Does Health Anxiety Moderate the Effects of Mortality Salience On Worldview Defense?

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DOES HEALTH ANXIETY MODERATE THE EFFECTS OF MORTALITY SALIENCE ON WORLDVIEW DEFENSE?

by

Toni Brooke Merkey

A Thesis
Submitted to the Graduate School of The University of Southern Mississippi in Partial Fulfillment of the Requirements for the Degree of Master of Science

Approved:

Dean of the Graduate School

May 2010
ABSTRACT

DOES HEALTH ANXIETY MODERATE THE EFFECTS OF MORTALITY SALIENCE ON WORLDVIEW DEFENSE?

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Research generated from Terror Management Theory has demonstrated that reminding participants of their eventual death increases self-esteem striving and worldview defense (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). The hypothesis in the present study was that health anxiety would moderate this effect, based on the premise that health-anxious individuals are chronically more aware of their own mortality. To test this hypothesis, the Illness and Attitudes Scale (IAS) was administered to 65 undergraduates to determine level of health anxiety. Participants were then randomly assigned to a mortality salience or control condition. Level of worldview defense was measured by participants’ reactions to pro- vs. anti-American essays. The results were analyzed using a regression model, with IAS scores standardized and treated as a continuous measure. As predicted, there was a significant IAS x Condition interaction, \( t(64) = 2.09, p < .05 \). However, the relation was in the opposite direction than hypothesized, with individuals higher in health anxiety engaging in more worldview defense after being reminded of their eventual death than did individuals lower in health anxiety. Implications and suggestions for future research are discussed.
ACKNOWLEDGMENTS

The writer would like to thank the thesis director, Dr. David K. Marcus, and the other committee members, Dr. Virgil Zeigler-Hill and Dr. David Echevarria, for their help and support during this project.
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CHAPTER I

INTRODUCTION

Terror management theory (Greenberg, Pyszczynski, & Solomon, 1986) is one of several theories that speculate on the purpose of self-esteem. According to terror management theory, the function of self-esteem is to buffer us from the anxiety we could potentially experience due to the knowledge of our eventual death. As humans, we have this knowledge, and need self-esteem to shield us from the terror that would otherwise result (Pyszczynski, Greenberg, Solomon, Arndt, & Shimel, 2004).

According to the theory, one’s worldview plays a critical role in this process, because worldviews are humanly constructed shared symbolic conceptions of reality that give meaning, order, and permanence to existence; provide a set of standards for what is valuable; and promise some form of either literal or symbolic immortality to those who believe in the cultural worldview and live up to its standards of value. (Pyszczynski et al., 2004, p. 436)

It is one’s worldview that gives meaning to one’s life. The worldview provides the possibility of one’s life having meaning beyond death, either literally with the promise of an afterlife, or in a symbolic manner such as by having descendants (Pyszczynski et al., 2004).

However, simply having a worldview is not enough. Individuals must feel that they are contributing to the culture that they subscribe to in order to benefit from it as a death-anxiety buffer (Arndt & Greenberg, 1999). If individuals feel as though they are
living up to the standards of their worldview, then high self-esteem and low death-related anxiety result (Pyszczynski et al., 2004).

A basic premise of terror management theory is that individuals' cultural worldviews buffer them from the anxiety associated with the knowledge of their eventual death (Rosenblatt, Greenberg, Solomon, Pyszcynski, & Lyon, 1989). This leads to high motivation for the individual to maintain a belief in his or her worldview and to defend it when it is threatened (Rosenblatt et al., 1989). In a series of studies, Rosenblatt et al. (1989) looked at how increasing mortality salience affects participants' views of those who violate or live up to cultural expectations. In their first study, experimenters used municipal court judges as participants. They made mortality salient to half of these participants by having them complete questionnaires concerning their feelings about their own eventual death. The participants were then asked to set “bond” for a hypothetical prostitute; the crime of prostitution was chosen because it “emphasized the moral nature of the alleged crime” (Rosenblatt et al., 1989, p. 682). Participants in the mortality salience condition assigned a significantly higher bond to the prostitute than the control participants. The researchers concluded that “inducing subjects to think about their mortality presumably increased their need for faith in their values, and thus increased their desire to punish the moral transgressor” (Rosenblatt et al., 1989, p. 683).

In the same paper, Rosenblatt et al. (1989) tested another hypothesis derived from terror management theory. Mortality salience should not only affect desire to punish moral transgressors; it should also affect desire to reward those who uphold moral values (Rosenblatt et al., 1989). In addition to having participants make a bond assessment for a hypothetical prostitute as in their previous study, participants were asked to “recommend
a reward for a woman who helped police apprehend a criminal” (Rosenblatt et al., 1989, p. 684). Participants in the mortality salience condition offered a much higher reward to someone who upheld the cultural worldview.

Greenberg et al. (1990) conducted several studies that examined the link between mortality salience and defense of the participants’ worldview. In their first study, Christian participants who were reminded of their mortality by being asked to write about it later rated Christians more positively than Jews on the Interpersonal Judgment Scale (IJS). In their third study, participants in the mortality salience condition rated those who had a high opinion of the participants’ own worldview, in the form of pro-United States statements, more positively than did control participants. They also rated others who had a negative view of the United States more negatively than did control subjects.

