THE EFFECT OF MORTALITY SALIENCE ON FACIAL PREFERENCES IN FEMALES

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CHAPTER I

INTRODUCTION

Over the last twenty years, numerous studies have demonstrated that reminding people of death (i.e., mortality salience) affects subsequent behaviors and attitudes, most notably attitudes towards out-group members (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000; Greenberg, Pyszczynski, Solomon, 1986; Greenberg et al., 1990; Greenberg, Pyszczynski, Solomon, Simon, & Brues, 1994; Greenberg et al., 1992; Harmon-Jones et al., 1997; Hewstone, Rubin, Willis, 2002; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel 2004; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989; Schimel et al., 1999; Solomon, Greenberg, & Pyszczynski, 2000). The previously mentioned studies have provided support for the theory of terror management. A number of recent studies have shown that individuals who are reminded of their mortality show an increased desire for offspring compared to individuals who were not reminded of their mortality (Fritsche et al., 2007; Wisman & Goldenberg, 2005). Thus far, no prior study has shown that mortality salience influences other decisions related to mating behavior in humans. The purpose of the present research was to test the hypothesis that processes involved in managing terror associated with death awareness affects decisions made about mate selection in women, specifically judgments about the attractiveness of faces.

Terror Management Theory

According to terror management theory, the fear associated with death can be regulated by identifying with a particular cultural worldview and set of cultural values (Greenberg et al., 1986; Greenberg et al., 1990; Greenberg et al., 1994; Rosenblatt et al., 1989). This adherence to a cultural worldview not only gives individuals a sense of unity with others, but also gives the individual a sense of being a part of something greater than themselves and something that will endure after the individual ceases to exist. In TMT studies, participants are randomly assigned to perform the mortality salience (MS) writing task or a control writing task. Participants assigned to the MS task describe in writing what will happen to them as they physically die and the emotions that arise from the thoughts of their own death. Participants assigned to the control group describe in writing what will happen to them physically as they experience an event that does not involve death, such as a dental appointment or watching television and the emotions that arise from the thoughts of the event. The data have consistently shown that when participants undergo the MS manipulation, they defend cultural norms more diligently and regard those that do not uphold culture norms less favorably than participants placed in a control condition. This stronger adherence to cultural values seems to be unique to thoughts concerning death. Studies have shown that other anxiety producing events such as, public speaking or severe physical pain, do not produce the same effect as thoughts about death.

Terror Management Theory and Procreation

Recent research has also shown that MS may affect behaviors related to procreation (Fritsche & Jonas, et al., 2007; Wisman & Goldenberg, 2005). In four

studies, Wisman and Goldenberg (2005) examined the effect MS would have on the desire for offspring in both men and women. Participants were undergraduates in Holland. In three of the four studies, participants were asked to report how many children they desired in a fantasy situation and in reality. Men in the MS conditions demonstrated a stronger desire for children in the fantasy and reality situations than did men in the control conditions. The fourth study presented an additional control that placed women in either a children/career compatible group or a children/career incompatible group. The women in this study were primed with bogus newspaper articles reporting the compatibility or incompatibility of having children and a career. The women that were in the children/career compatible group, when also placed in a MS condition, demonstrated a stronger desire for children than did those in the non MS children/career compatible group. The results, while demonstrating some flexibility in the effects of MS showed that a desire for offspring can function as a defense mechanism against thoughts of one's mortality. In 2007, Fritsche et al. reported additional evidence that MS can affect desire for children in a study with undergraduate students in Germany. In one of their two studies, participants were randomly assigned to a MS or a control condition and later were asked about their desire for having any children at all in the future and then were asked to report the strength of their desire for children. The results indicated that both the men and women in the MS condition showed a significantly greater desire for children compared with participants in the control condition.

Facial Attractiveness

The present research aimed to determine whether MS could affect heterosexual women's judgments about facial attractiveness. There are numerous studies demonstrating that women's judgments of men's faces are related to biological factors (Fink & Penton-Voak, 2002; Johnston 1999; Johnston & Franklin, 1993; Johnston, Hagel, Franklin, Fink, & Grammer, 2001; Johnston & Oliver-Rodriguez, 1997; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Scarbrough & Johnston, 2005). Johnston (1999) has argued that when looking for a suitable mate, many animals seek out certain physical attributes. In the case of the peacock for example, a full, brightly colored tail with several eyespots is quite appealing to an amorous peahen. An unblemished tail serves as a signal of disease and parasite resistance that in turn signals greater genetic quality. Yet this guarantor of reproductive success can also be a liability to the peacock by making him more conspicuous to predators. Even with all its liabilities, a peacock's tail or rather a peacock's full, brightly colored tail is the one that grants its owner the greatest reproductive success.

For humans, the face is our version of the peacock's tail. Features of faces particularly symmetry, and hormone markers such as eye brow ridges and cheek bone structure play a role in how humans determine whether or not a face is attractive. Prominent brow ridges are associated with high levels of testosterone. Testosterone is toxic in high levels and the ability to sustain these high levels of testosterone may act as a signal of fitness. Symmetry may be an indicator of fitness in that a symmetrical face is one that is devoid of any disfiguring affects of disease or injury. The ability to avoid disease suggests high immunocompetency thus providing a signal of fitness as a mate.

Johnston et al. (2001) investigated the effects that hormones play in women's judgments of the attractiveness of male faces. Women recruited for this study were tested at different points during their menstrual cycles. Results from this study showed that when women were ovulating (i.e., at high risk for pregnancy), they chose faces that were more masculine than when during menses (i.e., at a low risk for pregnancy).

