# RELATIONSHIP BETWEEN HEALTH AND REACTIVITY TO MORTALITY SALIENCE

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**ABSTRACT**

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The Mortality Salience (MS) postulate of Terror Management Theory states that subtle reminders of death increase an individual's attempts at identifying and aligning themselves with their cultural groups and values, an affect unique to MS (termed worldview defense; Greenberg, Pyszczynski, & Solomon, 1986). Evidence for negative effects of worldview defense include health-related effects such as the willingness to participate in risky sexual behaviors and risky scuba dives, increased aggression, and increased racism, among others (Greenberg, Schimel, Martens, Solomon, & Pyszcznyski, 2001; Miller & Taubman—Ben-Ari, 2004; Taubman—Ben-Ari, 2004). Research on relationships between MS and health is a relatively new area, and little is known of the effect of reactivity to a stimulus in response to MS. The author hypothesized that the

amount of reaction to noise startle during an MS induction procedure will be more related to health variables than the amount of reaction to noise startle during an anxiety induction procedure. Either MS or anxiety was induced in individuals, 34 of which gave valid responses to noise bursts after induction. Reactivity to noise startles between MS or anxiety groups were measured via Skin Conductance Response, and regressions were performed in an attempt to predict reactivity to MS based on health better than reactivity to anxiety based on health. Several health variables significantly predicted reactivity to MS and reactivity to anxiety; however, none of these significant predictors were more related to MS than anxiety. Therefore, results of the study did not support the hypothesis.

# CHAPTER I

## INTRODUCTION

Since September 11, 2001, terrorism has been in the back of the minds of the U.S. people, resulting in a sense of unease and insecurity. Possibly as a result of this insecurity, we have undergone major efforts in an attempt to thwart future terrorist attacks. Operation Enduring Freedom, the Department of Homeland Security, and vigilantes guarding the U.S. southern borders are just some examples. Might this sense of unease and insecurity spur us to action, and what are some of the effects that this insecurity may have on individuals? The answer to these questions may lie in an existentialist phenomenon that has been dubbed Terror Management Theory (TMT).

### Terror Management Theory

#### *Background and Explanation of the Model*

Building off the work of Becker (1973) and others, TMT is a theoretical model that attempts to explain many human behaviors through the notion that all humans possess higher-order thought, which includes the thought that they will eventually, unavoidably, die. This thought has the potential to cause overwhelming anxiety in the individual (Greenberg, Pyszczynski, & Solomon, 1986). Humans are motivated to perform behaviors that keep themselves from experiencing this overwhelming anxiety about death. According to TMT, the basic way in which an individual deals with this anxiety (unconsciously) is by performing tasks that have the effect of increasing that

individual's self-esteem; in other words, placing that individual under a more positive view, and providing feelings of self-worth (Greenberg et al., 1993).

A number of studies have supported this self-esteem anxiety-buffer hypothesis. See Psyznynski, Greenberg, Solomon, Arndt, and Schimel (2004) for a review of many of the findings in support of this hypothesis. In addition, the reader is encouraged to view table 8 located at the end of this manuscript, for a brief overview of many of the TMT articles cited here. In one study, for example, participants were given bogus neutral or positive feedback on a fake intelligence test, meant to bolster self-esteem in the positive feedback group. Then participants were hooked up to a skin conductance meter and told either that they would be receiving either electric shocks or visual stimuli. Participants that were given the positive feedback had less anxiety about the shocks than participants that were given neutral feedback (Greenberg et al., 1992). The reader is also referred to Becker's *Denial of Death* (1979) for a detailed description of the human need for self-esteem as a response to death anxiety.

According to TMT, a particular method of boosting self-esteem is by an individual defending his or her cultural worldviews. Cultural worldviews are those symbols or concepts that an individual identifies with that, in turn, provide a sense of security, and order in life (Greenberg, Pyszczynski, & Solomon, 1986). A cultural worldview, for example, could be a specific religion or race an individual identifies with, or a set of common values or belief systems. This effect of higher self-esteem and defense of the worldview has been seen in research. For example, individuals rated high in self-esteem as well as individuals who were given a boost in self-esteem showed both decreased anxiety and decreased defense of the worldview (Greenberg et al., 1992;

Greenberg et al., 1993). Furthermore, in a set of studies providing evidence for this self-esteem buffer for worldview defense, participants were either given bogus positive/neutral feedback after taking a "personality test", or were assessed for their levels of self-esteem. Worldview defense was decreased in both the bolstered self-esteem group relative to the non-heightened self-esteem group, and in individuals high in trait self-esteem relative to individuals low in trait self-esteem (Harmon-Jones et al., 1997).

The Mortality Salience (MS) hypothesis of TMT follows from this cultural worldview-anxiety buffer effect, and states that if individuals indeed deal with their anxiety by boosting their self-esteem through defending their cultural worldviews, then increasing anxiety about death should promote even more energetic defense of cultural worldviews (Rosenblatt, Solomon, Greenberg, Pyszczynski, & Lyon, 1989). This defense of the worldview could be both by heightening positive viewpoints toward persons or things that fit an individual's worldview, and heightening negative viewpoints toward persons or things that don't fit an individual's worldview.

The MS hypothesis has resulted in a number of research publications based on TMT. In a typical study testing this hypothesis, MS is induced by having some individuals write their thoughts on their own death via two open response questions: "Please briefly describe the emotions that the thoughts of your own death arouse in you" and "Jot down, as specifically as you can, what you think will happen to you as you physically die"; and by having other individuals write their thoughts on similarly-worded open-response questions designed to evoke anxiety or neutral thoughts: Ex. "Please briefly describe the emotions that the thoughts of having pain during a dental procedure

arouse in you" and "Jot down, as specifically as you can, what you think will happen to you as you physically experience this dental pain" (Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997). After this induction procedure, the amount of cultural worldview defense is measured on some topic. For example, after the induction procedure and a distraction task, Arndt, Greenberg, Solomon, Pyszczynski, and Simon (1997) gave an essay in which the author proclaimed anti-U.S. sentiment and asked participants to rate how much they liked the author of the essay. The distracter task is typically included to produce a distal rather than proximal defense (described within the next subsection). Using similar procedures, MS-induced individuals have produced a number of studies that demonstrate heightened worldview defense, an effect that typically fails to show for a number of anxiety-based controls such as dental pain and social rejection. Therefore, it appears that this effect of heightened worldview defense does not occur using other forms of anxiety; it is unique to MS (Landau et al., 2004).