Mortality salience does not always intensify negative reactions to those who contradict participants’ worldviews. Greenberg, Simon, Pyszczynski, Solomon, and Chantel (1992) hypothesized that the effects of mortality salience on reactions to individuals who hold different beliefs would be attenuated when the value of tolerance was either very important or easily accessible to the participant. In their first study, they used political ideology as a basis for assessing the effects of mortality salience when tolerance was highly important to some individuals. With previous evidence showing that liberals were more tolerant than conservatives, individuals whose beliefs were identified as being either highly liberal or highly conservative formed the two comparison groups. Mortality was made salient to half of the participants. The outcome measure consisted of participants’ ratings of an extremely liberal other and an extremely conservative other, based on surveys supposedly filled out by those individuals.
Therefore all participants evaluated both a liberal and a conservative individual. In the control (no mortality salience) condition researchers found a significant tendency for subjects to prefer the target similar to themselves. In the mortality salience condition, the expected effect of an increased preference for similar targets and a decreased preference for dissimilar targets was found, but only for conservative participants. As predicted, liberal participants neither increased their preference for similar others nor decreased their preference for dissimilar others based on the mortality salience manipulation. The authors concluded that the effect of the mortality salience manipulation was attenuated in liberal participants because they placed a higher premium on the value of tolerance as a part of their worldview (Greenberg et al., 1992).

Given the possibility that mortality salience may have simply increased preference for conservative values in both liberal and conservative participants, the authors conducted a second study in which the value of tolerance was primed in some individuals. Participants' evaluations of foreign students, one with a pro-US view and the other with an anti-US view, served as the dependent measure. The priming of tolerance attenuated the preference for the pro-US student over the anti-US student, but only in the mortality salience condition. This effect primarily occurred because of an increased preference for the anti-US student among these participants. Greenberg et al. (1992) concluded that the value of tolerance can counteract the effects of mortality salience on reactions to dissimilar others, either when it is primed or when it is important to the individual.

Kasser and Sheldon (2000) demonstrated the effect of mortality salience on another concept thought to be typical of the worldview of those in the United States—
financial gain. According to terror management theory, participants who are reminded of their mortality should increase their financial pursuits to bolster this worldview. Participants in the mortality salience condition wrote about their own death, whereas control participants were asked to write about music. When asked about their expected future financial status, participants in the mortality salience condition expected to be worth more financially than control subjects. Mortality salient subjects also expected to engage in more pleasure spending than control subjects.

Rosenblatt et al. (1989) examined alternative explanations for the effect of mortality salience on the worldview defense measures used. One alternative possibility they investigated was that negative affect, resulting from being reminded of death, caused the observed differences between the experimental and control groups. In the first three of their studies, mortality salience was manipulated by including a questionnaire that asked two questions: 1) “what will happen to them as they physically die”, and 2) “the emotions that the thought of their own death arouses in them” (Rosenblatt et al., 1989). Participants in the control condition did not receive this questionnaire. Negative affect was assessed in both mortality salience and control participants using the Multiple Affect Adjective Checklist (MAACL; Zuckerman & Lubin, as cited in Rosenblatt et al., 1989). Across all three studies, the researchers found no indication that the mortality salience manipulation altered affect (Rosenblatt et al., 1989, p. 682).

In Experiment 4 in the same series of studies, the authors tested the alternative possibility that increased self-awareness, resulting from self-reflection in the mortality salience manipulation, was causing the observed differences between groups. They performed the same mortality salience manipulation performed in Experiment 3, but had
some participants complete the questionnaires in front of a mirror. The purpose of the mirror was to increase self-awareness (Rosenblatt et al., 1989). If the observed differences between mortality salience and control participants was the result of increased self-awareness on the part of the participants in the mortality salience condition, then participants who did not experience the mortality salience manipulation but who filled out their questionnaires in front of a mirror should have the same level of worldview defense as those in the mortality salience condition. The researchers, however, found no significant differences between control subjects who completed questionnaires in front of a mirror and those who did not.

Another alternative explanation assessed by Rosenblatt et al. (1989) was the possibility that their findings were the result of increased arousal in the mortality salience condition. In Experiment 4, researchers essentially conducted a modified replication of Experiment 1 with the addition of measuring skin reactance, pulse rate, and pulse volume for all participants in order to examine arousal. Researchers did not find significant differences between mortality salience and control participants on any of the arousal measures.

