Running Head: STATE ANXIETY AND FACIAL ATTRACTIVENESS

Beauty and the Beast:

State anxiety influences males' attractiveness ratings for attractive female faces

by

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Abstract

Although more than 2500 articles published since 1970 deal with facial attractiveness, few have addressed whether characteristics of the beholder might influence such judgments. The present study considers whether misattribution and/or distraction contribute to a hypothesized change in male rating of female facial attractiveness when state anxiety is increased. Results obtained were consistent with distraction theory but were also interpretable through an alternative misattribution explanation. Participant relationship status was also found to be a significant predictor of attractiveness ratings and suggested the possibility that relationship status might interact with state anxiety to uniquely influence males' attractiveness ratings for female faces. Implications and applications of these findings are discussed for clinical, social, and developmental psychology and recommendations given for future research into this and related phenomena.

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"No object is so beautiful that, under certain conditions, it will not look ugly."

- Oscar Wilde

Introduction

The Importance of Facial Information

What's in a face? Judging from numerous studies on the subject, the answer appears to be "a lot". It is widely accepted that the face is the primary mode by which both emotion and attention are communicated socially (Bowlby, 1980; Ekman, 1993; Keltner & Kring, 1998). This is consistent across cultures (Ekman 1999; Ekman, Campos, Davidson, & de Waals, 2003; Ekman, Friesen, & Ellsworth, 1972) and highlights a possible universal information pathway (Darwin, 1872). Because facial information holds such social importance, we might also expect an attentional bias toward the information provided by others' faces. Indeed, research on early human development and cognitive biases shows that from a very young age we are psychologically and physiologically sensitive to detecting and processing the faces of others (Lunqvist & Ohman, 2005; Ristic et al., 2002). Even babies, within hours of being born, are highly sensitive to detecting others' faces and will preferentially choose to look at them as well as at stimuli that resemble the human face (Goren et al., 1975). Two factors that may influence such discrimination are facial expression and facial attractiveness, however only the literature pertaining to attractiveness will be the reviewed here as this is the focus of the thesis.

The importance of attractiveness

Facial attractiveness appears to be a powerful and effective avenue for obtaining information about others. Similar to how we display selective attention toward faces and the

expressions exhibited by them, we also appear innately disposed to attend to the attractiveness of faces. For instance, babies can discriminate between attractive and unattractive faces and tend to look longer at attractive faces than at unattractive ones (Slater et al., 2000). Also, certain types of faces are considered more pleasant to look at and have been found to stimulate reward centers in the brain (Aharon et al. 2001; O'Doherty et al. 2003). Therefore, it appears we have an innate preference for attractive faces – a preference that develops very early in life and is not solely a product of socialization. Nor is the preference confined to infancy.

Similar to how facial expression influences our beliefs about others (Argyle, 1975; Little, Bert, & Perrett, 2006), the facial attractiveness of others can also significantly influence how we perceive and interact with them. Research on the "what is beautiful is good" stereotype has revealed that the "beautiful" are perceived to be better lovers, more likeable, and more socially skillful (Ashmore, Solomon, & Longo, 1996; Dion, Berscheid, & Walster, 1972; Goldman & Lewis, 1977). They are also judged more leniently for crimes (Leventhal & Krate, 1977; Staley, 2008) and considered more qualified for certain jobs (Gilmore, Beehr, & Love, 1986), revealing a dark side to this otherwise "positive prejudice". Thus, it is clear that we hold a significant, albeit implicit, preference for attractive faces, and this preference extends to babies and adults alike.

Perhaps it is unsurprising, then, that the facial attractiveness of babies also influences the strength and quality of mother-child attachment. In particular, Langlois and her colleagues (1995) emphasized the impact facial attractiveness can have during the course of infant development, and determined that infant attractiveness predicts positive maternal behaviors and attitudes towards the child. Coy, Speltz, and Jones (2002), in replicating an earlier study (Speltz, Endriga, Fisher, & Mason, 1997), found that infants with facial deformities are, in fact, *more*

likely to develop secure attachments when compared to facially attractive children. Although unexpected, nevertheless, it indicates that child facial attractiveness influences (or facial abnormalities) may influence the quality of parent-child interaction, and ultimately may affect the strength and quality of attachment between mother and child.

Explanations for the importance of attractiveness

One explanation to account for the importance of facial attractiveness is that our preference for facially attractive faces is a simple by-product of the way the brain processes information. For instance, it has been suggested by some cognitive psychologists that our preference for "averageness" and symmetry (two qualities considered integral to judgments of facial attractiveness) have been attributed to a "generalization effect in recognition" (e.g. Enquist & Arak, 1994; Jansson, Forkman, Enquist, 2002; Johnstone, 1994). This would account for their finding that, when people are "trained" to treat slightly asymmetric patterns as members of the same category, a general bias develops for prototypical patterns of stimuli that are both symmetrical and average. Supporting this explanation are studies showing that when undergoing discrimination learning tasks, people develop a "preference" for a trained prototype and that extreme exemplars of the prototype generate stronger responses than do the training exemplars (Enquist & Arak 1994; Enquist, Ghirlanda, Lundquist, & Wachtmeister, 2002; Guilford & Dawkins 1991; Weary, Guilford, & Weisman, 1993). Interestingly, these types of acquired preferences are found both in humans and animals (Ghirlanda, Jansson, & Enquist, 2002; Jansson et al. 2002; Rhodes, 1996). Furthermore, it has been found that we prefer exemplars "averaged" of several traits (Halberstadt & Rhodes 2000, 2003; Halberstadt, Rhodes, & Catty, 2003), and that symmetry is an important factor in considering faces and many other stimuli attractive (Corballis & Beale, 1976, Kubovy, 2000). Based on this perspective, it is argued that

our "preference" for attractive faces is merely the by-product of how our brains discriminate between different categories of stimuli.

As a second explanation, it has been posited that facial attractiveness may also be important because it reveals meaningful information about mate quality. For instance, facial attractiveness may signal real or imagined personality traits in the other person since we seem attracted to faces that correlate with the possession of desired personality traits (Little, Bert, & Perrett, 2006). In other words, if we desire a particular personality trait and facial attractiveness correlates to the possession of that trait, attractiveness becomes a signal to which we should attend. Consistent with this explanation, some authors have posited that key components of facial attractiveness, such as "averageness", symmetry, and sexual dimorphism, may act as "signals" that reveal hidden biological information about the general health of others (Gangestad & Thornhill, 1997; Penton-Voak & Perrett, 2000; Rhodes & Zebrowitz, 2002; Thornhill & Gangestad, 1993, 1999; Symons, 1979). Further supporting this explanation, facial characteristics considered to be attractive have been correlated with the absence of disease (Fink, Grammar, & Thornhill, 2001; Fink & Penton-Voak, 2002; Thornhill & Gangestad, 1993, 2006), reproductive potential (Thornhill & Gangestad, 1999), longevity (Henderson & Anglin, 2003), and sperm quality (Soler et al., 2003). From this attractiveness-health perspective then, we find certain faces attractive because those faces are thought to signal healthy genes.

In general, facial attractiveness appears important to both sexes, since both genders demonstrate a robust preference for partners who are facially attractive (Thornhill & Gangestad, 1999). Consistent with the attractiveness-health hypothesis, the preference for facially attractive partners is even more pronounced in societies with generally poorer health and higher rates of parasitism (Gangestad & Buss, 1993). There is also general agreement on the characteristics that

determine facial attractiveness for men and women (Langlois et al., 2000) across cultures (Cunningham, Roberts, Barbee, Druen, & Wu, 1995; Dion, 2002; Perrett, May, & Yoshikawa, 1994; Perrett, Lee, Penton-Voak, Rowland, & Yoshikawa, 1998) indicating a general universality in what we consider to be an attractive face.

Gender differences in the preference for attractive faces

Despite agreement that facial attractiveness in a partner is important for both men and women, it has also been consistently demonstrated that males place greater emphasis on the importance of facial attractiveness than do females (Buss, 1989; Feingold, 1990). Furthermore, there are important gender differences around those characteristics that are considered facially attractive (Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Johnson & Franklin, 1993; Perrett et al., 1994, 1998; Rhodes, Hickford, & Jeffery, 2000; Russell, 2003) and in the contexts in which facial attractiveness is believed to be important (Buss & Schmidt, 1993; Frost, 1994; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999).

Howard, Blumstein, and Schwartz (1987) suggest a social explanation might account for males placing greater weight on facial attractiveness in a partner than do females. "Because of their restricted paths for individual advancement, women instead seek in mates characteristics that are associated with power, such as good earning capacity and higher education" (p.195). In contrast, men are "thought to place a premium on the quality of the exchange object, hence valuing characteristics such as physical attractiveness" (Bernard, 1981). It has also been demonstrated that although the male preference for facially attractive partners may exist in short-term contexts such as in "speed dating" scenarios, it does not necessarily predict which partners males will choose for more long-term romantic relationships (Eastwick & Finkel, 2008). Thus, male preference for attractive faces may not be as robust in everyday relationship contexts

(Hatfield & Sprecher, 1986). All of the above social explanations, however, account for the gender difference in the preference for attractive faces as a result of social learning that ultimately promotes individual security.

An alternative explanation for gender differences in the preference for attractive faces is found in Trivers's (1972, 1985) theory of parental investment. Trivers suggests that because males and females differ in their biological contributions to (and investments in) the process of pregnancy and childrearing, they will also differ in evolved mate preferences and mating behaviors. Because males are not biologically or functionally compromised by pregnancy or postpartum nurturing as are females, Trivers predicted that males would have evolved a capacity to identify females with high reproductive potential, and that they would do so by using physical characteristics as a guide. Facial attractiveness might represent such a trait, and if so, male preference for attractive faces would be consistent with Trivers's theory. Trivers's predictions has been consistently supported across cultures (Buss, 1989; Kenrick & Keefe, 1992), across research paradigms (Feingold, 1990), as well as reflected by males' specific preferences for youthful female faces (McArthur & Berry, 1987; Symons, 1979, 1995). Thus, while both genders value facial attractiveness in a mate (Buss, 2004), males might be predicted to place more importance on facial attractiveness when selecting a mate than do females, and more likely attend to female faces in mating contexts.

Based on research in the areas of social, personality, and evolutionary psychology, it seems reasonable to conclude that our judgments of others' facial attractiveness may spur our making quick assessments of them, and that these judgments, in turn, may correlate to some extent with various social, biological, genetic, and psychological characteristics that we consider to be important. Furthermore, research on the gender differences in the preference for facially

attractive partners consistently supports the finding that males, for a variety of possible reasons, tend to place more importance in physical attractiveness than do females. Male subjects, therefore, appear to be the ideal subjects for studies of factors affecting judgments of facial attractiveness.

Anxiety Affects Our Perceptions of Others

While much of the facial attractiveness literature has focused on qualities of the other, it also seems reasonable to ask whether characteristics of the *beholder* might also influence judgments of facial attractiveness. Empirical evidence supporting the existence of a relationship between the construct of anxiety and judgments of others' faces may be found in a number of distinct areas including: clinical, non-clinical, and neuropsychological research.

Clinical anxiety affects perception of others' faces

Research on clinically anxious individuals suggests that such individuals possess a variety of cognitive biases when processing their surrounding social environment. For instance, individuals with either generalized anxiety disorder or social phobia (or both) demonstrate selective biases toward threatening faces (Bradley, Mogg, White, Groom, & de Bono, 1999; Mogg, Philippot, & Bradley, 2004). Subjects with panic disorder have difficulty recognizing emotions in others' faces (Kessler, Roth, von Wietersheim, Deighton, & Traue, 2007), and, when compared to "normals", socially anxious individuals become significantly more sensitive to evaluation when presented with multiple faces, or "facial crowds" (Gilboa-Schechtmana, Presburgera, Maromb, & Hermeshb, 2005). Thus, clinical levels of anxiety can influence the sensitivity to, and interpretation of, the information obtained from faces. To consider anxiety as a factor, however, requires defining the particular view of anxiety that one is taking, since anxiety is not a uni-dimensional construct, and can be classified or differentiated in several ways.

State anxiety and trait anxiety

 "State anxiety" can be defined as the transitory anxiety produced in a person by different situations (Soric, 1999), and can be an important factor informing a person's interactions with his or her social environment. Thus, cognitive biases toward social and facial information are not limited to clinically anxious individuals but extend to the non-clinical population. Previous research has demonstrated that stereotyping of others can occur and social behaviors and attitudes can change when we judge others while experiencing anxiety or a sense or "state" of vulnerability (Muris et al., 2000). Studies focusing on in-group/out-group relations, for instance, revealed that the implicit priming of vulnerability to disease (with a presumed accompaniment of increased state anxiety) led to more discriminatory attitudes toward both visible minorities (Faulkner, Schaller, Park, & Duncan, 2004) as well as those with physical disabilities (Park, Faulkner, & Schaller, 2003). Therefore, state anxiety may interact with the physical appearance of others to affect our judgments of them. In another study, it was found that when participants were instructed to name the emotion of a target face, the interpretation of the emotion could be manipulated by giving the participants stories describing the target in a variety of different scenarios (Carroll & Russell, 1996). In this case, the assessments made appear to have been affected by the emotional context and emotional state of the study's participants. Thus, it appears that the judgments we make of others' appearances may be negatively impacted by state anxiety as well as by contextual information provided coincidentally. While these findings are open to other interpretations, they lend themselves to the broader notion that elevated state anxiety might affect the processing of social information, and more specifically, our judgments of others based on their physical appearance.

Research on brain structure and function has also shown that many of the neurological areas associated with states of elevated anxiety also become activated during the processing of social information. Thus, one might suspect that neurological correlates exist between states of anxiety and the processing of facial information. In particular, activation of the superior temporal sulcus (the "core" area involved with social cognition) is associated with activation of extended areas in the amygdala, ventral striatum, insular cortex, and orbitofrontal cortex, each involved with reinforcement and/or anxiety (Kampe, Frith, Dolan, & Frith, 2001; O'Doherty et al., 2003). Similarly, the amygdala, often considered central to the emotions of fear and anger, responds selectively to faces and is involved in both recognizing and responding to facial emotional signals (Adolphs, 2001; Brothers, 1990). Damage to the amygdala can result in profound deficits in the ability to recognize emotions (Scott et al., 1997) and suggests a clear participation of the amygdala in the process of social functioning. Given such findings, it seems plausible that states of elevated anxiety might in some way impact the attention paid to faces, the perception of faces, or more specifically judgments of others' facial attractiveness.

In contrast with "state anxiety" which is regarded to result from situational factors (Soric, 1999), "trait anxiety" is broadly defined as a person's general, or baseline level of anxiety, and is considered a "trait" because the individual "brings it to the situation" (Spielberger, 1966, 1972, 1985). Differences in trait anxieties appear very soon after birth (Kagan & Snidman, 1999; Kalin, 1993) suggesting a biological or genetic origin for individual differences. Not all people are inherently terrified of taking a math test (trait anxiety), but most individuals experience *some* increase in anxiety (state), however slight (Soric, 1999). When considering anxiety one should attempt to differentiate between the contributions of "trait" and "state".[1] However, in order to

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[1] State and trait anxiety should not be considered exclusive, as they likely interact with one another in a complex fashion.

constrain data analysis to manageable proportions, only state and not trait anxiety are measured in the study.

Somatic anxiety and cognitive anxiety.

"Somatic anxiety" is considered to be the response to threat that is purely physiological. Sweating and/or a rapid heartbeat are examples of resulting physiological symptoms. Somatic anxiety is postulated to have an adaptive function as research on performance has demonstrated that moderate levels of somatic anxiety can actually be beneficial to our functioning by piquing our general level of alertness, vigilance, and athleticism (Millar & Millar, 1996; Nesse, 1990). However, somatic anxiety appears to be beneficial only to a point, as higher levels of somatic anxiety tend to cause performance to deteriorate (Burton, 1988). As a result of this curvilinear function, the relationship between somatic anxiety and performance has been described as an "inverted U", reflecting the fact that performance first increases to a point of *optimal arousal*, and then decreases as anxiety becomes excessive. This is known as the "Yerkes-Dodson effect" (Morris, Davis, & Hutchings, 1981; Teigen, 1994).

Unlike somatic anxiety, "cognitive anxiety" is characterized by psychological symptoms such as worry and negative expectations (Hardy, Jones, & Gould, 1996). It is associated with psychological stress and apparently has little adaptive benefit as it is negatively correlated with competitive performance (Burton, 1988; Krane, Joyce, & Rafeld, 1994; Murphy & Woolfolk, 1987). Cognitive anxiety has also been shown to cause distraction (Behan & Wilson, 2008; Janelle, 2002) suggesting the possibility that performance might become attenuated in this way due to momentary inattention (for a comparison of the relative effects somatic and cognitive anxiety on general performance, see Figure 1). For the purposes of this study, anxiety was considered to encompass somatic and cognitive anxiety.

Possible Variables Affecting Subjective Judgment of Facial Attractiveness

Relationship status of the beholder. Research by Lydon et al. (1999, 2003) suggests the beholder's commitment to a relationship, as well as the "threat presented by an alternative [to their own partner]", influences whether the beholder "enhances" or "devalues" the alternative being judged. As Lydon and his colleagues assert, the devaluation or enhancement of alternatives is best understood when the level of commitment is calibrated with the level of threat presented by the alternative. More specifically,

"When the threat level is commensurate with the level of commitment, a relationship should be defended. When the level of threat exceeds the level of commitment, one will not defend and instead will succumb to the threat. Moreover, when level of commitment exceeds the level of threat, one will not defend because the threat is not sufficient to arouse a threat" (Lydon et al., 2003, p. 350).

Although it is difficult to predict precisely how relationship status might affect facial attractiveness ratings, based on this "calibration paradigm" we might expect the relationship status of male participants to positively or negatively influence ratings for female faces. For this reason, a measure of participant relationship status will be included in the present study.