While much of the research on MS has been done using the induction procedure described above, other procedures have been used to induce MS as well. For example, Individuals who were interviewed in front of a Funeral home showed heightened worldview defense compared to individuals who were interviewed several blocks away (Jonas, Schimel, Greenberg, & Pyszczynski, 2002).

*The Dual Defense Extension of Terror Management Theory*

Pyszczynski, Greenberg and Solomon (1999) formalized an extension to TMT in an attempt to explain previous findings that the MS manipulation does not appear to produce worldview defense in an individual every time. This dual-process hypothesis accounts for these previous findings by proposing that producing an increase in

accessibility to death-related thoughts and defense of the worldview depends on whether these death primes are in conscious thought (termed proximal) or outside of conscious thought (termed distal). Since then, research has found that increases in accessibility to death-related thought and worldview defense typically only occurs when the MS manipulation is: 1) Presented outside of conscious processing (e.g. masked word presentations; Arndt, Allen, & Greenberg, 2001); 2) occurring along with a task designed to increase cognitive load (e.g. trying to recall a ten digit number at the same time; Arndt et al., 1997); or 3) is followed by a distraction before measurements of defense of the worldview are taken (e.g. a 20-item scale asking to respond about leisure activities; Taubman, 2004). These are cases of distal defenses, as the individual would not be focusing on the mortality salience induction itself.

According to the dual-defense extension, an individual that is primed for mortality initially undergoes a defense that is focused on consciously dealing with the anxiety from suddenly being more aware of their possibility of dying (a proximal defense), often by suppressing or ignoring the thoughts (Greenberg et al., 1994). This proximal defense is typically short-lived, and gives way to a distal defense after the individual has implemented their strategy to deal with the threat (Pysczynski, Greenberg, & Solomon, 1999). In this distal defense, the individual is no longer actively dealing with the threat of thoughts of death; instead, the individual often reacts during this time by vigorously defending their worldview, by showing greater accessibility to death-related threats, and by seeking out ways to increase self-esteem (Arndt, Routledge, Cox, & Goldenberg, 2005). The sense is that in distal defenses, the individual is not explicitly aware that they are reacting in this way (Pyscznynski, Greenberg, & Solomon, 1999). For a more

detailed description of this addition to TMT, the reader can refer to Pyscznynski, Greenberg, and Solomon (1999).

*Overall Impact of Worldview Defense in Response to Mortality Salience*

Briefly, several empirical studies have shown that some worldview defenses in response to MS have benign or beneficial effects. As a demonstration of the beneficial effect of MS, individuals were interviewed in front of a funeral home or several blocks away (Jonas, Schimel, Greenberg, & Pyszczynski, 2002). The individuals interviewed in the presence of a funeral home demonstrated increased worldview defense by contributing more money to charities than the individuals interviewed several blocks away, but only when the charities were not international (e.g. only when an individual can identify with the charity; Jonas, Schimel, Greenberg, & Pyszczynski, 2002).

Many worldview defenses that individuals engage in, however, seem to be destructive toward others. For example, research has found heightened worldview defense in the form of aggression and racism toward others, in individuals that have had MS induced. In addition, MS inductions have been shown to produce heightened worldview defense within individuals, such as increased willingness to participate in risky scuba dives, increased willingness to suntan despite knowledge of tanning's detrimental effects, and increased willingness to engage in risky sex (Greenberg, Schimel, Martens, Solomon, & Pyszczynski, 2001; McGregor et al., 1998; Miller & Taubman—Ben-Ari, 2004; Taubman—Ben-Ari, 2004).

*Health-Related Impact of Worldview Defense in Response to Mortality Salience*

Research on the health-related impact of MS is still relatively small, but is beginning to grow. Hirschberger, Florian, Mikulincer, Goldenberg, and Pyszczynski

(2002) found that making mortality salient increases drug and alcohol use among men; and Grabe, Routledge, Cook, Anderson, and Arndt (2005) found that females under the MS condition have more of a tendency to objectify themselves and other women than female controls. A recent article by Arndt, Routledge, Cox, and Goldenberg (2005) provides a review of TMT, with an emphasis on the psychological and physical well-being of people affected by this paradigm.

One study by Cicirelli (2002) measured relationships between a number of health-related variables and fear of death among an aging population. Cicirelli assessed these participants for Fear of the Known and Fear of the Unknown using the Multidimensional Fear of Death scale, and compared the results to levels of self-esteem, religiosity, LOC, socioeconomic status, social support, and health variables, as well as demographics such as age and marital status. Participants scoring lower in "Fear of the Unknown" also showed greater levels of religiosity, higher self-esteem, more social support, higher socioeconomic status, and less external LOC. Participants scoring lower in this fear also showed greater levels of religiosity, higher self-esteem, higher socioeconomic status, less external LOC, better health, and were more often men (Cicirelli, 2002).

