Observer effects of non-sexual nipple erection and their possible reproductive advantages in human females

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OBSERVER EFFECTS OF NON-SEXUAL NIPPLE ERECTION AND THEIR POSSIBLE REPRODUCTIVE ADVANTAGES IN HUMAN FEMALES

by

Amy J. LeFevre

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Abstract

Nipple erection in women for any purpose other than lactation is somewhat of an evolutionary mystery. In earlier studies I found evidence of nonsexual nipple erection (NSNE) in females in response to anxiety-provoking stimulus material (LeFevre, unpublished). The goal of the present research was to determine what benefits, if any, that NSNE may confer upon females who display this behavior. Specifically, two studies tested the general proposition that non-sexual nipple erection decreases aggressiveness in males and looked at the possibility that cognitive interference may be a mediating factor in aggression de-escalation. Fifty-one undergraduate students (33 male and 18 female) took part in a pilot study to identify appropriate stimulus material for subsequent studies. They viewed a PowerPoint presentation of 32 slides of models, photographed from the waist up, wearing white cotton t-shirts. Each model displayed 6 different emotions with and without nipple erection. Based on pilot study results, stimulus material was chosen for use in subsequent studies. Study 1 tested the hypotheses that males primed with stimuli of females showing NSNE will display lower aggression toward (Hypothesis 1) and be more forgiving (Hypothesis 2) of females who have committed an act against them. Sixty-eight male undergraduates took part in a study that looked at possible effects of nonsexual nipple erection on aggression. It was found that nonsexual nipple erection (NSNE) affects aggression and forgiveness tendencies in males in hypothetical situations where females have provoked the male either accidentally or purposely. In Study 2 I looked into cognitive interference as a possible mediating mechanism of the lowered aggression and increased forgiveness effects I found in Study 1. Specifically, I
tested the hypotheses that because of cognitive interference, males, when provoked, will be less accurate at judging emotions (Hypothesis 3) and slower at judging emotions (Hypothesis 4). Eighty-nine undergraduate students (50 male and 39 female) took part in a reaction time study. However, in Study 2, we found little evidence of an effect of NSNE on ability to judge emotions. Thus, hypotheses 1 and 2 were supported, but Hypotheses 3 and 4 were not. Future research needs to examine other possible mediating factors responsible for the reduction in aggression and increase in forgiveness that occurs when provoked males are presented with NSNE as a stimulus.
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Chapter 1

Introduction and Literature Review

The evolution of humans, much like the evolution of all other sexually reproducing organisms, has occurred due to a variety of conditions, one of which is natural selection. If we look closer at natural selection, we can break it down into three specific conditions that are necessary for natural selection to occur. The first is variation in the gene pool, for without this all organisms in a species would be genetically identical and there would be nothing to 'select' for. The second is differential reproductive success. In other words, genetic variation among members of a species will allow some members to reproduce and create more offspring than other members of the species. The third necessary condition for natural selection is inheritance, for it is necessary for the characteristic (behavioral, morphological or physiological) that enabled the organism to preferentially reproduce offspring to be genetically passed on in order for evolution to occur. A common goal of research in evolutionary psychology is to examine those characteristics in humans that may, on the surface, seem perplexing, and try to determine why the behavior may have come about and evolved to be widespread.

One such behavior is nipple erection for any reason other than lactation in human females. An erect nipple presents an easier target for a neonate to locate and 'latch' on to during breastfeeding, making the likelihood that young offspring would receive adequate nutrition more likely. This is vital, as it is impossible to measure how much breast milk an infant has extracted from its mother's breast. What seems puzzling, on the surface, is why human females have evolved to display nipple erection in response to other stimuli, in particular sexual and anxiety-provoking situations. In fact, the very morphology of the
human breast is mystifying. Humans are the only species that show permanent breast enlargement. In other species, breast enlargement is apparent only during lactation. Several theories have attempted to explain why humans display permanent breast enlargement, but less attention has been paid to explaining nipple erection in females for reasons other than lactation. Researchers have suggested that one non-lactating purpose of nipple erection is to signal specific sexual receptivity in women. The research presented in this dissertation tests another possible purpose: in anxiety-provoking situations, nipple erection decreases interpersonal aggression in males.

**Theoretical Explanations of Permanent Breast Enlargement**

Morris (1967) stated that breasts evolved as a ‘buttocks mimic’ as a result of upright posture, to facilitate ventral/ventral intercourse. A major problem with this theory is that the larger buttock musculature necessary for upright posture maintenance probably evolved right along with permanent breast enlargement (Gallup, 1986). Morgan (1972) states that breasts evolved as a place for infants to hold onto their mothers while feeding. Morgan argues that this adaptation came about during the Pliocene era, when excessive, dry heat caused hominids to flee the withering forests and spent most of their waking hours in the water. The concept that a wet mass of adipose tissue in the form of a breast was a useful anchor point for an infant to grasp onto seems implausible at best. Another shortcoming in this theory is that it does not account for humans’ permanently enlarged breasts. The critical period for mothers to have these appendages is when the infant is very young (during lactation). As all mammals display enlarged breasts during this time period, it would hardly seem necessary for humans to develop them years prior to the time when enlarged breasts would be needed to nurture offspring.
Others have postulated that permanent breast enlargement became important in humans as a place to store adipose tissue necessary for ovulation, maintenance of pregnancy, and lactation. If it became necessary in humans, presumably due to fluctuating food availability, then why did it not become important to any other species?

Although all mammals tend to have adipose depots in homogeneous areas (Pond, 1998), we are the only species with such enlarged pectoral and gluteal adipose depots. Pond also points out that we are also the only species with significant sex differences in the positioning and amount of adipose tissue. Forbes (1987) states that, between the ages of 16 and 18, well-nourished females’ adipose tissue weight is about 26-28% of total body weight. Well-nourished males at these ages have around 14% of adipose tissue mass to total body weight.

Another shortcoming in the adipose breast tissue for lactation theory is that if this particular adipose tissue is necessary for lactation, one would assume that breast adipose tissue would be most readily used for milk production. Previous studies (Rebuffe-Scrive, Eldh, Hafstrom, & Bjorntorp, 1986; Rebuffe-Scrive, Enk, Crona, Lonnroth, Abrahamsson, Smith, & Bjorntorp, 1985) found that the most readily used sources of adipose tissue for milk production are in the abdomen and thighs and that these depots can be selectively used for lactation. Stoneham, Kiviluoto, Keso, and Ohisalo (1988) state “during lactation, the lower extra cellular adenosine concentration would allow lipid mobilization preferentially from the femoral site.”

Other reasons for permanent breast enlargement in humans include the possible benefit of buoyancy or insulation. In terms of buoyancy, it seems implausible that such a small percentage of body mass that is contained in breasts would be of much assistance in
keeping one afloat. Campagne, Katch, Freedson and Sady (1979) found that breasts compose approximately 4% of the total adipose tissue in a normal female.

In terms of insulation, it has been shown in numerous studies of aquatic and non-aquatic mammals that adipose tissue is not nearly as good an insulating material as hair. If insulation were needed (perhaps to help keep milk warm in a cold climate for a lactating mother’s offspring), it would appear more reasonable that females would simply have retained body hair on the chest. It would be rather unlikely that we would lose our bodily hair and then develop adipose tissue to make up for the loss.

Frisch (1983) felt that the breast evolved as a ‘cooling fin’ for the purpose of dissipating excess body heat. As Gallup (1986) states, this seems somewhat implausible, as males would be apt to have developed a similar ‘cooling fin’ if heat dissipation was the goal.

Although all of these theories have some difficulties, it is clear that there must be some purpose for these appendages. After all, there are definite costs to having permanently enlarged breasts. Among them are the caloric costs, which are necessary to maintain breast size, and ambulatory problems (e.g. making the body less streamlined, more apt to get caught or scratched while making one’s way through a densely forested area as our ancestors must have done). In evolutionary terms, it would be rather unlikely that a species would develop an all cost, no benefit appendage.

If we look elsewhere in the animal kingdom, however, we can find several adaptations that would, on the surface, appear to be all cost and no benefit to the owner. One example is the male peacock (Petrie, Halliday, & Sanders, 1991; Zahavi & Zahavi, 1997.). This creature has developed large, showy tail feathers which not only make him
extremely visible from quite a distance, but also less capable of evading predation by the shear weight and size of them. Only the healthiest individuals can sport this plumage, as the long tail feathers are grown during a several month period that occurs when food sources are diminished and the birds normally molt (Zahavi, & Zahavi, 1997).

Another example is the male mandrill, which sports both a vibrantly colored face and genitalia (Falk, 2000). Most male birds and many male fish are vividly colored, making them clear targets for any predator in the vicinity (Zahavi & Zahavi, 1997). These bright colorations are, in addition to being costly from this vantage point, metabolically expensive as well. The only thing that makes these worthwhile or beneficial to the owner is the advantage they give in terms of mate selection. Females in these species preferentially choose mates who are the brightest colored or have the largest tail feathers. Therefore, while these colorations and appendages are very costly, they give the owner an advantage over his or her less flamboyant peers. These characteristics are an indicator of good genes, nutritional status and hormone levels (Falk, 2000; Zahavi & Zahavi, 1997). Therefore, an animal that chooses the brightest mate has chosen wisely. While these examples are widely accepted by the scientific community in numerous animal models, we appear less willing to apply this concept to our own species.

Gallup (1982) theorized that permanent breast enlargement came about as a result of concealed ovulation. In many other primates, ovulation is signaled by visible changes (e.g. genital enlargement, bright genital coloration), with the outcome being that males who choose to mate with females who are likely to be ovulating will produce more offspring. In chimpanzees, for instance, estrus is marked by ano-genital swelling and bright pink coloration. When hominids became concealed ovulators (whether due to
upright posture or spending most of the daylight hours up to their necks in the cooling waters), the problem of synchronizing insemination with ovulation became formidable.

Gallup (1982) discusses changes in the female breast from preadolescence through menopause. He equates male mate choice to a "multiple choice exam". In the absence of overt signs of ovulation, males who could correctly identify females who were not capable of becoming pregnant (and therefore avoid copulating with these females) would produce more offspring (Gallup, 1982). All other things being equal, the development of breast tissue would serve as a signal that the female has reached a state where she could become pregnant. While the correlation between breast development and reproductive maturity is not perfect (breast development generally occurs approximately two years before reproductive maturity is reached), in the absence of any other cue as to reproductive capability, it would serve as a valuable and visible signal. Gallup calls this 'relative ovulatory signaling'. Therefore, the metabolic and ambulatory costs to developing permanent breasts may have a benefit as well.

Gallup (1986) cites several conditions of relative anovulation and their corresponding visual cues. Sexual immaturity is apparent in that there is no formation of breast tissue. Starvation, and the accompanying lack of caloric stores necessary for pregnancy to begin and proceed with a positive outcome, is indexed by the loss of breast enlargement. Pregnancy changes the shape of the body so that the most protruding aspect is the abdomen. Menstruation is apparent in the menstrual flow. Lactation is related to even further augmentation of breast size. Menopause is evident in the alteration of breast configuration; the most apparent changes being the reduction of breast size and droopiness of the remaining breast tissue.
Breast development is a cue to nutritional status as well. If a female is undernourished, she is unlikely to have fully developed breasts. As in the case with anorexia nervosa, females are purposely eating fewer calories than they require for proper health. Anorexics tend to lose the typical ‘hourglass’ shape commonly attributed to females, and they also tend to lose the ability to ovulate regularly or at all.

