experience (where the female retrospectively filled out an extra scale for her feelings during the task), and the last was following the couple's discussion about a topic of contention in their relationship. The only PANAS used in the present study was the last one distributed during the topics of contention.

Coan & Gottman (2007) developed the Specific Affect Coding System (SPAFF) coding system in order to observe affective behavior in couples, therapeutic interventions, and many other situations. The system has even been used in behavioral

coding of zebra finches (Figueredo et al., 2010). SPAFF encompasses aspects of many molecular behaviors such as the Facial Affect Coding System and vocalizations into 17 molar behaviors. These measured behaviors are listed on the left column of the Spaffogram, or coding sheet, attached in Appendix Figure 5. The brief overview of each molar behavior that was given to the coders is attached in Appendix Figure 6. If the individual displayed a specific behavior in a 30-second time period, that box was marked. The total sample consisted of 10 30-second clips for a total of 5 minutes of SPAFF coding.

The mediating measures include self-reported relationship quality and Attachment Style, both of which were distributed during the questionnaire portion of the study (see Figure 3).

Procedure

An overview of the timeline of the original study can be seen in Figure 3. The only portion of this study that was used in the present study is the 5-minute "topics of contention" section and data from the questionnaire section.

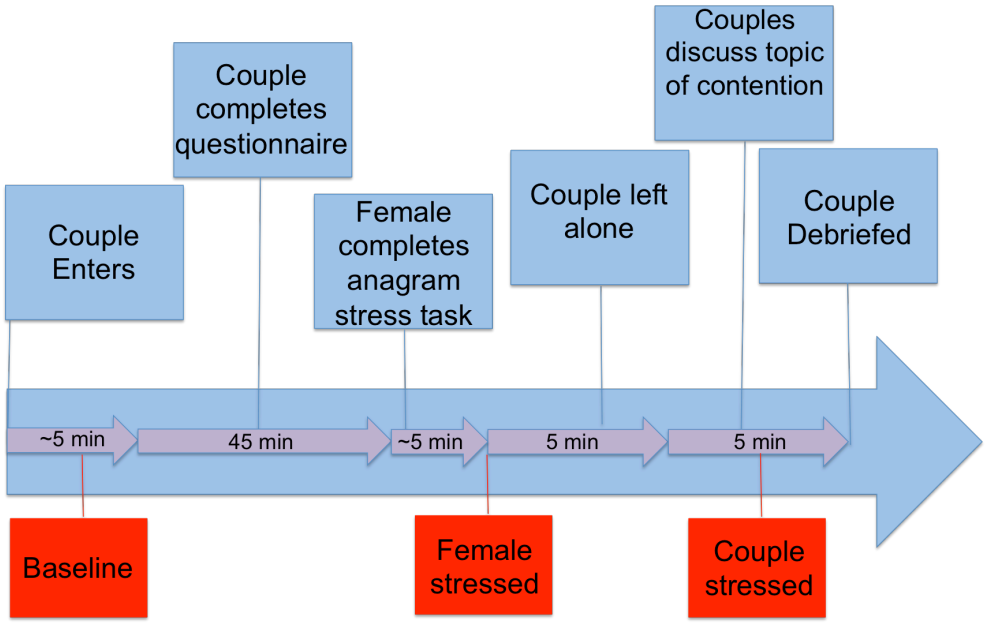


Figure 3: Timeline of the original study

In the original study, research assistants, dressed in a white lab coat and holding a clipboard to help establish the research assistant as an authority figure, greeted the couple, then led them into a comfortable room where they waited for five minutes to acclimate to the environment and relax. The participants were consented, and the cameras were pointed out to them. After the couple's attention was diverted away from the distraction of the cameras, a minute long video clip was recorded for a baseline measure. This portion was not used in the present study.

Questionnaires: The research assistant then led the couple into a separate room with two computers where they filled out questionnaires. The questionnaires included the

baseline PANAS scale, attachment style scales, a relationship satisfaction scale, and paper to list topics of contention in the couple's relationship.