Anxiety. If one anticipates that anxiety may affect how an individual views the attractiveness of others, it becomes necessary to predict the direction(s) of the effect and to assess the possible reasons for it. Several studies in the literature provide possible explanations along with possible predictions. These may be grouped together under predictions based on theories of misattribution; and predictions based on theories of distraction.

Misattribution theory.

In a memorable study, Dutton and Aron (1974) demonstrated that anxiety mediates sexual attraction in males when males "misattribute" their arousal to an attractive female confederate nearby. More specifically, male participants who were experiencing an anxiety response mistakenly believed their somatic arousal, which was actually due to either being on an elevated suspension bridge or due to the anticipation of a strong electric shock, was instead due to the presence of the attractive female confederate. In the suspension bridge component of the Dutton and Aron study, a significant proportion of males in the high anxiety condition demonstrated sexual attraction to the nearby female confederate by later contacting the female confederate by phone. Subsequent components of the study revealed that while anticipating a strong electric shock, males also reported sexual attraction to the confederate and experienced significantly less anxiety when a female confederate was present compared to when they were anticipating a strong shock alone.

The results of this study were explained within the paradigm of Schachter's two-factor theory of emotion (Schachter, 1964; Schachter & Singer, 1962), which argues that when experiencing arousal in an ambiguous situation, individuals will cognitively search the environment for a meaningful and salient cause of that arousal in order to assign to it an emotional label (e.g., anger, excitement, fear, etc.). Other researchers have argued that this "arousal-attraction" link is due to negative reinforcement (Kenrick and Cialdini, 1977), however, subsequent research by Dutton and Aron (1989) demonstrated that negative reinforcement is not required for the arousal-attraction process to occur.

Although the precise mechanism underlying the arousal-attraction link is unknown, it has also been demonstrated that misattribution can occur when an attractive stimulus is present, and

since judgments of overall desirability of another person rely almost exclusively on physical appearance including facial attractiveness (Hadjistavropoulos & Genest, 1994; Sergios & Cody, 1985), one might assume judgments of facial attractiveness would increase in a corresponding fashion when males experience elevated anxiety while in the presence of a female target.

Distraction theory.

Depending on the anxiety manipulation, questions arise regarding both the direction of the effect as well as precisely what emotion or somatic response might be experienced by the beholder. In the context of the misattribution literature, such questioning is warranted, since many researchers who closely replicated key components of Dutton and Aron's (1974) study on the misattribution of arousal failed to obtain the same results (e.g. Kenrick, Cialdini, & Linder, 1979; Somervill, 1983), while others have suggested other explanations for the phenomenon (Calvert-Boyanowski & Leventhal, 1975), and even suggested that one's awareness of his or her own physiological arousal may actually *impair* the attribution process (Cantor, Zellman, and Bryant, 1975). Indeed, subsequent research on misattribution indicated that individuals might be less likely to attribute their emotions when the emotion is negative and when they are self-aware or self-focused (Reisenzein & Gattinger, 1982).

With respect to beholder attention, it seems unreasonable to expect that all people all the time will meaningfully attend to a stimulus to the same extent. For instance, it is possible that when experiencing a state of elevated anxiety, an individual judging another person's facial attractiveness may not reliably attend to the target due to the distraction associated with that state of anxiety. Although anxiety can be helpful for processing facial information at moderate levels (Fox, Lester, & Russo, 2000; Hansen, 1988; Lundqvist et al., 1999), as anxiety becomes excessive the processing of faces or other stimuli can become interfered with causing important

information to be missed (Mogg et al., 1997).[2] Although research on this topic is limited in amount, it has been demonstrated that state anxiety can specifically interfere with visual attention during performance situations (Behan & Wilson, 2008; Janelle, 2002). Despite the possibility that males might attend more closely to an attractive face as a way of distracting themselves from their anxiety or as a way of reducing that anxiety, it is also possible that during states of elevated anxiety males might become sufficiently distracted by that anxiety to disable or "derail" their initial attraction to the other's face.

Hypotheses

Given the various, possible effects of anxiety on subjective judgment of facial attractiveness based on the literature outlined thus far, two competing predictions emerge depending upon whether considers either the misattribution or distraction framework.

The misattribution hypothesis. If one assumes that males will misattribute their anxiety (i.e., physiological arousal) to the female target, then one would hypothesize that *males' attractiveness ratings for female faces will increase as males experience greater arousal as a function of that state anxiety*. This hypothesis is based on the rationale outlined by Dutton and Aron (1974) in that males experiencing high anxiety will mistakenly attribute the source of their arousal to a salient female target.

The distraction hypothesis. Based on the reasoning of Cantor, Zellman, and Bryant (1975) who closely replicated key components of Dutton and Aron's (1974) study on the misattribution of arousal and failed to obtain the same results (i.e., that one's awareness of his or her own physiological arousal may actually *impair* the attribution process), it seems plausible that states of elevated anxiety may actually *distract* individuals, thereby inhibiting their (mis)attribution of their anxiety/arousal to a target. Similarly, if a subject is "attracted" to a

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[2] This is known as "the vigilance-avoidance hypothesis".

target, increased anxiety may simply distract them from the "attraction". In both instances, the effect may resemble a "regression to the mean", with the ratings for more attractive targets having further to "fall". Although the precise direction of a distraction effect is uncertain, it seems reasonable to hypothesize that *as males experience greater levels of state anxiety their attractiveness ratings for female faces will decrease* as they increasingly fail to attend meaningfully to otherwise salient faces.

Because the precise nature of the relationship between state anxiety and judgments of facial attractiveness is not yet known, and other variables affecting this relationship remain largely unidentified, the analysis of results will represent an active part of the research rather than merely a report of results obtained. Thus, facial attractiveness ratings will be analyzed as a function of state anxiety both as a categorical variable (low, moderate, and high; by experimental condition) and as a continuous variable (by participant self-reported state anxiety score). Ultimately, because different methodological approaches are used here, the results and implications revealed by each will also be subject to investigation and discussion.

Methods

Summary of Pilot Study

To develop the study materials, refine the conditions, and conduct an preliminary evaluation of the hypothesis, a pilot study was conducted using a photo inventory of male and female target faces and three anxiety conditions (low, moderate, and high). Variable speech simulation tasks were employed in order to alter participants' anxiety levels within each condition. After the manipulation participants rated the attractiveness of faces on a computer screen. The photo inventory used was comprised of faces (displaying a neutral expression) of individuals personally known to the researcher. Male participants' facial attractiveness ratings of

both male faces and female faces were then compared using a multivariate analysis of variance (MANOVA) as a function of those experimental conditions. Analysis of this pilot study data indicated a moderately significant relationship between experimental condition and facial attractiveness ratings for female faces ($p = .09$) but not for male faces ($p = .21$). However, an analysis of participant self-reported state anxiety by condition indicated that the experimental manipulation did not generate three distinctly different levels of anxiety. Probing this further, a *post hoc* Scheffé test for homogenous subsets indicated that no significant difference was found between anxiety levels reported in the moderate and high anxiety conditions. To correct this problem, the procedural manipulation of anxiety was modified to increase the level of state anxiety experienced by participants in the high anxiety condition. This modified procedure was used in Study One.

Study One

The purpose of Study One was to assess whether state anxiety affects males' attractiveness ratings of others' faces and whether the effect was specific to the rating of female faces. After conducting the pilot, it was decided that it would be important to include relationship status as well.

Participants

A total of 42 males aged 18-25 (M = 18.9, SD = 1.37) were recruited from the University of Manitoba's Introduction to Psychology participant pool website, and participated in exchange for experimental credit. The online recruitment ad included the study name and researcher details (for online recruitment ad, see Appendix A). This specific age group was chosen because first-year psychology students, in general, tend to be relatively naïve to contrived experimental tasks, and the successful deception of participants was deemed necessary to protect the internal validity

of the study. All participants were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, 2005) and were informed of their right to withdraw from the study at any time without reprisal or loss of experimental credit.

Materials

Target photo inventories*.* Photo Inventory 1 was developed and was comprised of 22 male faces and 22 female faces, all within the age range of 18 to 24 (mean age could not be calculated because specific age information was not collected from volunteers). Each target was photographed wearing a large plain white T-shirt against a plain white background, and was asked to display a neutral facial expression similar to that in a passport photo (for sample photo, see Appendix B). Six target photos were discarded from the original total of 50 photos because the individuals in the photographs did not display neutral facial expressions.[3] Targets were photographed using a digital camera and a photo manipulation program was used to crop photos for size (300 by 300 pixels) as well as to synchronize light and contrast levels. Five-dollar coffee cards were used to compensate individuals volunteering their photo to be used in the target photo inventory (for photo volunteer recruitment poster, see Appendix C; for photo consent form, see Appendix D). All photo volunteers in study one were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, 2005) and were informed of their right to withdraw and/or have their photo destroyed at any point in time without reprisal or loss of

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[3] Due to the attentional bias toward emotion exhibited by those with high trait anxiety (Bradley et al., 1999; Kessler et al., 2007; Mogg, Philippot, & Bradley, 2004), it was crucial to exclude targets overtly displaying emotionality.

compensation. (Photo Inventory 1 was also used to develop four smaller inventories during later analyses.)

In order to isolate targets from Photo Inventory 1 according to objective facial attractiveness, four photo "sub-inventories" were later generated for Study One as a function of target gender (male and female) and objective facial attractiveness (attractive and unattractive). The specific target faces selected for each of the "attractive" and "unattractive" inventories were selected *post hoc* based on the percentile rank of each target's mean facial attractiveness rating relative to all other same-sex targets in the larger Photo Inventory 1. The objective attractiveness ratings for targets in Study One were calculated using the ratings of the low anxiety participants in study one because these ratings were considered to be the least biased ratings available.

Other materials. In both the moderate anxiety and high anxiety conditions, participants were audiotaped using an analogue cassette recorder, and a VHS camera on a tripod was placed in the room for participants in the high anxiety condition, though it was not used to record participants. In addition to the VHS camera in the high anxiety condition, a webcam displaying a real-time video feed of high anxiety participants was relayed to a 17" computer monitor. E-Prime© Version 1.0 (Schneider, Eschman, & Zuccolotto, 2002) was used to present target photos as well as to record participants' attractiveness ratings for target photos. The statistical package SPSS (Version 16.0) was used to analyze results.

Measures

Independent variables. To assess the variable of state anxiety of participants, the state component of the Spielberger State-Trait Anxiety Inventory (a self-report measure of state anxiety; STAI, Form Y-1) was used. The STAI Form Y-1 is comprised of 20 self-descriptive statements (e.g., "I feel nervous" or "I feel calm") to which the participant responds by rating the

extent to which each statement best describes his feelings *at that moment* (e.g., "not at all" to "very much so"). The STAI, Form Y-1 was selected because it has demonstrated good construct and convergent validity (Spielberger, 1983). To assess the variable of participant relationship status, a demographics questionnaire was used, and requested participants to indicate whether they were single, dating, or in a committed relationship (and for how long). The demographic questionnaire also requested information about participant age, ethnicity, and sexual orientation. In order to assess the variable of participant self-rated facial attractiveness, the questionnaire also included two measures: absolute facial attractiveness (scale of 1 to 7) and facial attractiveness relative to peers (percentile of 0 to 100). For demographic information questionnaire see Appendix E.

Dependent variable. The dependent variable of male ratings of others' facial attractiveness was recorded using the E-Prime© computer program. Participants were verbally instructed to rate the facial attractiveness of each target using a 1-7 Likert scale, with "1" representing "very unattractive" and "7" representing "very attractive". These instructions were also displayed on the computer screen just prior to participants rating target faces. Participants recorded their responses by pressing the corresponding number key on the computer keyboard.

Procedure

In order to generate a broad continuum of state anxiety ratings, three different experimental anxiety conditions were employed in Study One: low, moderate, and high. These conditions were used in order to generate a wide range in participants' state anxiety scores by manipulating the expectation of social evaluation through a speech simulation task. Speech simulation tasks have been shown to be effective in eliciting a pronounced anxiety response, both in psychological research relating to state anxiety (Droppleman & McNair, 1971) as well as

in psychopharmacological research designed to test the effectiveness of anxiolytic drugs (Guimarães et al., 1989; Sartory, Andreatini, & Leite, 1993). Physiological responses recorded in *anticipation* of actual speechmaking are also consistent with the construct of anxiety (Lipper & McNair, 1972).

In the online participant recruitment form as well as in the consent form (for study consent form, see Appendix F), participants were told the study was about developing "welcome strategies" (the title of the study), and that the purpose of the study was for participants to develop and then list strategies the university might implement as a way of welcoming new students to the university. Upon arrival, and after providing consent to participate, each participant was randomly assigned to an experimental condition and briefed on their task which varied as a function of experimental condition.

In the low anxiety (LA) condition, participants were asked to take seven (7) minutes to write down ideas for how the university could help new and first-year students feel welcome at the university (for LA script, see Appendix G). A seven-minute timeframe was chosen because it was believed this brief time period would render the MA and HA conditions (described next) more anxiety evoking whilst not increasing the anxiety experienced by participants in the LA condition.

In the moderate anxiety (MA) condition, participants were asked to complete the same task as in the LA condition, however, they were also told they would be presenting their ideas on audiotape as a way of persuading individuals in university administration to implement the changes they suggest (for MA script, see Appendix H). After the seven-minute period in which MA participants recorded their ideas, each was told that the researcher needed to collect an audio sample of his voice in order to "calibrate the recording equipment in the back room". At this

point, each MA participant was recorded while reading the phrase "Mark was feeling very nervous about the upcoming final exam", which was then played back for him to hear. The purpose of having MA participants read this particular statement and then to having them listen to it was to boost the level of state anxiety through the anticipation of social evaluation.

In the high anxiety (HA) condition, participants were also told to complete the same task as in the MA condition but were instead told they would be recorded on videotape (not audiotape), and that this video footage would be later be viewed by faculty members in the psychology department. They were also told that, based on this video footage, they would be evaluated based on personal qualities such as speech clarity, persuasiveness, and the degree of confidence they exude on video (for HA script, see Appendix I). Participants in the HA condition were also audio recorded using the same record-and-playback procedure that was used for MA participants, and a VHS video camera was mounted on a tripod and placed next to where participants developed their ideas. Lastly, a webcam recorded a live video feed of the participant's face and relayed it to a 17" computer monitor roughly 18" to 20" to the participant's left. Again, this strategy was used to "ramp up" HA participants' state anxiety through the anticipation of intense social evaluation.

After the completion of the condition-related tasks, and prior to recording (for MA and HA participants), each participant was told that the researcher was required "to collect data for another unrelated study which [was] being conducted by another student in the lab". At this time, each participant was instructed to rate the facial attractiveness of the 44 target faces of Photo Inventory 1 presented on the computer. To increase the probability that participants were judging each target with the same temporal and situational context in mind, a specific cover story was provided verbally as well as on the computer screen just prior to the actual rating exercise. This

contextual story indicated that the targets they would be rating on the computer were actual students at the university and described a hypothetical scenario in which participants were asked to imagine personally interacting with the targets they would be rating (for contextual story, see Appendix J). Prior to beginning the task of rating faces, each participant confirmed that he understood the instructions, and was told to exit the room and notify the experimenter when they had completed the computer task. The experimenter then left the room and the participants rated the faces.

Because the E-Prime© program was used in Study One, the order of presentation of target photos was randomized thereby reducing any possible contrast effects. After the rating of faces, participants also completed the state anxiety component (Form Y-1) of the STAI and the demographics information questionnaire. Finally, after completing the computer task and questionnaires, each participant was debriefed (for debriefing form, see Appendix K) and asked if he was willing to provide a digital photo of himself for an extra participation credit (for photograph consent form, see Appendix L).[4]

Fire interruption

Halfway through data collection for Study One, a fire within the author's building interrupted the collection of data. At this time, a preliminary analysis of the available data was conducted and showed no significant difference in attractiveness ratings by experimental condition (using the same MANOVA approach employed in the pilot study). After further exploration, it was assumed that the difference between the results obtained in the pilot and Study One was due to a meaningful difference in target photo inventories, i.e., in the absolute mean attractive levels of the targets contained in the two different inventories. A Student's t-test

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[4] The purpose of obtaining this photo was to later obtain an objective rating of each participant's facial attractiveness, as recent research has shown it to influence ratings of others' facial attractiveness (Montoya, 2008). However, because these ratings were not obtained this variable will not be discussed further in this paper.

was conducted between the two inventories and confirmed this difference, especially for female faces. Overall, the photo inventory of the pilot study was rated as being more attractive than Photo Inventory 1. Furthermore, because some equipment was now inaccessible due to the fire, minor procedural and equipment changes were required. Thus, a new study (Study Two) was undertaken to complete data collection using a modified procedure and the same target photo inventory used in the pilot study.

Study Two

The purpose of Study Two was to replicate the objectives of Study One with only minor modifications of procedure. Because of necessary procedural changes and the use of the photo inventory from the pilot study, however, it is treated as a separate study and not a continuation of the experiment run before the fire.

Participants

For Study Two, 30 males, aged 18-25 (M = 19.2, SD = 1.45), were recruited using the same approach as Study One and participated in exchange for experimental credit. All participants were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, 2005) and were informed of their right to withdraw from the study at any time without reprisal or loss of experimental credit.

Materials

Target photo inventories. For Study Two, a second target inventory, Photo Inventory 2, was used based on the inventory of the pilot study. This inventory was comprised of 23 faces (8 male faces and 15 female faces) within the age range of 18 to 24 (precise age information was

not collected). The individuals who had volunteered their photographs for the pilot study were individuals personally known to the researcher, and were made aware that they would not be compensated in any way (for photo consent form, see Appendix M). All photo volunteers were treated in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada, 2005) and were informed of their right to withdraw and/or have their photo destroyed at any point in time without reprisal. (This inventory was also used to develop four smaller inventories during later analyses.)