**Non-lactating Purposes of Nipple Erection**

Thus, if we adopt Gallup's theory of relative ovulatory signaling (or relative sexual receptivity) as the most plausible theory of permanent breast enlargement, perhaps a non-lactating purpose of nipple erection would be to signal specific sexual receptivity. One of the first physiological changes during sexual arousal is nipple erection (Masters & Johnson, 1966; Cohn, 1974; Rathus, 1983; Killman, 1984; Maier, 1984); in a past evolutionary environment where clothing was not an issue, erect nipples would most likely have sent a very clear sexual receptiveness signal to any male in the visible vicinity.

Erect nipples are linked with sexuality to an extent that several companies (Nipplets™, product of DAK pharmaceuticals; Le Nip™, product of Siliconeworks) market prosthetic nipples for women to wear over their breasts in order to look “sexier, thinner, for youthful shapeliness” (from and ad for Nipplets™). These products, originally designed for mastectomy patients, are now being marketed for women with healthy breasts who want to display nipple erection to appear sexier. Prosthetic nipples were even the main topic on an episode of a popular television show, “Sex and the City.” It appears, therefore, that nipple erection may serve as a sexual cue. Is it possible that nipple erection occurs and serves as a cue for situations that are not of a sexual nature?
In an attempt to understand possible reasons for nipple erection in human females, LeFevre (unpublished) asked female participants to list non-sexual occasions during which they noticed that their nipples became erect. Although this question was open-ended and participants could give any (or no) response(s) that they chose, 8.1% of the participants listed anxiety or nervousness as inducing noticeable nipple erection. This was very interesting; particularly as 29% of the sample stated that they were not aware that their nipples became erect in non-sexual conditions. It is also quite likely that many of the participants who did notice non-sexual erection may have not noticed their nipples becoming erect when they were nervous or may simply not have thought of it while they were filling out the questionnaire. The question, then becomes, how widespread is this phenomenon?

Is it possible that human females evolved to show nipple erection, a typical sign of sexual excitement, in response to anxiety? If the anxiety was caused by a threatening situation, such as being confronted by an aggressive male, nipple erection could be beneficial, as it might confuse the male long enough for the female to flee. Even if the female weren’t able to flee the situation, it may have altered the tone of the encounter in a positive way. There are many examples in the animal kingdom of less-dominant members of a group showing submission to a more dominant member. These submissive rituals frequently involve sexual behaviors. For instance, Falk (2000) describes an encounter between two male olive baboons in which the ritualistic behaviors include posterior presenting, grasping of the posterior, mounting (of the non-dominant male by the dominant male), and fondling of the penis or scrotum. When these submissive or appeasement behaviors are performed, the result is an immediate lowering of aggression.
There is also evidence that mild sexual arousal may lower aggression in humans. Ramirez, Bryant and Zillmann (1982) assigned 72 male undergraduate students to one of 6 experimental groups, reflecting three levels of provocation (control, mild, high) crossed with three levels of erotica (non-erotica, mild, explicit). After exposure to provocation and erotica, the experimenters gave the participants an opportunity to vent their hostility by writing on paper their feelings and views toward the experimenter. Results revealed that exposure to mild provocation combined with mild erotica significantly reduced hostile thoughts and feelings compared to explicit erotica and the control condition.

Zillmann and Sapolsky (1977) either provoked or did not provoke male subjects and then exposed them to non-erotica, photos of nude females or photos of couples engaged in sexual activities. Provocation consisted of hooking up various physiological measurement devices to the participant, obtaining baseline measures and then viciously ripping the results from the oscillograph in front of the participant, falsely accusing them of not cooperating with experimental procedures. Specifically, the experimenter said: “See all this? That’s you squirming around. It’s so bad we’ll have to do it all over. Now try a little harder and cooperate.” In the non-provocation group, no accusations were made. Rather, the experimenter explained to the participant halfway through the experiment that, due to equipment failure, he would have to start the experiment over again. Zillmann and Sapolsky found that exposure to mild erotica (i.e., photographs of nudes) markedly reduced the level of annoyance in provoked participants.

In a similar study, Baron and Bell (1977), 85 male undergraduates were treated in a way that either provoked anger or not, and then were exposed to one of five varieties of stimuli, ranging from neutral stimuli (pictures of furniture and scenery) to explicitly
When later given the opportunity to aggress against their tormentor in the form of an electrical shock, it was found that exposure to the mild erotic stimuli inhibited aggression in provoked participants.

Since males are on average much stronger than females and possess on average twice the upper body strength of a female (Miller, MacDougall, Tarnopolsky and Sale, 1993; Nindl, Mahar, Harmon and Patton, 1994) an angry male could prove to be a real danger to a female. Clearly, a de-escalation of aggression would be of great benefit to females, whether it be an appeasement gesture or mild sexual arousal, and may even mean the difference between life and death. Therefore, if human females evolved to display nipple erection not only in response to sexual excitement, but also in response to anxiety-provoking situations; this could have provided a clear benefit to enhance survival outcomes.

**Preliminary Studies**

Preliminary studies have been conducted by the author to measure nipple erection and to examine correlates and antecedents of erection. LeFevre, Canna, Blanchard, and Gallup (unpublished) measured nipple erection using skin temperature, with increased temperature indicating erection. This method was chosen because of its ability to monitor changes in blood flow (measured by increase in temperature) while being unobtrusive enough to not cause erection from either anxiety or friction. Skin temperature measurement has been shown to be an accurate measure of blood flow (Blanchard, Morrill, Wittrock, Scharf & Jaccard, 1989; Blanchard, McCoy, Musso, Gerardi, Pallmeyer, Cotch, Siracusa & Andrasik, 1986). These studies demonstrated that anxiety and fingertip temperature are negatively correlated. The more anxious the individual, the
lower the fingertip temperature, and conversely, the more relaxed the individual, the higher the fingertip temperature. The relationship between fingertip temperature and anxiety relates to functions of the autonomic nervous system (Kolb & Whihaw, 2001; Carlson, 1993; Brooks, Koizumi, & Sato 1979). When confronted with an anxiety-provoking event, heart rate increases and blood flow is increased in various muscle groups. This helps prepare the individual for fight or flight. In order to increase blood flow in the needed muscles, blood flow is constricted in areas where it is not necessary at the moment. Therefore, digestion comes to a halt, and blood flow to extremities that are not necessary to the fight or flight response is constricted. Hence, if there were no purpose of nipple erection in alarming situations, one would expect that during anxiety-provoking events, the temperature of the nipples would not change or would decrease due to blood constriction. By contrast, if nipple erection in women were the result of stress reaction, we would expect increases in nipple temperatures during periods of anxiety. To test this hypothesis, LeFevre et al. (unpublished) used the same biofeedback monitors that are used in relaxation therapy. Probes were used to measure temperature changes at the site of the nipple and at the fingertip.

In the LeFevre et al. study, 16 female participants had temperature probes attached to their fingertips and under their bras positioned to be in contact with their nipples. Temperatures were recorded prior to and after participants listened to audiotapes of relaxing, sensual and anxiety-provoking stimuli (see Appendices A, B and C). Surprisingly, nipple temperatures only increased significantly relative to baseline temperatures when the anxiety-provoking stimulus was presented. Nipple temperatures did not significantly increase when the sensual stimulus was presented. For this study,
changes in fingertip temperatures were also recorded. A lowering of temperature at the fingertip concomitant to the raising of the temperature at the nipple site during the presentation of the anxiety-provoking would seem to lend credence to the idea that the sympathetic nervous system was activated, which would be expected if the stimulus material were, in fact, anxiety-provoking. This was, indeed, what we found.

One concern with this study, however, was that the stimuli might not have been sufficiently arousing in the different conditions, especially the sensual condition. To determine the salience of the vignettes, the three vignettes were presented to sixty-four female participants in a within-subjects design. After listening to each vignette, they were asked to indicate the subject matter of the vignette from six options: sensual, relaxing, angry, depressing, anxiety-provoking, and other. Participants were then asked to rate the extent to which the audiotape conveyed the descriptor that they chose. A five-point scale was used, where 1 = not at all, two = a little, three = somewhat, 4 = very much, and 5 = extremely. The presentation of the vignettes was counterbalanced. Analyses showed that participants correctly identified the subject matter of the vignettes (e.g. as anxiety-provoking, sensual or relaxing) and there was no significant difference in the salience of the intended content ($F(2, 180) = 1.839$, n.s.). Means by condition were: control (relaxing) = 4.00 (sd = 1.14); sensual = 3.51(sd = 1.63); anxiety-provoking = 3.70(sd = 1.46). This increases confidence that anxiety was responsible for the increases in nipple temperatures.

LeFevre (unpublished) attempted to replicate the results of the LeFevre et al. (unpublished) study in a separate sample of 24 female participants. As before, female participants had temperature probes attached to their fingertips and under their bras to
come into contact with their nipples. Temperatures were recorded prior to and after participants listened to the same audiotapes of relaxing, sensual and anxiety-provoking stimuli. In this second study, nipple temperatures increased significantly in both the anxiety provoking and sensual conditions. In this study, fingertip temperatures increased measurably during the relaxation vignette and decreased during the anxiety-provoking vignette, although neither was significantly different from baseline measures. Both of these changes are consistent with the expectation that blood flow at the fingertip site depends on activation of the sympathetic and parasympathetic nervous systems.

Taken together, these previous studies suggest that nipple erection occurs in anxiety-provoking as well as sensual events. In the LeFevre (unpublished 1998) study, women listed anxiety as the number one psychological reason for non-sexual nipple erection. In the physiological nipple/temperature change studies, it was found that anxiety-producing vignettes did produce reliable increases in temperature, which were indicative of nipple erection. An important question at this point is, why does this phenomenon occur? As with the formation and retention of permanent breast tissue, it would seem unlikely that increased blood flow and nipple erection would occur in nipples during periods of anxiety if there were not some benefit to outweigh the metabolic cost. As blood flows away from areas where it is not needed in order to be available at sites where extra oxygen may become necessary for fight or flight, it seems quite counterintuitive that the nipples would engorge with blood at this time for no purpose.

Although nipple erection is occasionally evident through clothing, this behavior would have been a regularly observable cue in our evolutionary past. To the extent that
nipple erection occurs as a result of anxiety and is an observable event, the question then becomes: what effect does nipple erection have on the observer? One possibility is that nipple erection acts on potential aggressors in inter-personal relationships. Several researchers have found that mild sexual arousal lowered aggression in male research participants (Baron & Bell, 1977, Donnerstein, Donnerstein & Evans, 1975, Ramirez, Bryant & Zillmann, 1982, Zillmann & Sapolsky, 1977). I hypothesize that observable nipple erection would be tantamount to mild erotica in the earlier studies and that in combination with mild provocation, should serve to lower aggression in males. The present study attempted to replicate these findings using photographs of fully clothed models with visible nipple erection vs. the same models without visible nipple erection. I hypothesized that if observing nipple erection lowers aggression in males, this would point to a clear reproductive advantage for females who displayed this behavior.

**Hypotheses**

Based on the literature reviewed above, that suggests that mild sexual arousal lowers aggression in males, the following hypotheses are offered.

**Hypothesis 1:** Males who are primed with stimuli of females (fully clothed) showing nipple erection who have committed an act against them will display lower aggression scores than males primed with stimuli of females (fully clothed) not showing nipple erection who have committed an act against them.