Stress task: After the questionnaire portion, the female underwent a stress task in a separate room. This portion of the study was not used for the present study. For the anagram stress task, the male participant waited in the Camera Room and the female was lead to the Stress Room. Females completed the task alone with the experimenter. The research assistant stood in front and slightly to the left of the participant. Before the task began, the research assistant read the task instructions aloud, explained that performance was related to verbal intelligence, and related to the probability of graduating with a bachelor's degree. The stress task included solving the various difficult anagrams (see Appendix Figure 3) described previously. The participants were instructed to unscramble the letters and say the correct word out loud. After each trial, there was a loud beep and research assistants told the participant if they were correct or not after each trial. Additionally, experimenters reminded the participants about their overall score by telling the participant the fraction of anagrams they successfully solved after the 5^{th}, 10^{th}, 15^{th}, and final anagram. On average, participants correctly solved 4.0 (SD = 3.4) of 20 anagrams. Immediately following the stressor, females were brought back to the Camera Room where the couple was left alone and recorded for five minutes. After resting uninterrupted for five minutes, the PANAS was once again distributed to the male and

female. The female was given an additional PANAS to retrospectively report her feelings during the stress task (female PANAS 2).

Topic of contention: This was the only portion of the original study that was analyzed in the present study. The experimenter worked with the couple to decide a topic of contention for the couple to discuss. Once a topic was decided upon, the couple discussed for another five minutes. These five minutes were video-recorded and later coded for touch measures and SPAFF coded. The PANAS scale was distributed one last time, and then couples were debriefed.

Debriefing: After completion of the study, the research assistant debriefed each participant. The participants were told the true nature of the study, specifically when their behavior was recorded, and the purpose of the anagram stress task. Each partner was asked if they wanted the videotapes to be destroyed. The participants signed a second consent form regarding additional uses of the video recordings. Finally, the participants were given compensation for their participation.

Results

Results for the study were unable to be obtained for multiple reasons. The data was stored on a server in the McClelland Park building at the University of Arizona campus in Tucson. In an attempt to move the server to the Psychology Building, the full-length video data was somehow erased. All that remained on the server were 30-second

video clips used for a previous study (Olderbak, 2011). Additionally, the remaining video clips were recorded during the baseline and female stressor portion of the study, both of which were not of interest for the present study. The only remaining copy of the full data is in Germany. Subsequently, multiple attempts were made to copy the data from Germany to the US with no prevail. This included the idea of putting the files in a massive zip-file that could be downloaded online as well as copying the data and shipping it to the US. The first idea did not work because there were technical problems with the size of the files and the transmission of European to American files. The latter idea did not work because by the time we realized the first idea would not work, it would have been too late to ship the data overseas in time since the estimated delivery date was around one month.

The expected results are as follows. If the hypothesis is supported by the data, the couples that touch for a longer duration in more locations will show the lowest measures of negative affect. They will, in turn, show the highest measures of positive affect. This will only be true when controlling for the couple's attachment style, which will mediate the effect.

Discussion

Though it is hypothesized that the total duration of touch will increase positive affect and decrease negative affect, there may be some situations where this may not hold true. For example, if the frequency of touch is high, touch may be irritating as opposed to helpful even if the duration of touch is high. There also may be certain locations of touch that do not increase positive affect and decrease negative affect in certain situations. For example, touching genitals may increase negative affect if the couple is in public, or in front of family members. If the data does not support the hypothesis, this also could be because the couples are not reliably reporting how they feel in the PANAS section. This issue will hopefully be balanced by comparing the SPAFF with the self-reported measures.

Touch may also have different effects cross-culturally. Though there is little empirical research on the topic, Kirch (1979) writes that French, Italians and Latin Americans touch the most. On the other hand, Americans, British, Germans and Far Easterners touch the least. Since the present study was conduced with Americans, who are considered to touch less than other cultures, touch may have more of an effect on outcome variables. If Latin Americans were used for the sample, touch may have minimally changed affect.

Potential gender differences should be noted as well. Women seem to have more extreme reports of affect than men (Fujita et al., 1991). Therefore, there may be more of a positive change in affect with touch in female partners compared to male partners (Stier

& Hall, 1984). This claim is controversial, however, and there is limited empirical data to support the claim. For example, Crusco & Wetzel (1984) studied the effect of touch on tipping in restaurants and did not find any gender differences.