Other materials. Due to the fire, E-Prime© was no longer accessible to the researcher. Therefore, photos from the target inventory were presented using Microsoft PowerPoint©, and attractiveness ratings of target photos were recorded using pen and paper (for rating sheet, see Appendix N). Also because of the fire, the analogue tape recorder and webcam used in Study One were not available. Instead, a VHS camera on a tripod and mock audio recording equipment (microphone and soundboard) were used to increase participants' anticipation of social evaluation. The statistical package SPSS (Version 16.0) was used to analyze results.

Measures

Independent variables. Information about participant state anxiety, relationship status, and self-rated facial attractiveness was gathered with the same demographic questionnaire used in Study One.

Dependent variable. To record each participant's ratings of target facial attractiveness, each participant was asked to write his rating for each target using a pen and paper. Participants were verbally instructed to rate the facial attractiveness of targets using the same 1-7 Likert scale

as study one (where "1" represents "very unattractive" and "7" represents "very attractive").

These instructions were also displayed on the computer screen just prior to participants rating

target faces (for Study Two instructions, see Appendix O).

Procedure

The procedure used in Study Two was the same as that used in Study One with the

following exceptions. In the MA condition, an audio recording soundboard was placed next to

participants to increase their expectation of being recorded. For the same purpose, in the HA

condition both the soundboard and a VHS video camera mounted on a tripod were placed in the

room next to where participants developed their ideas. Although both MA and HA participants

were told that they would be recorded later, the recording equipment was not operational and no

participants in Study Two were recorded in any way. Because Microsoft PowerPoint© program

was used to present target photos in Study Two, the order of presentation of target photos in

Study Two was not randomized. After completing the computer task and questionnaires, each

participant was fully debriefed as to the purpose of the study.

Full analysis of the data obtained in both studies was then conducted by examining the

two studies in parallel. During the course of that analysis, eight new smaller photo inventories

were created (four from each of the two larger inventories) in order to assess the role of target

objective facial attractiveness for each study. Attractive and unattractive targets for both male

and female faces were identified in each inventory using the ratings of the least biased ratings

available: for Study One, the ratings provided by low anxiety subjects were used to select target

photos; for Study Two, the ratings provided by low anxiety participants from the pilot study were

used. The most attractive and unattractive photos of each were then assigned to parallel, smaller

inventories. For descriptive statistics of these eight inventories see Table 1. With all data

gathered and photo inventories created, a complete data analysis was then conducted for both studies.

Results

Initial Statistical Analyses

For both Studies One and Two, an analysis of variance (ANOVA) F-test was conducted on participants' self-reported state anxiety (STAI) scores as a function of experimental anxiety condition in order to check experimental anxiety manipulation. The ANOVA for Study One revealed no significant differences in STAI scores as a function of experimental condition ($F(2, 41) = 2.016$, $p > .05$). The ANOVA for Study Two was significant ($F(2, 29) = 6.601$, $p < .01$) and a *post hoc* Scheffé test for homogenous subsets revealed a significant difference (with α set at .05) between the STAI scores of LA participants (M = 28.1) and those in the MA (M = 40.1) or HA conditions (M = 38.9). Despite attempts to increase participant anxiety level in the HA condition, the MA and HA experimental conditions of Studies One and Two both failed to effectively create three distinctly different levels of state anxiety (see Figure 2). Consequently, when ANOVAs were conducted on the facial attractiveness ratings for female faces *as a function of experimental condition*, both Studies One ($F(2, 42) = .243$, $p > .05$) and Two ($F(2, 30) = .481$, $p > .05$) yielded non-significant results. Similar non-findings were found as a result of these ANOVAs for male faces, both for Study One ($F(1, 9) = .207$, $p > .05$) and Study Two ($F(1, 9) = .216$, $p > .05$).

Since the three experimental anxiety conditions did not reliably partition participants into three distinctly different levels of anxiety, participants' self-rated anxiety (STAI) scores were used to create two experimental groups. Because no distinctly "moderate anxiety" group existed (i.e., the mean STAI scores for each experimental condition did not resemble a trimodal

distribution; see Figure 2), two groups were created using a median split on STAI scores to divide participants. Therefore, one group was comprised of participants who had self-reported "low" state anxiety, and the second group of participants who had self-reported "high" state anxiety. A more refined repeated-measures multivariate analysis of variance (MANOVA) was then run for each study using (1) anxiety group (by STAI score, median split): (2) participant relationship status entered as between-subjects factors; and (3) participant attractiveness ratings for (a) female faces and (b) male faces entered as within-subjects variables. As an important note, in Study One single males and males in relationships were compared because the number of dating males was thought to be too small (n = 5) to warrant their inclusion. For this same reason, in Study Two, males in relationships (n = 3) were excluded from this analysis.

The within-subjects effect of target gender was found to be significant for both studies One ($F(1, 36) = 7.821$, $p < .01$) and Two ($F(1, 26) = 16.314$, $p < .001$), indicating that males were rating female faces differently than male faces. For female faces in Study One, no main effect was found for STAI score ($F(1, 37) = .117$, $p > .05$) or relationship status ($F(1, 37) = 2.538$, $p > .05$). Furthermore, no interaction was found between STAI score and relationship status ($F(1, 37) = 1.927$, $p > .05$; for the means of female faces in Study One, see Table 2). For female faces in Study Two, no main effect was found for STAI score ($F(1, 27) = 2.056$, $p > .05$, however a main effect was found for relationship status ($F(1, 27) = 7.182$, $p < .02$. Lastly, no interaction occurred between STAI score and relationship status ($F(1, 27) = .172$, $p > .05$ (for the means of female faces in Study Two, see Table 3). Based on findings such as these it was determined that males' relationship status would require inclusion in subsequent analyses.

Similarly, during early analyses it became apparent that the objective facial attractiveness of the target seemed to play an important role in influencing subjective ratings of facial

attractiveness. This possibility was considered because, apart from a switch in the two photo inventories, little had changed in the methodological approach between Study One and Study Two. Yet, the experimental effect of attractiveness rating by anxiety level was found to be much greater in Study Two than in Study One. (As a brief reminder, the photo inventory was switched between Studies One and Two because of an *apparent* loss of the experimental effect between the pilot study (which employed Photo Inventory 2) and Study One (which employed Photo Inventory 1). Because it was suspected that there was a meaningful difference between the two inventories, the photo inventory used in the pilot was employed in Study Two in order to test this suspicion.) Supporting the possibility that objective attractiveness of the target was influencing the experimental effect between studies, a Student's t-test revealed that both the male faces ($t(62)$ = -1.970, p = .05) and female faces ($t(62)$ = -3.551, p < .002) in Photo Inventory 1 (used in Study One) were significantly less attractive than those in Photo Inventory 2 (used in Study Two). Thus, it appeared plausible that the larger effect in Study Two may have been due in part to the greater objective attractiveness level of the targets in Photo Inventory 2.

In order to assess the role of target objective attractiveness, the most attractive and unattractive targets for male and female faces were identified in each inventory and placed in one of four, new, smaller inventories. A MANOVA was then run for each study, using (1) participant STAI scores (median split: low and high); (2) relationship status as between-subjects factors: and (3) participant facial attractiveness ratings for (a) attractive female faces, (b) unattractive female faces, (c) attractive male faces, (d) unattractive male faces as within-subjects variables.[5] No significant effects were found for male faces as a result of these MANOVAs, however a

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[5] As a reminder, due to inadequate sample sizes dating males were excluded from Study One analyses and males in relationships were excluded from Study Two analyses.

collection of significant and marginally significant results was again found for female faces in both Studies One and Two.

For unattractive female faces in Study One, the main effect of anxiety ($F(1, 37) = .590$, $p > .05$) and relationship status ($F(1, 37) = 1.409$, $p > .05$), as well as the interaction effect between anxiety and relationship status ($F(1, 37) = 2.708$, $p > .05$), were all statistically insignificant. For attractive female faces, the main effect of anxiety was also insignificant ($F(1, 37) = 2.483$, $p > .05$), as was the interaction effect between anxiety and relationship status ($F(1, 42) = .992$, $p > .05$). However, the main effect of relationship status was marginally significant ($F(1, 37) = 3.857$, $p = .06$). Taken together, these ANOVAs suggest the single marginally significant finding that males in relationships tend to rate attractive female faces as more attractive than do single males (for Study One mean attractiveness ratings for attractive female faces, see Table 4).

For unattractive female faces in Study Two, the main of anxiety was insignificant ($F(1, 27) = .009$, $p > .05$), the main effect of relationship status was found to be significant ($F(1, 27) = 5.219$, $p < .05$), the interaction effect was insignificant ($F(1, 27) = .140$, $p > .05$). For attractive female faces, the main of both anxiety ($F(1, 27) = 14.218$, $p < .005$) and relationship status ($F(1, 27) = 13.665$, $p < .005$) were found to be highly significant. However, the interaction effect was insignificant ($F(1, 27) = .389$, $p > .05$). In sum, the Study Two ANOVAs revealed three findings. First, single males rated both attractive and unattractive female faces as more attractive than did dating males. Second, for attractive female faces, anxiety significantly decreased ratings for both single and dating males. Lastly, these two groups did not differ significantly from one another in how their ratings were affected as a function of anxiety condition (for Study Two mean attractiveness ratings for attractive female faces, see Table 5).

Overall, the results suggested that state anxiety does in some way influence males' attractiveness ratings of female faces; relationship status interacts in some way with anxiety to influence ratings of attractiveness; and that the effect of state anxiety on judgments of facial attractiveness does not occur equally for all targets. In order to examine these relationships further as well as to measure the strength of the association among these variables, correlational and regression approaches were used.

Linear Dummy-Variable Regression

Overview of statistical procedure. Having teased out relevant variables for inclusion in the theoretical model, linear dummy-variable regression was then employed. First, data from select participants were excluded due to insufficient sample sizes of their relationship status groups. Next, the distribution of participant STAI scores was analyzed. Partial correlation analyses (controlling for participant relationship status) were then used to investigate the strength, significance, and direction of the relationship between self-reported anxiety (using STAI scores as a continuous variable) and ratings of different faces.

Data were analyzed using linear dummy-variable regression with the common-slope model,

$$Y_{FA} = \alpha + \beta\,(X_{SA}) + \gamma\,(D_{RS}) + \varepsilon_i$$

where participant STAI score was entered as a continuous variable (X_{SA}), relationship status, in this case a two-level categorical variable, was entered using a dummy-variable (D_{RS}; single = 1; in a relationship = 0 for Study One; dating = 0 for Study Two) and facial attractiveness ratings for attractive female participants entered as the predicted outcome variable (Y_{FA}). Although it was predicted that state anxiety and relationship status might interact, an interaction variable was not included in the model because the sample size in each of the two studies was insufficiently

large to warrant the inclusion of such a small variable. For the same reason, the variable of participant self-rated attractiveness was omitted, as it was included primarily out of conceptual interest and had not been found to influence results.

Regression Analyses of Study One. The five (5) males who classified themselves as "dating" were excluded from the analysis because they constituted an unexpectedly small group, and, hence, their inclusion would introduce unnecessary noise into the analysis. Also to reduce noise, the data from one participant who classified his sexual orientation as "homosexual" was also excluded from the statistical analyses. The data used in the regression for Study One, therefore, was obtained from heterosexual male participants who classified themselves as either "single" (n = 27) or "in a relationship" (n = 10) resulting in a total sample size of 37. The age distribution of this sample was highly positively skewed and leptokurtic, with a mean of 18.8, a median of 18.0, and a standard deviation of 1.35. Analysis of participant STAI scores revealed that the resulting distribution was relatively normal, with a mean of 34.0, a standard deviation of 9.8, and a range of 35 (20 – 55; for distribution of STAI scores for Study One, see Figure 3). Because this general distribution was not considered problematic in terms of skewness or kurtosis (see Table 6 for STAI descriptive data), STAI scores were not transformed in any way.

To assess whether any significant relationships exist between self-reported state anxiety and facial attractiveness ratings for different target faces, partial correlations, when controlling for participant relationship status, were calculated for Study One (partial correlations are provided in Table 7). The only significant correlation found between participants' STAI scores and ratings of facial attractiveness was that for attractive female faces, $r = -.358$, $p < .05$ (2-tailed). Having revealed a significant relationship between these two variables, a linear regression analysis was then conducted.

The correlation matrix for validities in Study One is provided in Table 8. The correlation between facial attractiveness ratings for attractive female faces and self-reported anxiety was again strong and significant ($r = -.341$, $p < .02$), providing additional support for the relationship between these two variables. Similarly, the correlation between attractiveness ratings and relationship status was significant and nearly equally strong ($r = -.293$, $p < .05$). Importantly, there was no evidence of collinearity between the two predictor variables of participant state anxiety and participant relationship status, $r = -.005$, $p > .05$, permitting an analysis of each regression coefficient individually.

Results of the regression analysis itself revealed that both males' self-reported state anxiety and relationship status were each significantly associated with their ratings of facial attractiveness for attractive females (see Table 9). Addressing the significance of each coefficient individually, a statistically significant relationship was found between facial attractiveness ratings and self-reported state anxiety (adjusted mean for self-reported anxiety of 20 = 5.4; adjusted mean for self-reported anxiety of 56 = 4.2; $SE = 0.016$; $p < .05$), indicating that within this linear model, self-reported state anxiety is a significant predictor of female facial attractiveness ratings for attractive female faces. Second, the relationship between facial attractiveness ratings for attractive female faces and participant relationship status was found to be marginally significant (adjusted mean for single males = 5.45; adjusted mean for males in a relationship = 6.11; $SE = .346$; $p = .06$). Thus, males in committed relationships, on average, appear to rate female faces as more attractive than do single males. If we accept participant relationship status as an important and relevant predictor in this model (despite its marginal statistical significance of .06) the resulting regression equations are $Y_{FA} = 5.45 - (0.035)(X_{SA})$ for single males and $Y_{FA} = 6.11 - (0.035)(X_{SA})$ for males in a committed relationship. The linear

regression model was significant (R square change = .203; $F(2, 34) = 4.324$, $p < .05$; see Figure 4). Due to the less than desirable sample size in Study One, the adjusted R^2 value, which is a more conservative estimate of the significance of the multiple correlation coefficient, was estimated at .156, indicating that roughly 16% of the variation in these males' attractiveness ratings in Study One are explained by these two predictors.

Regression Analyses of Study Two. The data from three participants in Study Two were excluded due to their being the only participants "in a relationship" making the total sample size for this particular group unacceptably small. Similar to the exclusion of the 'dating' subjects in Study One, it was deemed that the inclusion of this data would introduce unnecessary noise into the overall analysis. Therefore, the resulting data used for analysis in Study Two was that of heterosexual male participants who either classified themselves as "single" (n = 16) or "dating" (n = 11) resulting in a total sample size of 27. The age distribution of this sample was positively skewed, with a mean of 19.2, a median of 19.0, and a standard deviation of 1.5. Analysis of the distribution of participant STAI scores revealed a relatively normal distribution with a mean of 35.2, a standard deviation of 10.0, and a range of 36 (20 – 56; see Figure 5). Again, because this general distribution was not considered problematic in terms of skewness or kurtosis (see Table 10 for STAI descriptive data), STAI scores were not transformed in any way.

To assess whether any relationships exist between self-reported state anxiety and facial attractiveness ratings for different target faces, partial correlations, when controlling for participant relationship status, were calculated for Study Two (partial correlations are provided in Table 11). Similar to Study One, the only significant correlation between participants' self-reported anxiety and ratings of facial attractiveness was that for attractive female faces, r = -.575,

$p < .005$ (2-tailed). Having revealed a significant relationship between these two variables, a linear regression analysis was then conducted.

The correlation matrix for validities in study two is provided in Table 12. Similar to what was revealed by partial correlation, the relationship between facial attractiveness ratings for attractive female faces and self-reported anxiety was again strong and significant ($r = -.500$, $p < .005$) indicating that as participant state anxiety increases, their ratings of facial attractiveness tend to decrease. Similarly, the correlation between attractiveness ratings and relationship status was almost equally strong and significant, $r = -.539$, $p < .005$, reflecting that dating males tended to rate female faces as significantly less attractive than do single males. Lastly, there was no evidence of collinearity between these two predictor variables of participant state anxiety and participant relationship status ($r = .031$, ns).

The regression analysis of Study Two, therefore, indicated that males' ratings of facial attractiveness for attractive female are significantly predicted by both self-reported state anxiety and participant relationship status (R square change = .525; $F(2, 24) = 13.255$, $p < .001$; see Table 13). More specifically, statistically significant relationships surfaced between facial attractiveness ratings and self-reported state anxiety (adjusted mean for self-reported anxiety of 20 = 4.5; adjusted mean for self-reported anxiety of 56 = 3.0; $SE = 0.009$; $p < .005$) and relationship status (adjusted mean for single males = 5.10; adjusted mean for dating males = 4.46; $SE = .172$; $p < .002$). Thus, the resulting regression equations are as follows: for single males, $Y_{FA} = 5.10 - (0.030)X_{SA}$; for dating males, $Y_{FA} = 4.46 - (0.030)X_{SA}$ (see Figure 6). Due to the less than desirable sample size in Study Two, the adjusted R^2 value was used and was estimated at .485. In general, this indicates that these two predictors accounted for roughly 49% of the variability in participant scores.

Discussion

In general, the studies conducted here provide preliminary support for the hypothesis that state anxiety influences males' judgments of attractiveness for attractive female faces, and lead to both theoretical predictions as well as methodological suggestions for future work. Not unexpectedly, many of the latter are produced by the significant differences the study *failed* to find, leaving unanswered questions regarding the generalizability of this phenomenon across genders and contexts alike. To insure a fruitful discussion of these findings and non-findings, the results will be considered in the same order as the statistical analyses that produced them.