One of the most prolific portions of health-related TMT research involves risky behaviors. Decisions to engage in risky behaviors often involve weighing the possible costs versus the likely benefits of an action, and a growing body of literature indicates that making mortality salient could cause an individual to place more weight in the likely benefits of an action. In support of this notion, Taubman—Ben-Ari (2004) found that induced-MS increases an individual's willingness to engage in risky sexual behaviors, though it also increased individuals' self-reported fear of intimacy. Miller and

Taubman—Ben-Ari (2004) found that scuba divers with low self-esteem or low self-efficacy to complete a dangerous dive were more likely to perform the dive under the MS-induced condition than controls. Taubman—Ben-Ari found that for men that identified driving as associated with their self-esteem, priming them for mortality increased their likelihood of engaging in reckless driving. The mortality salience process has also been shown to cause individuals to indicate a higher level of desire to suntan despite knowledge of tanning's role in skin cancer (Routledge, Arndt, & Goldenberg, 2004).

There is evidence that MS plays a role in the psychological well-being of individuals as well, particularly among depressed individuals. A set of studies by Simon, Greenberg, Harmon-Jones, Solomon, and Pysczynski (1996) explored the results of MS inductions among mildly depressed individuals. They found that depressed individuals responded to an MS induction with a more vigorous defense of the worldview compared to non-depressed controls, and that this more vigorous defense results in higher ratings of meaning of life for these individuals. The authors concluded that the vigorous worldview defense functions as a coping strategy meant to increase meaning of life for these individuals (Simon et al., 1996).

It should be noted that despite all the negative health behaviors associated with mortality salience, there is potential for mortality salience to spur positive health change. Positive attitudes toward health behavior modification may cause reminders of death to instead make an individual desire positive change in their lives. In a manuscript currently under review by Arndt, Cook, Goldenberg, and Cox (as cited in Arndt et al., 2005), women optimistic about their health were more likely to conduct a breast self-

examination in the near future after an MS induction procedure, and had higher desire for health information than women who were not optimistic about their health. In another study, Arndt, Schimel, and Goldenberg (2003) found that an MS induction procedure resulted in greater intention to obtain a higher level of fitness among participants who had high self-esteem. With that said, however, the MS induction also has been shown to cause women to eat less of a food identified to them as nutritious but fattening, relative to controls when their body-mass index was higher than the mean for their age (Goldenberg, Arndt, Hart, & Brown, 2005). Therefore, while MS could be related in some cases to positive health effects, the majority appears to be negative, and many health-related effects of MS inductions are likely moderated by other variables.

*Mediators of Mortality Salience Effects*

It appears that increasing one's salience of their death often has negative effects on the individual and those with whom he or she interacts. However, this is not the whole story. It appears that there are some other significant mediating factors to worldview defense in addition to self-esteem. In particular: An individual's Locus of Control (LOC) appears to mediate the amount of worldview defense as a result of mortality salience; the amount and type of reaction to mortality primes appears to mediate worldview defense (as opposed to simply whether an individual has been primed or not); and the amount of mortality salience may be influenced by previous death-related experiences or general death awareness.

As stated, research has shown that LOC appears to mediate the amount of worldview defense to mortality salience. In one study, Miller and Mulligan (2002) found that external-LOC individuals under the MS-induced condition showed more willingness

to drive while under the influence of alcohol, whereas internal-LOC individuals under the MS-induced condition showed less willingness to drive while under the influence. Cicirelli (2002) found that individuals with less external LOC were related to both higher fear of the known and fear of the unknown. In addition, Cicirelli found that high self-esteem was associated with less external LOC.

It also seems likely that the amount and type of reaction to mortality primes plays a mediating factor. Higher levels of Fear of Death, as measured by the Multidimensional Fear of Death Scale, have been linked to more negative attitudes against the elderly (Depaola, Griffin, Young & Neimeyer, 2003). In addition, one study found that college students who smoked recently scored higher levels of anxiety about death, and this effect was only seen when participants thought of smoking before taking the death anxiety scale (Kain & Nelson, 2001).

Finally, it is likely that a participant's pre-existing level of death-related experience and awareness in his or her life may mediate the results of an MS induction. Typical MS procedures induce Mortality Salience, but some studies instead measure pre-existing levels of anxiety about death. Measures such as the Multidimensional Fear of Death scale, the Death Anxiety Scale, and the Collett-Lester Fear of Death scale have been developed in order to allow for measuring this state (Hoelter, 1979; Lester, 2004; Thorson & Powell, 1992). Orit-Taubman (2004) used a modified form of Greenberg, Pyszcznynski, Solomon, Simon, and Breus's (1994) word-stem completion task to measure accessibility of death-related thoughts, and found that individuals who had previously thought of engaging in risky sexual behavior were more likely to complete word-stems with a death-related word than a neutral word, compared to individuals who

had thought of preparing food. Cicirelli (2002) used the Multidimensional Fear of Death Scale to measure the levels of death-related fear of the known and fear of the unknown, and correlated these results with several death-related variables.

While these scales have the potential for establishing a link between death-related experience and awareness to health and other effects, they tend to be less sensitive than the MS induction procedure and their use is likely itself to induce MS. Establishing links to "trait" MS and worldview defense effects may require more sensitive methods than scales. Measures of physiological arousal may provide a solution, as they can be very sensitive, noninvasive, and can measure reactivity shortly after a response. One such physiological measure is Electrodermal Activity.

## Measures of Electrodermal Activity

### *Introduction*

Since its initial discovery over 120 years ago, measures of electrical activity across the skin (EDA) have become one of the most-used indexes of excitation in research (Dawson, Schell, & Filion, 2000). The human body's dermal layers (skin) are inundated with glands that release moisture (sweat). Though this moisture primarily serves the purpose of regulating the heat level of the body (thermoregulation), sweat located on the palmar and plantar surfaces (hands and feet) also serve to increase grip. In addition to sweating in response to thermoregulation and grasping, the dermal layers also appear to sweat in response to emotions and startle (Dawson, Schell, & Filion, 2000). One explanation for sweating in response to emotions and startle is simply that the sweating occurs in response to the accompanying changes in temperature that happens as level of excitation increases. Another possible explanation for the changes in

temperature as a result of an individual's excitation, however, comes from an evolutionary perspective in which the sweating response may have become linked to excitation in order to prepare the body during the start of a fight or flight response (Dawson, Schell, & Filion, 2000).