TMT and the Body

Several studies have examined how perceptions of the physical body and physical activities, such as sex, are affected by thoughts of death. Mortality salience has been shown to influence the number of desired offspring (Wisman & Goldenberg, 2005), tolerance for physical sensations (Goldenberg et al., 2006), and future fitness intentions (Arndt, Schimel, & Goldenberg, 2003).
In a series of three studies, the moderating role of neuroticism on the effect of mortality salience on the appeal of physical sex was examined (Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999). Using terror management theory as a framework, the authors proposed that sex reminds us of our animal nature, which in turn reminds us of our mortality. In order to deal with this awareness, humans give sex meaning and incorporate it into our worldview. This association, however, is a problem for individuals high in neuroticism, because neuroticism has been found to correlate with worry about sex, guilt about sex, and the belief that sex is disgusting (Eysenk, as cited in Goldenberg et al., 1999). Based on this premise, the authors hypothesized that participants high in neuroticism would find physical sex less appealing after being reminded of death than either participants low in neuroticism or those high in neuroticism who had not been reminded of death. In the first study, the effect of mortality salience on appeal of sexual experiences was assessed, using neuroticism as a potential moderator of any effects. All participants completed the Neuroticism subscale of the Eysenck Personality Inventory (Eysenck & Eysenck, as cited in Goldenberg et al., 1999). Participants in the mortality salience condition completed a questionnaire consisting of 15 true-false questions about death, whereas control participants answered a similar questionnaire on watching television. Appeal of both the physical and romantic aspects of sex were examined using a 20 item measure. After a median split was conducted on neuroticism scores, the 2 (neuroticism) X 2 (mortality salience) ANOVA yielded a significant interaction. In the mortality salience condition, participants high in neuroticism rated physical sex less appealing than in the control condition. Participants
low in neuroticism rated physical sex as being more appealing in the mortality salience condition than in the control condition.

Goldenberg, McCoy, Pyszczynski, Greenberg, and Solomon (2000) conducted a series of three studies that examined the role of the body as a potential source of self-esteem in participants. They based their research on the belief that the body serves as an important basis of self-esteem in modern Western culture. In Study 1, the authors hypothesized that individuals with low body esteem would identify less with their bodies after being reminded of their mortality, whereas individuals high in body esteem would identify more strongly with their bodies after being reminded of their mortality.

Participants completed the Body-Esteem Scale (BES; Franzoi & Shields, as cited in Goldenberg et al., 2000) to establish high and low body esteem groups. To manipulate mortality salience, participants either completed a questionnaire that reminded them of their mortality (mortality salience condition) or a questionnaire about television (control condition). A body-identification questionnaire served as the dependent variable. A 2 (BES) X 2 (mortality salience) ANOVA revealed an expected main effect of body esteem. This effect was qualified by a significant BES X mortality salience interaction: Those high in BES exhibited greater body identification in the mortality salience group than in the control condition.

In Study 2 of the same series, Goldenberg et al. (2000) hypothesized that those high in body esteem would find thoughts of physical sex more appealing after being reminded of their eventual death than those with low body esteem. In a design similar to that used in Study 1, the authors administered the BES and manipulated mortality salience. The dependent measure was the same measure of the appeal of the physical
aspects of sex used as the dependent measure in Study 1 of Goldenberg et al. (1999). A 2 (BES) X 2 (mortality salience) ANOVA yielded an interaction between BES and mortality salience. As expected, participants high in BES rated physical sex as more appealing in the mortality salience condition than in the control condition. Also, as expected, in the mortality salience condition those high in BES found physical sex more appealing than those low in BES.

Wisman and Goldenberg (2005) demonstrated that reminders of mortality can affect the desire to have children. Having demonstrated that mortality salience increases the number of desired children for male participants but not females (Wisman & Goldenberg, 2005), the authors hypothesized that career ambition was a competing aspect of worldview that was differentially affecting women’s desired number of offspring. To test this hypothesis, researchers measured participants’ career strivings with a 4-item questionnaire. This was followed by manipulation in which participants in the mortality salience condition answered questionnaires asking them to a) describe the feelings they experience when they think of their own death and b) what they believe will physically happen to them when they die. Control participants received a similar questionnaire, except they responded to thoughts of a dentist visit. Participants then responded to questions about how many children they desired. A 2 (gender) X 2 (mortality salience) ANOVA revealed the expected gender x mortality salience interaction. Mortality salience increased the desired number of children for males. No effect of mortality salience was found for female participants. To examine the impact of career striving on this relationship, researchers conducted a multiple regression analysis with gender, mortality salience, and career striving. The authors found a main effect of career
strivings, with those high in career striving desiring fewer children. This was qualified
by a three-way interaction: Women high in career striving desired fewer children than
women low in career striving after the mortality salience manipulation. However, the
only effect for men was the expected increase in desired number of offspring in response
to the mortality salience condition, as was found in the two prior studies.

In a series of studies, Goldenberg et al. (2006) examined the moderating effects of
neuroticism on the relation between mortality salience and physical sensations. In Study
1, researchers examined the effect of mortality salience on performance on a cold-pressor
task. They hypothesized that individuals high in neuroticism would perform more poorly
after being made to think of their eventual death than would people low in neuroticism.
Mortality salience was manipulated using the questionnaire used in Wisman &
Goldenberg (2005). Control participants answered a parallel questionnaire concerning
failing an important exam. The cold-pressor task involved participants submerging their
forearm in cold water. Participants then completed a questionnaire concerning their
subjective evaluation of the cold-pressor task. A multiple regression analysis indicated
that there was the expected neuroticism by mortality salience interaction. Participants
high in neuroticism in the mortality salience condition spent less time on the cold-pressor
task than high neuroticism participants in the control condition.

In Study 2, Goldenberg et al. (2006) sought to replicate the findings of Study 1
with a pleasurable physical task. The basic design of Study 1 was replicated, with an
electronic foot massager replacing the cold-task. A multiple regression analysis revealed
an interaction between neuroticism and mortality salience. High neuroticism participants
spent less time using the massager in the mortality salience condition. Participants low in
neuroticism did not spend less time using the massager in the mortality salience condition than those in the control condition.