**Hypothesis 2:** Males who are primed with stimuli of females (fully clothed) showing nipple erection will be more forgiving of females who have committed an act against them than males primed with stimuli of females (fully clothed) not showing nipple erection who have committed an act against them.
One possible effect of nipple erection on observers is that it creates confusion or cognitive interference. That is, it disrupts thought processes involved in social interaction. Provocation causes aggressive thoughts, which are somewhat inconsistent with sexual thoughts. As sex is considered to be a primary drive in humans, (Masters, W., & Johnson, V. 1966) and nipple erection is an early occurring visible sexual response in women (Masters & Johnson, 1966; Cohn, 1974; Rathus, 1983; Killman, 1984; Maier, 1984), it seems reasonable to assume that if females display this natural sexual response in times of anxiety, that it may be confusing or cause cognitive interference in males.

Evidence of cognitive interference would be slower and less accurate responses at a cognitive task for which participants otherwise (in the absence of NSNE) show capability.

**Hypothesis 3**: Males will be less accurate at judging emotions in women with nipple erection than in those without nipple erection.

**Hypothesis 4**: Males will be slower at judging emotions in women with nipple erection than in those without nipple erection.

To test these hypotheses, the present research presented participants with photographs of fully clothed female models with visible nipple erection vs. no nipple erection and assessed aggressive reactions to provocation and the accuracy and speed of judging the models' emotions. In Study 1, males read vignettes, which described provocations by females and were asked how they would respond to the situations after viewing a picture of the model. Dependent measures included levels of aggression and forgiveness. In Study 2, participants were asked to judge the emotions that the women in the pictures were displaying. Dependent measures included the speed and accuracy of
judgments. If observing NSNE lowers aggression, this would point to a clear
reproductive advantage for females who displayed this behavior. That is, in the event that
a female was in a situation in which she felt anxiety (i.e. fear for her safety), it may have
been beneficial to her to display NSNE in order to make a male who might be around her
less likely to behave toward her in an aggressive manner. This would be especially
beneficial if the male felt that she had somehow ‘wronged’ him. Likewise, if a female
had committed some act, either on purpose or accidentally, which angered the male, he
would be more forgiving if the female displayed NSNE.
Chapter 2

Pilot Study
A pilot study was conducted prior to testing hypotheses. The objective of the pilot study was two-fold: (1) to test and identify appropriate stimuli for the main studies and (2) to gather preliminary evidence regarding the effects of NSNE on one's ability to judge emotions. Regarding the first objective, it was important to identify pictures of women that reliably manipulated the variables of interest (e.g., emotion) but did not introduce extraneous or nuisance variance (e.g., attractiveness, distinctiveness). Research on emotional intelligence indicates that levels of empathy are related to the ability to judge facial emotions (Mayer & Geher, 1996) and therefore it was decided to include a measure of empathy in this study to determine if mediating effects exist. Research that studied hostility and facial affect recognition found that highly hostile men were less accurate at recognizing happy, angry and neutral emotions than their less hostile peers (Herridge, Harrison, Mollet, & Shenal, 2004). For this reason, trait scales measuring dispositional aggression and hostility toward women were included in the pilot study.

**Participants**

Fifty-one undergraduate students (33 male and 18 female) from undergraduate psychology classes were recruited for this study. They were given research credit for their participation.

**Materials**

For this study I used PowerPoint to present a series of 32 slides containing 4 models displaying different emotions. Models were photographed from the waist up wearing white cotton t-shirts. Models were asked to depict six emotions: anger, surprise, happiness, fear, disgust, and confused. For each emotion, four female volunteer models (aged 18 – 24) posed wearing prosthetic nipples under white t-shirts for each emotion. In
order to depict the models without nipple erection, the photos were then digitally altered (using Adobe Photoshop, TM) to remove the visible ‘nipple erection’. The PowerPoint slides were projected onto a screen that was visible from all aspects of the room. The average distance from the screen was 15' 7".

**Measures**

Participants viewed each slide via a PowerPoint presentation for a period of 1 second and then answered 2 questions from the Emotion Questionnaire for Pilot Study/Manipulation Check (Appendix E). Participants chose (from 11 options) which emotion they thought the model was depicting in the photo, and then responded via a 5 point likert scale about the level of intensity to which they felt the model was feeling the emotion they chose. After viewing the slides, participants completed a personal data sheet (see Appendices F and G for the female and male versions, respectively). Males also filled out the Hostility toward Women scale (Check, 1985, Appendix I). This is a 36-item scale that assesses trait levels of hostility toward women. Sample items include: "I rarely become suspicious with women who are friendlier than I expected" and "I generally don't get really angry when a woman makes fun of me." Participants responded "true" or "false" to indicate their agreement or disagreement with each item. Coefficient alpha for this scale was .79. All participants filled out the Empathy Scale (Mehrabian, & Epstein, 1972, Appendix H). This is a 29-item scale that assesses trait levels of empathy. Sample items include: "I find it annoying when people cry in public" and "The suffering of others deeply upsets me". Participants responded on a scale ranging from 1 = extremely uncharacteristic of me to 5 = extremely characteristic of me. Coefficient alpha for this scale was .81.
Procedures

Participants took part in this study in single gender groups of 2 – 7 participants per group. Participants were seated so that they were far enough apart to impede the possibility of gaining access to other participants’ responses during any part of the study. Participants watched a counter-balanced slide show in which they judged the facial emotions of female models depicting various emotions: happy, fearful, confused, disgusted, angry, surprised or neutral (no emotion). Participants were each given a packet containing sufficient copies of the Emotion Questionnaire for Pilot Study (Appendix E) prior to the beginning of the study. After viewing each slide, participants would select their answers before viewing the next slide. After viewing the slides, female participants filled out the Personal Data Sheet (Female) and the Empathy Scale (Mehrabian, & Epstein, 1972). Male participants filled out the Personal Data Sheet (Male), the Hostility Toward Women Scale (Check, 1985) and the Empathy Scale (Mehrabian, & Epstein, 1972).
## Results

Table 1

*Mean Accuracy Ratings by Emotion and Erection (Pilot Study)*

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Non-Erect M (SE)</th>
<th>Erect M (SE)</th>
<th>t</th>
<th>total M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Happy</td>
<td>.784(.412)</td>
<td>.810(.393)</td>
<td>.61</td>
<td>.796</td>
</tr>
<tr>
<td>Confused</td>
<td>.471(.500)</td>
<td>.542(.499)</td>
<td>-1.34</td>
<td>.501</td>
</tr>
<tr>
<td>Fear</td>
<td>.794(.406)</td>
<td>.873(.335)</td>
<td>-1.50</td>
<td>.833</td>
</tr>
<tr>
<td>Angry</td>
<td>.726(.451)</td>
<td>.343(.476)</td>
<td>5.19**</td>
<td>.419</td>
</tr>
<tr>
<td>Surprise</td>
<td>.461(.501)</td>
<td>.366(.107)</td>
<td>1.51</td>
<td>.404</td>
</tr>
<tr>
<td>Neutral</td>
<td>.480(.502)</td>
<td>.784(.415)</td>
<td>-3.73**</td>
<td>.582</td>
</tr>
</tbody>
</table>

Marginal Means: 2.843(.073) 2.544(.064)

*Note.* Standard Errors are in parentheses. ** = *p* < .001.

Results of the pilot study indicated that participants were more accurate at identifying happy, fear, and angry conditions during the non-erect conditions. We chose the non-erect condition as baseline to determine saliency of the stimulus material. Results indicated that participants were significantly less accurate at judging "angry" in the erect condition than in the non-erect condition. Interestingly, they were significantly more accurate at identifying "neutral" or no emotion in the erect condition than they were in the non-erect condition. It was important to test the saliency of the "neutral" condition for use in Study 1, as it is important that the participants did not infer any positive or negative emotion from the female in the photo as they considered how they would behave in the hypothetical situations. This study helped determine the stimulus material for the main
While the (non-erect) mean accuracy ratings for the confused condition are slightly higher than for the surprised condition, which was the fourth emotion chosen for the main studies, there were two models for which confused had a low accuracy rating. It was therefore decided that surprised would be an overall better stimulus choice for the studies. There was no significant effect of erection or gender on accuracy of judging emotion in the pilot study.

Post-hoc tests of nipple erection for each emotion revealed significant effects of erection on the emotions 'angry' and 'neutral'. Interestingly, participants were significantly less accurate at identifying the emotion 'angry' in the NSNE condition; however, they were significantly more likely to accurately identify 'neutral'.

In addition to testing stimulus material, I examined inter-correlations between the individual difference measures, demographic variables, and emotion ratings. Correlations were observed that involved empathy, hostility toward women and self-reported GPA. I found a significant positive correlation between empathy and self-reported GPA, \( r = .349, p < .05 \). I also found a significant negative correlation between scores on the hostility scale and reported GPA, \( r = -.415, p < .05 \). Finally, I found a significant positive correlation between the number of male siblings that males had and the likelihood that they were in a relationship at the time of the study, \( r = .363, p < .05 \).

**Discussion**

I was able to identify, through this study, appropriate stimuli to use in the main study. The final four emotions chosen were: angry, happy, fearful and surprise. These were chosen because out of the six emotions tested (anger, surprise, happy, fearful, disgusted, and confused), these four were the most reliably chosen by participants in the
pilot study. These four emotions also are considered to be part of the six universally recognized emotions in all cultures (Kirouac & Dore, 1985). Significant reduction in accuracy in the NSNE condition in 'anger' lends preliminary support to Hypothesis 3.

Higher scores on the Hostility toward Women Scale were associated with lower reported GPA; this finding is consistent with previous research that investigated the ability of children to self-regulate their behavior and academic outcomes (Graziano, Reavis, Keane & Calkins, 2007). In this study, they found that children with significant behavior problems (who displayed aggression) scored significantly lower in math, literacy and emotional regulation than students who did not have significant behavioral problems. While the Graziano et al. (2007) study was undertaken with a younger population, there is no reason to believe that outcomes of older students would improve if levels of hostility/aggression remain elevated. As a result of these findings, and because of predictions from evolutionary theory about mediating effects of aggression and hostility levels on ability to judge emotions and males' behavior toward provocation from females, it was decided to include the Hostility toward Women and the Aggression Scales in the main studies. In the interest of time and to eliminate the possibility of participant fatigue, the empathy scale was eliminated for these studies.
Chapter 3

Study 1
Study 1 was designed to test Hypotheses 1 and 2, which stated that males would show lower aggression and more forgiveness toward females when they show nipple erection than non-nipple erection. Previous research demonstrates that mild sexual arousal lowers aggression in males (Ramirez, Bryant & Zillmann, 1982, Baron & Bell, 1977, Zillmann & Sapolsky, 1977, Donnerstein, Donnerstein & Evans, 1975), and thus I designed this study to examine whether nipple erection would function as a mild sexual arouser and lower aggression in male observers. It is important to state that in this study, as in the earlier studies (Ramirez, Bryant & Zillmann, 1982, Baron & Bell, 1977, Zillmann & Sapolsky, 1977, Donnerstein, Donnerstein & Evans, 1975), there was no actual measure taken of level of sexual arousal. In the earlier studies, it was assumed that the more explicit the erotic material, the more sexually arousing the stimulus material was. For this group of studies, I chose not to measure sexual arousal due to concerns of demand characteristics. I did not want to make sexual arousal salient to males while they were responding to the scenarios and did not want them guessing the purpose of the experiment. In order to look at the possible observer effects of nipple erection on aggression, we developed a scenario study to see how males would react to a woman who had supposedly done something that might mildly upset them.