Discussion of Factorial Analyses

Analysis 1: Using MANOVA to look at main effect by experimental condition. As described above, ANOVAs between experimental anxiety condition and facial attractiveness ratings conducted for both studies failed to produce significant results of the studies' main effect: a change in attractiveness rating produced by a manipulation of the participants' state anxiety. The missing effect might be attributable to two methodological factors. First, neither the variable of participant relationship status nor that of objective attractiveness of target were controlled for in the studies because they were not originally known to be influential. The exclusion of these two variables may have contributed to the failure in detecting the experimental effect. The second methodological problem is the generally poor correspondence between the experimental anxiety condition and participants' self-reported anxiety scores in both studies One and Two (as well as in the pilot study). Analysis of the data suggests that this poor correspondence was, itself, due to two other problems. First, some if not most participants in the moderate and high anxiety conditions may have experienced both experimental conditions as nearly equal in anxiety evoking potential. In fact, participants who were told they would be audiotaped self-reported

similar levels of state anxiety as those who were told they would be videotaped. Second, many participants reported very different levels of state anxiety *within* the same experimental condition. Thus, many participants in the high anxiety condition were not made anxious by the idea of being videotaped and criticized, while some in the low anxiety condition were made highly anxious simply from having to write down their ideas. Both explanations suggest that state anxiety needs to be determined by a more accurate and quantitative measure than merely the assignment to experimental condition.

Analysis 2: Using MANOVA and STAI-based groups to look for main effect. When it was determined that analysis by the experimental conditions failed to reliably partition participants according to the state anxiety they were experiencing, and participants' self-reported anxiety scores were instead used to determine experimental group membership, a mix of significant and marginally significant results were obtained. This mix may well have resulted from the control of relevant factors affecting attractiveness ratings and from the interaction of those factors. The series of repeated-measures MANOVAs using participants' self-reported anxiety, participant relationship status, and "objective" facial attractiveness ratings for target faces of varying attractiveness as the dependent variable may have produced some significant results for simple reason that important variables were now controlled, at least in the statistical analysis. Similarly, the analysis may have failed in some instances to produce significant results because these same factors interacted to cancel the effect. Although results were generally difficult to interpret as a whole, it was apparent that males' ratings for female faces varied systematically as a function of self-reported state anxiety, participant relationship status, and the objective facial attractiveness of the target and the interaction between these factors was unavoidable in the experimental design employed.

Discussion of Regression Analyses (by finding)

Finding 1. State anxiety predicts males' attractiveness ratings for attractive female faces. Results of regression analyses in both Studies One and Two supported the hypothesis that self-reported state anxiety was a significant predictor of facial attractiveness ratings for attractive females. As males' self-reported anxiety increased, their attractiveness ratings for attractive female faces decreased. Between the two theories proposed, a distraction explanation was supported and misattribution theory was unsupported. Although, on this basis, the misattribution hypothesis was rejected, further evaluation of the misattribution paradigm is warranted.

The misattribution hypothesis. The data obtained in the present study did not support the direction predicted by the misattribution hypothesis, however they do point toward several issues that require exploration. To begin, it is possible that the misattribution process could become inhibited when participants are experiencing elevated anxiety. This assertion is consistent with an earlier finding that individuals are *less* likely to attribute their emotions when the emotion is negative (Reisenzein & Gattinger, 1982). It is also plausible that a "repulsive" misattribution effect is occurring, whereby beholders are misattributing the negative component of their anxiety to the target. This type of misattribution effect, if occurring, might occur only for the most salient or "relevant" targets. This explanation could be argued to be consistent with the results of Dutton and Aron (1974) since the presence of an attractive female confederate produced the misattribution, whereas the presence of a male confederate did not. In the present study, if attractive or unattractive faces were viewed as being more "relevant" to Dutton and Aron's (1974) negatively anxious state, misattribution might be similarly affected.

Another possibility consistent with this explanation points towards the importance of considering specific and unique aspects of the induced arousal. It is very possible that the

misattribution effect found by Dutton and Aron (1974) and not found by other researchers was, in fact, due to a specific physiological response called the *cremasteric reflex* (or the "peno-cremasteric reflex"). This response, which has been suggested by some as being more prominent in adult males than in boys (Shafik, Shafik, El Sibai, & Shafik, 2006), produces the contraction of the cremaster muscles – muscles that cover the testes and function to raise and lower the scrotum in order to regulate the temperature of the testes and promote spermatogenesis. Importantly, the cremaster muscle is also sensitive to anxiety (Bell, Stroebel, & Prior, 1971) and contracts during exposure to cold environments, shock, when exposed to fearful stimuli (such as heights), *and during orgasm and ejaculation.* While the cremaster muscle is fully developed in males, in females it is represented by only a few muscle loops (Shafik et al., 2006). The results obtained by Dutton and Aron may have been due to males (only) becoming sexually charged through the contraction of muscles associated with orgasm and ejaculation, but which, in this experiment, were actually triggered by the physiological response of being on an elevated suspension bridge. That sexually dysfunctional males do not show the same pattern of misattribution as sexually functional males when aroused or made anxious (Cranston-Cuebas et al., 1993) is consistent with this explanation.[6]

The discovery of an order effect between ratings of attractiveness and measures of emotion and arousal (Dutton & Aron, 1989; Riordan and Tedeschi, 1983) also requires consideration. As Dutton and Aron (1989) explain,

> "[s]ince having the subject fill in attraction items first forces an explicit attribution of arousal, a misattribution perspective would explain this rapid drop [in arousal]: arousal would be lowered by attributing it to an appropriate, non-threatening cause. Similarly

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[6] Cranston-Cuebas et al. (1993) note, "it is difficult to attribute these results to a conscious attribution" (p. 531), suggesting that perhaps the attribution process is a less conscious process than previously thought.

self-reports of affect such as anger or anxiety would be lowered because arousal has been

attributed to an alternative source." (p. 255)

Because participants in the present study rated the attractiveness of faces first and completed the

self-reported anxiety questionnaire second, it is possible that the participants who were

experiencing a strong anxiety response were attributing at least a portion of that response to the

target image. Furthermore, the males who self-reported low levels of state anxiety *after* rating the

computer images may have been the same males who reported greater levels of attraction to the

targets seen during that task. In the present study, such "negative reinforcement" is also

supported by the finding that attractiveness ratings and state anxiety were significantly and

negatively correlated for attractive female faces only. This finding makes intuitive sense within

the negative reinforcement paradigm, since it is these faces that likely yield the greatest anxiety-

reducing potential for anxious male participants.

Regrettably, because the order of these rating tasks was not counterbalanced it is

unknown whether negative reinforcement is the driving force behind the effects found here.

Because Dutton and Aron (1989) note that "negative reinforcement may operate in paradigms

that employ stimulus persons as distractions from aversive arousal" (p.255), and because this

assertion effectively describes the paradigm of the present study, further research is necessary to

assess the role of negative reinforcement when judging the facial attractiveness of others.

The distraction explanation: State anxiety derails beholder attention. The decrease in

males' attractiveness ratings for attractive female faces might also be explained by employing a

distraction explanation. If distraction were driving the experimental effect, we might predict that

a decrease in attractiveness ratings should be most pronounced for attractive female faces since

their ratings would have further to "fall". The differences found in the relative amounts of

decrease in ratings of attractive versus less attractive faces found in Studies One and Two might be explained as a "regression to the mean." For instance, if we assume that males attend less to unattractive faces when they are not anxious, then we would not expect to find the same decrease in attractiveness ratings for unattractive faces as anxiety increases. The ratings for less attractive faces would appear less vulnerable or even immune to decreased rating due to distraction. Additional support for this explanation might be found by looking at the level to which males' ratings are predicted to decrease by the regression line. If males' attractiveness ratings for attractive female faces are predicted to decrease only to the *mean* attractiveness rating for all female faces, it would be consistent with a distraction explanation. Alternatively, if males' ratings of attractive female faces are predicted to decrease to a level that is *below the mean* attractiveness level for all female faces, this prediction would be consistent with a repulsion explanation. With the exception of single males in Study One, the data trend, as reflected in Figures 7 and 8, indicate that males' ratings in the current study are generally consistent with a distraction explanation. However, as discussed above, due to a procedural limitation related to a lack of counterbalanced tasks, it is not known whether a regression to the mean or a negative reinforcement phenomenon is responsible for the observed effect.

Finding 2. The relationship status of male beholders predicts attractiveness ratings for attractive female faces. Regression analyses also revealed that relationship status plays a significant role in predicting males' judgments of female facial attractiveness for facially attractive females although the direction of the findings was inconsistent with an interpretation of "need" decreasing as one enters into a more "committed" relationship. More specifically, in Study One, males in relationships rated attractive females as more attractive than did single

males; in Study Two, single males rated attractive females as more attractive than did dating males. Two explanations are provided here for this effect: calibration and target relevance.

   The calibration explanation. The calibration paradigm (Lydon et al., 2003) discussed earlier also provides a useful framework within which to consider the finding that males with varying degrees of relationship commitment differently rate the attractiveness of females' faces. According to the calibration hypothesis, an inverted U function exists between "relationship defenses" and commitment level, suggesting that when the level of threat posed by an available alternative (in this case, an attractive face) is either above or below the beholder's commitment level, the beholder will *not* cognitively or behaviorally defend the relationship by an act of devaluing the alternative. Thus, single males who have little to no commitment would rate target attractiveness higher simply because they have no relationship or emotional commitment to defend. For similar reasons, strongly committed males would also not be expected to devaluate alternatives because they may not feel sufficiently threatened by the alternative female target. Conversely, when the threat of the alternative is commensurate with the beholder's commitment level (e.g., for dating males), devaluation of the alternative is most likely to occur since the perceived threat is likely highest for these individuals.

   The calibration framework fits well with the findings of the present research, as the process of cognitive devaluation is conceptually consistent with lower mean facial attractiveness ratings for targets. In short, we would expect lower attractiveness ratings to be related to higher levels of devaluation. Thus in Study One, males in relationships rated attractive female faces as more attractive than did single males, yet this difference was only marginally significant. As predicted by the inverted U function identified by the calibration paradigm, males in committed relationships may not have found these faces "threatening" to their relationships, thus lowering

their target devaluation. As a possible explanation for this lack of threat, the female target faces may not have been sufficiently attractive to cause a threat to the relationships of highly committed males or, alternatively, because photographs were used rather than the females themselves, it is possible (and likely) that the exposure to these targets wasn't sufficiently threatening to provoke defensive devaluation behavior. The calibration paradigm also offers a possible explanation for why the difference between the attractiveness ratings provided by single males and committed males was only marginally significant. If each group falls on either end of the inverted U of relationship commitment-defense, the absolute difference between such groups would be expected to be small.

The calibration hypothesis may also shed light on the finding in Study Two that dating males rated attractive female faces as less attractive than did single males. Dating males may best fit the category of those who are "moderately-committed" who lie at the peak of the inverted U, and who aggressively defend their relationships by cognitively devaluing available alternatives with which they are presented. In the case of dating males, the low attractiveness ratings of female faces may reflect their attempts to reassure themselves that the available alternatives are not attractive and, thus, are not threats to their moderate commitment level.

In summary, the calibration paradigm appears to describe the impact of relationship status on judgments of facial attractiveness. Regrettably, however, because different photo inventories were used in each study and because sample sizes were small, a comprehensive comparison of all three groups in both studies was not possible. Thus, future research is required to empirically validate the calibration explanation in the context of this research.

The target relevance explanation. Another possible explanation for effect of relationship status draws on the concept of *target relevance*. Firstly, if we postulate that the most critical

factor is whether a male is *looking* for a partner, we might assume that the attractiveness of a female target photo would be most relevant (and, therefore, salient) for those males who are "in the search." Thus, each of the relationship categories in the current studies may contain a bias from a failure to control for "looking-not looking" participants. (After all, being single does not guarantee one is looking, and being in a relationship does not ensure one is not!) Secondly, if we assume that "looking" males will be most attentive and judgmental (or "choosy") of the attractiveness of females, then a male who is in a *committed* relationship may be less critical of attractiveness than a male who is single, or a male who defines himself in a relationship but "looking" nonetheless. Because the target is irrelevant to him, the committed male may not be as critical as a single male resulting in higher attractiveness ratings from males in committed relationships.

A related phenomenon that supports this explanation is the finding that relatively poor children judge the size of valuable coins as being larger than do wealthier children (Bruner & Goodman, 1947; Carter & Schooler, 1949; Tajfel, 1957). This effect may be attributable to the individual's "drive" for a resource being influenced by (among other factors) his or her need/desire for that resource. In the same way that children perceptually distort the size of coins based on both their need or desire for money, we might also expect that males' judgments of female attractiveness to be influenced by his need/desire for a partner (i.e., his relationship status). It would be predicted, therefore, that single males should rate female faces as more attractive than males who are in relationships, since their drive for a partner is assumed to be higher. Despite the fact that the data in the present study is somewhat inconsistent with this explanation, it may be entirely consistent with the "looking" or "not looking" status of participants.

An additional view into the relevance of participant relationship status on attractiveness ratings of attractive female faces is obtained attractiveness ratings for attractive female faces are plotted as a function of both participant relationship status and membership in either a high state anxiety group or a low state anxiety group (for Study One see Figure 9; for Study Two see Figure 10). While no firm conclusions can be drawn based only on these figures, a comparison of the visual trends suggests that the facial attractiveness ratings provided by males in committed relationships (in Figure 9) are perhaps affected differently by state anxiety than are those of single and dating males. The possibility that males in relationships are affected differently is further supported by a noticeable increase in the strength of the regression model from Study One to Study Two. In particular, because the exclusion of males in relationships in Study Two boosted the predictive power of the regression model, we might assume that the ratings provided by these males were not as well predicted by state anxiety and that perhaps an interaction was taking place.

Finding 3. Only the ratings for objectively attractive female faces were affected by males' state anxiety. When it comes to the effect of state anxiety on judgments of facial attractiveness, it appears that not all faces are affected equally. In both studies it was found that males' ratings were affected by anxiety for attractive female faces only. An explanation of this finding may suggested by research on what influences our drive for resources (Bruner & Goodman, 1947; Carter & Schooler, 1949; Tajfel, 1957). In the studies on judging coins already mentioned, children distorted their perception of the size of only valuable coins. Coins of lesser value failed to produce the same effect. Thus, it may be the case that the value of the resource must reach a critical threshold before it becomes inherently meaningful and salient to the beholder. If we assume that a similar threshold exists for facial attractiveness, it might be

predicted that faces lying below that threshold are simply not salient enough to the beholder. As a result, they are not meaningfully attended to, and their characteristics will not be influenced by changes in perception. Alternatively, faces that are sufficiently attractive become salient because of their inherent value to the beholder. These faces are meaningfully attended to and are potentially susceptible to perceptual distortions depending on the internal state of the beholder. Therefore, in the same way that children perceptually distort the size of coins based on the value of the coin being judged, males' judgments of female attractiveness might be influenced by the objective facial attractiveness of the target.

General Limitations of the Research

Limitations of the current studies may be broken into and discussed in three distinct categories: problems with participant samples; problems with measures; and problems with procedure. Here, each category is discussed in turn.

1. Problems with participant samples.

An additional problematic aspect of the fire in the research building that terminated Study One is that if also effectively discontinued access to the subject pool at the end of an academic year. This made adequate subject recruitment for Study Two difficult. Hence, the sample sizes in both studies were far less than desirable. Had the obtained sample sizes been larger, a relationship status–state anxiety interaction variable could have been included in the regression analyses which would have allowed a more meaningful assessment of whether a significant interaction was taking place between participants' relationship status and the anxiety they were experiencing. Since the present studies suggested that such an interaction is likely to be occurring, future studies should ensure sufficient sample sizes to allow for the inclusion of such a measure.

A second factor concerning subjects also deserves mention. Because the data obtained in the pilot study generally reflected that the experimental effect involved males only, female subjects were excluded from both studies. Subsequent analyses, however, revealed that when participant relationship status and objective attractiveness of the target are controlled, the experimental effect was significant, measurable, and generally more interpretable. Because no female subjects were included in this analysis, the studies may have overlooked similar affects for that gender. Females' ratings of males' faces may also be influenced by state anxiety, or perhaps be influence in a different way to male participants. Exclusion of females, therefore, limits the ability to generalize from the results obtained, thus it is recommended that future studies include females to assess possible gender differences.

A further limit to generalizability is also imposed by the ages of the male subjects. Because the study only used males between the ages of 18 and 25 (and most were younger than 20) generalizing the findings to older males may well deserve challenge. Older males might show a consistently enhanced or decreased effect. Furthermore, the age range of the present subjects raises questions about at least one relationship category. It would seem difficult to argue that "a committed relationship" means the same thing to a 20 year old as it does to someone in their forties. Because beholder attentiveness is believed to influence the rating effect, an age-attentiveness interaction might also be revealed. In order to assess the possibility of an age effect, it is recommended that future research include participants of different age groups (e.g., 18-25 year olds versus 30-35 year olds).

2. Problems with measures.

Several problems concerning various experimental measures surfaced during analysis of data. First, concerning the measurement of state anxiety, neither study employed physiological

measures such as galvanic skin response (GSR) and/or heart rate as a means of providing information about whether participants were experiencing somatic components of anxiety. While it was originally considered that STAI ratings obtained from subjects could provide information, the superior objectivity of such physiological measures cannot be overestimated. Furthermore, inclusion of both measures may allow for the teasing apart of the somatic and cognitive components of anxiety and provide valuable information about how each component differentially contribute to the experimental effect. Because a measure of trait anxiety was not included in this study, it could be neither controlled for nor accounted. As a consequence, it the proportion of each participant's self-reported state anxiety score due to the state anxiety from the experimental manipulation and the proportion due to his baseline anxiety level (trait anxiety) could not be determined. Future studies should include physiological measures of anxiety, such as GSR and heart rate, as well as a measure of trait anxiety, in order to allow for the aforementioned comparisons to be made.