The studies performed by Johnston and colleagues (Johnston et al., 2001; Scarbrough & Johnston, 2004) have been conducted using a set of faces developed by Johnston et al. (2001). The faces used in the program consist of 16 random Caucasian males between 18 and 26 years of age and 16 random Caucasian females between 18 and 30 years of age. All of the faces were photographed under constant light conditions and the individuals being photographed had neutral facial expressions. Composite average male and female faces were then created using the Facial Explorer program developed by Grammer, Fielder, and Fink (1998). Features and proportions of perceived masculine and feminine faces where then created using the FacePrints programs developed by Johnston (1994). FacePrints uses a genetic algorithm that allows for a search of a multidimensional face space of more than 34 billion different possibilities of masculine and feminine facial images. The average male and female faces were combined with the masculine and feminine faces to construct a morphing movie that slowly morphs the faces from an extreme masculine to an extreme feminine face. The end result is a movie that displays 1,200 frames of female and male faces using a QuickTime movie player. Figure 1 displays three sample faces. Participants can either press the 'play' button which will cause the program to run a movie of the faces morphing or the participants can use the slider control to morph the faces at the participants own pace.

A similar study performed by Penton-Voak & Perrett (2000) arrived at the same results as Johnston et al. (2001) but with a different procedure for developing the facial stimulus. The faces were of 40 female and 21 male Caucasian undergraduate students. The students were instructed to remove and jewelry, push their hair back, and assume a neutral facial expression. Two photographs were taken of each student and the best of those two were chosen for the stimulus. The images were then delineated by marking 174 points on the individual images indicating the position of the various facial structures (i.e., mouth, eyes, etc.). Average male faces were created by using the mean position of each delineated point on the faces. To make a feminized male face, each point on the male face was moved to correspond to points on the aligned female average face. Masculinized faces were constructed in a process of exaggerating the differences between male and female faces by 30% and 50%. The faces were then printed in full color in a magazine along with a questionnaire asking participants about their age, menstrual cycles, oral contraception use, and pregnancy. The questionnaires were then returned to the researchers in a prepaid postage envelope. The results showed that women who were at most risk of pregnancy chose the masculinized male faces as being more attractive than did the women who had the least risk of pregnancy.

In the present research, it was hypothesized that MS would influence women's attractiveness judgments for male faces. Heterosexual women were randomly assigned to participate in the study either when they were ovulating (i.e., at a high risk for pregnancy) or during menses (i.e., at a low risk of pregnancy). Women in each group were then randomly assigned to either an MS or control condition. It was expected that women in the MS conditions would prefer more masculine faces from an array of faces

ranging in high to low masculinity than those women in the control conditions resulting in a main effect of MS. It was possible that the effect of MS would be larger for ovulating participants than for non-ovulating participants, as it might be that effects of environmental factors, such as MS, might be affected by biological factors, such as risk of pregnancy.

CHAPTER II

METHODOLOGY

Participants

Female participants were selected from the undergraduate pool at Oklahoma State University (N=139). Participants ranged in age from 18 to 29 (M = 20, SD = 2.05), identified as heterosexual, and indicated that they were non currently taking hormone-based contraception. Participants were given course credit for their participation.

Materials and Procedure

Eligible participants were identified from the pre-screener questions submitted to SONA, an online resource used to recruit participants from the undergraduate participant tool at Oklahoma State University. Participants were randomly assigned to participate either during ovulation (i.e., high risk of pregnancy) or during menses (i.e., low risk of pregnancy). This resulted in four different groups: ovulating MS, ovulating control, non-ovulating MS, and non-ovulating control. Generally ovulation occurs 14 days prior to the onset of menses in women with 28 day cycles and 20 days for women with 34 day cycles (Fluhman, 1957; Lein, 1979; Matsumoto, Nogami, & Okhuri, 1962). Participants were randomly assigned to an MS or control conditions. Participants were contacted via email to set up an individual appointment. When participants arrived to the session, they were

asked to confirm that they were not pregnant and not using hormone-based contraception. Participants were also asked to confirm the last onset of menses and length of their menstrual cycle.

Participants assigned to the MS condition received the following instructions: "Describe the emotions you feel while thinking about your own death," and "Describe what you think will happen to you as you physically die." The control group received the following instructions: "Describe the emotions you feel while thinking about taking a final exam" and "Describe what you think will happen to you as you take the final exam" (c.f., McGregor et al., 1998, Heine, Harihara, & Niiya, 2002). Following the writing task, all participants completed the Positive and Negative Affect Scales (PANAS; Watson, Clark, & Tellegen, 1988). This measure has been used in previous terror management studies to determine if the MS manipulation had any effect on mood. Lastly, participants completed the face judgment task. The program developed by Johnston et al. (2001) was used. Participants were given an introduction on how to use the Johnston et al. (2001) program and then asked to make the appropriate face choices for each of the following categories: an attractive male face, an average male face, a dominant male face, a healthy male face, a masculine male face, an intelligent male face, a good-father male face, and an androgynous male face. The list of choices was counterbalanced among participants.

Experimental Design

A one-factor between subjects design with four levels was used. The four levels were: non-ovulating MS, non-ovulating control, ovulating MS, and ovulating control.

The appendix contains the forms for the menstrual cycle and birth control checklist, control and MS manipulation, the PANAS, and the face rating form.

CHAPTER III

RESULTS

The frame selected for each of the eight judgments was recorded for each participant. The frames ranged from 0 (extremely masculine) to 1,200 (extremely feminine) with frame 600 being androgynous. The means for the judgments are displayed in Table 1. For each type of rated face, the mean frame numbers were analyzed using a one-way analysis of variance (ANOVA). Consistent with recommendations by Rosnow and Rosenthal (1995) a one-way ANOVA was used in order to determine whether there were differences among the means of the four groups (non-ovulating control, non-ovulating experimental, ovulating control, and ovulating experimental). An alpha level of .05 was selected.

The results for "attractive male face" (Figure 1) ratings were statistically significant, F (3,135) = 4.69, p = .004, η^2 = .10. Post hoc comparisons using the Tukey's HSD procedure indicated the non-ovulating MS group (M = 209.17, SD = 91.831) chose a significantly more masculine face than the non-ovulating control group (M= 262.03, SD = 72.390), p = .030. The results also indicated that the ovulating control group (M = 206.47, SD = 77.603) chose a significantly more masculine face than the non-ovulating control group (M = 262.03, SD = 72.390), p = .038. While the Tukey's HSD procedure

revealed no significance between ovulating MS and ovulating control groups (p = .06) and between ovulating MS and non-ovulating MS groups (p = .06), Cohen's d tests did reveal medium effect sizes of .66 and .62 respectively.