Regardless of the reasons for sweating in response to excitation, there is biological evidence to supporting the notion that electrodermal activity is related to levels of excitation and to the fight or flight response. According to Boucsein (1992, pp. 30-36), there are three cortical pathways that result in electrodermal activity: 1) Influence from the hypothalamus and limbic system, including the amygdala and hippocampus; 2) Influence from the pre-motor and frontal cortex; and 3) Influence from the activation of the reticular formation. These centers of the brain are responsible for (respectively): 1) Hormonal regulation, the fear response, and emotional affect; 2) Fine motor control, cognitive load, and prioritizing of attention; and 3) Muscle tenseness and gross motor movements. The first pathway is likely what results in the link between sweating and emotions.

The specific process by which the body responds to excitation by sweating, however, is relatively less-known. It appears that the eccrine sweat glands release a certain amount of sweat into a duct that traverses all of the dermal layers. The sweat in the duct then rises and falls based on the amount of sweat released. Electrical impulses vary based off of this rising and falling of the sweat because when sweat rises within the duct, electrical currents pass across the skin more easily. Likewise, when sweat drops within the duct, electrical currents do not pass across the skin as easily (Dawson, Schell, & Filion, 2000).

Therefore, measurements of electrodermal activity are measurements of the electrical conductance across skin levels which vary based on the amount of sweat within the sweat ducts. This amount of sweat further varies based on a number of physiological responses to, among other things, emotions and startle responses. Although this measure is therefore somewhat of an indirect measure of the level of excitation and response to startle, the changes occur fairly rapidly. Furthermore, the measurements are very accurate and measurable at a high sample rate (Dawson, Schell, & Filion, 2000). The process is also non-invasive, and only requires the attachment of electrodes that measure electrical charge. This makes measures of Electrodermal Activity highly suitable for measuring the response to startle procedures. Measures of electrodermal activity therefore are widely used in research, especially in studies which measure responses to a startle induction procedure.

It should also be noted that there are several different terms for the measurement of various types of electrodermal activity. Measures of the amount of electrical conductance across the skin over time and without a stimulus (tonic levels) are often referred to as skin conductance level (SCL) or the inverse, skin resistance levels (SRL). Measures of the amount of electrical conductance across the skin in response to a stimulus are often referred to as a skin conductance response (SCR) or the inverse, skin resistance response (SRR). There are several other terms that have been used, but these are found most often (Dawson, Schell, & Filion, 2000).

*The Use of Physiological Measures in Mortality Salience*

Physiological measures would seem to hold particular promise in picking up on reactions to MS, as data can be collected with a high degree of sensitivity. However,

attempts at physiological measures from MS-inductions have yielded mixed results. Rosenblatt, Greenberg, Solomon, Pyszczynski, and Lyon (1989) could not find any differences from controls on affect using measures of EDA. In addition, a subtle difference from controls was found using measures of facial electromyography, measuring reactions to implicitly presented death primes. In this particular study, the participants did not perceive the presence of the death prime, but nevertheless registered a physiological reaction to the prime. However, this effect was not related to the amount of worldview defense an individual showed (Arndt, Allen, & Greenberg, 2001). Greenberg et al. (1992) did find that increasing self-esteem (by giving bogus positive feedback on "intelligence" and "personality" tests) resulted in less EDA during threats of electric shocks, though this study did not utilize an MS-induction procedure. Researchers in one study did find heightened EDA utilizing an MS-induction procedure, when measuring a noise startle, though data from this experiment was unfortunately lost before it could be published (Solomon, Unpublished Data). Therefore, past attempts at using physiological measures have been less than satisfactory. General conclusions from these studies are that there may be a difference in reaction between MS groups and control groups, but the differences were difficult to produce and at any rate were not related to the degree of worldview defense (Arndt, Allen, & Greenberg, 2001).

Based on the past research using physiological measures, it appears that, while highly sensitive, these measures may still not be sensitive enough to consistently pick up on subtle differences between reactions from the MS condition and control conditions. However, the research also hints that it may be possible to distinguish differences when reactions to the MS induction procedure are also experimentally exaggerated. A startle

procedure such as a noise burst or a balloon popping may have this effect. Exaggerating this response may furthermore provide another avenue to determine whether there is a detectable relationship between the degree of MS reaction and amount of worldview defense. This is an avenue that is yet to be explored in detail under MS research. In response to the lack of data in MS research using physiological measures and a startle procedure, this experiment utilizes physiological measures of EDA, and measures the reactivity to a startle procedure.

To summarize, EDA is one of the most widely used physiological measures of excitation, particularly because of its relatively fast response, measurable reactivity levels, and noninvasive nature (Dawson, Schell, & Filion, 2000). Its ability to produce accurate and sensitive measurements of emotional arousal to stimuli may provide more substantial data than simple questionnaires. EDA works by passing a small, unrecognizable and harmless current across an individual's skin, whose level of sweat varies slightly due to stimuli, including emotional stimuli (Dawson, Schell, & Filion, 2000). Eccrine glands release more sweat as an individual becomes more excited, which measurably lowers the resistance to voltage across the skin (Dawson, Schell, & Filion, 2000). EDA has been in use for a long period of time; however, relatively few studies focusing on a TMT model have used either it or other forms of physiological measures. This may be due to mixed results obtained from the few TMT studies that have utilized physiological measures. The general consensus is that while MS may be related to physiological arousal, the physiological arousal is not likely related to worldview defense (Arndt, Allen, & Greenberg, 2001). The author is not aware of any TMT studies, however, that utilize reactivity to mortality salience as a measure, and this avenue may

hold promise in the linking of Mortality Salience to worldview defense and to health-related variables.