The attractiveness rating system is another area that may have contributed problematic aspects. First, the facial attractiveness rating system did not include measures designed to standardize the rating process. What does a rating of "3" actually mean to the various participants asked to rate targets on the 1 to 7 scale for facial attractiveness? Does a score of 3 mean that the target would be worth approaching on the street? Worth dating? Worth engaging in a relationship? Because it is unlikely that all participants were treating the rating system similarly, the system, itself, may have introduced significant noise into the data. Future studies should attempt to include a more standardized rating system and measures of facial attractiveness, perhaps one defined operationally such the desirability of candidate for: a conversation, casual date, long term relationship, marriage, etc.

A second problem related to the "key" target photos concerned their post-hoc selection. Because absolute attractiveness was not recognized early to be a significant factor in the emergence of the experimental effect, true inventories of highly attractive and highly unattractive targets were not used in either study. Instead, attractive and unattractive faces were based only on percentile rank within their respective inventories. As a result, the mean facial attractiveness ratings of these attractive and unattractive target groups were not as distant as they could have been had the researcher deliberately recruited attractive and unattractive targets. Because it is probable that this oversight attenuated the effect in the present studies, future studies should recruit and develop target inventories that comprised of more objectively attractive and unattractive targets.

3. Problems with procedure.

Three problems related to procedure deserve discussion. Because the experimental effect in this study was influenced by beholder attention, distraction, and the significance (salience) of target faces, more appropriate definitions need to be used to separate participants into "relationship" categories. As mentioned earlier, a more appropriate distinction might be as to whether they were "looking" or "not looking" for a partner, or the degree of active search. Since one's relationship status does not necessarily determine one's vigilance or attentiveness for the other sex, separating participants according to such interest may deliver cleaner, more interpretable data. Researchers interested in investigating this phenomenon in the future may wish to include a questionnaire item using such a parameter in lieu of, or in addition to, an item measuring participant relationship status.

The second point concerns the order effect discussed earlier, between attractiveness ratings and self-reports of emotion and/or arousal (Dutton & Aron, 1989; Riordan and Tedeschi,

1983). Because in the present study the order of the face rating task and the completion of the self-reported anxiety questionnaire was not counterbalanced, it is somewhat difficult to evaluate and interpret the effect of state anxiety on facial attractiveness independent of this demonstrated order effect. Given this limitation, future researchers should ensure the counterbalancing of measures of attractiveness with those of self-reported anxiety.

The ecological validity of the experimental manipulation in the present study is the final point to be considered. It might be argued that the computer presentation of photos was not sufficiently powerful, meaningful, or relevant enough to ensure participants adequately attended to target faces. Instead of participants interacting directly with the other person (as would describe the procedure of the Dutton and Aron (1974) study) or the experimenter telling participants that they would have an opportunity to meet the other person, the present study asked participants to rate facial attractiveness based on what might easily be perceived as a fictitious scenario. Because it has been previously suggested that misattribution relies on the salience of a plausible cause for arousal (White & Kight, 1982), it may be important for future studies to make targets as salient as possible to participants while they are experiencing anxiety. In support of this argument, a recent study investigating the relationship between alcohol consumption and judgments of facial attractiveness employed the same digital photo approach as the present study and similarly failed to find any differences between groups (Neave, Tsang, & Heather, 2008) suggesting this computer approach might prove ecologically invalid. Therefore, future studies might instead consider having participants personally interact with the target being judged, or alternatively, tell each participant that he or she will have the opportunity to meet the target after completion of the study.

Conclusion

Overall, the current studies appear to provide substantial support for the proposition that characteristics of the beholder can affect judgments of facial attractiveness. First, a state of elevated anxiety appears to affect male attention to female faces resulting in decreased ratings of facial attractiveness for objectively attractive females. Second, consistent with previous research (Madey et al., 1996), a male's relationship status appears to influence his attractiveness ratings for objectively attractive female faces. This effect might be explained either by considering that the relevance of a female face varies as a function of the male's relationship status, and/or that a "looking" male might demonstrate greater selectivity (or criticism) when judging the physical traits of a female. Also consistent with previous research (Istvan et al., 1983), the studies in this thesis found that the objective attractiveness of the target plays an important role in eliciting the effect, since state anxiety was found to influence only ratings for attractive female faces. Again, this might be explained in two ways. First, it is possible that males were misattributing their distressful experience of anxiety to the most salient targets in their environment – attractive female faces – which resulted in a repulsive lowering of their ratings for those females. Second, it is possible that during a state of distraction from anxiety males' ratings regressed toward the mean rating of facial attractiveness for females. Certainly, the distraction explanation is the simpler one, and for that reason alone might be argued to be the more plausible. Additional research, however, is the only way to arrive at a final answer to that question.

Implications

These studies also have important implications for a number of key areas, including those of developmental, social, and clinical psychology.

Developmental implications. Given the link between the facial attractiveness of babies and the quality and strength of attachment (Coy et al., 2002; Speltz et al., 1997), the findings from the present studies may have significant implications for the area of child development and parent-child attachment. Should the mother's perceptions of facial attractiveness be affected by either state or trait anxiety it might well have implications for the quality and strength of attachment to their children. Alternatively, if a similar link exists between the facial attractiveness of the child and the quality of the father-child attachment, the father-male might be especially prone to the effect. The present studies provide intriguing evidence that state anxiety can affect males' judgments of facial attractiveness, and perhaps influence the bond between men and their children.

Social implications. If anxiety does influence males' judgments of female facial attractiveness, this also carries significant social implications. As previously discussed, the "what is beautiful is good" stereotype plays a powerful role in our beliefs about others. It has consistently been demonstrated that we hold many positive stereotypes regarding physically attractive individuals, such as that are better lovers, more likeable, and more socially skillful (Ashmore, Solomon, & Longo, 1996; Dion, Berscheid, & Walster, 1972; Goldman & Lewis, 1977) and that these assumed characteristics generally correspond to those that are valued within each culture (Wheeler & Kim, 1997). As also noted earlier, our beliefs and judgments of physically attractive individuals also carry over to less benign scenarios, as they are also judged more leniently for crimes (Leventhal & Krate, 1977; Staley, 2008) and considered more qualified for certain jobs (Desrumaux, De Bosscher, & Leoni, 2009; Gilmore et al., 1986). If the anxiety state of the beholders can influence their judgments of attractiveness, there will be significant

implications for how state anxiety might exacerbate or attenuate these prejudices in social situations as well as in legal and professional contexts.

Clinical implications. Perhaps most important are the clinical implications suggested by these studies. For instance, developing and maintaining primary relationships involves the constant assessment of attractiveness, both in oneself and in one's partner. That anxiety may affect the outcome of such monitoring has very real implications not only for social psychology, but also for clinical psychology in areas relating to therapeutic relationships, relationship counseling, and attachment. Given the likelihood of such interactions, it can only be beneficial for practicing clinicians to understand how states of anxiety might affect clients' judgments about others in primary, secondary, tertiary and other levels of relationships.

Furthermore, because the effect found here may depend on the type of arousal or anxiety experienced by the participant, it begs the question of whether clinically significant levels of trait anxiety have a similar or different effect on the beholder. Could individuals diagnosed with panic disorder, social anxiety disorder, generalized anxiety disorder be affected the same or differently than "normals"? Because ample evidence supports the premise that many clinically anxious individuals attend to and process facial information differently than do non-anxious individuals (Bradley et al., 1999; Mogg, Philippot, & Bradley, 2004), there may be reason to believe that trait anxiety might also significantly impact perceptions and/or judgments of facial attractiveness. Because anxiety disorders are more prevalent in females than in males (APA, 2000), it may be especially important to include female participants in future studies assessing facial attractiveness judgments in clinically anxious populations. Lastly, if the type of arousal/anxiety does influence the effect, it raises additional questions such as: What are the relative effects of caffeine ingestion on judgments of facial attractiveness? What about physical

exercise? Or sexual arousal? Researchers interested in this subject might consider varying types of anxiety and arousal as a means of shedding light on where and when this phenomenon is liable to occur.

In summary, the present studies demonstrate that both state anxiety and relationship status can predict male facial attractiveness ratings for attractive females – a finding that has important implications not only for the methodology of future studies on the subject, but also for social and clinical interactions. Having identified that state anxiety can potentially influence our judgments, perceptions, and beliefs about those around us, additional research is needed to assess how these seemingly disparate concepts interact with one another. If a goal of psychology is to maximize social harmony through an identification and understanding of the psychological factors influencing human attachment, and social and legal discrimination, the results and implications of the present study provide practitioners with an important direction in which to pursue that goal.

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Footnotes

[1]   State and trait anxiety should not be considered exclusive, as they likely interact with one another in a complex fashion.

[2]   This is known as the "vigilance-avoidance hypothesis".

[3]   Due to the attentional bias toward emotion exhibited by those with high trait anxiety (Bradley et al., 1999; Kessler et al., 2007; Mogg, Philippot, & Bradley, 2004), it was crucial to exclude targets overtly displaying emotionality.

[4]   The purpose of obtaining this photo was to later obtain an objective rating of each participant's facial attractiveness, as recent research has shown it to influence ratings of others' facial attractiveness (Montoya, 2008). However, because these ratings were not obtained during the course of this research this variable will not be discussed further in this paper.

[5]   As an important note, in Study One single males and males in relationships were compared because the number of dating males was thought to be too small (n = 5) to warrant their inclusion. For this same reason, in Study Two, males in relationships (n = 3) were excluded from this analysis.

[6]   Cranston-Cuebas et al. (1993) note, "it is difficult to attribute these results to a conscious attribution" (p. 531), suggesting that perhaps the attribution process is a less conscious process than previously thought.

Appendix A

Online Recruitment Notice

Study Title: Welcome Strategies

Description:

     Principle Investigator: Caelin White, MA student
     Supervisor: Maria Medved, Assistant Professor

     The purpose of this study is for participants (first year undergraduate students) to develop strategies for welcoming new students to the university. More specifically, you'll be asked to generate several ideas you think might help new students to better enjoy campus life, such as changes to campus layout, social events, intramural sports, etc. In completing this study, you will also be asked to provide some basic demographic information (such as your ethnic background, relationship status, etc.) and some opinions about yourself and your present feelings (such as excitement, sadness, etc.). The study will take approximately 30 minutes and you will earn one credit toward your research participation requirement for your Introduction to Psychology course.

     [The recruitment page also contained the location of the study]

Appendix B

Sample Inventory Photo

300 pixels

300 pixels
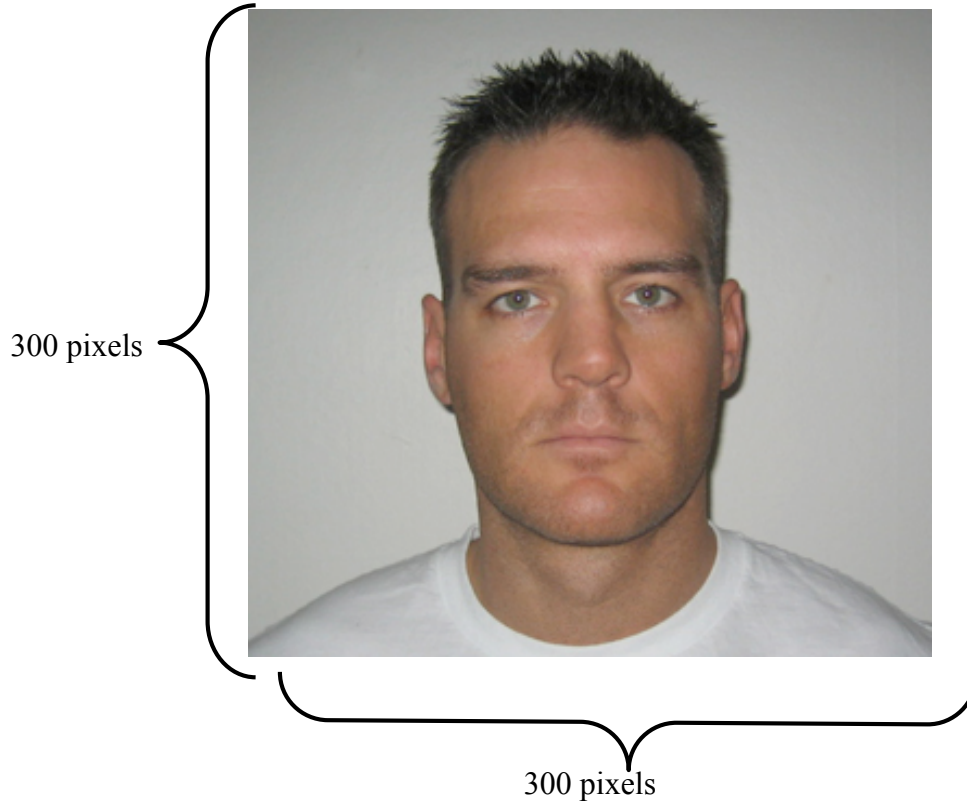
Appendix C

Study One – Target Inventory Recruitment Poster

Fort Garry Campus Research Ethics Boards
CTC Building, 208 - 194 Dafoe Road
Winnipeg, MB R3T 2N2
Phone: (204) 474-7122
Fax: (204) 269-7173

UNIVERSITY
OF MANITOBA

Earn a $5 Tim Horton's gift card for 5 minutes of your time!

Principal Researcher: Caelin White, MA student, Department of Psychology
Contact Number: (204) 227-5077

Research Supervisor: Dr. Maria Medved, Assistant Professor, Department of Psychology
Contact Number: (204) 480-1465

Title of Project: Perceptions of Faces

Purpose of research: The general purpose of this project is to generate a series of digital photographs of different people's faces. These photos will be shown to undergraduate students at the University of Manitoba. The short-term goal of this research is to help us better understand the relationship between states of anxiety and perceptions of others' facial attractiveness. The long-term goal of this research is to better understand whether the effects of anxiety, if found, influence certain people more than others and, in particular, those in various clinical populations.

Description: Participation in this project will take no more than five (5) minutes. In agreeing to participate, you will be asked to pose for a digital photograph of you with the purpose of generating a single photograph of you displaying a neutral facial expression.

Risks: Photos will be judged by first-year undergraduate students at the University of Manitoba. Thus, there is a small risk that the participants rating your photograph in these studies may by chance recognize the participant in the photograph. Because all data are kept confidential, there is no risk of you, or others, discovering the attractiveness rating of your photograph.

Benefits: There are no direct benefits to participants for their involvement in this aspect of the study. However, this study will benefit the research community by improving our understanding of how anxiety and depression can influence our perception of others.

Compensation: In exchange for providing your digital photograph, you will be compensated with a $5 Tim Horton's® gift card.

If you are interested in participating but are unable to do so at this time, you may contact researcher at: [researcher's phone number]

Appendix D

Consent for Photo to Be Used in Research (Photo Inventory 1)

[printed on department letterhead]

University of Manitoba, Department of Psychology
LETTER OF INFORMATION/INFORMED CONSENT

Research Project Title: Anxiety and the perception of faces.

Primary Investigator (P.I.): Caelin White, MA Student
      Phone: (204) 227-5077
      Email: umwhit84@cc.umanitoba.ca

Research Supervisor: Dr. Maria Medved, PhD, C. Psych
      Phone: (204) 480-1465
      Email: medved@cc.umanitoba.ca

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Purpose: The general purpose of this project is to generate a series of digital photographs of different people's faces. Your photo will be placed into a larger pool of photos of 40 - 45 other individuals and judged by research participants for facial attractiveness. At some point in the following months, these photos will be used in a supervised study at the University of Manitoba. Specifically, these photos will be shown to first-year undergraduate students and judged on facial attractiveness. The short-term goal of this research is to help us better understand the relationship between states of anxiety and perceptions of others' facial attractiveness. The long-term goal of this research is to better understand whether the effects of anxiety, if found, influence certain people more than others and, in particular, those in various clinical populations.

Description: In agreeing to participate, you will be asked to pose for a digital photograph of you with the purpose of generating a single photograph of you displaying a neutral facial expression. This session will take between 1–5 minutes. You will be asked to remove any jewelry on or around the facial area (earrings, nose rings, etc.) and, if you have longer hair, you will be asked to pull your hair back away from your face with the use of a hair tie or clip. Also, you will be asked to wear a plain white T-shirt in order to cover the clothing on your upper body. Once the photograph is taken, you will be offered the opportunity to review your final photograph and provide consent for its use in later studies. If your consent is not given, all photographs of you will be deleted immediately.

Risks: Photos will be judged by first-year undergraduate students at the University of Manitoba. Thus, there is a small risk that the participants rating your photograph in these studies may by chance recognize the participant in the photograph. Because all data are kept confidential, there is no risk of you, or others, discovering the attractiveness rating of your photograph.

Benefits: There are no direct benefits to participants for their involvement in this aspect of the study. However, this study will benefit the research community by improving our understanding of how anxiety and depression can influence our perception of others.

Confidentiality: Confidentiality will be respected. Names and photos will be stored in two separate files, in two separate and secure offices in the Department of Psychology at the University of Manitoba in which only the researchers will have access. No information that discloses your identity will be released or published. Raw data will be identified by participant number only (names will not be used), and all identifying data will be destroyed seven years after publication (ie. no later than August 2016). Only aggregate results will be reported in any publications resulting from this research. A summary of the findings will be made available at the end of August 2009. You may provide an email address below if you wish to receive a summary by email.

Compensation: In exchange for providing your digital photograph, you will be compensated with a $5 Tim Horton's® gift card.