Arndt et al. (2003) examined the effects of mortality salience on fitness intentions. The purpose of the study was to assess whether fitness intentions could serve as a proximal defense against thoughts of death, regardless of whether the individual was high or low in fitness self-esteem. Fitness self-esteem was examined with a questionnaire and a median split divided participants into high and low fitness self-esteem groups. A mortality salience manipulation similar to those used in previous studies (Rosenblatt et al. 1989; Wiseman & Goldenberg, 2005) was used. Participants then read an article on the benefits of fitness, then responded with their future exercise intentions. A 2 (fitness self-esteem) X 2 (mortality salience) ANOVA revealed a main effect for mortality salience. Participants in the mortality salience condition demonstrated higher fitness intentions than the control group.

Health Anxiety and Hypochondriasis

Health anxiety is “a multifaceted phenomenon, consisting of distressing emotions (e.g. fear, dread), physiological arousal and associated bodily sensations (e.g., palpitations), thoughts and images of danger, and avoidance and other defensive behaviors” (Taylor & Asmundson, 2004, p.1). Health anxiety exists on a continuum, on the far end of which lies hypochondriasis. Hypochondriasis is a clinical disorder with an estimated prevalence in the general population of 1-5% (American Psychiatric Association, 2000). Hypochondriasis, as stated in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (American Psychiatric Association, 2000), involves a “preoccupation with fears of having, or the idea that one has, a serious
disease based on a misinterpretation of one or more bodily signs or symptoms” (p. 504). People with excessive health anxiety pay more visits to general practitioners and specialists and have more lab tests and more procedures performed than the general population, which can take a toll on the health care system (Taylor & Asmundson, 2004). It is estimated that approximately $20 billion each year is spent on unnecessary visits to the emergency room, doctor visits, and on unnecessary tests relating to hypochondriasis (Neziroglu, 1998).

Research on health anxiety as it relates to the five-factor model of personality indicates that health anxiety is correlated with neuroticism (Cox, Borger, Asmundson, & Taylor, 2000). Cox et al. (2000) found that neuroticism was a significant predictor of health anxiety. In addition, they found that the negative relation between health anxiety and the personality factors agreeableness and extraversion declined or disappeared when the effects of neuroticism were controlled for.

This purpose of the proposed study is to examine health anxiety in the context of terror management theory. Individuals with hypochondriasis often have intrusive fears of aging and death (American Psychiatric Association, 2000). How will those who are already more cognizant of their own mortality react to a mortality salience manipulation? Will it increase their worldview defense, as it has in other studies involving general student populations (Harmon-Jones, Simon, Pyszczynski, Solomon, & McGregor, 1997; Arndt & Greenberg, 1999; Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992)? Or will level of health anxiety attenuate the effects of mortality salience in some way?

To date, no study has examined the potential effects of health anxiety on the relation between mortality salience and worldview defense. Our experimental hypothesis
is that level of health anxiety will attenuate the previously demonstrated effects of mortality salience on worldview defense. This hypothesis stems from the fact that hypochondriasis is often accompanied by recurrent thoughts of death (American Psychiatric Association, 2000). If those high in hypochondriacal tendencies experience recurring thoughts of death, then it would follow that a manipulation reminding them that they are going to die would not have the same effect as it would on the general population, because they are already more aware of this inevitability.

This study will examine the relation between level of hypochondriacal tendencies and worldview defense after a mortality salience manipulation. In addition, it will attempt to replicate previous studies (Greenberg et al., 1992; Kasser & Sheldon, 2000) that have demonstrated the general effects of mortality salience on self-esteem striving. Because neuroticism is associated with health anxiety and because neuroticism has been shown to affect the relationship between mortality salience and a variety of outcomes (e.g., the appeal of the physical aspects of sex; Goldenberg et al., 1999), its effects will be statistically controlled for in the analyses.
CHAPTER II

METHOD

Participants

The participants were 65 undergraduates from the University of Southern Mississippi. The mean age of participants was 20.89, with a range of 18-51. Of the 65 participants, 18.5% were male and 81.5% were female; 44.6% were Caucasian, 53.8% were African American, and 1.5% were classified as “other.” Their participation was in partial fulfillment of the research participation requirement in their undergraduate psychology courses.

Instruments

The Illness and Attitudes Scales (IAS; Kellner, 1986) was used to assess health anxiety. The IAS is a self-report instrument which was designed to measure hypochondriacal and abnormal illness related fears, beliefs, and behaviors (Fischer & Corcoran, 1994). Test-retest reliability over one to four weeks ranges between .62 and .92, with all but one of the correlation at or above .75 (Fischer & Corcoran, 1994). The IAS also has good known-groups validity (Speckens, Spinhoven, Sloekers, Bolk, & van Hermert, 1996). It consists of 9 3-item subscales. For the present study, only the 5 subscales identified by Kellner (1986) as being most relevant to a diagnosis of hypochondriasis (i.e. hypochondriacal beliefs, concern about pain, bodily preoccupation, disease phobia, and worry about illness) were used to compute the IAS total. For the current study, the composite IAS score was internally consistent, with $\alpha = .85$.