## Summary of TMT

To summarize the previous sections, TMT attempts to explain many human behaviors through the notion that all humans possess higher-order thought, which includes the thought that they will eventually die. This can cause anxiety in individuals, who are motivated to perform tasks designed to increase self esteem in order to develop a sense of self-worth and thus cope with the anxiety that stems from thoughts of death (Greenberg et al., 1993; Greenberg, Pyszczynski, & Solomon, 1986). One of the ways that self-esteem can be increased is by aligning with cultural worldviews, and research has shown that inducing thoughts of death (termed mortality salience) promotes more vigorous defense of the worldview (Rosenblatt, Solomon, Greenberg, Pyszczynski, & Lyon, 1989). However, this worldview defense as a result of mortality salience typically only occurs in cases in which the individual is not actively thinking about ways to cope with this anxiety (i.e. when an individual is dealing with anxiety about death in the distal sense; Pyszczynski, Greenberg, & Solomon, 1999).

Worldview defense as a response to MS has been shown to have a number of negative effects, and a few positive ones. In addition, some constructs have been shown that mediate the effects of mortality salience (e.g. Locus of Control; Miller & Mulligan, 2002). What is known appears to point to the notion that worldview defense can result in negative health consequences. However, it remains that relatively little is known about health relationships with MS, possibly due to the sensitivity of the measures required to conduct this type of research. Physiological measures may hold some promise in

developing measures of MS that are sensitive enough to pick up on the subtle differences that may be related to health. The use of physiological measures in past TMT research has met with mixed results, but there are several different physiological measures available and several different ways to measure MS. Therefore, physiological measures may yet hold some promise.

## The Current Study

Based on the existing research indicating that there may be health effects of MS-manipulations, that health may influence reaction to MS manipulations, and that the majority of these effects are likely to be negative on health, I propose that there will be an overall negative (or inverse) relationship between individuals' reactions to a MS induction and startle procedure, and that individual's health. Furthermore, I propose that this relationship will be stronger than any similar relationship seen by anxiety-induced controls. As previous research has shown LOC to be a mediator in the effects of MS-inductions on health (Miller & Mulligan, 2002), I propose that it may play a similar mediating role, such that low internal LOC individuals will show lower health than high internal LOC individuals. To the author's knowledge, no other study has tested whether the level of reactivity to mortality salience is related to several different health-related variables while using the MS induction procedure.

The researcher needed to accomplish five things in order to correctly answer these hypotheses: 1) The researcher needed to retain the MS-induction paradigm to ensure that the MS construct was the same as was done in the number of other studies. In order to ensure that the paradigm is the same, the researcher added a form asking for ratings of the author of an essay proclaiming Anti-U.S. sentiment. Measures of Anti-U.S. has been

used in the past as a dependent measure of the effect of an MS induction procedure (e.g. ; Greenberg, Martens, Jonas, Eisenstadt, Pyszczynski, & Solomon, 2003; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992). In this case, however, this measure was used as a check for validity. If similar results in worldview defense were obtained in this study, then it is likely that the procedure is a measure of the same construct.

2) Due to the subtlety of differences between mortality salience and anxiety-based controls, the researcher required one of the most sensitive and non-invasive measures of reactivity. This necessitated a psychophysiological measure, and though there were a number of measures to accomplish this, the experimenter chose skin conductance, combined with noise bursts during recording to increase measurable reactivity change. This was done for the reasons mentioned above.

3) In order to focus on overall health, rather than some aspect of health, the researcher needed to measure a number of different dimensions of health. Therefore, several questionnaires were created which measured a number of different health-related variables. In addition, the experimenter chose a widely available, relatively quick measure of overall quality of live on several different dimensions: The World Health Organization Quality of Life Survey – Brief Version. It should be noted that many studies focus on one or two aspects of health, or physical health. This study, however, focuses on an individual's health as having multiple dimensions, to include physical, emotional, psychological, and environmental health among others. The focus is intended to be on overall health, and therefore care was taken in selecting measures that attempted to get at overall health, rather than simply one aspect of health.

4) An individual's overall health was considered by the researcher to be somewhat stable and having a preexisting point at the time of the experiment. An individual was not likely to be of good health at the start of the experiment, and fatally ill at the end of the experiment, for example. Therefore, the researcher needed to build the hypotheses and design in attempting to get at an aspect of MS that TMT has up to this point not placed much emphasis on: Trait mortality salience. Individual traits are considered, in common literature, to be aspects of an individual that are pre-existing and relatively stable across a period of time. Individual states, however, are considered to be much less stable, of shorter duration, and influenced by the conditions that exist at that period of time (see Spielberger, 1972, for a more thorough description of the differences between state and trait as related to anxiety). For the purposes of this research, the author defines trait mortality salience as the amount of anxiety someone has of their own possibility of dying from day to day, whereas the author defines state mortality salience as the amount of anxiety someone has about their own possibility of dying *as a result* of a mortality salience stimulus. The researcher felt that it was important to focus on an individual's trait mortality salience because the health relationships measured were of a more stable nature; therefore, the type of mortality salience that was likely to be related to overall health was trait mortality salience. As a result, the researcher chose differences in reactivity to a MS induction procedure as indicative of trait mortality salience, and careful consideration was given to the order of the experiment and the degree to which health-related variables may be influenced directly by the MS induction procedure.

5) In order to decrease the number of confounding variables, the researcher needed to take into account several of the mediating factors seen in previous MS

inductions. A) In particular, the researcher added a distracter task between the induction procedure and the Anti-U.S. essay. This was done in order to ensure that the MS measure of worldview defense initiated a distal defense, rather than a proximal defense. B) The Multidimensional Health Locus of Control (LOC) survey was chosen to address the LOC mediating variable. This was a different scale than is typically used in MS research, but the Multidimensional Health LOC survey is commonly used in health-related research, and gives LOC measures based on health. Therefore, it was a better fit than other measures of LOC. C) Finally, in order to ensure that the results of the MS worldview defense were not influenced by individuals' previous interactions with death, the researcher added questions addressing previous death-related experience and death-related awareness. In this way, it was possible to control for these variables during data analysis.