Participation: Your participation is completely voluntary. If you choose to participate, you have the right to discontinue at any time during or after the process of your photograph being taken, even after signing this form. Should you choose not to continue your participation, there will be no penalties imposed, and your photograph will be immediately and permanently deleted.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a participant. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or have your photograph removed (and permanently deleted) from use in this study, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

This research has been approved by the Psychology and Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at (204) 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Consent (two parts):

I have read and understood the above information and agree to have my photograph taken.

_____   _____
Participant's Signature   Date

_____
Name of Participant (please print)

_____   _____
Researcher Signature   Date

I have read and understood the above information and agree to have my photograph used in the above mentioned research.

_____   _____
Participant's Signature   Date

_____
Name of Participant (please print)

_____   _____
Researcher Signature   Date

I would like to receive a summary of the results of this study (Provide email address):

_____

Appendix E

Participant Demographic Information Questionnaire

- **Age**: _____

- **Ethnic Background**: Please indicate how you would best describe your race or ethnicity by checking one of the general categories presented below.

    _____ White (European)
    _____ Black (African)
    _____ Chinese
    _____ Japanese
    _____ South Asian (e.g., East Indian, Pakistani, Punjabi)
    _____ First Nations/Aboriginal
    _____ Other (please specify: _____)

- **Relationship Status**: Please indicate how you would best describe your current relationship status by checking one of the general categories presented below.

    _____ Single (and not currently dating anyone)
    _____ Single (and currently dating someone)
    _____ In a long-term relationship (if yes, for how long? _____)
    _____ Married/Common law (if yes, for how long? _____)
    _____ Separated/Divorced

- **Sexual orientation:** Please indicate how you would best describe your sexual orientation by checking one of the general categories below:
    _____ Heterosexual
    _____ Gay
    _____ Bisexual

- On a scale of 1 – 7 (1 being "very unattractive" and 7 being "very attractive"), how facially attractive would you say you are? (It is important that you think of *your own* answer, and not the answer you think *others* would give for you).

    Answer: _____ (1 - 7)

- When you think of your friends and classmates that are roughly the same age as you (within 2 or 3 years), what percentage of them do you think are *less* facially attractive than you? (For example, if you indicate "65%", it means that you consider yourself to yourself to be more facially attractive than 65% of your friends and classmates.) Here, it is important that you think of your own answer, and not the answer you think *others* would give.

    Answer: _____% (0% – 100%)

Appendix F

Consent Form for Participation in Study

[printed on departmental letterhead]

Study Title: Welcome Strategies

Principal Researcher: Caelin White, MA student, Department of Psychology
Contact Number: (204) 227-5077

Research Supervisor: Dr. Maria Medved, Assistant Professor, Department of Psychology
Contact Number: (204) 480-1465

This research is being conducted as part of Caelin White's Master's thesis under the supervision of Dr. Maria Medved.

Thank you for taking the time to come to the laboratory today. This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

This study is aimed at developing new ways of welcoming new students to the university. As a newer student, we are interested in hearing the suggestions you might have on this participant, and to see how you develop and deliver your ideas.

If you agree to participate in this study, you will be asked to generate and share some ideas that the university might use to help new and first-year students feel more at home on campus. In completing this study, you will also be asked to provide some basic demographic information (such as your ethnic background, relationship status, etc.) and some opinions about yourself and your present feelings (such as excitement, sadness, etc.). At the end of the session, you will be given an explanation of the purpose of this study and the methods that were used.

We would like to emphasize that all of your responses will be recorded by participant number only and will therefore be anonymous. Moreover, the data will be stored in a locked laboratory room in the Duff Roblin Building that is only accessible to the principle investigator and research supervisor. The data obtained from this study will be destroyed seven years after publication (ie. no later than August 2016). Only aggregate results will be reported in any publications resulting from this research. A summary of the findings will be made available at the end of August 2009. You may provide an email address below if you wish to receive a summary by email.

The session should take approximately 30 minutes and you will receive one course credit for your participation.

This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact Dr. M. Medved at 480-1465, or e-mail medved@cc.umanitoba.ca; alternatively you may contact the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

_____

Participant's Signature   Date

_____

Researcher and/or Delegate's Signature   Date

You may provide an email address below if you wish to receive a summary of the results. This is *entirely optional*.

_____

Appendix G

Instructions: Low Anxiety (LA) Condition

In this study, we are trying to find out new ways to help new students feel welcome at the university. So for this exercise, you are asked to write down as many ideas as you can for how the university might help new students feel more comfortable on campus. For example, you might consider creating social events, interactive programs, or even provide suggestions for how to better organize the campus. Any ideas you have are appreciated and may benefit first-year students in the future. Please note that the information you provide here is completely anonymous.

- Take your time; there is no rush.
- Use the page underneath to develop your ideas.
- You may take up to seven (7) minutes to develop some ideas.

Appendix H

Instructions: Moderate Anxiety (MA) Condition

In this study, we are trying to find out new ways to help new students feel welcome at the university. So for this exercise, you are asked to develop some ideas for how the university might help new students feel more comfortable on campus. After you have completed this task, you must choose three of your ideas, and provide an argument for why you think it is important to implement those idea(s). We want individuals in university administration to hear your ideas, and because we have found that audio clips are generally more persuasive than writing, I will be recording you on audiotape as you present your argument.

- You can take up to seven (7) minutes to work on this task before we will begin videotaping.

- Use the page underneath to develop your argument.

- **Important:** You will not be able to use your notes during audiotaping.

Appendix I

Instructions: High Anxiety (HA) Condition

In this study, we are trying to find new ways to help new students feel welcome at the university. So for this exercise, you are asked to develop some ideas for how the university might work to accomplish this. After you have completed this task, you must choose three of your ideas, and provide an argument for why you think it is important to implement those idea(s). Because we want individuals in university administration to hear your ideas, and we have found that video clips are generally more persuasive than writing, I will be recording you on videotape as you attempt to present your argument.

In order to decide which tapes are best to send to the university, your video will be rated by several faculty members in the psychology department. You will be evaluated on qualities such as your *speech clarity*, the *persuasiveness of your argument*, and *your level of confidence* you exude on video, so it is very important that you work quickly and effectively to structure a good, solid argument. The best videotapes from this study will be sent to university administrators as a way of persuading them to make the changes you suggest.

- You can take up to seven (7) minutes to work on this task before we will begin videotaping.
- Use the page underneath to develop your argument.
- **Important:** You will not be able to use your notes during videotaping.

Appendix J

Study One – Instructions for Rating Faces

[Displayed on computer screen]

You are about to see the faces of 44 actual students here at the university. Your job is to rate each person's face on attractiveness. To help you in this task, consider the following scenario when judging each face:

> Imagine you are a part of a student group whose job it is to welcome new students to the university. This person has been "assigned" to you and now it's your job to show this person around campus and help him or her feel more comfortable. As a member of this welcoming committee you will also likely be seeing this person at a "welcome party" during the upcoming weekend. After this event, however, you are unlikely to see him or her again. As a final note, you know absolutely nothing about this person other than that he or she is single.

For each photo use the number keys along the top of the computer keyboard to rank each person, on a scale of 1 to 7 (1 being "very unattractive" and 7 being "very attractive"). Remember that responses are kept confidential.

When you have completed the task, please notify the administrator.

Appendix K

Study Debriefing Form

[printed on department letterhead]

Study Title: Welcome Strategies

Principal Researcher: Caelin White, MA student, Department of Psychology
Contact Number: (204) 227-5077

Research Supervisor: Dr. Maria Medved, Assistant Professor, Department of Psychology
Contact Number: (204) 480-1465

This research is being conducted as part of Caelin White's Master's thesis under the supervision of Dr. Maria Medved.

Thank you once more for taking the time to participate and for sharing your ideas with us. Your responses will provide us with important information for evaluating our hypotheses. The purpose of this form, which you are free to take with you, is to provide you with an explanation for these hypotheses as well as the methodology used to test them.

Contrary to what was outlined in the consent form, the purpose of this study was not to develop strategies for welcoming new students to the university. Rather, the goal of this research is to better understand the influence of anxiety on the way we perceive others' facial attractiveness. In this study, you were first told that you would be communicating (via writing, audiotape, or videotape) the ideas you generated for how we might better welcome new students to the university, and that these ideas might be evaluated and implemented by the university. The ideas you generated will not be evaluated by anyone, as the actual purpose of this step was to alter your level of anxiety. Second, you were told that the people whose faces you were rating were single undergraduate students at the university, when this was also not the case. The reason this information was provided was to increase the likelihood that, while you were rating each of these individuals, you were considering each of them as a possible partner for a romantic relationship.

As indicated, the task you completed was used to alter your anxiety level and, in doing this, it is hypothesized that this might influence your judgments about others' appearances. In a somewhat different way, we anticipate your input on the questionnaire and digital photograph will allow us to see how different individuals, who are in different relationship scenarios are influenced by this phenomenon. Lastly, the measure asking about your present feelings was used to ensure the tasks you completed were inducing anxiety as they were intended to do.

The long-term goal of this research is to better understand whether the effects of anxiety, if found, can influence certain people more than others and, in particular, those in various clinical populations. A better understanding of these effects will eventually help us develop interventions in order to prevent stereotyping behaviors that have been found in related studies. It is our hope

that, in the long run, this research will help improve social functioning, romantic relationships, and prevent stereotyping that has been shown to coincide with judgments of attractiveness.

We would like to emphasize that all of your responses will be recorded by participant number only and will therefore be anonymous. Moreover, the data will be stored in a locked laboratory room in the Duff Roblin Building that is only accessible to the principle investigator and research supervisor. The data obtained from this study will be destroyed seven years after publication (ie. no later than August 2016). Only aggregate results will be reported in any publications resulting from this research. A summary of the findings will be made available at the end of August 2009. You may provide an email address below if you wish to receive a summary by email.

This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact Dr. M. Medved at 480-1465, or e-mail medved@cc.umanitoba.ca; alternatively you may contact the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and /or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Starting university can be a stressful time, both in terms of forming and/or maintaining relationships with others and in terms of meeting new academic challenges. Please be aware that there are confidential services on campus and in the city designed to help students deal with these and other issues:

Student Counseling and Career Centre:	474 University Centre	474-8592
Psychological Service Centre:	161 Dafoe Building	474-9222
Peers: Students Helping Students:	150 University Centre	474-6696
Klinic Community Health Centre:	870 Portage Avenue	784-4090

Appendix L

Consent Form for Use of Participant's Photo

[printed on department letterhead]

Study Title: Welcome Strategies

Principal Researcher: Caelin White, MA student, Department of Psychology
Contact Number: (204) 227-5077

Research Supervisor: Dr. Maria Medved, Assistant Professor, Department of Psychology
Contact Number: (204) 480-1465

This research is being conducted as part of Caelin White's Master's thesis under the supervision of Dr. Maria Medved.

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Description: In agreeing to participate, you will be asked to pose for a digital photograph of you with the purpose of generating a single photograph of you displaying a neutral facial expression. This session will take between 1–5 minutes. You will be asked to remove any jewelry on or around the facial area (earrings, nose rings, etc.) and, if you have longer hair, you will be asked to pull your hair back away from your face with the use of a hair tie or clip. Also, you will be asked to wear a plain white T-shirt in order to cover the clothing on your upper body. Once the photograph is taken, you will be offered the opportunity to review your final photograph and provide consent for its use in this study. If your consent is not given, all photographs of you will be deleted immediately.

Risks: If you consent to have your photograph taken and used for this research, we will ask others to rate your photo on facial attractiveness. These individuals will be independent raters living in another Canadian city, and thus, the chances of you being identified are very remote.

Confidentiality: We would also like to emphasize that all digital photographs will be identified by participant number only and will therefore be anonymous. Moreover, the data will be stored in a locked laboratory room in the Duff Roblin Building that is only accessible to the principle investigator and research supervisor. The data obtained from this study will be destroyed seven years after publication (ie. no later than August 2016). Only aggregate results will be reported in any publications resulting from this research. A summary of the findings will be made available at the end of August 2009. You may provide an email address below if you wish to receive a summary by email.

Compensation: You will be granted one (1) participation credit in exchange for volunteering your photo to be used in this research.

This research has been approved by the Psychology/Sociology Research Ethics Board at the University of Manitoba. If you have any concerns or complaints about this project you may contact Dr. M. Medved at 480-1465, or e-mail medved@cc.umanitoba.ca; alternatively you may contact the Human Ethics Secretariat at 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw your photograph from the study at any time without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

Consent (two parts):

I have read and understood the above information and agree to have my photograph taken.

_____   _____
Participant's Signature   Date

_____
Name of Participant (please print)

_____   _____
Researcher Signature   Date

I have read and understood the above information and agree to have my photograph used in the above mentioned research.

_____   _____
Participant's Signature   Date

_____
Name of Participant (please print)

_____   _____
Researcher Signature   Date

I would like to receive a summary of the results of this study (Provide email address):

_____

Appendix M

Consent for Photo to Be Used in Research (Photo Inventory 2)

[printed on department letterhead]

University of Manitoba, Department of Psychology
LETTER OF INFORMATION/INFORMED CONSENT

Research Project Title: Anxiety, depression, and perception of faces.

Primary Investigator (P.I.): Caelin White, MA Student
        Phone: (204) 227-5077
        Email: umwhit84@cc.umanitoba.ca

Research Supervisor: Dr. Maria Medved, PhD, C. Psych
        Phone: (204) 480-1465
        Email: medved@cc.umanitoba.ca

This consent form, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what your participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Purpose: The general purpose of this project is to generate a series of digital photographs of different people's faces. Your photo will be placed into a larger pool of photos of 30 to 40 other individuals and judged by research participants for facial attractiveness. At some point in the following months, these photos will be used in a supervised pilot study at the University of Manitoba. Specifically, these photos will be shown to first-year undergraduate students and judged on facial attractiveness. The short-term goal of this research is to help us better understand the relationship between states of anxiety and perceptions of others' facial attractiveness. The long-term goal of this research is to better understand whether the effects of anxiety, if found, influence certain people more than others and, in particular, those in various clinical populations.

Description: In agreeing to participate, you will be asked to pose for a digital photograph of you with the purpose of generating a single photograph of you displaying a neutral facial expression. This session will take between 1–5 minutes. You will be asked to remove any jewelry on or around the facial area (earrings, nose rings, etc.) and, if you have longer hair, you will be asked to pull your hair back away from your face with the use of a hair tie or clip. Also, you will be asked to wear a plain white T-shirt in order to cover the clothing on your upper body. Once the photograph is taken, you will be offered the opportunity to review your final photograph and provide consent for its use in later studies. If your consent is not given, all photographs of you will be deleted immediately.

Risks: Photos will be judged by first-year undergraduate students at the University of Manitoba. Thus, there is a small risk that the subjects rating your photograph in these studies may by chance recognize the participant in the photograph. Because all data are kept confidential, there is no risk of you, or others, discovering the attractiveness rating of your photograph.

Benefits: There are no direct benefits to participants for their involvement in this aspect of the study. However, this study will benefit the research community by improving our understanding of how anxiety and depression can influence our perception of others.

Confidentiality: Confidentiality will be respected. Names and photos will be stored in two separate files, in two separate and secure offices in the Department of Psychology at the University of Manitoba in which only the researchers will have access. No information that discloses your identity will be released or published. Raw data will be identified by subject number only (names will not be used), and all identifying data will be destroyed seven years after publication (ie. no later than August 2016). Only aggregate results will be reported in any publications resulting from this research. A summary of the findings will be made available at the end of August 2009. You may provide an email address below if you wish to receive a summary by email.

Compensation: Participants will not be compensated for volunteering their photograph for use in this study.

Participation: Your participation is completely voluntary. If you choose to participate, you have the right to discontinue at any time during or after the process of your photograph being taken, even after signing this form. Should you choose not to continue your participation, there will be no penalties imposed, and your photograph will be immediately and permanently deleted.

Your signature on this form indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate as a subject. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or have your photograph removed (and permanently deleted) from use in this study, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation.

This research has been approved by the Psychology and Sociology Research Ethics Board. If you have any concerns or complaints about this project you may contact any of the above-named persons or the Human Ethics Secretariat at (204) 474-7122, or e-mail margaret_bowman@umanitoba.ca. A copy of this consent form has been given to you to keep for your records and reference.

Consent (two parts):

I have read and understood the above information and agree to have my photograph taken.

_____   _____

Participant's Signature   Date

_____

Name of Participant (please print)

_____   _____

Researcher Signature   Date

I have read and understood the above information and agree to have my photograph used in the above mentioned research.

_____   _____

Participant's Signature   Date

_____

Name of Participant (please print)

_____   _____

Researcher Signature   Date

I would like to receive a summary of the results of this study (Provide email address):

_____

Appendix N

Study Two – Attractiveness Score Recording Sheet

Very Unattractive						**Very**
			Attractive			
1	**2**	**3**	**4**	**5**	**6**	**7**
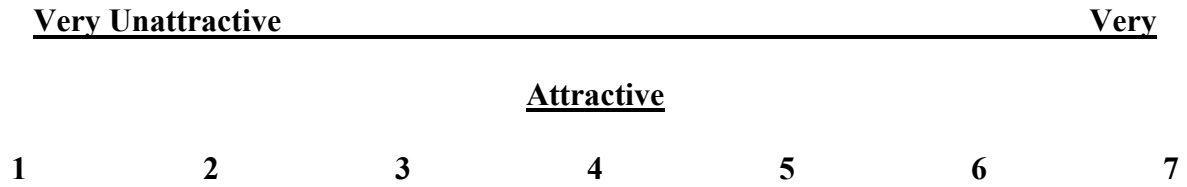
Using the scale provided above, please record your responses below.

1.   15.

2.   16.

3.   17.

4.   18.

5.   19.

6.   20.

7.   21.

8.   22.

9.   23.

10.

11.

12.

13.

14.