If the expected results do occur, this may also have clinical implications. In a marital therapy setting, couples can be screened for attachment style and directed how to touch accordingly. However, only naturalistic touch was observed in the present study. In order to take steps toward potential therapeutic manipulation, future studies could focus on purposefully manipulating touch.

References

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of Attachment A Psychological Study of the Strange Situation*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Bara-Jimenez, Maria Jose Catalan, W., Catalan, M. J., Hallett, M., & Gerloff, C. (1998). Abnormal somatosensory homunculus in dystonia of the hand. *Annals of Neurology*, *44*(5), 828-831.

Bowlby, J. (1969). *Attachment and Loss Volume 1 Attachment*. New York, NY: Basic Books.

Brennan, K. A., Clark, C. L., & Shaver, P. R. (1998). Self-report measurement of adult attachment: an integrative overview. In Simpson, J.A. & Rholes, W. S., *Attachment Theory and Close Relationships*. New York, NY: The Guilford Press.

Carver, C. S. (1997). Adult attachment and personality: Converging evidence and a new measure. *Personality and Social Psychology Bulletin, 23*(8), 865-883.

Coan, J. A., & Gottman, J. M. (2007). The Specific Affect (SPAFF) coding system. In J. A. Coan and J. J. B. Allen (Eds.) Handbook of Emotion Elicitation and Assessment (pp. 106-123), New York, NY: Oxford University Press.

Coan, J. A., Schaefer, H. S., & Davidson, R. J. (2006). Lending a Hand: Social Regulation of the Neural Response to Threat. *Psychological Science, 17,* 1032-1039.

Collins, N. L. & Read, S. J. (1990). Adult attachment, working models, and relationship quality in dating couples. *Journal of Personality and Social Psychology, 58*(4), 644- 663.

Cragg, B. G. (1974). The development of synapses in kitten visual cortex during visual deprivation. *Experimental Neurology*, *46*(3), 445-451.

Crusco, A. H., & Wetzel, C. G. (1984). The midas touch: The effects of interpersonal touch on restaurant tipping. *Personality and Social Psychology Bulletin*, *10*(4), 512-517. Retrieved from 10.1177/0146167284104003

Deffenbacher, J. L. (1978). Worry, emotionality, and task-generated interference in test anxiety: An empirical test of attentional theory. *Journal of Educational Psychology, 70(2),* 248-254.

Dunbar, R.I.M. 1980. Determinants and evolutionary consequences of dominance among female gelada baboons. Behav. Ecol. Sociobiol. 7, 253–265.

Dunbar, R.I.M. (2010). The social role of touch in humans and primates: Behavioural function and neurobiological mechanisms. *Neuroscience and Biobehavioral Reviews, 34,* 260-268.

Figueredo,A. J., Olderbak, S.G. & Moreno, V.A. 2010. A Social Relations Model For The Colonial Behavior Of The Zebra Finch. Methods And Measurement In The Social Sciences. 1, 21 -32.

Fisher, J. D., Rytting, M., & Heslin, R. (1976). Hands touching hands: Affective and evaluative effects of an interpersonal touch. *Sociometry*, *39*(4), 416-421.

Fraley, R. C., & Shaver, P. R. (2000). Adult romantic attachment: Theoretical developments, emerging controversies, and unanswered questions. *Review of General Psychology. 4*(2), 132- 154.

Fujita, F., Diener, E., & Sandvik, E. (1991). Gender differences in negative affect and well-being: The case for emotional intensity. *Journal of Personality and Social Psychology*, *61*(3), 427-434. doi: 10.1037/0022-3514.61.3.427

Hazan, C., & Shaver, P. (1987). Romantic love conceptualized as an attachment process. *Journal of Personality and Social Psychology, 52*(3), 511-524.

Jones, S. E., & Yarbrough, E. (1985). A naturalistic study of the meanings of touch. *Communication Monographs*, *52*, 19-56.

Kass, J. H. (1983). What, if anything, is SI? Organization of first somatosensory area of cortex. *Physiol Rev*, *63*(1), 206-231.

Kirch, M. S. (1979). Non-verbal communication across cultures. *Modern Language Journal*, *63*(8), 416-423.

LeDoux, J. (2012). *Rethinking the emotional brain*. (73 ed., pp. 653-676). New York: Neuron.