# CHAPTER II

## METHOD

### Participants

The experiment was conducted using college undergraduate students that went through both the Health Psychology and the Psychology of Persuasion courses at Texas State University, San Marcos, Texas. This population is similar to those that are typically involved in research on TMT.

After exclusions, the number of participants used during data analysis was a total of 45. In analyses involving physiological measures, eleven more participants were excluded, bringing the final number of participants used in all data analysis to 34. This group included 9 males and 25 females, with an average age of approximately 22 ($M$ = 21.9, SD = 1.4). The final demographics population is considered to be similar in makeup to the undergraduate body at the Psychology department of Texas State University-San Marcos. The following is a breakdown of the initial participant pool, as well as exclusionary criteria and the resulting pool from the exclusions:

The initial pool consisted of 87 participants that consented to and completed a Heart Disease Risk Assessment form, designed to determine initial eligibility for the experiment. Participants that reported on this assessment that they had been diagnosed with heart disease were excluded from the study. Participants that did not answer on this form whether or not they had been diagnosed with heart disease were also excluded from

the study. Participants that indicated that that they did not wish for their information to be used for a future experiment were also excluded from the study. Therefore, seven participants were excluded from participation in the experiment.

The 80 qualifying participants were offered five points extra credit on an exam to participate in the experiment. Of these, 49 participants appeared during their assigned times and obtained their extra credit, but one participant was not able to stay to complete the study. Therefore, 48 participants signed an informed consent and completed the experiment.

Another participant came on behalf of a third class. This participant was given the extra credit as agreed with the instructor of this course and went through the experiment, but data from this participant were excluded from analysis. In addition two participants indicated during the experiment that they did not have a normal, or corrected to normal, level of hearing, and as a result their data were excluded from analysis. Eleven other participants moved on to a portion of the experiment prematurely and their data were excluded from analysis.

## Apparatus

1. Heart Disease Risk Assessment (HDRA) Form: Because there were no readily available scales of risk of a cardiac event that didn't require numerical levels of blood pressure and cholesterol levels, this form was created. The HDRA asked participants to give their ratings on risk factors for heart disease, such as levels of cholesterol, blood pressure, smoking levels, and age. The HDRA is included in Appendix A and its consent form is included in Appendix B. Care was taken to keep both this form and its consent from tipping off the participants as to the nature of the study.

While the HDRA was designed to approximate the Framingham Heart Study scale (Wilson, D'Agostino, Levy, Belanger, Silbershatz, & Kannel, 1998), and furthermore uses this scale in its scoring, the Heart Disease Risk Assessment was not tested prior to its use in this study. Scoring the HDRA utilized the Framingham Heart Study risk computation algorithm, with the following changes: Instead of asking actual levels of cholesterol and blood pressure as the Framingham Heart Study risk computation algorithm, the HDRA form asked for participants to include subjective ratings of levels of cholesterol and blood pressure. These ratings were assigned numerical values that provide an approximate representation of low, normal, above normal, and high cholesterol and blood pressure levels, and these values were entered into the Framingham Heart Study computation algorithm. Ages that were under the lowest limit in the Framingham Heart Study calculation algorithm were replaced with the lowest age acceptable in the study (30 years). Utilizing these conversions, this information was entered into the Framingham Heart Study's computation algorithm to obtain a percentage of risk of heart attack within ten years. Participants scoring more than one standard deviation above the participants' mean score were labeled by the experimenter as higher risk.

2. Measure of Electrodermal Activity (EDA): The BioPac MP150 Workstation is a device that was used in this experiment to measure small changes in electrical conductance across the skin, under a noninvasive procedure. Small changes in sweat levels across the skin affect the skin's conductance to an electric current. This current can be measured by electrodes placed at the tips of the index and middle fingers. The amount of conductance is linked to that individual's level of sympathetic arousal.

This process of measuring skin conductance responses poses no danger to participants (Hugdahl, 1995; Rosenblatt et al., 1989). Responses were measured in the electrical conductance unit μmho, which is .000001 times the unit mho and the direct, reciprocal of the standard electrical resistance unit μohm.

3. MS / Anxiety Induction Form: Individuals under the MS Induction group were given a form asking them to respond to two questions: A. "Please briefly describe the emotions that the thought of your own death arouses in you." B. "Jot down, as specifically as you can, what you think will happen to you physically as you die and once you are physically dead." Individuals under the anxiety control group were given a form asking them to respond to two parallel questions: A. "Please briefly describe the emotions that the thought of having pain during a dental procedure arouses in you." B. "Jot down, as specifically as you can, what you think will happen to you physically while you experience this dental pain and after you experienced this dental pain." (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989)
4. Auditory Startle Response: Three audible pure 1000Hz tone of 100dB in intensity and 500ms in duration were administered during the course of the study. This evoked a startle response that was measured though the EDA apparatus. The tones were played back via an audio file on a PC computer, on Microsoft Windows XP's Microsoft Sound Recorder, and were delivered through a set of headphones attached through the computer.
5. Anti-U.S. Essay: This is an essay used previously in TMT research, in which the author proclaims Anti-U.S. sentiment, and the participant rates how much he or she likes the author of the essay. It was used here primarily to indicate if the MS

manipulation produced worldview defense (and if the anxiety control procedure did not), as would be expected if the MS manipulation was effective (McGregor et al., 1998). The response sheet to the Anti-U.S. essay contained five questions that ask the participant to respond with how pleasant they found the author of the Anti-U.S. statement on a one through nine scale, with one representing "Not at all", five representing "Somewhat", and nine representing "Totally". Scores on the Anti-U.S. essay were added together to obtain a total score of dislike for the author of the Anti-U.S. essay measuring five to 45. The essay form and the author response questions are shown in Appendix C.