Disposition and tendencies toward aggression are likely to influence the level of aggression displayed toward others (Norlander & Eckhardt, 2005). In addition, disposition and hostility toward women may influence men’s aggressive responses toward women. Thus, scales measuring both of these traits were included in Study 1.
Participants

Sixty-eight male students from undergraduate psychology courses at the University at Albany were recruited for this study. 97% stated that they were from the 18-22 age group, 3% from the 23-27 age group. Ethnicities reported broke down as follows: 65.7% Caucasian, 14.9% African American, 10.4% Asian, 6% Hispanic, and 3% Other. Self-reported GPAs ranged from 1.6 to 4.0. They were given research credit for their participation.

Materials

Six scenarios were developed for this study. Each of the six scenarios was designed so that the female would have either purposely or inadvertently acted in ways that would likely cause some level of irritation in the participant (i.e. provoke the participant). Scenarios included provoking incidents such as the female arriving half an hour late for a movie date and not appearing at all apologetic, a female jumping line in front of the male in a 6 item or less aisle at the grocery store with at least 20 items, and a newly hired female getting a promotion that the male had been thinking he was going to receive. For a complete description, see Appendix L. Seven judges (mean age = 28.7) who were blind to the hypothesis were recruited and asked to rate each of the scenarios on a scale of 1 to 5 for level of provocation, where 1 = not at all and 5 = very much. It was determined that the scenarios were sufficiently irritating. It was important to choose scenarios that were somewhat, but not overly, provoking in order to avoid a spillover effect that might make some males increasingly angry as the study progressed. Worthy of note also is the age difference of the raters and the eventual participants. As stated, the judges for the scenario material had a mean age of 28.7, whereas the participants' age fell
predominantly (66 of 68 participants) in the 18 – 22 age group, with only 2 out of 68 participants in the 23 – 27 age group. Mean ratings for the scenarios were as follows: scenario one, \( = 2.29\), scenario two \( = 2.0\), scenario three \( = 2.07\), scenario 4 \( = 2.50\), scenario 5 \( = 2.43\), scenario 6 \( = 3.07\). Each scenario was verbally recorded by the researcher on a RCA digital voice recorder (model RP5120). A PowerPoint presentation was made of the scenarios with a photo of one of the models appearing after each for one second. Participants were told to imagine that this was the female that had been a part of the preceding scenario along with them. The PowerPoint program was designed to then stop on a blank slide to allow the participant as much time as was needed to answer the 4 questions regarding that scenario. Each participant was exposed to scenarios 1-6 one time; in 3 of the scenarios the model shown afterward would be depicting NSNE; in the other 3, the model shown would not. Photos were counter-balanced by model and NSNE. All participants also filled out a Personal Data Sheet (Male), an aggression scale (Buss & Perry 1992), and the hostility toward women scale (Check 1985).

**Procedures**

Participants took part in this study on an individual basis. When participants entered the laboratory, they were greeted by the experimenter and then told that they would be taking part in a scenario study in which they would be listening to a series of descriptions of situations in which they should imagine themselves. They were told to look at the computer screen where the recorded scenario that they were listening to was also written (in a Power-point presentation) in order that they would see a picture of a female flash on the screen at the end. They were instructed to think of this female as being in the situation with them and answer the questions that followed accordingly. A
PowerPoint presentation was made of the scenarios so that participants could read along as they listened. After the audio of each scenario finished, the words faded away and a photo of one of the models would appear for one second. This was considered to be a sufficient length of time for participants to fully absorb the facial expression without allowing excessive time to dwell upon the presence or absence of NSNE. Each participant was then shown a photo of a model depicted with either nipple erection or without and then asked a series of questions pertaining to the level of possible upset they would be likely to feel in the hypothetical scenario and what behaviors they might be likely to display. After participants completed the counter-balanced scenario task, they filled out the Male Data Sheet, the Hostility toward Women Scale (Check, 1985), and the Aggression Scale (Buss, & Perry, 1992, Appendix J). This is a 29-item scale that assesses trait levels of aggression. Sample items include: "Once in a while, I can't control the urge to strike another person" and "Some of my friends think I am a hothead". Participants responded on a scale ranging from 1 = extremely uncharacteristic of me to 5 = extremely characteristic of me. Coefficient alpha for this scale was .89.

Measures

After each photograph, participants were asked four questions: How likely is it that you would be angry with her? How likely is it that you would become verbally aggressive with her? How likely is it that you would become physically aggressive with her? How likely is it that you would forgive her? They responded on a 5-point scale, anchored at 1 = not at all and 5 = very much. Factor analyses revealed that these four items formed one factor, which was labeled anger. Coefficient alpha for this scale was .73. All participants also filled out the Personal Data Sheet and the Aggression Scale
(Buss & Perry, 1992), and the hostility toward women scale (Check 1985) used in the Pilot Study.

**Results**

I analyzed the data using the linear mixed-effects model procedure (MIXED) in SPSS. This approach to repeated measures analysis uses restricted maximum likelihood estimation (REML) rather than least-squares methods used in common analysis of variance. Bonferroni adjustment was used for post-hoc multiple comparisons among means. The forgiveness item (Question 4 from Appendix L) was reverse scored and combined with the other three questions from Appendix I to make a separate variable which was labeled ‘Anger’. The means and standard deviations for anger by scenario are presented in Table 1. Results of the mixed-effects model revealed a significant main effect for erection and scenario, but no significant interaction (see Table 2 for results). Overall, males expressed significantly less anger at the women in the scenarios when they had erect nipples than when they did not (Ms = 2.54 vs. 2.84, respectively). Post-hoc tests of nipple erection for each scenario revealed significant effects for anger for scenarios 1 and 5. Males were significantly less angry in these scenarios when provoked by females who showed nipple erection than no nipple erection. These scenarios depicted: (1) a female who has shown up 30 minutes late for a movie date, acting unconcerned that she has kept her date waiting, and (2) a female at work, who is new to the company and gets a promotion that [the participant] thought would be his.
# Table 2

*Mean Anger Ratings by Erection by Scenario (Study 1)*

<table>
<thead>
<tr>
<th>Erection Level</th>
<th>Scenario</th>
<th>Non-Erect</th>
<th>Erect</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2.867(.172)</td>
<td>2.225(.126)</td>
<td>-3.077*</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.744(.231)</td>
<td>2.671(.160)</td>
<td>-.268</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>2.365(.148)</td>
<td>2.410(.152)</td>
<td>.212</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>3.265(.139)</td>
<td>3.072(.225)</td>
<td>-.766</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>2.398(.202)</td>
<td>1.759(.107)</td>
<td>-2.907*</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>3.421(.160)</td>
<td>3.126(.144)</td>
<td>-1.324</td>
</tr>
<tr>
<td>Marginal Means</td>
<td></td>
<td>2.843(.073)</td>
<td>2.544(.064)</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Standard errors are in parentheses. Responses were on a 5-point Likert-type scale, anchored at 1 = not at all and 5 = very much. * = p < .05.

# Table 3

*Main Effects and Interactions for the Effect of Nipple Erection and Scenario on Anger Ratings (Study 1)*

<table>
<thead>
<tr>
<th>Effect</th>
<th>F</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario</td>
<td>16.226</td>
<td>.000*</td>
</tr>
<tr>
<td>Erection</td>
<td>9.552</td>
<td>.000*</td>
</tr>
<tr>
<td>Scenario x Erection</td>
<td>1.643</td>
<td>.155</td>
</tr>
</tbody>
</table>

*Note.* a df = (5,106); b df = (1,276); * = p < .05.

The main effect for scenario indicated that regardless of nipple erection, anger varied significantly by scenario, indicating that some scenarios were more provocative than others. When looking at pair-wise comparisons for scenario, we found significant differences between scenarios 1 and 4 (-.623, p < .05) and scenarios 1 and 6 (-.728, p <
.05), indicating that Scenario 1 provoked less anger than scenarios 4 and 6. Significant differences were also found between scenarios 2 and 5 (.629, p < .05) and Scenarios 2 and 6 (-.567, p < .05), scenario 3 was significantly less provocative than scenarios 4 (-.782, p < .05) and 6 (-.887, p < .05). Finally, scenario 4 was more provocative than scenario 5 (1.090, p < .05) and scenario 5 was more provocative than scenario 6 (1.195, p < .05).

Overall, males expressed significantly more forgiveness at the women in the scenarios when they had erect nipples than when they did not (Ms = 3.44 vs. 3.07, respectively). Post-hoc tests of nipple erection for each scenario revealed significant effects for anger for scenario 5. Males were significantly less angry in these scenarios when provoked by females who showed nipple erection than no nipple erection. The scenario depicted a female at work, who is new to the company and gets a promotion that [the participant] thought would be his.

Table 4

Mean (Reverse-Scored) Forgiveness Ratings for Erection by Scenario (Study 1)

<table>
<thead>
<tr>
<th>Erection Level</th>
<th>Non-Erect</th>
<th>Erect</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>3.865(.197)</td>
<td>3.333(.219)</td>
<td>1.802</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>2.963(.188)</td>
<td>3.115(.235)</td>
<td>.505</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>3.657(.203)</td>
<td>3.437(.212)</td>
<td>.748</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>2.957(.250)</td>
<td>2.614(.181)</td>
<td>1.110</td>
</tr>
<tr>
<td>Scenario 5</td>
<td>4.222(.200)</td>
<td>3.484(.216)</td>
<td>2.510*</td>
</tr>
<tr>
<td>Scenario 6</td>
<td>2.966(.2.23)</td>
<td>2.447(.195)</td>
<td>1.750</td>
</tr>
<tr>
<td>Marginal Means</td>
<td>3.072(.086)</td>
<td>3.438(.086)</td>
<td></td>
</tr>
</tbody>
</table>

Note. Standard errors are in parentheses. * = p < .05.
Table 5 presents inter-correlations between all variables in this study. Responses to the individual anger scale items are also included in this table. Other variables in the correlation table are scores on the Aggression Scale (Buss, & Perry, 1992) and on the hostility toward women scale. Also included were the participants GPA and relationship status. A significant positive correlation was found scores on the Aggression Scale (Buss & Perry, 1992) and scores on the Hostility Toward Women Scale, \( r = .457, p < .01 \) level (2-tailed). A significant negative correlation was also found between scores on the Aggression Scale and relationship status 0 = not in a relationship, 1 = in a relationship, \( r = -.158, p < .01 \) level (2-tailed). This revealed that the higher a participant scored on the Aggression Scale, the less likely he was to be in a relationship at the time of his participation in the study (See Table 5, next page).
### Correlations Among Participant Characteristics and Responses on Scenario Study