Nguyen T,.R., R.Heslin and M.L.Nguyen (1975) "The meaning of touch: Sex differences Journal of Communication 5:92-103.

Olderbak, S.G. (2011). Attachment style and nonverbal behavioral synchrony in romantic couples. (Unpublished doctoral dissertation). University of Arizona, Tucson.

Peláez-Nogueras, M. (1996). *Infants' preference for touch stimulation in face-to-face interactions*. (2 ed., Vol. 17, pp. 199-213). Florida: University of Miami School of Medicine.

Reichard, U., & Sommer, V. (1994). Grooming Site Preferences in Wild White-handed Gibbons (Hylobates Lar). *Primates, 35*. 3, 369-74.

Sarason, E. G. (1984). Stress, anxiety, and cognitive interference: Reaction to tests. *Journal of Personality and Social Psychology, 46*(4), 929-938.

Scherer, K. (2005). What are emotions? and how can they be measured?. *Social Science Information*, *44*(4), 695-729.

Schino, G., Scucchi, S., Maestripieri, D. & Turillazzi, P. G. 1988. Allogrooming as a tension-reduction mechanism: a behavioral approach. American Journal of Primatology, 16, 43–50.

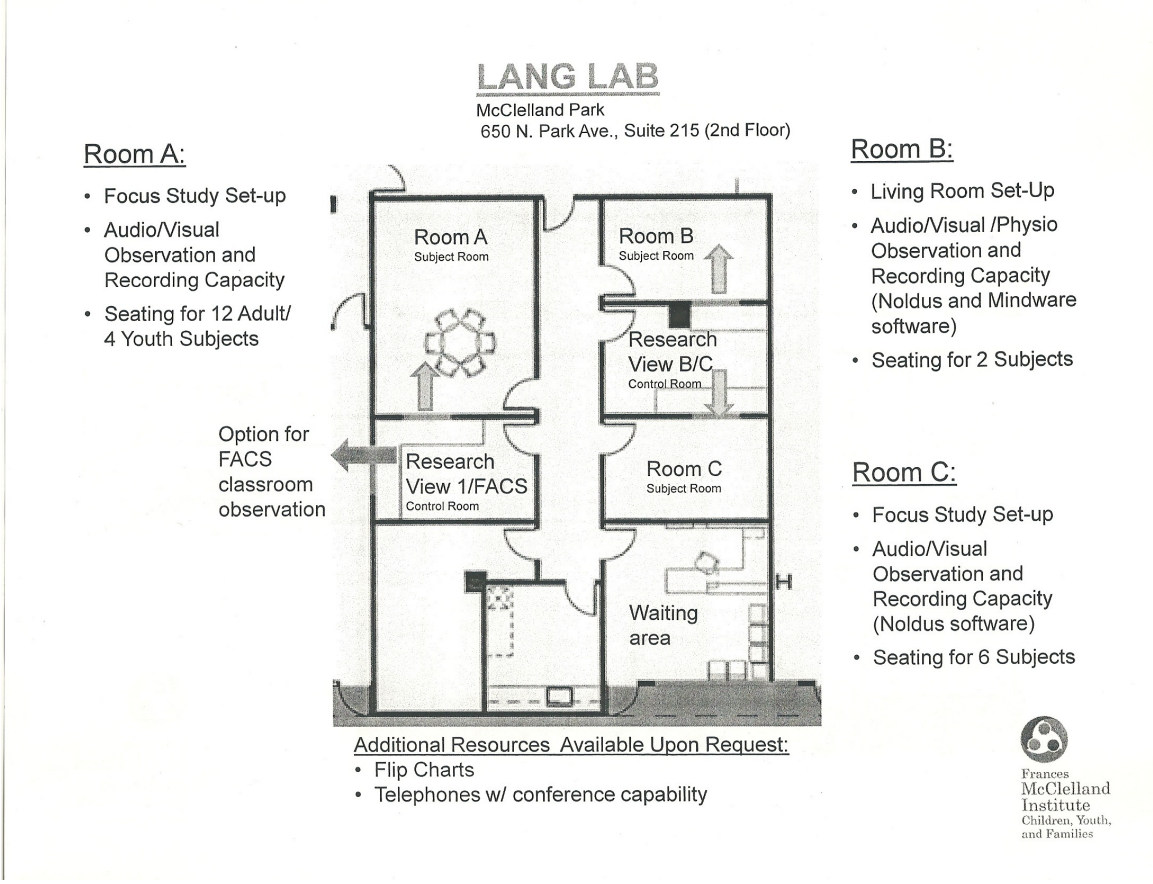
Silk, J.B., Alberts, S.C., Altmann, J., 2003. Social bonds of female baboons enhance infant survival. Science 302, 1231–1234.