The results for the "dominant male face" ratings (Figure 2) were statistically significant, F (3,135) = 4.96, p =.003, η^2 =.10. Post hoc comparisons using the Tukey's HSD procedure indicated the non ovulating MS group (M = 84.71, SD = 63.84) chose a significantly more masculine face than the non-ovulating control group (M = 138.71, SD = 69.31), p = .005. The results also indicated the ovulating control group (M=83.73, SD= 70.90) chose a significantly more masculine face than the non-ovulating control group (M = 138.71, SD = 69.31), p = .009. The Tukey's HSD procedure revealed no significant differences between ovulating MS and non-ovulating control groups (p = .143) however; Cohen's d did reveal a medium effect size of .53. The results for the "healthy male face" ratings (Figure 3) were also statistically significant, F (3,135) = 3.03, p = .031, η^2 = .06. Post hoc comparisons using the Tukey's HSD procedure indicated the ovulating control group (M = 187.63, SD = 70.95) chose a significantly more masculine face than the ovulating MS group (M = 250.87, SD = 85.57), p = .019.

Results from the two PANAS sub-scales, one assessing positive affect and one assessing negative affect, were analyzed to determine if there were any differences in levels of affect among the four groups. Most previous studies of mortality salience do not report scores on the PANAS, as it is used only as a distracter task and not as a measure of the effectiveness of the MS manipulation. The means for the two sub-scales are provided in Table 2. These two sub-scales have been shown to be independent (Watson et al., 1988) and were analyzed in separate one-way ANOVAs in order to determine if scores varied

across condition. The results for the positive affect subscale were statistically significant, F (3,134) = 2.57, p = .057, η^2 = .054. Post hoc comparisons using the Tukey's HSD procedure indicated that the ovulating control group (M = 35.07, SD = 6.02) had a higher level of positive affect than the non-ovulating control group (M = 30.84, SD = 6.64), p = .04. Analysis of the negative affect sub-scale revealed no significant differences. Data were missing for one subject in the non-ovulating control group.

CHAPTER IV

DISCUSSION AND CONCLUSION

The results indicated that there was an influence of mortality salience on women's evaluations of male faces. This was most evidenced by the significant difference found between the non-ovulating control and non-ovulating MS groups in their choices made for the "attractive male face" category. The women in the non-ovulating MS condition chose faces that were significantly more masculine than those chosen by women in the non-ovulating control condition. Significant differences also existed between women in the non-ovulating control condition and women in the ovulating control condition with the latter choosing significantly more masculine faces. A similar difference was found in the choices for the "dominant male face" category. The women in the non-ovulating MS and ovulating control groups chose faces that were significantly more masculine than those chosen by the women in the non-ovulating control group. The "healthy male face" category revealed significant differences between the ovulating MS group and the ovulating control with the latter choosing significantly more masculine faces.

Previous research in women's perception of facial attractiveness has demonstrated that when women are ovulating and at the highest risk for pregnancy they choose more masculine faces as being attractive than when they are not ovulating and at a lower risk of pregnancy (Fink & Penton-Voak, 2002; Johnston 1999; Johnston & Franklin, 1993; Johnston et al., 2001; Johnston & Oliver-Rodriguez, 1997; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Scarbrough & Johnston, 2005). Using methods similar to those utilized by Johnston et al. (2001), the present study was able to replicate their findings by demonstrating that women in the ovulating control condition chose significantly more masculine faces for the "attractive male" category than those chosen by women in the non-ovulating control condition (see Figure 1).

The results of the present study have also clearly shown that when non-ovulating women are placed in a MS condition, a condition in which they are made aware of their mortality, they will choose as an attractive face one that is not significantly different from the choices made by women that are ovulating. Some effect of MS appeared to be causing the women in this group to choose faces more typical of choices made by ovulating women. Previous research in TMT has shown that when placed in a MS condition both men and women express an increased desire for offspring (Fritsche & Jonas, et al., 2007; Wisman & Goldenberg, 2005). Research examining the effects of natural and man-made disasters has shown similar results. Cohan and Cole (2002) examined marriage, birth, and divorce rates in the years following Hurricane Hugo that struck South Carolina in 1989. The damage from the hurricane resulted in 24 of the 46 counties in South Carolina being declared disaster areas. Birth rates across the state increased significantly from 10 births per 100,000 persons to 41 births per 100,000

persons in the year following Hurricane Hugo. Rodgers, St. John, and Coleman (2005) in a similar study examined the birth rates in several Oklahoma counties following the 1995 bombing of the Alfred P. Murrah Federal Building in Oklahoma City. The damage to the downtown Oklahoma City area was extensive and resulted in the deaths of 168 persons of whom 19 were children. In the four years following the bombing, birth rates increased significantly each year in Oklahoma County, the county in which Oklahoma City is located, resulting in 23.2 births per month in 1996, 34.1 in 1997, 54.1 in 1998, and 51.7 in 1999.

In addition to natural and man-made disasters, other negative environmental stressors appear to play a role in increased birth rates. Research by Wilson and Daily (1997) examined the In addition to natural and man-made disasters, other negative environmental stressors appear to play a role in increased birth rates. Research by Wilson and Daily (1997) examined the birth rates in several Chicago neighborhoods that had either long or short life expectancies based on information for the years 1988 to 1993. In the neighborhoods with the shorter life expectancies, crimes such as homicide were particularly high. The homicide rates for men aged 15-24 were 300 per 100,000 persons per year for the short life expectancy neighborhoods compared with roughly 25 per 100,000 persons per year for men aged 15-24 in the long life expectancy neighborhoods. Birth rates in the short life expectancy neighborhoods were 190 births per 1,000 persons for women aged 15-19 per year and 224 births per 1,000 persons for women aged 20-24 per year. By contrast, the birth rates for the long life expectancy neighborhoods were much lower with 45 births per 1,000 persons per year for women aged 15-19 and 90 births per 1,000 persons per year for women aged 20-24.