<table>
<thead>
<tr>
<th></th>
<th>Erect/Not</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Anger</th>
<th>Aggression</th>
<th>Hostility</th>
<th>GPA</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erect/not</td>
<td>1</td>
<td>-.118*</td>
<td>-.196**</td>
<td>-.015</td>
<td>.176**</td>
<td>-.192**</td>
<td>-.005</td>
<td>-.004</td>
<td>.000</td>
<td>-.029</td>
</tr>
<tr>
<td>Q1</td>
<td>-.118*</td>
<td>1</td>
<td>.638**</td>
<td>.089</td>
<td>-.588**</td>
<td>.865**</td>
<td>.148**</td>
<td>.048</td>
<td>-.062</td>
<td>.025</td>
</tr>
<tr>
<td>Q2</td>
<td>-.196**</td>
<td>.638**</td>
<td>1</td>
<td>.126*</td>
<td>-.569**</td>
<td>.850**</td>
<td>.134**</td>
<td>.098*</td>
<td>-.087</td>
<td>-.009</td>
</tr>
<tr>
<td>Q3</td>
<td>-.015</td>
<td>.089</td>
<td>.126*</td>
<td>1</td>
<td>-.092</td>
<td>.119*</td>
<td>.036</td>
<td>-.026</td>
<td>-.175**</td>
<td>-.086</td>
</tr>
<tr>
<td>Q4</td>
<td>.176**</td>
<td>-.588**</td>
<td>-.569**</td>
<td>-.092</td>
<td>1</td>
<td>-.850**</td>
<td>-.089</td>
<td>-.063</td>
<td>.079</td>
<td>.004</td>
</tr>
<tr>
<td>Anger</td>
<td>-.192**</td>
<td>.865**</td>
<td>.850**</td>
<td>.119*</td>
<td>-.850**</td>
<td>1</td>
<td>.141**</td>
<td>.080</td>
<td>.086</td>
<td>.002</td>
</tr>
<tr>
<td>Aggression</td>
<td>-.004</td>
<td>.148**</td>
<td>.134**</td>
<td>.036</td>
<td>-.089</td>
<td>.141**</td>
<td>1</td>
<td>.487**</td>
<td>.096</td>
<td>-.158**</td>
</tr>
<tr>
<td>Hostility</td>
<td>.000</td>
<td>-.062</td>
<td>-.087</td>
<td>-.175**</td>
<td>.079</td>
<td>-.086</td>
<td>.096</td>
<td>.021</td>
<td>1</td>
<td>.036</td>
</tr>
<tr>
<td>GPA</td>
<td>-.029</td>
<td>.025</td>
<td>-.009</td>
<td>-.086</td>
<td>.004</td>
<td>.002</td>
<td>-.158**</td>
<td>-.154**</td>
<td>.036</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation is significant at 0.01 (2-tailed). *Correlation is significant at the 0.05 (2-tailed).**

**Note.** Q1, Q2, Q3, and Q4 refer to questions 1 - 4 in Appendix K.
Discussion

The results for this study indicate that males responding to a hypothetical situation are significantly less aggressive and significantly more forgiving of females who have provoked them when the female displays nipple erection. The significant main effect of NSNE on anger, and the significant correlations between the NSNE condition and forgiveness and aggression items in Table 5, provide support for Hypotheses 1 and 2. These findings are also consistent with previous studies by Baron & Bell (1977), Ramirez, Bryant & Zillmann (1982), and Zillmann & Sapolsky (1977), who all found that when provoked, males were less aggressive when they were mildly sexually aroused. In neither this study nor the previous studies was sexual arousal measured, males were simply exposed to material that was considered to be sexually arousing. I chose not to measure sexual arousal due to the possibility of eliciting demand characteristics in this sample. In this study, there was a question pertaining to sexual orientation in a questionnaire that participants took after they finished the PowerPoint presentation, which was designed to at least touch on the topic. As participants were not supposed to be aware of the hypothesis, it was considered impossible to ask direct questions about the arousing nature of the PowerPoint material. Only one participant self identified as having homosexual orientation.

A lowering of aggression when provoked would be a valuable commodity for a female to elicit. This would be a direct benefit to her chances of survival and, therefore, her chances of passing her genes into the next generation. It would be highly likely that women who displayed nipple erection in response to anxiety-provoking situations would leave more descendants and that the trait would become widespread in the gene pool.
An increase in forgiveness would serve to benefit a female much in the same manner and would also make likely that this behavior would be passed on to future generations and become widespread in the population.

As in the pilot study, it was found that high scores on a hostility toward women scale correlated with negative outcomes for males. In the pilot study, it was linked with lower GPA, in this study it was linked with lack of romantic relationship at the time of the study. Scores on the Aggression Scale (Buss & Perry, 1992) also correlated with lack of romantic relationship at the time of the study. These data are correlational and it is possible that the lack of relationship between scores on hostility and aggression measures may be due to a myriad of reasons. Given my design, it is impossible to identify the exact causal factor, however, there are data that point to enhanced levels of aggression as an undesirable characteristic in a dating relationship (Straus, 2004).

In this study, a negative relationship was found between the level of physical aggression participants would hypothetically use on a female provoker and GPA, with the more likely a male was to become physically aggressive, the lower their reported GPA was likely to be. While these are hypothetical data, it is somewhat disturbing to find that some participants actually state that they would be somewhat likely to physically harm a female for such infractions as being late for a date, or cutting in line at a grocery store. These results are consistent with the results from the pilot study that showed a correlation between scores on the hostility toward women scale and lower GPA in male participants.
Chapter 4

Study 2
Study 1 showed that nipple erection lowers aggressive responses in males in some situations. One explanation for this finding is that males recognize nipple erection as a sign of sexual arousal. Observing nipple erection in situations where the female is actually anxious or alarmed (and therefore, not sexually aroused) may send mixed signals, creating cognitive interference and making the misreading of emotions more likely (Hypotheses 3 and 4).

In order to gauge cognitive interference of nipple erection on emotion recognition, Study 2 examined latency effects in judging emotions in a reaction time study. Participants viewed images of models displaying different emotions with or without nipple erection. It was hypothesized that latencies would be longer in models displaying nipple erection. This study looked at the ability of males and females to accurately determine emotions (from facial expressions) and attempted to establish if non-sexual nipple erection makes determining emotions more difficult.

**Participants**

Eighty-nine undergraduate students (50 male and 39 females) from undergraduate psychology courses at the University at Albany were recruited for this study. They were given research credit for their participation.

**Materials**

This study was conducted on a Dell V Pro desktop computer with an Intel Core 2 Duo CPU E8200 processor at 266 GHz with Windows XP Professional 2002. The computer had a 60 - 70 Hz refresh rate and a 19" flat screen monitor. Stimuli were presented and results recorded using E-Prime computer software (Schneider, Eschman, & Zuccolotto, 2002). The E-Prime program is capable of audited millisecond-timing
precision for randomized presentation of pictures (Schneider, Eschman, & Zuccolotto, 2002), which made it a suitable choice for this study. This program provided measures of both latency to respond as well as accuracy of response. The E-Prime program recorded all responses made by each participant during practice blocks and testing blocks. Only responses made during testing blocks were considered for this study. This study was set up so that there were two practice blocks and four testing blocks; each block consisted of forty trials. The first trial block was a word trial, consisting of the 4 words that corresponded to the 4 emotions depicted in the study. Each word trial was preceded by a centered 1/4" x 1/4" fixation cross. Each word was 3/8" high x 1 1/2" (average) wide and appeared for 200 ms. The 200ms. stimulus presentation period was chosen for this study as it was considered to be of an acceptable length for participants to attend to the stimulus material, and falls within temporal boundaries used in reaction time studies (Lopez, Lopez-Calderon, Ortega, Kreither, Carrasco, Rothhammer, Rothhammer, Rosas & Aboitiz, 2006; Niedeggena, Hesselmann, Sahraieb, & Milders, 2006). Participants were given 3 seconds to respond for all blocks of the study. If participants did not respond within the 3 second time period, it was considered a non-response. The second trial block was a photograph trial block. Preceding each photo was a 1/4" x 1/4" fixation. Photographs were 5 1/4" wide x 5 3/4" high.

For this study, each model was shown depicting four emotions: anger, surprise, happiness and fear. As it could be argued that nipple erection, in itself, may cause participants, males especially, to become distracted and therefore display slower reaction times, it was decided to add a 'distracter' to the photographs. A purple dot was chosen and added halfway between the face and the chest area. This was considered to be a neutral
zone, taking the eye of the participant equidistant away from the face and the area of possible nipple erection.

**Procedures**

When participants arrived at the laboratory, the experimenter explained the study to them and asked them to sign an Informed Consent form. After signing the Informed Consent form, each participant took part in two practice trials on the computer to familiarize themselves with the equipment and the study. The first practice period consisted of the four emotion words: anger, surprise, happy, fear. The four words duplicated the emotions depicted on the models' faces during the testing blocks. A trial block of 40 words was shown. The second practice period consisted of the photographs depicting either anger, surprise, happy, or fear and was used to help get the participants further accustomed to the equipment and familiar with the task for the experimental trials. After the practice blocks, there were four blocks of 40 randomized photographs shown to each participant with rest periods in between, each of which the participant could control the duration.

After completing the E-Prime study, female participants filled out the Female Data Sheet (Appendix E) and an empathy scale (Mehrabian, & Epstein, 1972). Male participants filled out the Male Data Sheet Appendix F), a hostility toward women scale (Check, 1985, Appendix I), an aggression questionnaire (Buss, & Perry, 1992, Appendix J) and an empathy scale (Mehrabian, & Epstein, 1972).

**Results**

Reaction time was analyzed in a 2 (Nipple Erection) X 4 (Emotion) X 2 (Sex) repeated measures of analysis. Means and standard deviations for this are displayed in Table 5. I
found a significant effect for emotion, $F(3,261) = 49.47$, $p < .01$. Post-hoc tests revealed that participants, both males and females, were slowest to respond to models displaying 'fear' (males, $m = 893.9$; females, $m = 883.3$). Reaction time for models depicting 'anger' was significantly slower than reaction times for 'happiness' (Males, $m = 763.7$; females, $m = 754.5$). Reaction times to 'happiness' were significantly faster than for all of the other emotions.

I found no main effect for erection, nor any significant interaction with gender or emotion. There was not a significant difference in reaction time between males and females in this study (see Tables 6 & 7).

Table 6

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Anger Males</th>
<th>Anger Females</th>
<th>Fear Males</th>
<th>Fear Females</th>
<th>Happiness Males</th>
<th>Happiness Females</th>
<th>Surprise Males</th>
<th>Surprise Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Erect</td>
<td>865.6</td>
<td>817.2</td>
<td>894.4</td>
<td>896.1</td>
<td>764.6</td>
<td>750.5</td>
<td>839.3</td>
<td>844.3</td>
</tr>
<tr>
<td>Erect</td>
<td>847.4</td>
<td>829.6</td>
<td>893.5</td>
<td>870.4</td>
<td>762.7</td>
<td>758.4</td>
<td>857.2</td>
<td>823.9</td>
</tr>
</tbody>
</table>

*Note.* Values represent reaction time in milliseconds. No mean differences within a row are significant.
Table 7

Mean Reaction Time by Emotion Expressed by Model (Study 2)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Emotion</th>
<th>Mean Difference</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anger</td>
<td>Fear</td>
<td>-48.680*</td>
<td>11.936</td>
</tr>
<tr>
<td></td>
<td>Happiness</td>
<td>80.876*</td>
<td>9.679</td>
</tr>
<tr>
<td></td>
<td>Surprise</td>
<td>-1.227</td>
<td>11.224</td>
</tr>
<tr>
<td>Fear</td>
<td>Anger</td>
<td>48.680*</td>
<td>11.936</td>
</tr>
<tr>
<td></td>
<td>Happiness</td>
<td>129.556*</td>
<td>11.094</td>
</tr>
<tr>
<td></td>
<td>Surprise</td>
<td>47.453*</td>
<td>11.041</td>
</tr>
<tr>
<td>Happiness</td>
<td>Anger</td>
<td>-80.876*</td>
<td>9.679</td>
</tr>
<tr>
<td></td>
<td>Fear</td>
<td>-129.556*</td>
<td>11.094</td>
</tr>
<tr>
<td></td>
<td>Surprise</td>
<td>-82.102*</td>
<td>9.701</td>
</tr>
<tr>
<td>Surprise</td>
<td>Anger</td>
<td>1.227</td>
<td>11.224</td>
</tr>
<tr>
<td></td>
<td>Fear</td>
<td>-47.453*</td>
<td>11.041</td>
</tr>
<tr>
<td></td>
<td>Happiness</td>
<td>82.102*</td>
<td>9.701</td>
</tr>
</tbody>
</table>

Note. Values represent reaction time in milliseconds.
*Mean differences are significant at p < .05. F(3,261) = 49.47, p < .01.