Neuroticism was assessed with the Neuroticism subscale of the Big Five Inventory (John, Donahue, & Kentle, 1991). The Big Five Inventory is a 44 item
measure of personality that measures the “Big Five” dimensions of neuroticism, conscientiousness, extroversion, agreeableness, and openness. Three month test-retest reliability typically ranges between .80 and .90, and estimates of internal consistency usually fall between .75 and .90. (John & Srivasta, as cited in Clark, Boccaccini, Caillouet, & Chaplin, 2007). For the current study, the BFI was internally consistent, with α = .86.

The dependent variable, worldview defense, was measured using difference scores in preference for a pro vs. an anti-American author (see Appendixes C and D). Essays were handwritten and presentation order was counterbalanced. This measure, or a variation of it, has been used in several terror management studies and has yielded moderately large effect sizes (Arndt & Greenberg, 1999; Greenberg et al., 1992; Harmon-Jones et al., 1997). Difference scores were calculated for each individual by subtracting the composite score for the anti-American Essay from the pro-American essay. An average was calculated for the both the control and experimental group.

Procedure

Participants completed the IAS online prior to coming in for the experiment portion of the study. Participants were randomly assigned to either the mortality salience or control condition upon arrival. Each experimental session contained between one and six participants.

Upon arriving, participants were informed by the experimenter that they were participating in two short studies. The first study was described as an assessment of the relationship between personality and reactions to life events. Participants assigned to the mortality salience condition were given questionnaires used in Goldenberg et al. (2006)
that asked them to 1) describe the feelings that the thought of their own death arouses in them and 2) describe what they think will happen to them physically as they die and once they are dead (see Appendix A). Also as in Goldenberg et al. (2006), participants in the control condition were given a questionnaire that asked them to 1) describe the feelings that the thought of failing an important exam arouses in them and 2) describe what they think will happen to them after they failed the exam (see Appendix B). This was chosen in an attempt to create an alternate negative experience for participants to think of in an attempt to control for negative affect.

After the participants completed the questionnaires, they were informed that the "second study" was designed to assess Americans' reactions to foreigners' perspectives on the United States. This portion of the study was based on the procedure used in Harmon-Jones et al. (1997). The participants were asked to read and evaluate two essays, ostensibly written by foreigners, and to evaluate the essays. Each essay was presented in turn, along with an evaluation form (see Appendix E). The order of presentation of these two essays was counterbalanced.

As in Harmon-Jones et al. (1997), the forms used to evaluate each essay contained three items designed to assess the participants' evaluation of each author. Each question was rated on a nine-point Likert-type scale. The three questions asked the participant to rate 1) how much he or she liked the author; 2) how intelligent the participant believed the author was; and 3) how knowledgeable the participant believed the author to be on the subject.

After rating each essay, participants were given the Big Five Inventory (John et al., 1991) to assess neuroticism; this was the final questionnaire administered. After the
completion of the study, participants were thoroughly debriefed. Due to the minor deception in this study, participants were asked not to disclose the nature of this study to any other students so that the study was not compromised.

A t-test was conducted to determine whether there were significant differences in IAS score between the mortality salience and control groups. There were no significant differences between groups on the IAS, $t = -0.39, p = .95$. The zero-order correlations among neuroticism, health anxiety, and worldview defense are depicted in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>Neuroticism</th>
<th>Worldview Defense</th>
<th>Health Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>.96</td>
<td>-0.01</td>
<td>.13</td>
</tr>
<tr>
<td>Worldview Defense</td>
<td>-0.08</td>
<td></td>
<td>.05</td>
</tr>
<tr>
<td>Health Anxiety</td>
<td>.28</td>
<td>.47</td>
<td>.85</td>
</tr>
</tbody>
</table>

Note: The correlations for the control condition ($n = 32$) are above the diagonal, and the correlations for the mortality salience condition ($n = 32$) are below the diagonal. Alpha for the full sample is in bold along the diagonal.

The main hypothesis that health anxiety will moderate the relationship between mortality salience and worldview defense was analyzed using an ANOVA/regression model. The model included both condition (mortality salience vs. control) and health anxiety, as measured by the IAS, as independent variables. IAS scores were standardized.
CHAPTER III
RESULTS

Prior to examining worldview defense scores, it was necessary to determine if differences existed between groups on the IAS. A t-test was conducted to determine whether there were significant differences in IAS score between the mortality salience and control groups. There were no significant differences between groups on the IAS, \( t = -0.39, p > .05 \). The zero-order correlations among neuroticism, health anxiety, and worldview defense are depicted in Table 1.

Table 1
Indicator Correlations

<table>
<thead>
<tr>
<th>Neuroticism</th>
<th>Worldview Defense</th>
<th>Health Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuroticism</td>
<td>.86</td>
<td>-.01</td>
</tr>
<tr>
<td>Worldview Defense</td>
<td>-.08</td>
<td>-</td>
</tr>
<tr>
<td>Health Anxiety</td>
<td>.28</td>
<td>.47*</td>
</tr>
</tbody>
</table>

Note. The correlations for the control condition \((n = 33)\) are above the diagonal, and the correlations for the mortality salience condition \((n = 32)\) are below the diagonal. Alphas for the full sample are in bold along the diagonal.
*\(p < .01\)

The main hypothesis that health anxiety will moderate the relationship between mortality salience and worldview defense was analyzed using an ANOVA/regression model. The model included both condition (mortality salience vs. control) and health anxiety, as measured by the IAS, as independent variables. IAS scores were standardized...
and treated as a continuous measure. Condition was dummy coded (control = -1, mortality salience = 1), and an interaction term was created by multiplying condition by standardized IAS scores. Condition was then entered into the first step of a regression equation, IAS scores were entered into the second step, and the interaction term was entered in the third step. The difference between participants’ ratings for pro vs. anti-American essays served as the dependent variable (i.e., worldview defense).