The three previously mentioned studies provide 'real life' examples of situations that violate a view of the world being orderly, having permanence, stability, and the ability to transcend death. This worldview is a part of the anxiety buffer that TMT describes as being key to managing the fear resulting from the realization that humans have of the inevitability of their own deaths (Pyszczynski et al, 2004). In situations when this view has been violated either in a simulated way (Fritsche & Jonas, et al., 2007; Wisman & Goldenberg, 2005) or in 'real life' situations (Cohan & Cole, 2002; Rodgers et al., 2005) research has demonstrated that individuals have responded with an increased desire for offspring and with actual increases in offspring respectively. In the context of the current study the women in the non-ovulating MS condition appear to have responded to this violation by choosing as an attractive male face one that is not significantly different from the women in the ovulating control condition who were at a point when the ability to conceive was greatest. While this doesn't necessarily demonstrate an increased desire for offspring, it does demonstrate that in some ways non-ovulating women when made aware of their mortality are behaving in a fashion similar to women that are not mortality salient and are biologically ready to reproduce. The implication here being that an environmental stressor such as MS can have an influence on a behavior that would under less stressful conditions be more influenced by biology.

The women in the ovulating MS condition when asked to choose an attractive male face, chose one that was not significantly different from the women in the non-ovulating control condition. There was also no significance shown between the ovulating MS condition when compared with the ovulating control and with the non-ovulating control MS. While these differences were not statistically significant, they appeared to

be approaching significance. The practical significance of these findings is that some effect of MS may be causing women in the ovulating MS condition to choose a face that is less masculine than women in the ovulating control condition. Previous research has demonstrated that socially negative attributes such as dominance, and being controlling, coercive, and manipulative are associated with highly masculine faces (Boothroyd, Jones, Burt, & Perrett, 2007; Johnston, et al., 2001) whereas socially positive attributes such as helpful, cooperative, trustworthy, and good father were associated more with average male faces (Johnston, et al., 2001). Previous research in TMT has demonstrated that people in a MS condition will adhere more strongly to socially acceptable norms and will react negatively towards those persons who do not uphold these norms (Greenberg et al., 1986; Greenberg et al., 1990; Greenberg et al., 1994; Rosenblatt et al., 1989).

It appears that the previously mentioned quality of MS may have affected the biologically driven preference for more masculine faces resulting in the choice of faces that are less masculinized and that are associated more with socially acceptable attributes. This could also be the case for the "healthy male face" category in which women in the ovulating MS condition chose faces that were significantly less masculinized than the women in the ovulating control condition (see Figure 3). An adaptive compensation of choosing the benefit of stability and paternal investment over the benefit of good genes in a potentially dangerous situation might be at work with ovulating women when in a MS condition.

The results of the choices made for the "dominant male face" category were similar to those found for the "attractive male face" category in that both the women in the ovulating control and non-ovulating MS conditions chose faces significantly more

masculine than those chosen by the women in the non-ovulating control condition (see Figure 2). When ovulating, women appear to be sensitive to masculine features especially when evaluating faces for attractiveness (Boothroyd et al., 2007; Fink & Penton-Voak, 2002; Johnston 1999; Johnston & Franklin, 1993; Johnston et al., 2001; Johnston & Oliver-Rodriguez, 1997; Jones et al., 2008; Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999; Scarbrough & Johnston, 2005). This heightened sensitivity may be the reason why the women in the ovulating control condition are choosing significantly more masculine faces than those chosen by the women in the non-ovulating control condition. The women in the non-ovulating MS condition also chose faces that were significantly more masculine than those chosen by the women in the non-ovulating control condition. As has been shown in the present study, this sensitivity to masculine features appears to exist as well in non-ovulating women who have been made salient of their mortality, which would offer an explanation for their choices.

Strangely though, the women in the ovulating MS condition did not differ significantly from the women in the non-ovulating control condition in their choices of a dominant male face, nor did they differ significantly from the women in the ovulating control and non-ovulating MS conditions. While the difference between the women in the ovulating MS and non-ovulating control conditions was not statistically significant, there was a moderate effect. It could very well be that the women in the ovulating MS condition experience the same heightened sensitivity to masculine features as the women in the ovulating control and non-ovulating MS conditions. The results of the present study though cannot offer enough evidence for this conclusion. There could, however, be

some effect of MS that decreases ovulating women's sensitivity to masculine features again though, the results of this study cannot completely confirm this conclusion.

The results of this study have supported the first of the two proposed hypotheses that women in the MS condition would choose a face in the "attractive male face" category that was significantly more masculine than women in the control condition. This was demonstrated by the difference between the women in the non-ovulating MS condition and non-ovulating control condition. The results however, were unable to support the second hypothesis that ovulating women in the MS condition would choose a more masculine face than the ovulating women in the control condition. In fact the opposite seems to be the case. While this opposite effect was not statistically significant, it was very near significance with a medium effect size. Additional findings suggest that women in a MS condition may experience increased sensitivity to masculine features as was demonstrated in the choices made by the women in the non-ovulating MS condition for the "dominant male face" category.

This study is the first to date that has examined the effects of MS on evaluations of human faces. While the results do demonstrate an effect of MS on these evaluations, the study present study is not without its limitations. A particular concern were the rather large standard deviations of the means for the different categories of faces. This suggested a rather large variation in choices made by the women within each of the four conditions. This could be due to some inaccuracy in determining when the women were ovulating however; great care was taken in making these determinations. A future second study is planned using a within subjects design that will offer more control over this possible but unlikely error.

A potential strength of the current study is its ability to provide insight into the effects of environmental factors on the biologically driven factors concerning mate selection and evaluations of faces. Previous research regarding perceptions of facial attractiveness has demonstrated the biological influences (Boothroyd et al., 2007; Fink & Penton-Voak, 2002; Johnston 1999; Johnston & Franklin, 1993; Johnston et al., 2001; Johnston & Oliver-Rodriguez, 1997; Jones et al., 2008; Penton-Voak et al., 1999; Penton-Voak & Perrett, 2000, Scarbrough & Johnston, 2005). Previous research has been able to demonstrate that simulated MS conditions can increase a desire for offspring (Fritsche & Jonas, et al., 2007; Wisman & Goldenberg, 2005) and that 'real world' MS conditions can actually result in increased offspring (Cohan & Cole, 2002; Rodgers et al., 2005). While future research is in order, the present study has been able to provide evidence that environmental factors can influence biological factors that are used in the perceptions and evaluations of faces.