Accuracy was also analyzed in a 2 (Nipple Erection) X 4 (Emotion) X 2 (Gender) repeated measures analysis. Means and standard deviations for this are displayed in Table 8. There was a significant difference in accuracy between males and females. Females were significantly more accurate in judging the emotions on the faces of the female models.
Table 8

Mean Accuracy by Emotion Expressed by Model and Participant Gender (Study 2)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Anger</th>
<th>Fear</th>
<th>Happiness</th>
<th>Surprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>.544(.032)</td>
<td>.258(.023)</td>
<td>.730(.023)</td>
<td>.417(.023)</td>
</tr>
<tr>
<td>Females</td>
<td>.608(.042)</td>
<td>.321(.029)</td>
<td>.823(.030)</td>
<td>.552(.030)</td>
</tr>
</tbody>
</table>

Note. Values represent proportion of responses that are accurate. Standard errors are in parentheses. Marginal (row) means are: males = .487, females = .576.

All two-way interactions were non-significant, as was the Nipple Erection X Emotion X Gender interaction. Means are displayed in Table 9.

Table 9

Mean Accuracy by Emotion Expressed by Model, Erection and Gender (Study 2)

<table>
<thead>
<tr>
<th>Emotion</th>
<th>Anger Males</th>
<th>Anger Females</th>
<th>Fear Males</th>
<th>Fear Females</th>
<th>Happiness Males</th>
<th>Happiness Females</th>
<th>Surprise Males</th>
<th>Surprise Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Erect</td>
<td>.540</td>
<td>.589</td>
<td>.254</td>
<td>.322</td>
<td>.729</td>
<td>.822</td>
<td>.413</td>
<td>.545</td>
</tr>
<tr>
<td>Erect</td>
<td>.548</td>
<td>.629</td>
<td>.262</td>
<td>.320</td>
<td>.732</td>
<td>.823</td>
<td>.429</td>
<td>.559</td>
</tr>
</tbody>
</table>

Note. Values represent proportion of responses that are accurate. No gender differences within a row are significant.
Discussion

I did not find evidence of an effect of nipple erection on ability to judge emotions in this study. There are several possible reasons for this. One possibility is that the stimulus used was not of sufficient strength to produce an effect. This seems unlikely as the stimulus material was shown to be effective during the pilot study. Alternatively, perhaps the response time contingencies need to be altered in such a way to make responding more likely for this particular task. Participants require, on average, a latency period of 330 ms. in order to make a planned response. For this study, participants were given 3 seconds in order to respond and have their response be coded as correct before the next trial started. The rationale behind this timing design is based on the concept of keeping the participant's eyes (and attention) focused on the computer monitor and was shown to be sufficient during pretests with volunteers before running the study. As the results showed several participants, males especially, had very low response rates (one male responded only 20 out of 160 possible responses), it may be necessary to find a program that ensures that participants respond before they move on to the next trial. Unfortunately, the E-Prime program does not provide this function. It is questionable whether such a program would actually be considered ethical, as it is not permissible to force participants to answer any question in a study that they do not wish to answer. Designing a program in a manner that forces participants to answer questions would not comply with IRB regulations. It may be possible to place a longer delay in the program so that participants who do not respond in an appropriate manner would have to wait for a longer period than otherwise before continuing. However, this may cause a new problem of not having the eyes focusing on the monitor when the next stimulus appears.
It is possible that cognitive interference does not explain the findings from Study 1, and that some other mechanism or mechanisms are responsible for the de-escalation of aggression. It may be that males are simply more attracted to females displaying NSNE and, therefore, are less aggressive toward them. It is plausible that males are sexually aroused by the photographs of females depicting NSNE and therefore, display a momentary reduction in aggression.
Chapter 5

General Discussion
In earlier studies I found evidence of nonsexual nipple erection (NSNE) in females in response to anxiety-provoking stimulus material (LeFevre, unpublished). The goal of the present research was to determine what benefits, if any, that NSNE may confer upon females who display this behavior. Study 1 was designed to look at the possibility that NSNE might temper aggression in males. I found evidence that NSNE affects aggression and forgiveness tendencies in hypothetical situations where a female has provoked a male participant. When males were provoked and then viewed a photograph of a model depicting NSNE, they were significantly less aggressive than when the model was not depicting nipple erection. These results are consistent with similar results of earlier studies that looked at effects of mild erotica and provocation on levels of aggression (Baron & Bell, 1977, Ramirez, Bryant & Zillmann, 1982, and Zillmann & Sapolsky, 1977). NSNE may confer a biological advantage for females who display this behavior. It would certainly be beneficial to any female who provoked a male, whether accidentally or on purpose, to be able to deescalate the level of aggression and/or to have the male become more forgiving. To be able to do it without uttering a word may have been extremely valuable in our distant past (and likely remains quite useful in the present), and it is likely that females who presented NSNE in response to anxiety, especially to an angry male human, lived longer to leave more offspring than females who did not display this behavior.

While the stimulus material was not the same, and there was no measure of arousal taken, the results of Study 1 and the earlier studies (Baron & Bell, 1977, Donnerstein, Donnerstein & Evans, 1975, Ramirez, Bryant & Zillmann, 1982, Zillmann & Sapolsky, 1977) showed lowered levels of aggression when male participants were
exposed to either NSNE or mild erotica. In all fairness, participants in earlier studies were not typically measured for level of arousal. It therefore is possible that my similar results are due to a common causal mechanism. Further research is necessary in order to determine if this is the case.

NSNE was also found to significantly increase the level of forgiveness in males in Study 1. Forgiveness can be considered a specific situation of aggression de-escalation, targeted at the ostensible cause of the aroused aggression. This was not a dimension of the earlier studies by other authors, however it was deemed important to explore individually. The quality of forgiveness would be of great value in a real-life situation if a female had provoked a larger, stronger male.

There was a significant negative correlation in Study 1 between relationship status and hostility and aggression. Males who were not in a relationship scored higher on both aggression and hostility. There were also significant positive correlations between scores on the aggression scale (Buss, & Perry, 1992) and participants' answers on Q1 and Q2, as well as the composite anger measure consisting of Q1, Q2, Q3 and Q4. There was also a positive correlation between scores on the Hostility toward Scale and participants answers on Q2 (Check, 1985). These results may point out the high level of importance females place on procuring a male who is not hostile or aggressive. While it is only correlation, and it would be impossible to say why they were not in a relationship at the time of the study, it is certainly plausible that females would be less likely to choose males who would be more likely to become hostile or aggressive with them. Throughout history, females who were able to choose males that were not hostile or aggressive with them or their offspring certainly would have left more viable offspring.
There was a significant negative correlation between GPA and Q3. Put in plain terms, this means that the more likely a male was to say he would become physically aggressive with a female for provoking him, the lower his GPA. This is worthy of note because when we look at the research on the topic of child corporal punishment and/or abuse, we find a direct link from parental use of corporal punishment/ spanking or physical abuse and later heightened levels of aggression in the child (Lasky, 1993; Laub, & Sampson, 1995; Straus & Yodanis, 1996; Straus, Sugarman & Giles-Sims, 1997; Swinford, DeMaris, Cernkovich, & Giordano, 2000; Trickett, & Kuczynski, 1986; Whipple, & Richey, 1997; Vasta, 1982). More recent research suggests that in addition to creating heightened levels of aggression in children and adolescents, the environment of aggression that exists when parents use corporal punishment/spank their children causes children to grow up with heightened levels of tension and anxiety. These negative emotional states due to corporal punishment or spanking may cause chronic stress for children who are spanked (Lasky, 1993; Laub, & Sampson, 1995; Straus & Yodanis 1996; Straus et. al, 1997; Swinford et. al, 2000; Trickett & Kuczynski 1986; Whipple & Richey 1997; Vasta1982). This can lead to later posttraumatic symptoms of fear of impending doom and heightened startle response, which have both been linked with lower cognitive function. Recently researchers have found a link between corporal punishment/spanking and lower intelligence (Straus, Douglas, & Medeiros, in press; Straus, & Peschall, 2009).

Although my data is only correlational, it is consistent with these recent studies in that being raised in an environment of aggression can perpetuate subsequent aggression and a lowering of intelligence (Straus et al. in press; Straus & Peschall, 2009), which may
be evidenced by a lower GPA. Lower reported GPAs for participants may, in turn, limit their economic prospects after college. A study looking at effects of corporal punishment/spanking on educational attainment found that children who received corporal punishment were less likely to complete college (Straus & Gimbel, 1992).

If corporal punishment can cause effects that range from lower intelligence to inhibited educational (and therefore, economic) attainment, it is possible that females who choose not to mate with aggressive males may be also avoiding males whose earning potentials may be lower than other potential mates. Therefore, these females may be protecting themselves from three deleterious possible outcomes: abusive mates, abusive fathers of future offspring, and mates who cannot provide resources as well as other males.

I found little evidence for an effect of NSNE on ability to judge emotion in Study 2. My results indicate that ability to judge emotion is not mediated by NSNE. I found no main effect for erection, nor a significant interaction with gender or emotion. There was a significant difference between males and females, with males being significantly less accurate at judging emotions than females. This finding converges with other studies of abilities to detect facial emotions (Kirouac & Dore, 1985; Rotter & Rotter, 1988) which both found females superior to males at decoding facial emotions. As females have historically been the primary caregivers of offspring, an enhanced ability to detect emotions on the face of a pre-lingual infant would likely increase chances of offspring survival and enhance maternal-child relationships.

In the pilot study, there was a negative relationship between hypothetical aggression and reported GPA. There was also a negative correlation between scores on
the Hostility Toward Women Scale (Check, 1985) and relationship status at the time of
Study 1. While these data are only correlational, both of these findings point to negative
outcomes for males who have higher than average levels of aggression/hostility. These
results are consistent with research on emotional intelligence (Brackett, Mayer & Warner,
2004) and point to a necessity for further research in this area.

As I did not find support for cognitive interference in these studies, (i.e., slower
reaction time or lower accuracy for judging emotions in the NSNE condition), it is
presently unknown what the mediating mechanism(s) for aggression
reduction/forgiveness enhancement due to NSNE may be. My findings could be due to
inadequate experimental design. It is plausible that NSNE may function as a mechanism
to enhance positive affect through increasing perceived attractiveness of the model and
this may mediate the aggression/forgiveness that occurs concomitant with this behavior.
It is also possible that NSNE may simply enhance attraction to the female displaying this
behavior, which may directly cause a de-escalation of aggression and enhance
forgiveness. In earlier studies, (Byrne, London, & Reeves, 1968; Kleck & Rubenstein,
1975) physical attractiveness has been shown to effect ratings of attraction and 'liking' for
members of the opposite sex, so it may in fact be that these factors are principal in the de-
escalation of aggression/enhanced forgiveness we found in the presence of NSNE in this
research.