The overall regression model was significant, $F(3, 61) = 3.37, p < .05, R^2 = .14$. The main effect of condition was not significant [$t(64) = 1.69, p > .05$]. Additionally, the effect of condition was not significant when entered alone in the first step of the regression equation [$t(64) = 1.71, p = .092$]. Therefore, there were no significant differences in worldview defense between the mortality salience and control conditions overall. However, the estimated effect size of condition is $d = .42$, which is considered a moderate effect size. This trend toward significance indicates that the expected effect might have been achieved if the analysis had more power. Additionally, there was not a significant main effect for IAS scores [$t(64) = 1.67, p > .05$], indicating that there was no relation between IAS score and worldview defense. As predicted, there was a significant IAS x Condition interaction [$t(64) = 2.09, p < .05$]. The results of this analysis were used to form two regression equations that described the relation between the IAS and worldview defense: one for the control condition (Worldview Defense = 2.60 - 3.91IAS) and one for the mortality salience condition (Worldview Defense = 5.75 + 3.52IAS). These regression lines are depicted in Figure 1.
Figure 1
Relation between Health Anxiety and Worldview Defense, by condition

Note. Level of Worldview Defense was determined by calculating the difference between a participant’s scores for the pro and anti-American essays. Level of health anxiety is based on IAS scores.

Although a significant IAS x Condition interaction was hypothesized, the effect was in the opposite direction than predicted, with individuals higher in health anxiety displaying greater worldview defense in the mortality salience condition than individuals who were less health anxious, $\beta = .47$, $t (30) = 2.90$, $p < .01$. In the control condition, there was no significant relation between IAS scores and worldview defense, $\beta = -.05$, $t (31) = -.28$, $p > .05$.

To determine the effects of neuroticism on worldview defense, the neuroticism subscale of the BFI was entered into the regression equations for the control condition and for the mortality salience condition. In the control condition, when neuroticism and
IAS score were entered into the model, the overall model was not significant, \( F(2, 29) = .03, p > .05 \). Additionally, the unique effect of neuroticism was not significant, \( t(29) = -.01, p > .05 \). In the mortality salience condition, the overall model (neuroticism and IAS scores) was significant, \( F(2, 29) = 5.30, p < .05 \). The IAS remained a significant predictor, \( \beta = .53, t(29) = 3.22, p < .01 \), but neuroticism did not contribute to the equation, \( \beta = -.23, t(29) = -.1.40, p > .05 \). See Table 3 for a depiction of these results.

Additionally, when neuroticism, condition, and the interaction between neuroticism and condition was used to predict worldview defense, this regression was not significant, \( F(3, 60) = 1.00, p > .05, R^2 = .05 \).

### Table 3

<table>
<thead>
<tr>
<th>Step</th>
<th>Predictor</th>
<th>( b )</th>
<th>( t )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Health Anxiety</td>
<td>1.51</td>
<td>.96</td>
<td>.19</td>
</tr>
<tr>
<td>2</td>
<td>Condition</td>
<td>1.57</td>
<td>.93</td>
<td>.20</td>
</tr>
<tr>
<td>3</td>
<td>Interactions</td>
<td>1.96</td>
<td>.94</td>
<td>.25*</td>
</tr>
</tbody>
</table>

\( R^2 = .04 \) for Step 1, \( \Delta R^2 = .04 \) for Step 2, \( \Delta R^2 = .00 \) for Step 3

\( *p < .05 \)
Table 2

Summary of Regression Analysis for Variables Predicting Worldview Defense (N = 64)

<table>
<thead>
<tr>
<th>Step</th>
<th>Condition</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>(n = 31)</td>
<td>1.65</td>
<td>.97</td>
<td>.21</td>
</tr>
<tr>
<td>Step 2</td>
<td>Health Anxiety</td>
<td>1.51</td>
<td>.96</td>
<td>.19</td>
</tr>
<tr>
<td>Step 3</td>
<td>Condition</td>
<td>1.57</td>
<td>.93</td>
<td>.20</td>
</tr>
<tr>
<td></td>
<td>Health Anxiety</td>
<td>1.57</td>
<td>.94</td>
<td>.20</td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td>1.96</td>
<td>.94</td>
<td>.25*</td>
</tr>
</tbody>
</table>

Note: $R^2 = .04$ for Step 1; $\Delta R^2 = .04$ for Step 2; $\Delta R^2 = .06$ for Step 3

* $p < .05$
Table 3

Summary of Regression Analysis for Health Anxiety and Neuroticism as Predictors of Worldview Defense

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Condition (n = 31)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Anxiety</td>
<td>-0.38</td>
<td>1.48</td>
<td>-0.05</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>-0.01</td>
<td>0.25</td>
<td>-0.01</td>
</tr>
<tr>
<td><strong>Mortality Salience (n = 31)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Health Anxiety                 | 4.02 | 1.25 | 0.53 *
| Neuroticism                    | -0.24| 0.17 | -0.23|

Note. For the control condition, $R^2 = .002$; for the mortality salience condition, $R^2 = .219$. 
*p < .05
CHAPTER IV

DISCUSSION

The primary hypothesis for this study was that level of health anxiety would attenuate the previously demonstrated effects of mortality salience on worldview defense. In contrast, higher levels of health anxiety were associated with increased effects of mortality salience on worldview defense. In other words, those higher in health anxiety engaged in greater worldview defense when they were reminded of their mortality than did individuals who were lower in health anxiety. Neuroticism did not contribute any unique variance in explaining this relation.