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APPENDICES

The following are the questions that were used in the SONA pre-screener survey.

Do you experience regular or irregular menstrual cycles?

What is the typical length of your menstrual cycle?

Are you currently taking an estrogen based contraceptive (birth control pill)?

Are you pregnant?

Are you currently taking a corticosteroid such as Prednisone™?

Do you consider yourself heterosexual? Yes No Unsure.

Experimental Condition

Please respond to the following scenarios. You may take as long as you like and if you have any questions, please feel free to ask the researcher.

1. Describe the emotions you feel while thinking about your own death.

2. Describe what you think will happen to you as you physically die.

Control Condition

Please respond to the following scenario. You make take as long as you like and if you have any questions please feel free to ask the researcher.

1. Describe the emotions you feel while thinking about taking a final exam.

2. Describe what you think will happen to you as you take the final exam.

PANAS

Directions

This scale consists of a number of words that describe different feelings and emotions. Read each item and then circle the appropriate answer next to that word. Indicate to what extent you have felt this way during the past week.

Use the following scale to record your answers.

(1) = Very slightly or none at all (2) = A little (3) = Moderately (4) = Quite a bit

(5) = Quite a bit

1. Interested	1	2	3	4	5
2. Distressed	1	2	3	4	5
3. Excited	1	2	3	4	5
4. Upset	1	2	3	4	5
5. Strong	1	2	3	4	5
6. Guilty	1	2	3	4	5
7. Scared	1	2	3	4	5
8. Hostile	1	2	3	4	5
9. Enthusiastic	1	2	3	4	5
10. Proud	1	2	3	4	5
11. Irritable	1	2	3	4	5
12. Alert	1	2	3	4	5
13. Ashamed	1	2	3	4	5
14. Inspired	1	2	3	4	5

15. Nervous	1	2	3	4	5
16. Determined	1	2	3	4	5
17. Attentive	1	2	3	4	5
18. Jittery	1	2	3	4	5
19. Active	1	2	3	4	5
20. Afraid	1	2	3	4	5

Face Rating Form

In this part of the experiment, you will be looking a series of faces presented on a computer screen. For each of the categories, please choose one face that you feel best represents that particular category. Take as much time as you like and if you have any questions please feel free to ask the researcher.

1. Average male face (AvM)- A typical man that you could see anywhere.
   Frame _____
2. Attractive male face (AtM)- A male face that you might see on campus that you found attractive.
   Frame_____
3. Dominant male face (DoM)- A male face that would be the leader of his group of friends, or head of a company.
   Frame_____
4. Healthy male face (HtM)- A male face that looks to be physically and mentally healthy.
   Frame_____
5. Masculine male face (MaM) – A male face that appears to be masculine.
   Frame _____
6. Intelligent male face (ItM) – Which face appears to be the face of an intelligent male?
   Frame_____
7. Good father male face (GfM) – Which face looks like the face of a good father?
   Frame_____
8. Androgynous face (PaT) – Which face looks like it could be either male or female?
   Frame_____

TABLE I

MEAN JUDGEMENTS AND (STANDARD DEVIATIONS) BY QUESTION TYPE

	Condition			
	Non-Ovulating		Ovulating	
Question Type	Control (n= 38)	MS (n= 41)	Control (n= 30)	MS (n= 30)
Androgynous	609.10 (105.86)	659.05 (72.39)	626.20 (101.33)	656.73 (84.51)
Attractive	262.03 (72.39)	209.17 (91.83)	206.47 (77.60)	260.77 (92.03)
Average	370.61 (93.83)	369.39 (92.61)	326.77 (96.91)	368.20 (114.87)
Dominant	138.71 (69.31)	84.71 (63.84)	83.73 (70.90)	101.83 (78.54)
Good Father	235.39 (79.52)	222.17 (112.83)	204.90 (91.97)	234.43 (91.61)
Healthy	224.39 (79.52)	213.15 (91.32)	187.63 (70.95)	250.87 (85.57)
Intelligent	285.74 (118.23)	299.56 (137.76)	271.47 (113.85)	295.23 (135.60)
Masculine	92.37 (75.71)	63.98 (62.25)	71.27 (67.65)	66.50 (71.51)

TABLE II

MEANS AND STANDARD DEVIATIONS FROM THE POSITIVE AND NEGATIVE SUBSCALES ON THE PANAS BY CONDITION

	Positive Affect	Negative Affect
Non-Ovulating Control (n = 37)	30.94 (6.64)	20.92 (6.67)
Non-Ovulating Experimental (n = 41)	33.78 (6.30)	21.44 (6.48)
Ovulating Control (n = 30)	35.07 (6.02)	18.23 (5.12)
Ovulating Experimental (n = 30)	33.23 (6.99)	21.60 (6.42)