Simpson, J. A., Rholes, W. S., & Nelligan, J. S. (1992). Support seeking and support giving within couples in an anxiety-provoking situation: The role of attachment styles. *Journal of Personality and Social Psychology, 62*, 434-446.

Stier, D. S., & Hall, J. A. (1984). Gender differences in touch: An empirical and theoretical review.*Journal of Fenoiulity and Social Psychology*,*47*(2), 440-459.

Watson, D., Clark, L. A., & TeUegen, A. (1988). Development and vali- dation of brief measures of Positive and Negative Affect: The PANAS *Sates*. *Journal of Personality and Social Psychology, 54,* 1063-1070.

Appendix



Appendix Figure 1: The "Camera Room" is labeled as Room B. The "Observation Room" is labeled as Research View B/C. The "Stress Room" is labeled as Room C. The "Questionnaire Room" is not pictured. Room A and Research View 1/FACS were both not used for the study.

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent [INSERT APPROPRIATE TIME INSTRUCTIONS HERE]. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

We have used PANAS with the following time instructions:

Moment	(you feel this way right now, that is, at the present moment)
Today	(you have felt this way today)
Past few days	(you have felt this way during the past few days)
Week	(you have felt this way during the past week)
Past few weeks	(you have felt this way during the past few weeks)
Year	(you have felt this way during the past year)
General	(you generally feel this way, that is, how you feel on the average)

Appendix Figure 2: The PANAS on self-reported affect

++++++++**FOLLOW VERBATIM**++++++++

When you walk into the room, say the following phrase and press F5 to start the anagram task PowerPoint:

"Please take a seat. We are going to start the next part of the study. The instructions for this portion of the study will be displayed on the screen. Here is also a blank sheet of paper and a pen to help you with this test."

	Anagram	Solution(s)
1	ERNAG	Anger, Range
2	IUFTR	Fruit
3	OEWRP	Power
4	EADLNI	Denial
5	ETLHHA	Health
6	ETROS	Rotes, Store

Tell them how many they have correctly solved out of the total. Say:
"You have gotten X out of 6."

7	RECMI	Crime
8	CNEGAH	Change
9	NMGOINR	Morning
10	NSRWAE	Answer

Tell them how many they have correctly solved out of the total. Say:
"You have gotten X out of 10. There are 10 left"

11	EPUTAME	Amputee
12	NMPIGAC	Camping
13	SPRUUE	Pursue

Tell them how many they have correctly solved out of the total. Say:
"You have gotten X out of 13."

14	SUTCBII	Biscuit
15	SCLIAO	Social
16	EVSUORN	Nervous
17	TABE	Abet, Beat

Tell them how many they have correctly solved out of the total. Say:
"You have gotten X out of 17. You only have 3 left."

18	RSANEO	Senora, Reason
19	IMTCELA	Climate
20	ELSAUX	Sexual

Tell them how many they have correctly solved out of the total. Say:
"You have gotten X out of 20."

TOTAL NUMBER THEY GOT CORRECT:_____/20____

Then say the following while you exit out of the PowerPoint and walk them to the next room:
"Ok, that's it. I am going to walk you back into the next room. We need just a few minutes before we start the next portion of the study."

During the test, say one of the following after they respond to the presented anagram:

"Correct"

"Incorrect"

If they try to talk to you, say one of the following phrases:

"Please concentrate on the test."

"The test requires that you continue."

If at some point they stop responding, try saying one of the following:

"You know, even if you do not answer, I am still going to say that you are incorrect."

"No response is an incorrect response."

Appendix Figure 3: The anagram task instructions that were given to the experimenter to take notes on, and was read directly to the female participant.