6. WHOQoL-BREF: The World Health Organization's Quality of Life survey, Brief form (WHOQoL-BREF): Developed by the World Health Organization, the WHOQoL-BREF is a simplified form the WHOQOL, with high validity and reliability with the larger form (World Health Organization, 1998). Designed to measure overall quality of life independent of culture and language, the form is being used in clinical as well as epidemiological research, and in practice. It measures quality of life through perceptions of status under the physical, psychological, and spiritual domain, as well as under independence levels, social relationships, and the environment (World Health Organization, 1998). Scoring of this survey is done by entering the survey information into an SPSS spreadsheet, and running a SPSS syntax included on the SPSS Scoring Manual. This SPSS syntax outputs transformed percentile scores for primarily the physical, psychological, social relationships, and environment domains, with the percentages representing level of functioning in this domain.

7. Multidimensional Health LOC: This scale is geared to health-related research and represents a conceptualization of Locus of Control under three simultaneous dimensions: Low to high internal LOC, the extent in which an individual thinks that factors affect health; low to high chance LOC, the extent in which an individual thinks that their health is governed by chance events or chance factors; and low to high powerful others LOC, the extent in which an individual believes that their health is affected by other knowledgeable or powerful individuals (Wallston, Wallston, & DeVellis, 1978). There are three forms available, of which Form A was recommended for these purposes, and used. It consists of 18 items arranged on a 1-6 forced-choice scale from Strongly Disagree to Strongly Agree. Scoring of this scale is by adding the scores of several questions representing each dimension of Health LOC as described in Wallston, Wallston, & DeVillis (1978). The construct of Multidimensional Health LOC has generated a number of publications, and is widely accepted in the behavioral health realm.

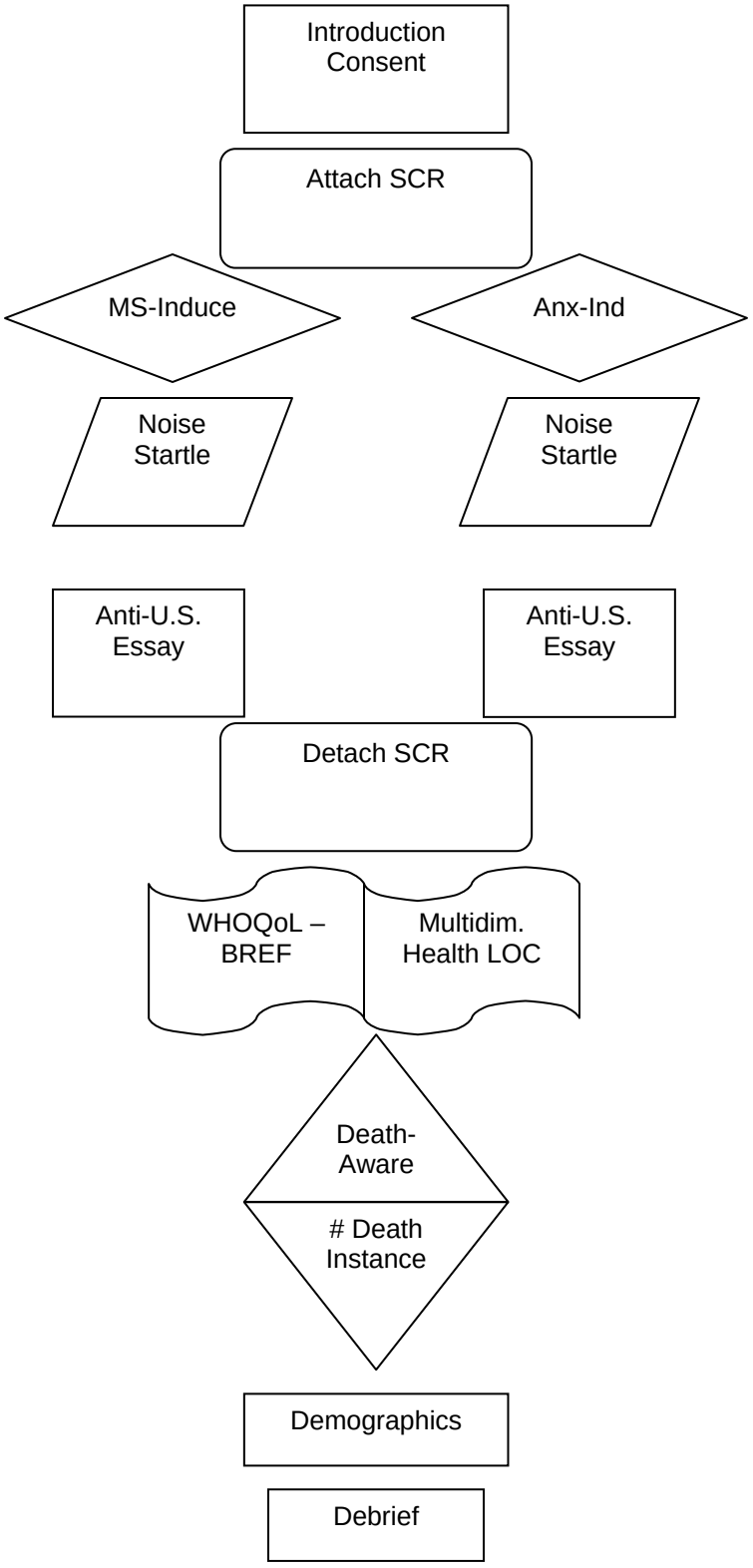
It should be noted, however, that this construct has not been widely used in TMT studies. Although TMT studies typically use a one-dimensional concept of LOC such that an individual is very internal to very external LOC in a number of different life situations, Multidimensional Health LOC has the three different dimensions noted above, and furthermore relates them specifically under a health focus. As a result, the two conceptualizations of LOC are similar but not at all the same, and results using this scale are not necessarily expected to be completely parallel to results using LOC scales in other TMT studies.