The increased levels of worldview defense that occurred in individuals higher in health anxiety indicates that individuals high in health anxiety are even more affected by thoughts of their own death than are individuals who are not high in health anxiety. Therefore, they more strongly defend their worldview. The initial hypothesis, that the effects of mortality salience on worldview defense would be attenuated for those high in health anxiety, was based on the idea that hypochondriasis is often accompanied by recurrent thoughts of death (American Psychiatric Association, 2000). It was proposed that if those high in hypochondriacal tendencies experience recurring thoughts of death, a manipulation reminding them that they are going to die would not have the same effect as it would on the general population because they are already more aware of this inevitability. However, in light of the current study, it is possible that individuals high in health anxiety are not only more likely to have recurring thoughts of death, but are more sensitive to death cues in the environment and have stronger reactions to death-related stimuli.
Implications for Terror Management Theory

A central tenet of terror management theory proposes that individuals need to feel as though they are living up to the standards of their worldview to experience high self-esteem and to defend against thoughts of their inevitable mortality. This study provides support for this tenet. If health anxious individuals are more afraid of illness and/or death than other individuals, then it would follow that they would engage in more worldview defense when reminded of their own death, according to this theory. This is exactly what the results of this study showed.

As previously discussed, Goldenberg et al. (1999) found that neuroticism moderated the effect of mortality salience on the appeal of physical sex. Specifically, they found that participants high in neuroticism rated physical sex as less appealing in the mortality salience condition than in the control condition. Participants low in neuroticism, on the other hand, rated physical sex as more appealing in the mortality salience condition than in the control condition. In the present study, neuroticism did not moderate the relation between health anxiety and worldview defense; neuroticism did not significantly predict worldview defense when entered independently from health anxiety. The different role played by neuroticism in these different terror management studies could be a result of different study design, including the use of different dependent variables or different measures of neuroticism. Terror management theory could benefit from future studies which clarify the role of neuroticism in the theory, both as a moderator and its direct influence on worldview defense.
Clinical Implications for Health Anxiety

Although it should be noted that this study did not use a clinical sample of health anxious individuals, the findings in this study may have implications for treating individuals with health anxiety. For example, most people can be expected to respond in a negative manner when receiving a terminal diagnosis. The results in this study, however, imply that health anxious individuals may respond even more strongly to such mortality-related news. They may engage in more “worldview defense,” i.e., they may have an even stronger need than non-health anxious individuals to ensure that they subscribe to a culture and live up to its standards. This may have implications in the manner of delivery of a terminal diagnosis to a patient who is already health anxious.

If self-esteem and a worldview provide a defense against thoughts of the inevitability of death on a normal basis, perhaps they can be used in a therapeutic manner. For example, when a patient is provided with a terminal diagnosis, allowing them to engage in some form of worldview defense or self-esteem striving may lessen the immediate aftershock of a devastating diagnosis. It would allow them to feel as though they have a culture to belong to and that the world has meaning. Perhaps specific intervention strategies for terminally ill clients can be developed involving “worldview defense” exercises, which can be engaged in during the weeks or months remaining in the individual’s life. They may help the patient feel that their life is grounded within their culture, that they have lived up to their cultural standards, and that their life has had meaning.

Additionally, this study may have implications for the treatment of health anxiety. Exposure to a feared stimulus is a common treatment component for many anxiety
disorders, including health anxiety (Taylor & Asmundson, 2004). The results of this study suggest that exposing an individual to thoughts of his or her own death may be an important component of any such treatment for health anxiety. For example, health anxious clients could be asked to think or write about their own death until the anxiety caused by this activity decreases to a certain level. This treatment possibility should be further explored with a clinical population.

From a clinical perspective, a better understanding of the nature of death-related thoughts in health anxious individuals may prove beneficial in treating their health anxiety. As discussed previously, one proposed explanation for the results of this study is that individuals high in health anxiety are not only more likely to have recurring thoughts of death, but are more sensitive to death cues in the environment and have stronger reactions to death-related stimuli. An alternate possibility is that those high in health anxiety do not experience recurrent, unprompted thoughts of death at a higher rate than those who are not health anxious. Rather, it is possible that those high in health anxiety are simply more sensitive to death related stimuli, and respond to cues in the environment at a higher rate. It appears as though they have unprompted, recurring thoughts of death when in actuality they are simply responding to environmental triggers. Reactions to death-related stimuli may comprise an important aspect of health anxiety that is currently unexplored. For example, the DSM-IV-TR (American Psychiatric Association, 2000) states that individuals diagnosed with hypochondriasis often have recurrent thoughts of death. Is it possible that they are not more likely to experience spontaneous, recurrent thoughts of death than non-hypochondriacal individuals, but experience more death-related thoughts because they are more sensitive to death-related cues in the
environment? Moreover, are health anxious individuals more likely to respond to all death related stimuli than individuals who are not health anxious, or is this phenomenon specific to contemplating their own mortality? These and other questions concerning the relation between health anxiety, recurrent thoughts of death, and reactions to death-related stimuli should be further explored.