	Body Part Code	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	**Sum**
Male Touching Female	1											
	2											
	3											
	4											
Female Touching Male	1											
	2											
	3											
	4											

Appendix Figure 4: Touch coding sheet used by coders. Q1, Q2… Q10 corresponds to each 30-second time period in the 5-minute coded section.

SUBJECT_____**CODER**_____**DATE**_____

CODE *(Scale)*	*Q1*	*Q2*	*Q3*	*Q4*	*Q5*	*Q6*	*Q7*	*Q8*	*Q9*	*Q10*	***SUM***
Affection											
Anger											
Belligerence											
Contempt											
Criticism											
Defensiveness											
Disgust											
Domineering											
Enthusiasm											
Fear/Tension											
Humor											
Interest											
Sadness											
Stonewalling											
Threats											
Validation											
Whining											

Appendix Figure 5: SPAFF coding sheet used by coders

Definitions of *Molar* SPAFF Scales (Using *Molecular* SPAFF Items as Behavioral Cues)

Molar Scales	***Molecular Items*** *(Behavioral Cues)*
Affection	*Reminiscing, CaringStatements, Compliments, Flirting, CheekRaise, LipCornerPull, AffectionateHumor, DecreaseinVoicePitchAmpTempo*
Anger	*Frustration, AngryStatements, BrowLower, UpperLidRaise, LidTighten, LipPressTighten, ClenchedTeeth, JawNeckMusclesTightened, Growling, IncreaseinVoicePitchAmpTempo, DecreaseinVoicePitchAmpTempo, LipFunnel*
Belligerence	*InnerBrowRaise, OuterBrowRaise, JawThrustForward, ConfrontationalVoiceTone*
Contempt	*Sarcasm, Mockery, Insults, HostileHumor, Dimple, EyeRolling, UnilateralLipCornerPull*
Criticism	*BetrayalStatements, CharacterAttacks, KitchenSinking, Blaming, NComplaints*
Defensiveness	*Minimization, Excuses, InnerBrowRaise, OuterBrowRaise, ArmsFoldedAcrossChest, IncreaseinVoicePitchAmpTempo*
Disgust	*MoralObjection, NoseWrinkle, UpperLipRaise, BrowLower, ChinRaise, LipCornerDepress, ProtrudingTongue*
Domineering	*PatronizingVoiceTone, Glowering, OuterBrowRaise, BodyForward, HeadForward, HeadTilt, FingerPointing, NInsults*
Enthusiasm	*Anticipation, Joy, Expansiveness, InnerBrowRaise, OuterBrowRaise, UpperLidRaise, CheekRaise, LipCornerPull, LipPressTighten, LipsPart, JawDrop, MouthStretch, Gesticulating*
FearTension	*SpeechDisturbances, ShiftsinFundamentalFrequency, Fidgeting, NervousLaughter, NervousGestures, InnerBrowRaise, OuterBrowRaise, UpperLidRaise, LipCornerPull, LipStretch, BrowLower, LipBiting, Gulping, FrequentEyeMovements, TenseHumor, NForeignObject*
Humor	*GoodNaturedTeasing, WitandSilliness, FunandExaggeration, InnerBrowRaise, OuterBrowRaise, CheekRaise, LipCornerPull, LipsPart, JawDrop, MouthStretch*
Interest	*LeaningForward, WarmVoiceTone, SustainedEyeContact, PositiveValence, LipCornerPull, OuterBrowRaise, CheekRaise, InnerBrowRaise*
Sadness	*Sighing, PoutingSulking, Resignation, Crying, HurtFeelings, InnerBrowRaise, CheekRaise, LipCornerDepress, ChinRaise, ShoulderDroop, HungHead, EyesDown, LipsChinTremble, QuaveringBreakingVoice, SelfCriticism, NRelief, NHappyTears*
Stonewalling	*AwayBehaviors, JawNeckMusclesTightened*
Threats	*Bans, InnerBrowRaise, OuterBrowRaise, UpperLidRaise, HeadForward, BodyForward, FingerPointing, HeadTilt*
Validation	*SustainedEyeContact, InnerBrowRaise, OuterBrowRaise, CheekRaise, LipCornerPull, HeadNod, NBobbingHeads*
Whining	*InnerBrowRaise, OuterBrowRaise, LipCornerDepress, WhinyProtest*

Appendix Figure 6: SPAFF instructions given to coders