Appendix O

Study Two – Instructions for Rating Faces

[Displayed on computer screen]

You are about to see the faces of 23 actual students here at the university. Your job is to rate each person's face on attractiveness. To help you in this task, consider the following scenario when judging each face:

Imagine you are a part of a student group whose job it is to welcome new students to the university. This person has been "assigned" to you and now it's your job to show this person around campus and help him or her feel more comfortable. As a member of this welcoming committee you will also likely be seeing this person at a "welcome party" during the upcoming weekend. After this event, however, you are unlikely to see him or her again. As a final note, you know absolutely nothing about this person other than that he or she is single.

For each photo use the paper and pencil provided to rank each person, on a scale of 1 to 7 (1 being "very unattractive" and 7 being "very attractive"). Remember that responses are kept confidential.

When you have completed the task, please notify the administrator.

Appendix P

Ethics Board Approval Certificate: Development of Photo Inventory 2 (also used for Pilot Study)

APPROVAL CERTIFICATE

27 October 2008

TO: **Caelin White**   (Advisor M. Medved)
              Principal Investigator

FROM: **Bruce Tefft, Chair**
              Psychology/Sociology Research Ethics Board (PSREB)

Re: **Protocol #P2008:075**
              "Anxiety, Depression, and Perception of Faces"

Please be advised that your above-referenced protocol, as revised, has received human ethics approval by the **Psychology/Sociology Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement. This approval has been issued based on your agreement with the change(s) to your original protocol required by the PSREB. It is the researcher's responsibility to comply with any copyright requirements. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

> **Please note:**
>
>   - **if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), <u>including the Sponsor name</u>, before your account can be opened.**
>
>   - **if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

> **The Research Ethics Board requests a final report for your study (**available at: http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html**) in order to be in compliance with Tri-Council Guidelines.**

Appendix Q

Ethics Board Approval Certificate: Pilot Study Procedure

APPROVAL CERTIFICATE

12 November 2008

TO: **Caelin White**   (Advisor M. Medved)
                  Principal Investigator

FROM: **Bruce Tefft, Chair**
                  Psychology/Sociology Research Ethics Board (PSREB)

Re: **Protocol #P2008:085**
                  "Welcome Strategies"

Please be advised that your above-referenced protocol, as revised, has received human ethics approval by the **Psychology/Sociology Research Ethics Board**, which is organized and operates according to the Tri-Council Policy Statement**.** This approval has been issued based on your agreement with the change(s) to your original protocol required by the PSREB. It is the researcher's responsibility to comply with any copyright requirements. This approval is valid for one year only.

Any significant changes of the protocol and/or informed consent form should be reported to the Human Ethics Secretariat in advance of implementation of such changes.

Please note:

  - **if you have funds pending human ethics approval, the auditor requires that you submit a copy of this Approval Certificate to Kathryn Bartmanovich, Research Grants & Contract Services (fax 261-0325), <u>including the Sponsor name</u>, before your account can be opened.**

  - **if you have received multi-year funding for this research, responsibility lies with you to apply for and obtain Renewal Approval at the expiry of the initial one-year approval; otherwise the account will be locked.**

The Research Ethics Board requests a final report for your study (available at: http://umanitoba.ca/research/ors/ethics/ors_ethics_human_REB_forms_guidelines.html**) in order to be in compliance with Tri-Council Guidelines.**

Appendix R

Ethics Board Amendment Approval Certificate: Development of Photo Inventory 2

AMENDMENT APPROVAL CERTIFICATE

15 December 2008

TO: **Caelin White**
                 Principal Investigator

FROM: **Bruce Tefft, Chair**
                 Psychology/Sociology Research Ethics Board (PSREB)

Re: **Protocol #P2008:075**
                 "Anxiety, Depression, and Perception of Faces"

This will acknowledge your e-mail dated December 12, 2008 requesting amendment to your above-noted protocol.

Approval is given for this amendment. Any further changes to the protocol must be reported to the Human Ethics Secretariat in advance of implementation.

Appendix S

Ethics Board Amendment Approval Certificate: Revision to Study Procedure

AMENDMENT APPROVAL CERTIFICATE

24 March 2009

TO: **Caelin White**
              Principal Investigator

FROM: **Bruce Tefft, Chair**
              Psychology/Sociology Research Ethics Board (PSREB)

Re: **Protocol #P2008:085**
              "Welcome Strategies"

This will acknowledge your e-mail dated March 02, 2009 requesting amendment to your above-noted protocol.

Approval is given for this amendment. Any further changes to the protocol must be reported to the Human Ethics Secretariat in advance of implementation.

Table 1. Descriptive statistics for eight target inventories generated from Photo Inventories 1 and 2.

Photo Inventory 1						
	Attractive Female Faces	Unattractive Female Faces	All Female Faces	Attractive Male Faces	Unattractive Male Faces	All Male Faces
N (valid)	11	11	11	11	11	11
Missing	0	0	0	0	0	0
Mean	4.34	2.23	3.29	3.57	1.97	2.70
Median	4.50	2.10	3.41	3.50	1.67	2.64
Std. Deviation	1.07	0.91	0.84	1.60	0.82	0.99
Percentile Rank of Targets Included in Inventory	> 80	< 20	N/A	> 75	< 25	N/A

Photo Inventory 2						
	Attractive Female Faces	Unattractive Female Faces	All Female Faces	Attractive Male Faces	Unattractive Male Faces	All Male Faces
N (valid)	11	11	11	11	11	11
Missing	0	0	0	0	0	0
Mean	4.33	2.98	3.59	4.09	2.97	3.49
Median	4.73	2.98	3.59	3.97	3.03	3.33
Std. Deviation	1.34	1.23	1.08	0.92	1.14	0.90
Percentile Rank of Targets Included in Inventory	> 75	< 25	N/A	> 70	< 30	N/A

Table 2. Study One: Means for female faces as a function of high/low anxiety (median split) and participant relationship status (for single males and males in relationships).

Anxiety	Relationship Status	Mean	Standard Error
Low	Single	3.52	.229
	In a Relationship	3.58	.404
	Total	3.55	.226
High	Single	2.56	.238
	In a Relationship	3.92	.404
	Total	3.44	.229
Total	Single	3.24	.275
	In a Relationship	3.75	.167
	Total	3.49	.161
* *p* < .05			

Table 3. Study Two: Means for female faces as a function of high/low anxiety (median split) and participant relationship status (for single males and dating males).

Anxiety	Relationship Status	Mean	Standard Error
Low	Single	4.44	.234
	Dating	3.96	.114
	Total	4.20	.154
High	Single	4.23	.234
	Dating	3.57	.105
	Total	3.90	.146
Total	Single	**4.33	.135
	Dating	**3.77	.164
	Total	4.05	.106
** $p < .02$.			

Table 4. Study One: Means for attractive female faces as a function of high/low anxiety (median split) and participant relationship status (for single males and males in relationships).

Attractive Female Faces				
Anxiety	**Relationship Status**	**Mean**	**Std. Deviation**	**N**
Low	Single	4.67	1.05	14
	In a Relationship	5.00	.177	5
	Total	4.82	.946	19
High	Single	3.78	1.02	13
	In a Relationship	4.80	.672	5
	Total	3.97	1.02	18
Total	Single	4.23†	1.11	27
	In a Relationship	4.90†	.474	10
	Total	4.38	1.07	37
† *p* < .07.				

Table 5. Study Two: Means for attractive female faces as a function of high/low anxiety (median split) and participant relationship status (for single and dating males).

Attractive Female Faces				
Anxiety	**Relationship Status**	**Mean**	**Std. Deviation**	**N**
Low	Single	4.97	.674	8
	Dating	4.45	.325	5
	Total	***4.77[a]	.608	13
High	Single	4.43	.259	8
	Dating	3.71	.188	6
	Total	***4.02[a]	.457	14
Total	Single	***4.70[b]	.564	16
	Dating	***4.05[b]	.459	11
	Total	4.48	.625	27
a, b – Indicates different comparison groups				
*** $p < .005$.				

Table 6. Study One: Descriptive data for participant self-reported state anxiety (STAI) scores.

Self-Reported Anxiety (STAI)	
(Study One)	
Descriptive Statistics	
Valid (N)	37
Missing	0
Mean	34.0
Std. Error of Mean	1.62
Median	32
Mode	22.0a
Std. Deviation	9.83
Variance	96.7
Skewness	0.366
Std. Error of Skewness	0.388
Kurtosis	-0.950
Std. Error of Kurtosis	0.759
Range	35
Minimum	20
Maximum	55
a. Multiple modes exist. The smallest value is shown	

Table 7. Study One: Partial correlations between self-reported state anxiety (STAI) scores and ratings of facial attractiveness (controlling for participant relationship status; df = 34).

Control Variable: Relationship Status		All Female Faces	Attractive Female Faces	Unattractive Female Faces	All Male Faces	Attractive Male Faces	Unattractive Male Faces
Self-Reported Anxiety (STAI)	**Correlation**	-.165	-.358	.065	-.008	-.097	.073
	Sig. (2-tailed)	n.s.	.032	n.s.	n.s.	n.s.	n.s.
All Female Faces	**Correlation**	1	.807	.865	.643	.483	.579
	Sig. (2-tailed)	.	.000	.000	.000	.003	.000
Attractive Female Faces	**Correlation**	.807	1	.496	.551	.506	.331
	Sig. (2-tailed)	.000	.	.002	.001	.002	.049
Unattractive Female Faces	**Correlation**	.865	.496	1	.557	.365	.617
	Sig. (2-tailed)	.000	.002	.	.000	.029	.000
All Male Faces	**Correlation**	.643	.551	.557	1	.936	.805
	Sig. (2-tailed)	.000	.001	.000	.	.000	.000
Attractive Male Faces	**Correlation**	.483	.506	.365	.936	1	.623
	Sig. (2-tailed)	.003	.002	.029	.000	.	.000
Unattractive Male Faces	**Correlation**	.579	.331	.617	.805	.623	1
	Sig. (2-tailed)	.000	.049	.000	.000	.000	.
* p < .05** p < .01 *** p < .005 **** p < .001							

Table 8. Study One: Correlation matrix for validities (correlations between the predictor variables and the criterion variable; N = 37).

Correlations (Validities)		Attractive Female Faces	STAI	Relationship Status
Pearson Correlation	Attractive Female Faces	1.000	-.341*	-.293*
	STAI	-.341	1.000	-.005
	Relationship Status	-.293	-.005	1.000
Sig. (1-tailed)	Attractive Female Faces	-	.019	.039
	STAI	.019	-	.489
	Relationship Status	.039	.489	-
N	Attractive Female Faces	37	37	37
	STAI	37	37	37
	Relationship Status	37	37	37
* p < .05				

Table 9. Study One: Results of the linear regression analysis.

Model Summary									
						Change Statistics			
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.450a	.203	.156	.93453	.203	4.324	2	34	.021
a. Predictors: (Constant), Relationship Status, Self-Reported State Anxiety (STAI)									

ANOVA(b)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.553	2	3.777	4.324	.021a
	Residual	29.694	34	.873		
	Total	37.247	36			
a. Predictors: (Constant), Relationship Status, Self-Reported State Anxiety (STAI)						
b. Dependent Variable: Attractive Female Faces						

Coefficients(a)								
		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	6.107	.616		9.919	.000	4.856	7.359
	Self-Reported State Anxiety (STAI)	-.035	.016	-0.342	-2.235	.032	-.068	-.003
	Relationship Status	-.665	.346	-0.294	-1.921	.063	-1.368	-.038
a. Dependent Variable: Attractive Female Faces								

Collinearity Diagnostics(a)						
					Variance Proportions	
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Self-Reported State Anxiety (STAI)	Relationship Status
1	1	2.759	1.000	.01	.01	.03
	2	.205	3.671	.03	.08	.89
	3	.036	8.762	.96	.91	.07
a. Dependent Variable: Attractive Female Faces						

Table 10. Study Two: Descriptive data for participant self-reported state anxiety (STAI) scores.

Self-Reported State Anxiety (STAI)	
(Study Two)	
Descriptive Statistics	
Valid (N)	27
Missing	0
Mean	35.19
Std. Error of Mean	1.92
Median	37
Mode	26
Std. Deviation	9.97
Variance	99.39
Skewness	0.447
Std. Error of Skewness	0.448
Kurtosis	-0.544
Std. Error of Kurtosis	0.872
Range	36
Minimum	20
Maximum	56

Table 11. Study Two: Partial correlations between self-reported state anxiety (STAI) scores and ratings of facial attractiveness (controlling for participant relationship status; df = 24).

Control Variable: Relationship Status		All Female Faces	Attractive Female Faces	Unattractive Female Faces	All Male Faces	Attractive Male Faces	Unattractive Male Faces
STAI	**Correlation**	-0.093	-.575***	0.239	-0.106	-0.167	-0.131
	Sig. (2-tailed)	n.s.	0.002	n.s.	n.s.	n.s.	n.s.
All Female Faces	**Correlation**	1	.599***	.847****	.523**	.417*	.490*
	Sig. (2-tailed)	-	0.001	.000	0.006	0.034	0.011
Attractive Female Faces	**Correlation**	.599***	1	0.264	0.263	0.263	0.266
	Sig. (2-tailed)	0.001	-	n.s.	n.s.	n.s.	n.s.
Unattractive Female Faces	**Correlation**	.847****	0.264	1	0.418*	0.309	0.317
	Sig. (2-tailed)	.000	n.s.	-	0.033	n.s.	n.s.
All Male Faces	**Correlation**	.523**	0.263	.418*	1	.941****	.927****
	Sig. (2-tailed)	0.006	n.s.	0.033	-	.000	.000
Attractive Male Faces	**Correlation**	.417*	0.263	0.309	.941****	1	.785****
	Sig. (2-tailed)	0.034	n.s.	n.s.	.000	-	.000
Unattractive Male Faces	**Correlation**	.490*	0.266	0.317	.927****	0.785****	1
	Sig. (2-tailed)	0.011	n.s.	n.s.	.000	.000	-
* p < .05 **p < .01 *** p < .005 **** p < .001							

Table 12. Study Two: Correlation matrix for validities (correlations between the predictor variable and the criterion variable; N = 27).

Correlations (Validities)		Attractive Female Faces	STAI	Relationship Status
Pearson Correlation	Attractive Female Faces	1	-.500**	-.539**
	STAI	-.500	1	.031
	Relationship Status	-.539	.031	1
Sig. (1-tailed)	Attractive Female Faces	-	.004	.002
	STAI	.004	-	.440
	Relationship Status	.002	.440	-
N	Attractive Female Faces	27	27	27
	STAI	27	27	27
	Relationship Status	27	27	27
** p < .005				

Table 13. Study Two: Results of the linear regression analysis.

Model Summary									
						Change Statistics			
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.724a	.525	.485	.43821	.525	13.255	2	24	.000
a. Predictors: (Constant), Relationship Status, Self-Reported State Anxiety (STAI)									

ANOVA(b)						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.090	2	2.545	13.255	.000a
	Residual	4.609	24	0.192		
	Total	9.699	26			
a. Predictors: (Constant), Relationship Status, Self-Reported State Anxiety (STAI)						
b. Dependent Variable: Attractive Female Faces						

Coefficients(a)								
		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
Model		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	6.379	.391		16.302	.000	5.571	7.187
	Self-Reported State Anxiety (STAI)	-0.03	.009	-0.484	-3.439	.002	-0.047	-0.012
	Relationship Status	-0.64	.172	-0.524	-3.725	.001	-0.994	-0.285
a. Dependent Variable: Attractive Female Faces								

Collinearity Diagnostics(a)						
					Variance Proportions	
Model	Dimension	Eigenvalue	Condition Index	(Constant)	Self-Reported State Anxiety (STAI)	Relationship Status
1	1	2.88	1	.01	.01	.01
	2	.09	5.663	.01	.30	.72
	3	.03	9.78	.98	.69	.26
a. Dependent Variable: Attractive Female Faces						