Limitations and Directions for Future Research

One of the limitations of the present study was the use of a college student sample instead of a clinical sample of hypochondriacal patients. Although health anxiety is conceptualized as a dimensional construct, it is possible that those at extremely high end of the spectrum (i.e. those diagnosed with hypochondriasis) would have responded differently when asked to contemplate their own mortality. This can be explored in the future through replication of this study with a clinical sample.

Another potential limitation to this study is the relatively small sample size. The current study included 65 participants, with 33 participants in the control condition and 32 participants in the mortality salience condition. A power analysis suggested that the failure to replicate the significant effect of condition found in previous terror management studies is likely due to the small sample size of this study.

Another potential limitation to this study is the absence of a global trait anxiety measure. Health anxiety is related to both a ruminative cognitive style (Marcus, Hughes, & Arnau, 2008) and neuroticism (Cox et al., 2000), which are both correlates of anxiety in general. In the present study, it is difficult to determine whether the observed results are due to health anxiety specifically, or are due to more general anxious tendencies that may overlap with health anxiety. In the present study, the BFI was administered, which
includes a neuroticism subscale. This subscale has several anxiety-related items (i.e., “is tense”; “worries a lot”). Neuroticism did not contribute a unique amount of variance to the explanation of worldview defense scores. This suggests that the observed results of this study are not due to anxiety in general; however, future replications of the study may benefit from a more thorough, global anxiety measure. If the observed results are not due to anxiety in general, as the present study suggests, are there other specific anxiety disorders for which similar results may be found (e.g. individuals with blood, injury, or injection phobias)? These effects should be sorted out in the future via replication with the addition of a broader measure of anxiety that taps into forms of anxiety other than health anxiety. Moreover, the role of anxiety in terror management theory has thus far been completely ignored and certainly merits exploration in its own right. The exact role of both trait and state anxiety in terror management theory is an area ripe for future research.

In spite of these limitations, this is an interesting and potentially important contribution to the literature on both terror management theory and health anxiety. It raises many new questions and points to new directions for future research. What does increased worldview defense mean for those with health anxiety? What is the exact role of anxiety generally, and health anxiety specifically, in terror management theory? Hopefully future studies will answer these questions and fill in the missing links between these two areas of interest.
APPENDIX A

MORTALITY SALIENCE QUESTIONNAIRE

Describe the feelings that the thought of your own death arouses in you

Describe what you think will happen to you physically as you die and once you are dead
APPENDIX B

CONTROL QUESTIONNAIRE

Describe the feelings that the thought of failing an important exam arouses in you.

Describe what you think will happen to you after you failed the exam.
APPENDIX C

ANTI-US ESSAY

When I first came to this country from my home in XXXXX I believed it was the "land of opportunity" but I soon realized this was only true for the rich. The system here is set up for the rich against the poor. All people care about here is money and trying to have more than other people. There is no sympathy for people. It’s all one group putting down others and nobody cares about the foreigners. The people only let foreigners have jobs like pick fruit or wash dishes because no American would do it. Americans are spoiled and lazy and want everything handed to them. America is a cold country that is insensitive to needs and problems of foreigners. It thinks it’s a great country but its not.
APPENDIX D

PRO-US ESSAY

The first thing that hit me when I came to this country, was the incredible freedom people had. Freedom to go to school, freedom to work any job you want. In this country people can go to school and train for the job they want. Here anyone who works hard can make their own success. In XXXXX most people live in poverty with no chance of escape. In this country people have more opportunity for success than any other and success does not depend on the group belong to. While there are problems in any country, America truly is a great nation and I don’t regret my decision to come here at all.
APPENDIX E

ESSAY RATINGS

Please answer the following questions about the essay you just read. Use the following scale:

1 ............. 2 ............. 3 ............. 4 ............. 5 ............. 6 ............. 7 ............. 8 ............. 9
Not at all       Neutral       Very Much

How much do you like the author? _______

How intelligent do you think the author is? _______

How knowledgeable do you think the author is on the subject? _______
APPENDIX F

IRB APPROVAL FORM

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: 28041405
PROJECT TITLE: Does Health Anxiety Moderate the Effects of Mortality Salience on Worldview Defense?
PROPOSED PROJECT DATES: 03/24/08 to 03/24/09
PROJECT TYPE: Dissertation or Thesis
PRINCIPAL INVESTIGATORS: Toni Merkey
COLLEGE/DIVISION: College of Education & Psychology
DEPARTMENT: Psychology
FUNDING AGENCY: N/A
HSPRC COMMITTEE ACTION: Expedited Review Approval
PERIOD OF APPROVAL: 04/14/08 to 04/13/09

Lawrence A. Hosman, Ph.D.
HSPRC Chair

Date 4-17-08
REFERENCES


identification with one’s body, interest in sex, and appearance monitoring.