FIGURE I

RESULTS OF MS AND TYPE OF PARTICPANT FOR THE ATTRACTIVE MALE FACE CATEGORY

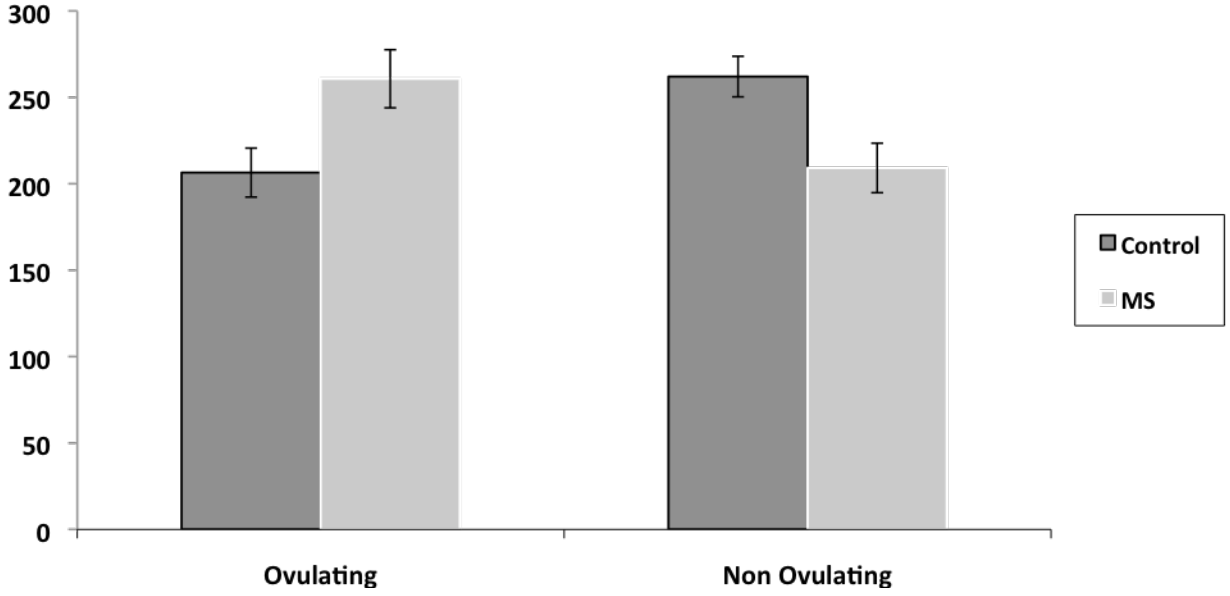

FIGURE II

RESULTS OF MS AND TYPE OF PARTICPANT FOR THE DOMINANT MALE FACE CATEGORY

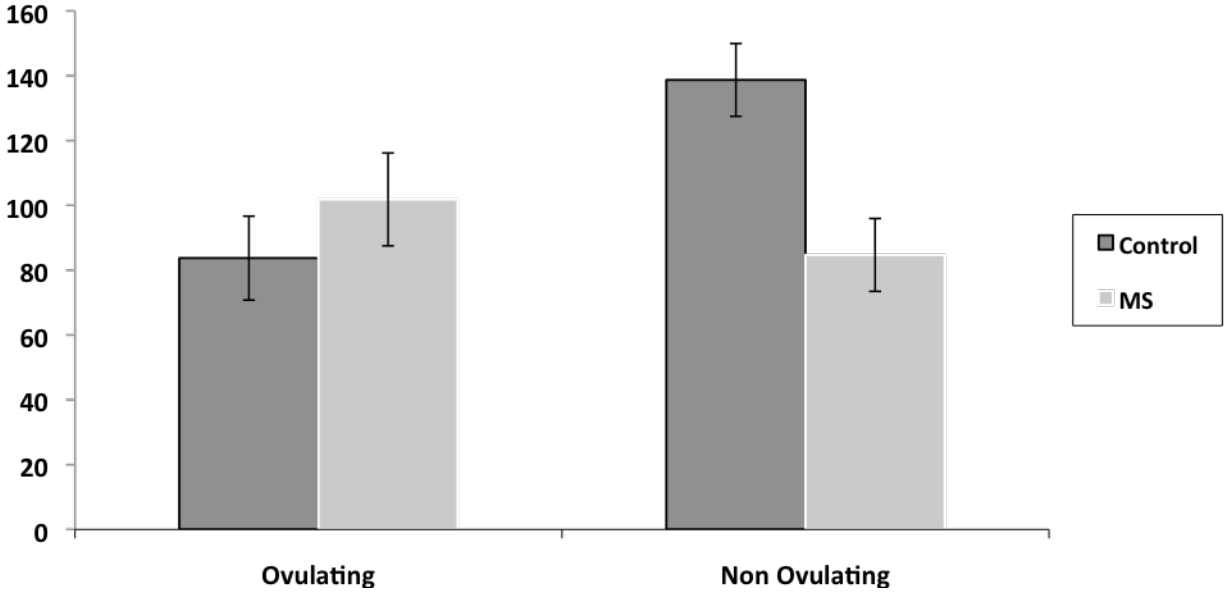

FIGURE III

RESULTS OF MS AND TYPE OF PARTICPANT FOR THE HEALTHY MALE FACE CATEGORY

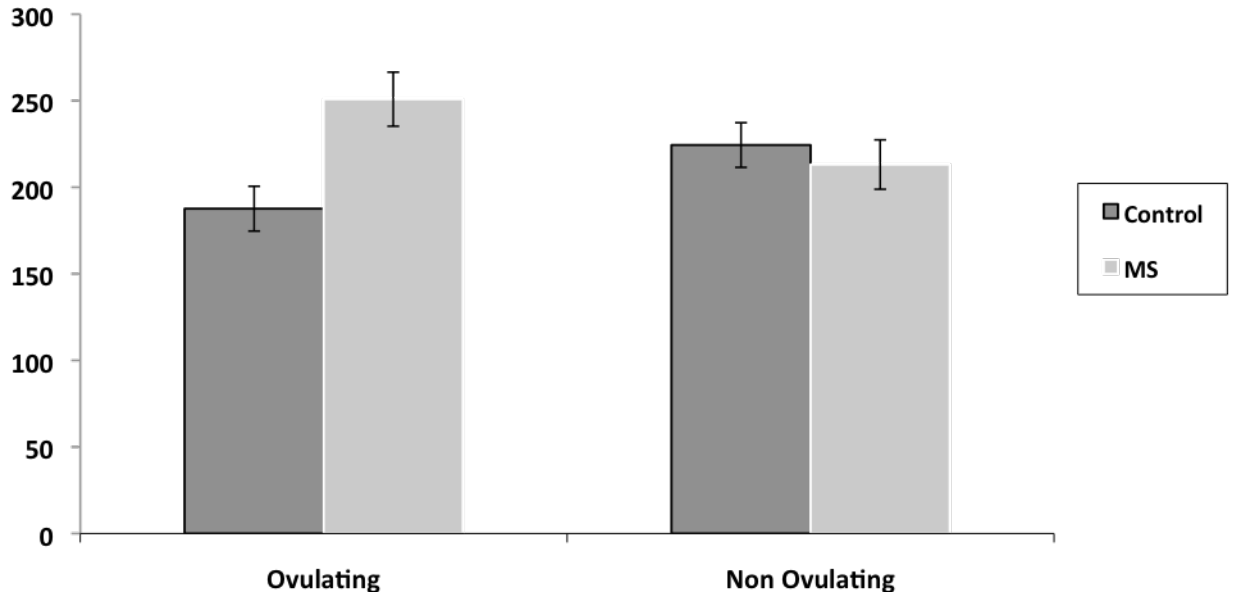

FIGURE IV

FACE FRAMES CHOSEN FOR THE ATTRACTIVE MALE FACE CATEGORY