Future studies should focus on these and other possible mediating mechanisms
that deescalate aggression due to NSNE. It would be quite interesting to see if, instead of
simply attempting to decrease deleterious outcomes, when primed with images of NSNE,
males would be more likely to behave in an altruistic manner or become more pro-social.


Byrne, D., London, O., & Reeves, K. (1968). The effect of physical attractiveness, sex, and attitude similarity on interpersonal attraction. *Journal of Personality*, 36, 259-271


Appendix A

Anxiety Vignette

You rush as you leave your apartment. At the last minute you had to change your blouse because you spilled coffee on yourself. Then you couldn’t find your keys. They weren’t in your jacket pocket or on the kitchen counter, where you usually leave them. After a frantic search, which left your place a wreck, you finally found them under a couch cushion. You go to lock the door and drop the keys in a puddle. You finally get the door locked and rush to your car. Now you are really late for work. And your boss sent out a memo just last week about proper office attire and being on time. You pull out of the parking lot and see that traffic is at a standstill. While you are waiting for traffic to move, you turn on the radio and the traffic news is playing. From a helicopter somewhere overhead, the reporter is announcing that an accident that is blocking traffic has occurred two blocks up from where you sit. Now there is no way you could possibly get to work on time. As you sit there trying to think of an appropriate excuse for being late, you glance down and notice that your blouse doesn’t really match your pants. Great. Now you are late AND you look unprofessional. You spent years in college to get this job and now you’re already screwing up. You vaguely recall a different route that should leave you off a few blocks from work. You were riding in the back seat of a friend’s car when you went that route before, but if you can just remember the turns, with a little luck you might shave a few minutes off your time. The traffic finally crawls up to the road you can turn on. Already agitated, you begin to perspire as you make the final decision to try the other route to work. If you can remember all the turns, you may make it in before anyone notices. If you mess up, you may be later than you would have been if you stayed in that traffic mess. Your palms start to sweat and your heart is in your throat as you make the first turn. Things look familiar. So far, so good. You make the second turn and there is hardly any traffic on this road. Maybe you could go a little faster and shave off some more time. You are doing 40 in a 30 zone when you hear a siren. A glance in the rear view mirror confirms your worst fears; you’ve been caught. Now you will be REALLY late. You wonder if your boss will take pity on you for getting a speeding ticket on the way to work or if your boss would think you were irresponsible for getting a ticket. As you slow down and try to find a place to pull over, you wonder how much the ticket will be. You don’t get paid until next Friday and the rent is due then. The police car is so close behind you that you can see the faces of the officers. They look very business-like and stern. The siren and lights are making you feel queasy. Your palms are so sweaty now that your hand slips a bit as you turn the wheel. You swallow past the lump in your throat as you finally find a place to pull over on the right.
Appendix B

Relaxation/Control Vignette

You pull on your sweatshirt as you amble out the door to the back porch and out to the yard. The back yard is a meadow, and the sun is slowly rising. A soft mist covers the grass and your sneakers squeak as you walk. You can smell the freshness of the grass, the fragrance of new blooms on the flowers. You become aware of birds singing their morning songs. As the sun comes up, the colors of the sky gradually change. Lavenders and blues become peaches and pinks. The air is fresh, a soft wind whispers against your cheeks. An owl hoots. You gently stretch your arms out and yawn as the last vestiges of sleep leave you. You are awake and calm as the sun comes over the edge of the meadow and bathes everything in a warm golden glow. You slowly make your way back to the porch to read the morning paper.
Appendix C

Sensual Vignette

The doorbell rings. You know without looking who it is. It’s him. You have been thinking of him all afternoon. It’s only been a few days, but it seems like he’s been gone a year. You took special care getting ready today. You chose an outfit that makes you feel sexy. And you sprayed on a mist of your favorite cologne.

You have been remembering little sexy things about him all day…the intensity in his eyes when he looks at you with desire…the way his voice catches when he whispers sweet love words in your ear…the way his hands tremble slightly as he tenderly caresses your face…the anticipation as his eyes slide shut while his lips slowly come closer to yours…the tiny groan that escapes when your lips finally meet…

By the time you finally reach the door, your whole body is warm and tingly, your breathing is shallow. You take a deep breath and try to calm down as you open the door. But as soon as you see him, you know you are lost. Your eyes lock with his and your heart beats faster.

“Hi” he says and smiles shyly.

“Hi” you reply as he walks in and you shut the door. For a minute, you just stand there looking at each other and smiling.

Then, as if on cue, you both move toward each other and embrace. As soon as your bodies touch, you feel energized and you both just hold each other for a while, enjoying the nearness. Then, with one arm still holding you, he moves the other hand up and runs his fingers through your hair.

He whispers “I missed you” as he nuzzles your neck, inhaling the scent of you as he places little kisses on your throat and neck. Then, holding your face gently in both hands, he pulls back to gaze again into your eyes. His eyes are luminous and as your gazes lock together, the world disappears and there is nothing else but this moment and the two of you.

His voice is husky as he says “I love you” and brings his lips close to yours. You lean toward him to close the distance and your lips finally meet in a kiss so sublime it leaves you both dizzy.
Appendix D

Physiological Study Manipulation Check Packet

(One sheet per audiotape was supplied in a packet to each participant.)

TAPE 1:

Please fill out this sheet AFTER you have listened to TAPE 1.

Please indicate which word or phrase describes BEST the audiotape you have just heard:

____Sensual
____Relaxing
____Angry
____Depressing
____Anxiety-provoking
____Other (please list)______________________

Please rate the extent to which this audiotape conveys the descriptor you chose for the previous question. (Example: HOW well did the tape convey anger?)

1                   2                     3                    4                  5
not at all                   a little                           somewhat                      very much               extremely

Please turn the page and turn the tape player on to TAPE 2.
Appendix E

Emotion Questionnaire for Pilot Study/Manipulation Check*

Show Photo.

What emotion is this woman feeling? Please choose only one.

___ No emotion
___ Happy
___ Sad
___ Confused
___ Disgusted
___ Angry
___ Anxious
___ Calm
___ Sexually Excited
___ Can’t tell from photo
___ Other, please list _________________________

To what extent is the woman feeling this emotion?
(Please circle appropriate number)

1                  2                  3                     4                     5
Not at all       Slightly     Somewhat     Moderately     Very Much

(*These were used 1 per photo, there was a packet of these in the actual experiment.)
Appendix F

Personal Data Sheet (Female)

1. Please indicate your age group: 18 – 25 _______ 26 – 35 _______ 36 – 45 _______
   46 – 55 _______ 55+ _______

2. Please indicate your height _______ and weight _______

3. Please indicate your bra size (Examples: 32, 36, 38, 40, etc.) _______

4. Circle your cup size: AA B C D DD Larger

5. Have you ever had your breasts enlarged or reduced?
   ___ Yes, enlarged
   ___ Yes, reduced
   ___ No

   If you answered yes to Question 5, has there been a change in the sensitivity of your
   nipples/breasts since the surgery?
   ___ Much more sensitive
   ___ Slightly more sensitive
   ___ Same level of sensitivity
   ___ Moderately less sensitivity
   ___ Much less sensitivity

6. Have you had your nipple(s) pierced?
   ___ Yes
   ___ No

   If yes, has there been a change in your nipple(s) sensitivity since the piercing(s)?
   ___ Much more sensitive
   ___ Slightly more sensitive
   ___ Same level of sensitivity
   ___ Moderately less sensitivity
   ___ Much less sensitivity
7. How sensitive would you say your nipples are to sexual stimulation?
   _____ Extremely sensitive
   _____ Very sensitive
   _____ Somewhat sensitive
   _____ Not very sensitive
   _____ Not sensitive at all

8. How important is breast stimulation to you in sexual situations?
   _____ Very important
   _____ Important
   _____ Somewhat important
   _____ Not important at all
   _____ I find breast stimulation unpleasant

9. How important is nipple stimulation to you in sexual situations?
   _____ Very important
   _____ Important
   _____ Somewhat important
   _____ Not important at all
   _____ I find nipple stimulation unpleasant

10. Have you ever experienced orgasm solely as a consequence of breast stimulation?
    _____ Yes
    _____ No
    _____ Does not apply to me

11. Do you notice your nipples becoming erect without physical stimulation when you are sexually aroused?
    _____ Yes
    _____ No
    _____ Does not apply to me

12. Do you notice your nipples becoming erect during physical stimulation in sexual situations?
    _____ Yes
13. Do you notice your nipples becoming erect in Non-sexual situations?

____Yes
____No

If yes, please check as many of the following list as apply to you:

- When I am tired
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am anxious
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I have “goose bumps”
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am in an argument
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am sad
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am around men
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am happy
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am cold
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am nervous
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am relaxed
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am excited
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never

- When I am drunk I do not drink alcoholic beverages
  ___Always  ___Often  ___Sometimes  ___Rarely  ___Never
When my clothes rub against my nipples

___Always   ___Often   ___Sometimes   ___Rarely   ___Never

When I am scared

___Always   ___Often   ___Sometimes   ___Rarely   ___Never

When I am hungry

___Always   ___Often   ___Sometimes   ___Rarely   ___Never

When I hear MY baby cry (only if it is your own baby) I don’t have a baby

___Always   ___Often   ___Sometimes   ___Rarely   ___Never

When I hear ANY baby cry

___Always   ___Often   ___Sometimes   ___Rarely   ___Never

___When I eat certain foods, please list food(s) ______________________________________

___Other, Please list all __________________________________________________________

14. Do you take any medications to treat depression?

___Yes

___No

If yes, please list ________________________________________________________________

15. Do you take any medications to treat anxiety?

___Yes

___No

If yes, please list ________________________________________________________________

15. Do you take any medications to treat hypertension/High Blood Pressure??

___Yes

___No

If yes, please list ________________________________________________________________
16. Are you currently taking hormonal contraceptives?  ____Yes  ____No
   If yes, please check one:  __Depo-Provera
   __combination pills
   __mini pills (progestin only)
   __Birth control patch
   __Norplant

17. Are you currently cycling regularly?
   ____Yes
   ____No
   ____I have reached menopause

Thank you very much for participating!
Appendix G

Personal Data Sheet (Male)

Please answer the following questions. Your answers are completely confidential and will not affect your participation in this study in any way. If you do not want to answer any question(s) for any reason, please skip and go to the next question.