Figure 1. Comparison between the effects of somatic anxiety and cognitive anxiety on general performance (theoretical interpretation from Burton, 1988; Krane et al., 1994; Morris et al., 1981; Murphy & Woolfolk, 1987; Teigen, 1994).
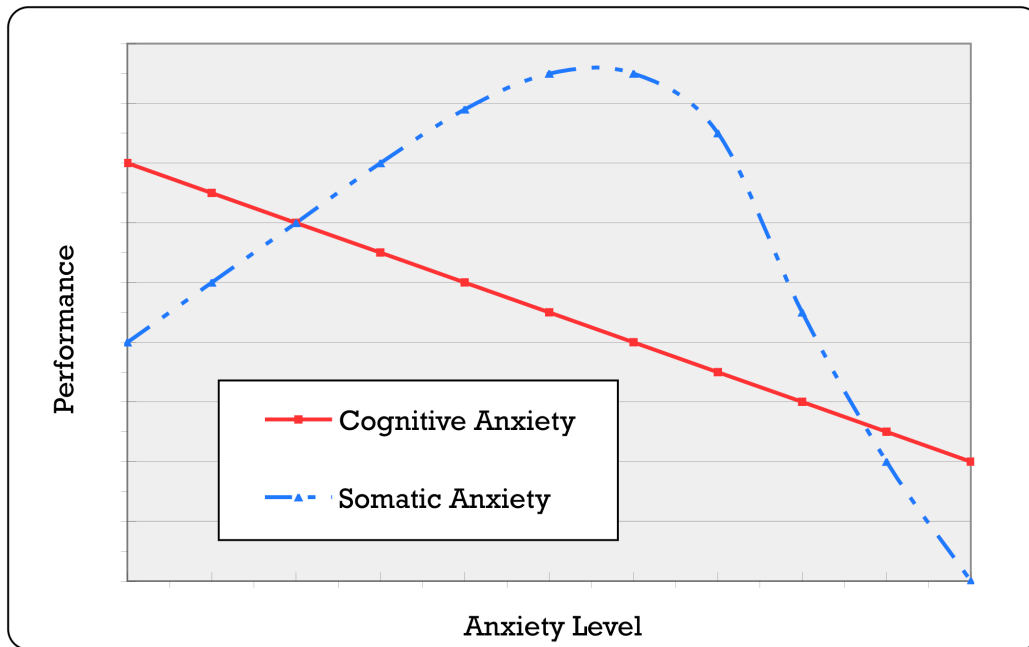
Figure 2. Mean participant self-reported state anxiety (STAI) scores by experimental anxiety condition for all studies.
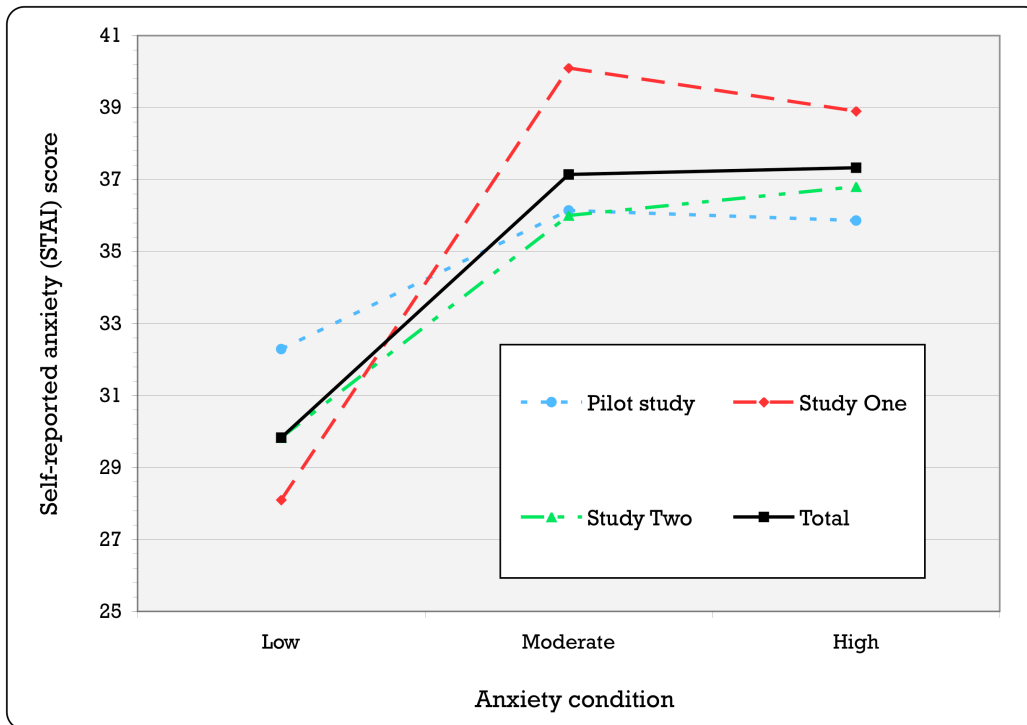
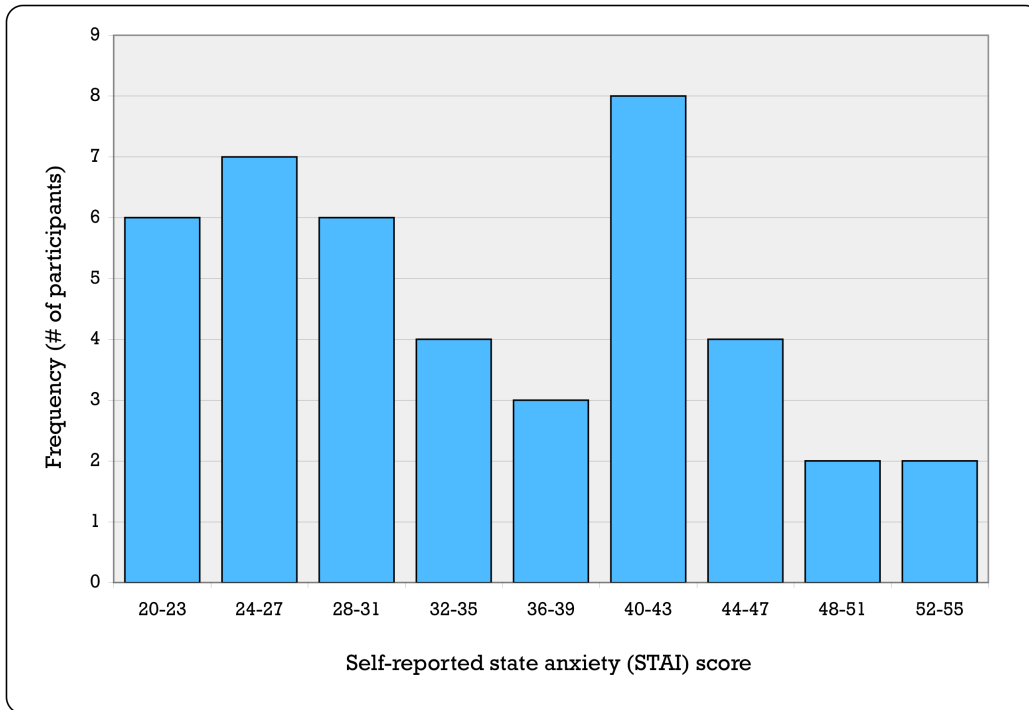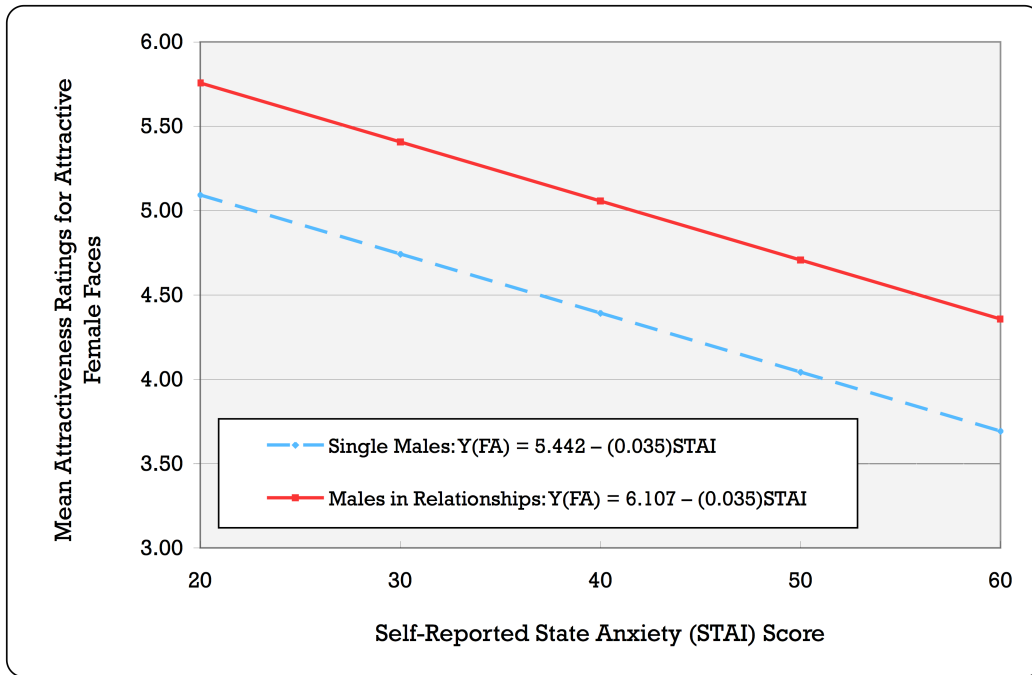**Figure 3.** Study One: Distribution of participant self-reported anxiety (STAI) scores (N = 37).

Figure 4. Study One: Regression model.

Figure 5. Study Two: Distribution of participant self-reported anxiety (STAI) scores (N = 27).
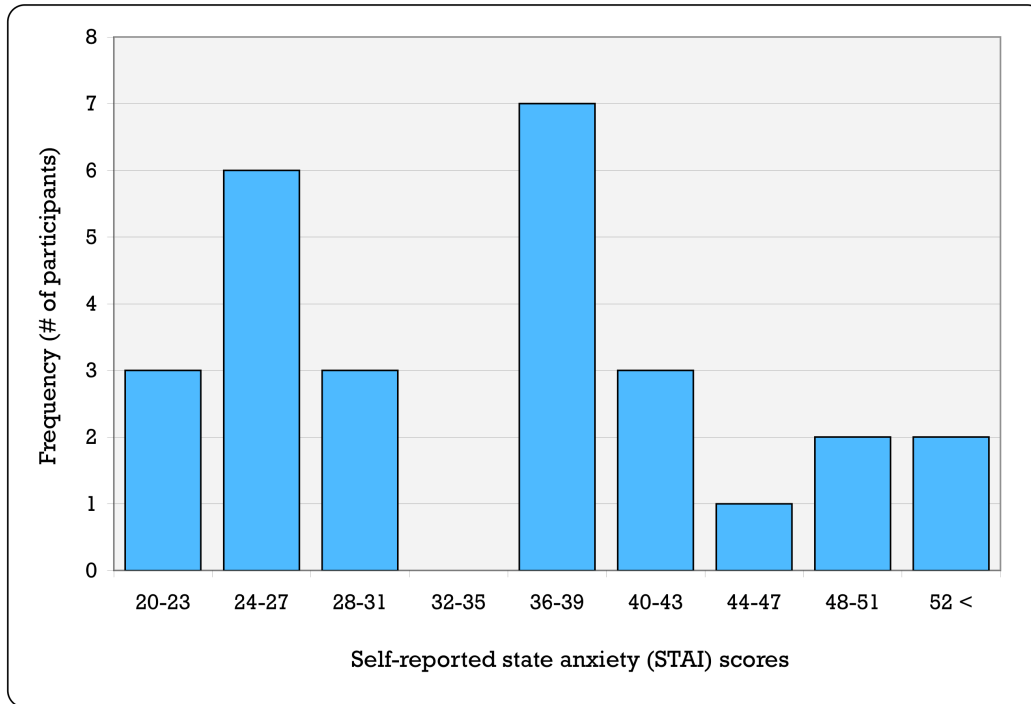
Figure 6. Study Two: Regression model.

Single Males: Y(FA) = 5.10 – (0.030)STAI

Dating Males: Y(FA) = 4.46 – (0.030)STAI

Figure 7. Study One: Regression model including mean attractiveness rating for All Female Faces in Photo Inventory 1.
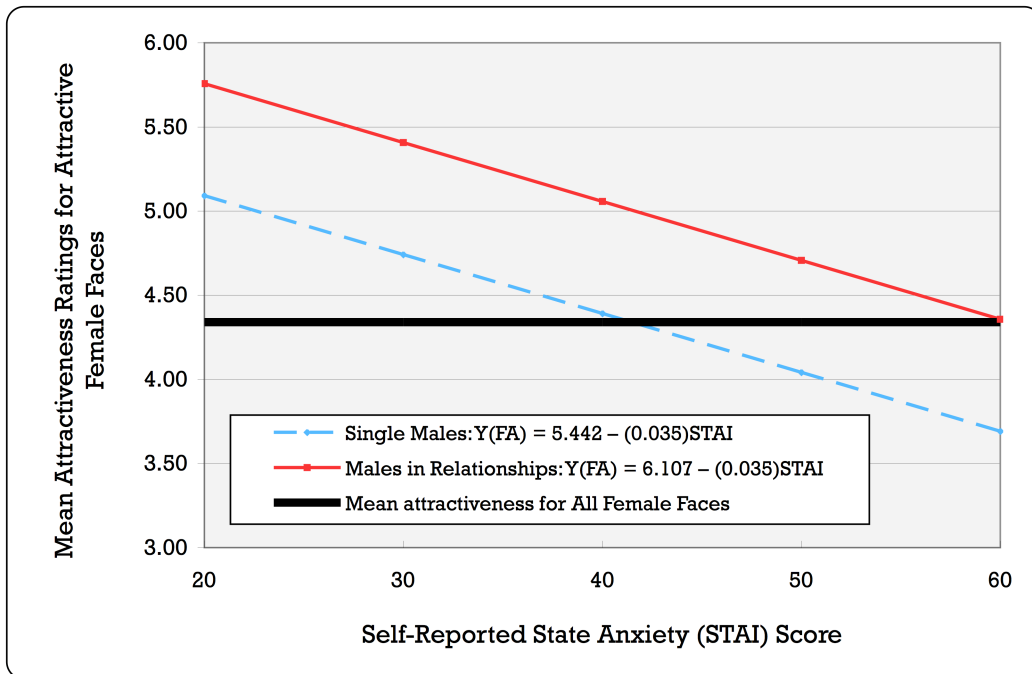
Figure 8. Study Two: Regression model including mean attractiveness rating for All Female Faces in
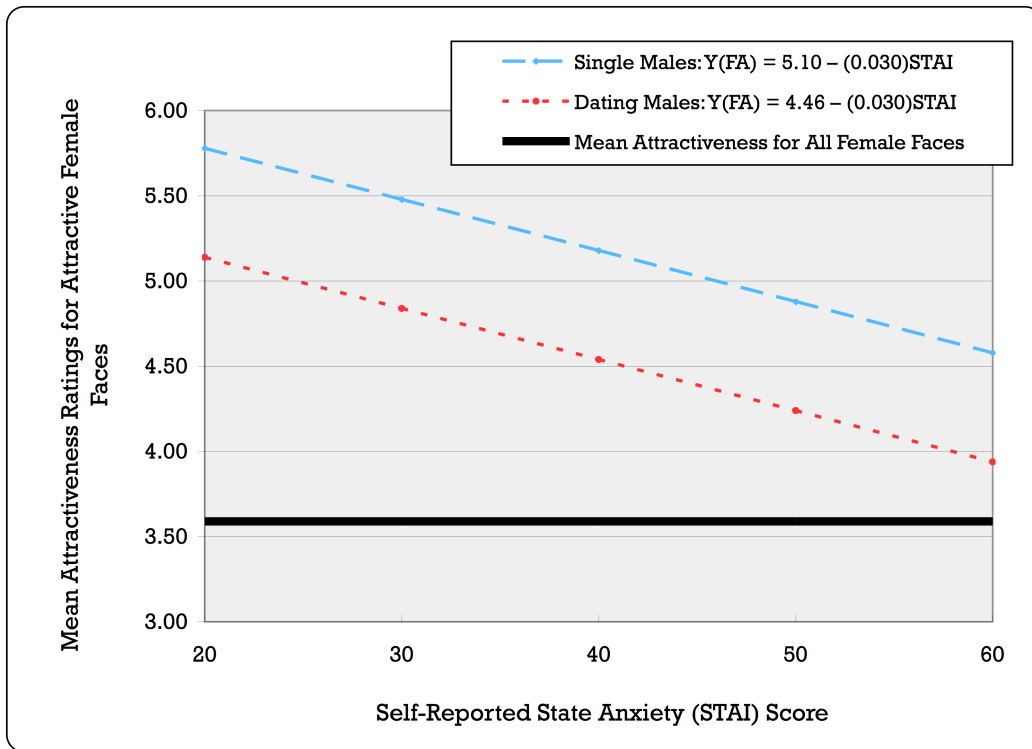   Photo Inventory 2.

Figure 9. Study One: Mean facial attractiveness ratings for attractive female faces as a function of participant relationship status and self-reported state anxiety (STAI; median split).
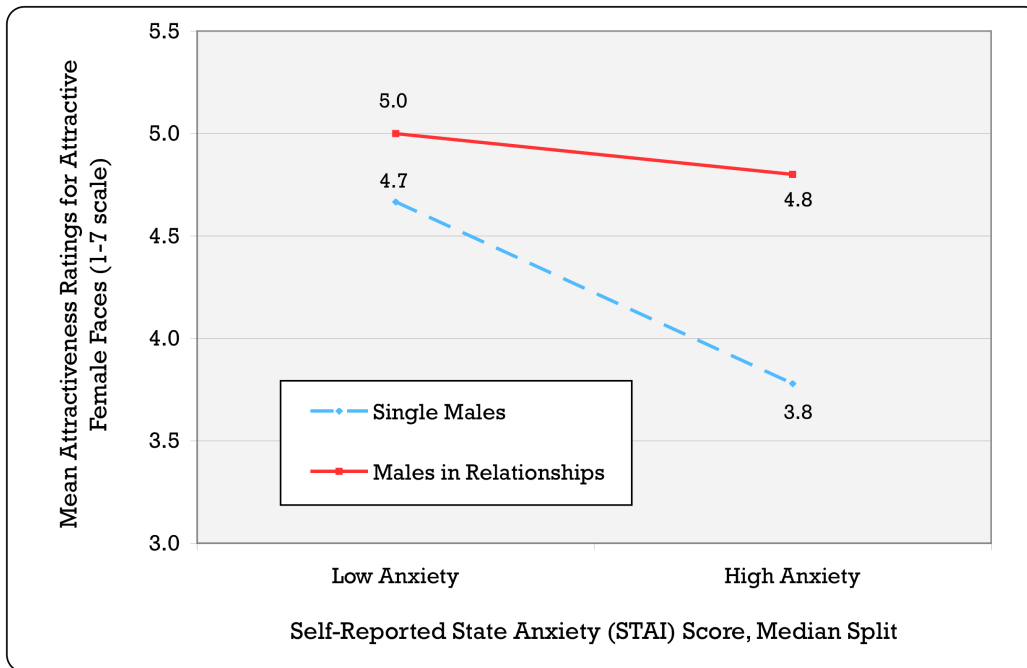
Figure 10. Study Two: Mean facial attractiveness ratings for attractive female faces as a function of participant relationship status and self-reported state anxiety (STAI; median split).