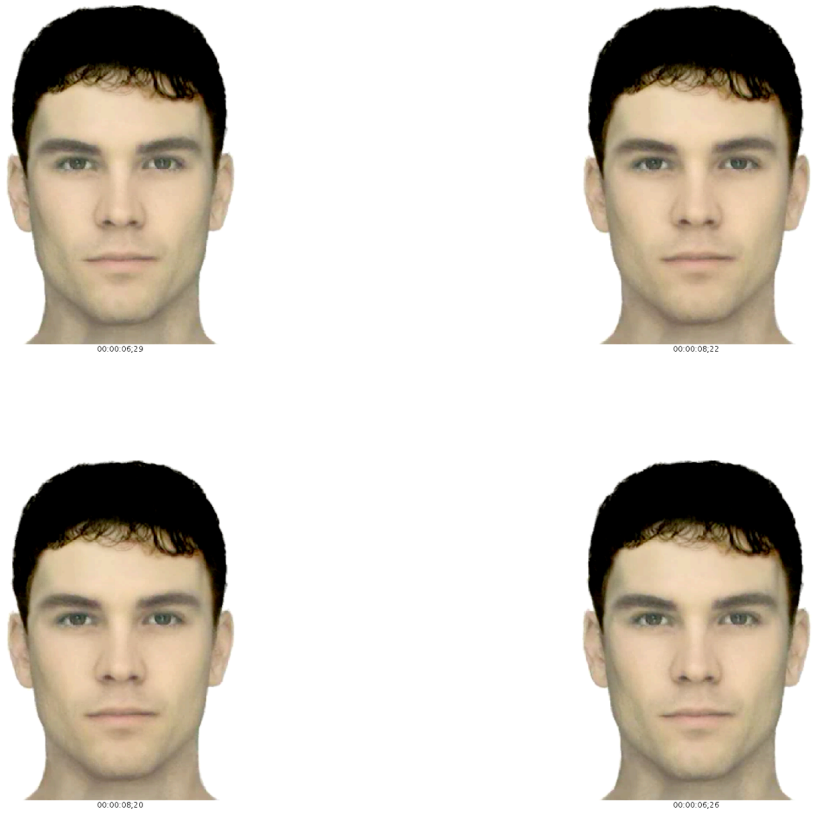

Figure 4. Top row from left to right: non-ovulating MS (209) and non-ovulating control (262). Bottom row from left to right: ovulating MS (261) and ovulating control (206).

FIGURE V

FACE FRAMES FOR THE DOMINANT MALE FACE CATEGORY

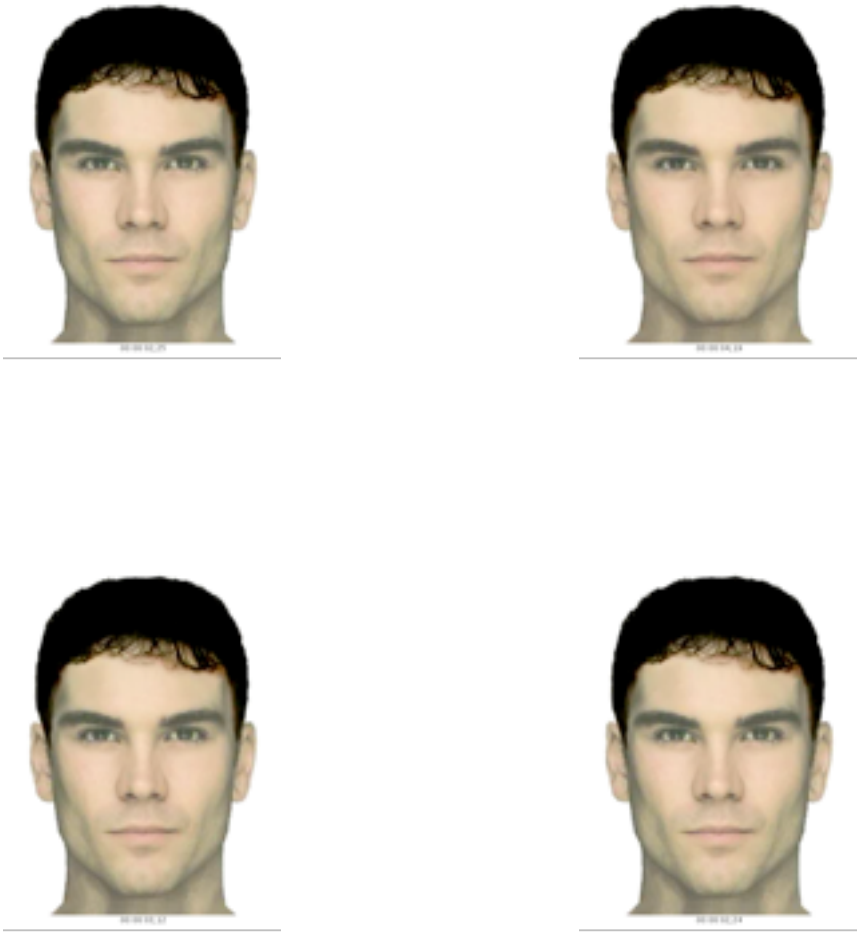

Figure 5. Top row from left to right: non-ovulating MS (85) and non-ovulating control (139). Bottom row from left to right: ovulating MS (102) and ovulating control (84).