1. Please indicate your age group:
   - 18-22
   - 23-27
   - 28-32
   - 33-37
   - 38-42
   - 43-47
   - 48-52
   - 53+

2. Please indicate what you consider to be your ethnicity:
   - ___ African American
   - ___ Asian
   - ___ Caucasian
   - ___ Hispanic
   - ___ Native American
   - ___ Other, please list ________________________________

3. In sexual relationships, do you prefer:
   - ___ females only
   - ___ females and males
   - ___ males only
   - ___ don’t know
   - ___ I prefer not to answer this question

4. How many siblings do you have?
   - ___ Female-full, biological
   - ___ Male-full, biological
   - ___ Female-half, biological
   - ___ Male-half, biological
   - ___ Female, step
   - ___ Male, step
   - ___ Female, adopted
   - ___ Male, adopted

5. Approximately what is your GPA? ________

6. Are you currently in a romantic relationship? Yes_________ No__________

Thank you very much for participating!
Appendix H

Empathy Scale

1. I cry easily when watching a sad movie.
2. Certain pieces of music can really move me.
3. Seeing a hurt animal by the side of the road is very upsetting.
4. I don't give others' feelings much thought.
5. It makes me happy when I see people being nice to each other.
6. The suffering of others deeply disturbs me.
7. I always try to tune in to the feelings of those around me.
8. I get very upset when I see a young child who is being treated meanly.
9. Too much is made of the suffering of pets or animals.
10. If someone is upset I get upset, too.
11. When I'm with other people who are laughing I join in.
12. It makes me mad to see someone treated unjustly.
13. I rarely take notice when people treat each other warmly.
14. I feel happy when I see people laughing and enjoying themselves.
15. It's easy for me to get carried away by other people's emotions.
16. My feelings are my own and don't reflect how others feel.
17. If a crowd gets excited about something so do I.
18. I feel good when I help someone out or do something nice for someone.
19. I feel deeply for others.
20. I don't cry easily.
21. I feel other people's pain.
22. Seeing other people smile makes me smile.
23. Being around happy people makes me feel happy, too.
24. TV or news stories about injured or sick children greatly upset me.
25. I cry at sad parts of the books I read.
26. Being around people who are depressed brings my mood down.
27. I find it annoying when people cry in public.
28. It hurts to see another person in pain.
29. I get a warm feeling for someone if I see them helping another person.
30. I feel other people's joy.
Appendix I

Hostility Toward Women Scale
(Labeled ‘Opinions about Women Questionnaire’ for participants)

General Instructions: The following questionnaire is designed to access men’s relationships with women and men’s feelings toward women. The first part of the questionnaire addresses your experiences with women. Keep in mind, there are no correct responses; instead, these statements ask for your opinion.

Part I Instructions. Please read each statement carefully and CIRCLE T (true) if it applies to you or you agree with the statement. CIRCLE F (false) if the statement does not apply to you or if you disagree with it.

Thank you for your time and careful consideration of the questions.

1. I feel that many times women flirt with men just to tease them or to hurt them. T F
2. I feel upset even by a slight criticism by a woman. T F
3. It doesn’t bother me when women tease me about my faults. T F
4. I used to think that most women told the truth but now I know otherwise. T F
5. I do not believe that women will walk all over you if you aren’t willing to fight. T F
6. I do not often find myself disagreeing with women. T F
7. I do very few things to women that make me feel remorseful afterward. T F
8. I rarely become suspicious with women who are friendlier than I expected. T F
9. There are a number of females who seem to dislike me very much. T F
10. I don’t agree that women seem to get all the breaks. T F
11. I don’t seem to get what’s coming to me in my relationships with women. T F
12. I generally don’t get really angry when a woman makes fun of me. T F
13. Women irritate me a great deal more than they are aware of. T F
14. If I let women see the way I feel, they would probably consider me a hard person to get along with. T F
15. I have often been grouchy with women. T F
16. I think that most women would **not** lie to get ahead.  
17. It is safer **not** to trust women.  
18. When it really comes down to it, a lot of women are deceitful.  
19. I am **not** easily angered by a woman.  
20. I often feel that women probably think I have **not** lived the right kind of life.  
21. I **never** have hostile feelings that make me feel ashamed of myself later.  
22. Many times a woman appears to care, but just wants to use you.  
23. I am sure I get a raw deal from the women in my life.  
24. I **don’t** usually wonder what hidden reason a woman may have for doing something nice for me.  
25. If women had **not** had it in for me, I would have been more successful in my personal relations with them.  
26. I **never** have the feeling that women laugh about me.  
27. Very few women talk about me behind my back.  
28. When I look back at what’s happened to me, I **don’t** feel at all resentful toward the women in my life.  
29. I **never** sulk when a woman makes me angry.  
30. I have been rejected by too many women in my life.  

**Part II Instructions.** Please read each statement carefully and CIRCLE Y (yes) if it applies to you or if you agree with the statement. CIRCLE N (no) if the statement does not apply to you or if you disagree with it.

Thank you again for your time and consideration of the questions.

1. Have you ever felt inadequate because you felt a woman was comparing the way you kiss, or your “performance”, with other men?  
2. Have you ever felt that women sometimes like to act and talk like they
were your mother?

3. Do you sometimes feel subtly ‘put down’ by women – criticized or ridiculed in a way that makes it hard to defend yourself?  Y  N

4. Have you ever felt the urge to assert yourself with a woman because she was getting a little too ‘pushy’, a little too domineering?  Y  N

5. Have you ever felt that women sometimes try to make you feel “small”, like a little boy?  Y  N

6. Have you ever felt that, despite their claims to the contrary, women secretly feel superior to men?  Y  N
Appendix J

Aggression Scale
(Labeled ‘Attitudes Questionnaire’ for participants)

Instructions:
Using the 5 point scale below, indicate how uncharacteristic or characteristic each of the following statements is in describing you. Place your rating in the box to the left of the statement.

1 = extremely uncharacteristic of me
2 = somewhat uncharacteristic of me
3 = neither uncharacteristic nor uncharacteristic of me
4 = somewhat characteristic of me
5 = extremely characteristic of me

1. ____ Some of my friends think I am a hothead.
2. ____ If I have to resort to violence to protect my rights, I will.
3. ____ When people are especially nice to me, I wonder what they want.
4. ____ I tell my friends openly when I disagree with them.
5. ____ I have become so mad that I have broken things.
6. ____ I can’t help getting into arguments when people disagree with me.
7. ____ I wonder why sometimes I feel so bitter about things.
8. ____ Once in a while, I can’t control the urge to strike another person.
9. ____ I am an even tempered person.
10. ____ I am suspicious of overly friendly strangers.
11. ____ I have threatened people I know.
12. ____ I flare up quickly but I get over it quickly.
13. ____ Given enough provocation, I may hit another person.
14. ____ When people annoy me, I may tell them what I think of them.
15. ____ I am sometimes eaten up with jealousy.
16. ____ I can think of no good reason for ever hitting a person.
17. ____ At times I feel I have gotten a raw deal out of life.
18. ____ I have trouble controlling my temper.
19. ____ When frustrated, I let me irritation show.
20. ____ I sometimes feel that people are laughing at me behind my back.
21. ____ I often find myself disagreeing with people.
22. ____ If somebody hits me, I hit back.
23. ____ I sometimes feel like a powder keg ready explode.
24. ____ Other people seem to get all the breaks.
25. ____ There are people who pushed me so far that we came to blows.
26. ____ I know that my “friends” talk about me behind my back.
27. ____ My friends say that I am somewhat argumentative.
28. ____ Sometimes I fly off the handle for no good reason.
29. ____ I get into fights a little more than the average person.
Appendix K

Photo/Emotion Questionnaire for Manipulation Check

Show Photo.

What emotion is this woman feeling? Please choose only one.

___ No emotion
___ Happy
___ Sad
___ Confused
___ Disgusted
___ Angry
___ Anxious
___ Calm
___ Sexually Excited
___ Can’t tell from photo
___ Other, please list _________________________

To what extent is the woman feeling this emotion?
(Please circle appropriate number)

1                  2                  3                  4                  5
Not at all       Slightly     Somewhat     Moderately     Very Much

(*These will be used 1 per photo, there will be a packet of these in the actual experiment.)
Appendix L
Scenario Questionnaire

I. You have a date with a girl you recently met at school. You are supposed to have met in front of the movies at the mall half an hour ago. She finally saunters up, not looking as if she is at all concerned that she has kept you waiting. This is the girl.

Show photo.

1. How likely is it that you would be angry with her?

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Somewhat</td>
<td>Moderately</td>
<td>Very much</td>
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2. How likely is it that you would become verbally aggressive with her?

<table>
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<th>4</th>
<th>5</th>
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<tr>
<td>Not at all</td>
<td>Slightly</td>
<td>Somewhat</td>
<td>Moderately</td>
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3. How likely is it that you might become physically aggressive with her?

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4. How likely is it that you would forgive her?

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II. You are driving to work and see a car stopped by the side of the road with its hood up and steam or smoke coming out from under the hood. Beside it stands a girl. You stop to help her and realize that her car has over-heated and needs to cool down. She also needs anti-freeze. You go buy her some and, after the car has cooled down, put it in the car. All of this has made you late for work, but you feel good knowing that you have helped this woman out. As you close the hood of the car, you turn to the young woman and smile. She turns on the car, tosses a little ‘thanks’ out the window at you and drives off. This is the girl.

Show photo.

Show photo.

1. How likely is it that you would be angry with her?
   
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

2. How likely is it that you would become verbally aggressive with her?
   
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

3. How likely is it that you might become physically aggressive with her?
   
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

4. How likely is it that you would forgive her?
   
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much
III. You are at a company party with a date. She is a new employee and you felt lucky that you got to ask her out before any of your coworkers got a shot at her. You were happily surprised that she said ‘yes’. But now that you are at the party, she seems to be spending a lot more time with some of your coworkers than with you. Worse yet, she seems to be flirting. When you confront her, she says that she is just trying to become acquainted with the other employees. This is the girl.

Show photo.

Show photo.

1. How likely is it that you would be angry with her?

<table>
<thead>
<tr>
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2. How likely is it that you would become verbally aggressive with her?

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3. How likely is it that you might become physically aggressive with her?

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4. How likely is it that you would forgive her?

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</table>
IV. You are in a bar, having a few beers with your friends. A girl walks by talking on her cell phone, not even noticing you at all. As she passes you by, she knocks into your elbow, causing you to spill some of your beer on your lap. When she notices this, she just shrugs and says ‘sorry’ as if she is not really sorry at all and keeps walking. This is the girl.

Show photo.

Show photo.

1. How likely is it that you would be angry with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

2. How likely is it that you would become verbally aggressive with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

3. How likely is it that you might become physically aggressive with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

4. How likely is it that you would forgive her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much
V. Imagine you are at work and there is a big promotion opportunity coming up. You and your male buddies have secretly thought you had the promotion ‘in the bag’ for weeks. Your boss just called you into his office and announced that the raise has gone to a new female colleague, who he brought in from another branch of the company two weeks ago (and is slightly more qualified for the position), not you. This is the girl.

Show photo.

Show photo.

1. How likely is it that you would be angry with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

2. How likely is it that you would become verbally aggressive with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

3. How likely is it that you might become physically aggressive with her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much

4. How likely is it that you would forgive her?
   1  2  3  4  5
   Not at all  Slightly  Somewhat  Moderately  Very much
VI. You are standing in the express line at the grocery store after a long day at work. You are beat, and just want to pay for your tasty beverages and chips and get home. You turn to read one of those silly magazines about UFOs landing in someone’s back yard and stealing the family dog when you look up and discover there is a new girl; in line in front of you. And she has at least 15 items when the checkout is clearly marked 6 items or less. This is the girl.

Show photo.

Show photo.

1. How likely is it that you would be angry with her?

1  2  3  4  5
Not at all Slightly Somewhat Moderately Very much

2. How likely is it that you would become verbally aggressive with her?

1  2  3  4  5
Not at all Slightly Somewhat Moderately Very much

3. How likely is it that you might become physically aggressive with her?

1  2  3  4  5
Not at all Slightly Somewhat Moderately Very much

4. How likely is it that you would forgive her?

1  2  3  4  5
Not at all Slightly Somewhat Moderately Very much
Appendix M

Model of NSNE