FIGURE VI

FACE FRAMES FOR THE HEALTHY MALE FACE CATEGORY

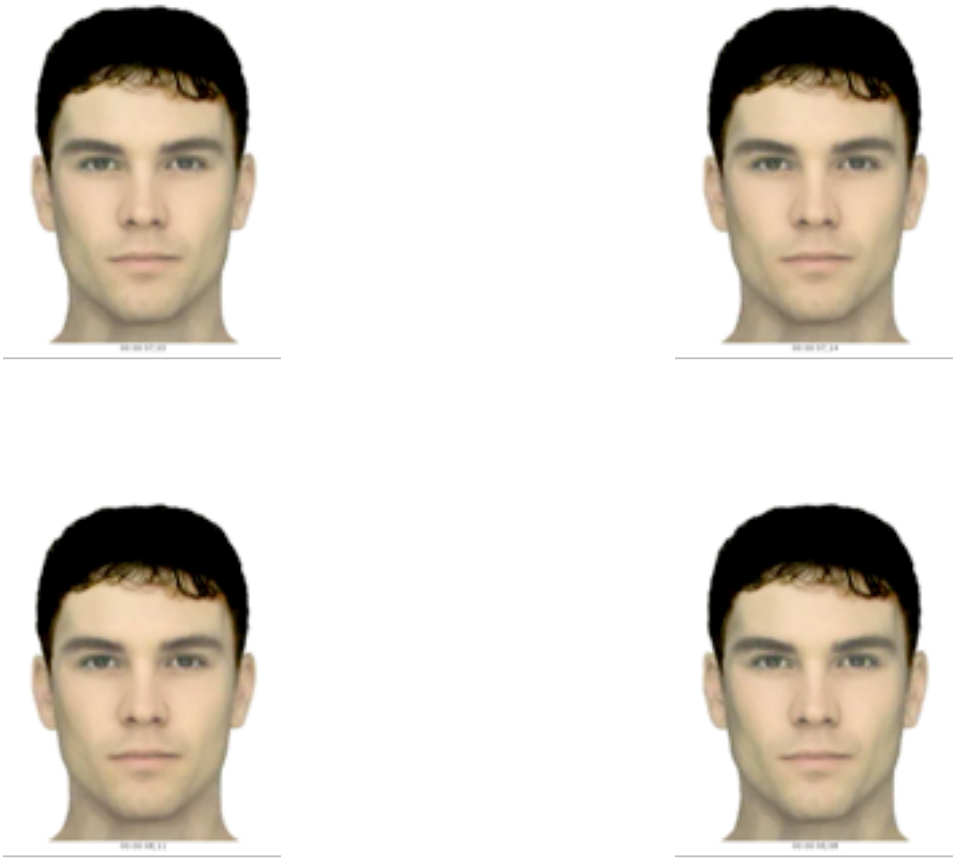

Figure 6. Top row from left to right: non-ovulating MS (213) and non-ovulating control (224). Bottom row from left to right: ovulating MS (251) and ovulating control (188).

VITA

James E. Vaughn, III

Candidate for the Degree of

Master of Science

Thesis: JAMES E. VAUGHN, III

Major Field: Life Span Developmental Psychology

Biographical:

Education:
Completed the requirements for the Master of Science in Life Span Developmental Psychology at Oklahoma State University, Stillwater, Oklahoma July, 2009. Master of Arts in Psychology at the University of Central Oklahoma, Edmond, Oklahoma, July, 2009. Bachelor of Arts in Psychology at the University of Central Oklahoma, Edmond, Oklahoma, May, 2004.

Experience: Laboratory Instructor for Quantitative Methods, two semesters, Oklahoma State University. Graduate Instructor for Introductory Psychology, five semesters, Oklahoma State University.

Professional Memberships: Association for Psychological Science, Human Behavior and Evolution Society, International Society for Human Ethology, Society for the Teaching of Psychology, Oklahoma Network for the Teaching of Psychology, Society for the Psychological Study of Lesbian, Gay, Bisexual, and Transgendered Issues.

Oklahoma State University Institutional Review Board

Date:	Wednesday, September 10, 2008
IRB Application No	AS0859
Proposal Title:	Evaluating Human Faces
Reviewed and Processed as:	Expedited

Status Recommended by Reviewer(s): Approved Protocol Expires: 9/9/2009

Principal Investigator(s):

James Vaughn
2532 1/2 N.W. 21 Apt. B
Okla. City, OK 73107

Shelia M. Kennison
116 N. Murray
Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☑ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,

Shelia Kennison, Chair
Institutional Review Board

Name: James E. Vaughn, III Date of Degree: July, 2009

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: THE EFFECT OF MORTALITY SALIENCE ON FACIAL PREFERENCES IN FEMALES

Pages in Study: 39 Candidate for the Degree of Master of Science

Major Field: Life Span Developmental Psychology

Scope and Method of Study: Prior research has shown that when individuals are reminded of their mortality, they are more likely to adhere strongly to cultural norms and react more unfavorably towards those who do not uphold those cultural norms than individuals who perform a control task**.** Previous research has also shown that individuals who were reminded of their mortality show an increased desire for offspring as compared to individuals who were not reminded of their mortality .The present research investigated whether being reminded of mortality affects facial preference judgments in women. Prior research on mate selection has shown that women prefer more masculine faces when they are ovulating (i.e., high risk for pregnancy) than when they are experiencing menses (i.e., low risk for pregnancy). Furthermore, pregnant women prefer less masculine mates than non-pregnant women.

Findings and Conclusions: The present research tested the hypothesis that reminding women of their mortality would increase their preference for masculine features in male faces. Women who were not taking estrogen-based contraception were tested either during their menses or during the week of ovulation. The results showed that mortality salience influenced facial preference choices in women.

ADVISER'S APPROVAL: Dr. Shelia Kennison