8. Death Awareness: Participants gave their rating to the question, “How aware are you of your own possibility of dying?” on a one to seven scale, with one representing “Completely Unaware”, four representing “Neutral”, and seven representing “Completely Aware”.
9. Death-Related Experience: Participants responded to the question, “Compared to others, how experienced do you think you are with death?” on a one to seven scale, with one representing “Completely Inexperienced”, four representing “Neutral”, and seven representing “Completely Experienced”.
10. Demographics: Despite the name, this is not necessarily simply a demographics questionnaire. This questionnaire was developed specifically for this study and asked participants to list their age and gender, as well as rated their perceived socioeconomic status relative to their peers. In addition, the questionnaire asked participants to rate the amount of recent sickness, amount of recent absences from work and school, smoking habits, and sleeping habits. This form is shown in Appendix D.
11. Permission to use HDRA: This was a form designed to simply ask the participant whether or not the information in the HDRA could be used in the analysis of the study. This form is found in Appendix E.
12. Literary Preference Questionnaire: This form was a distracter designed both to increase cognitive load after the MS/DP induction procedure, and to provide enough time for the noise bursts to occur before moving on to the Anti-U.S. essay. This form is presented on Appendix F.

## Design

The reader is referred to figure 1 below for a diagram of the overall experiment process. Analysis of these data required using a number of different analyses described below. Before beginning the experiment, the researcher randomized both whether a participant received the experimental or control condition and the order of presentation of the WHOQoL and Multidimensional Health LOC scales. This resulted in the following four groups: MS condition with the WHOQoL scale occurring before the Multidimensional Health LOC scale (MS-WHO); MS condition with the Multidimensional Health LOC scale occurring before the WHOQoL scale (MS-LOC); DP condition with the WHOQoL scale occurring before the Multidimensional Health LOC scale (DP-WHO); DP condition with the Multidimensional Health LOC scale occurring before the WHOQoL scale (DP-LOC).

**Figure 1: An outline of the experiment flow.**



To assign participants to one of these four groups, the experimenter created a randomized 1-4 sequence. Four participants were assigned a group based on one of the numbers in the sequence. Upon completion of assigning the sequence, a new random 1-4 sequence was created, and further participants were assigned groups based on the numbers in this sequence. In this way, all conditions occurred every four times that the experiment was administered.

The following control analyses were done prior to the experimental analyses: First, participants were compared based on classes to the experiment results. This was done to determine if belonging to one class or the other affected the results of the manipulation. Next, presentation order of the WHOQoL and Multidimensional Health Locus of Control scales were compared to Death Awareness and Death Experience, to determine if presentation order made a difference in these measurements. Third, an analysis was run comparing the results of the noise burst data, to determine whether or not these data could be collapsed. Fourth, the results of the Anti-U.S. essay were compared according to the MS or dental pain condition, to determine if the resulting data could be generalized to previous TMT research. Also, an analysis was run on the noise burst data to produce a data set that factors out the effects of Death Experience and Death Anxiety. These data were used instead of the direct noise burst data during the regression portion of the analysis, which is described below.

A brief overview of the experiment's analysis process is as follows: First, the experimenter tested for any effects of the MS manipulation on the resulting EDA reaction data. This analysis is described within the "between & within-groups experimental" portion below. Next, the experimenter analyzed the data to indicate any relationships

between the reaction data and health-related variables. This analysis is described within the "regression" portion below. Last, the experimenter tested any significant relationships among the reaction data and health-related variables (obtained from within the "regression" portion of the analysis) between the MS and DP conditions, in an attempt to compare the degree of health related relationships between the two conditions. This occurs in the last portion of the experiment analyses.

For the between & within-groups experimental portion of the analysis, the independent measures had two levels: whether the participant was assigned to the MS condition or the DP condition. The dependent measures were the following (for each of the three noise bursts): 1) mean response, 2) amplitude of the response, 3) mean slope of the response curve, 4) length of time of the response, 5) linear regression of the response curve, 6) integral of the response curve, and 7) area under the curve. Analyzing these seven responses separately for each of the noise bursts resulted in 21 total dependent measures.

For the regression portion of the analysis, the significant dependent measures obtained from the between & within-groups experimental measures were taken as the independent measures of this portion. There were sixteen dependent measures: 1) internal to external, 2) high to low chance, and 3) high to low powerful others health locus of control; WHOQoL quality of life measurements from 4) physical; 5) psychological; 6) environmental; and (7) social relationships factors; 8) participants' ratings of perceived socioeconomic status; 9-12) ratings of how often the participants felt ill in the past month, past six months, past year, and in their past lifetimes; 13-16) ratings

of how often the participants missed class in the past month, past six months, past year, and in their past lifetimes; and 17) average hours of sleep per night.

Dependent measures that were significant in both the MS and DP conditions within the regression portion of the analysis were taken as the measures in the comparison of significant health-related variables between DP and MS groups. The experimenter elected to only include those that were significant in both groups into this analysis because a non-significant result has a high likelihood of only showing variance due to chance, and comparing a non-significant result with a significant result (for instance) would be capitalizing on that chance. In this portion of the analysis, the independent measure was MS versus DP, and the dependent measures were these significant health-related variables.

Because this design is somewhat complicated, the author wishes to once again reiterate the analysis process. The process was first to consider controls by randomizing participants to one of four different groups (MS-WHO, MS-LOC, DP-WHO, DP-LOC) and running the control analyses (analyzing for the effect of class, presentation order, noise burst habituation, generalization to TMT research, and factoring out Death Experience and Death Anxiety). The first portion of analyses to answer the hypotheses was to test for the effect of the MS vs. DP manipulation on the EDA. When there were significant differences between MS and DP on EDA, regressions were run on these EDA measures to determine health relationships to MS and DP. Last, when health-relationships were significant in both MS and DP, the relationships were compared to determine if there was a significant difference between them.

*Procedure*

To determine eligibility for the study, potential participants initially completed the Heart Disease Risk Assessment (HDRA) during their class. Completed HDRA were masked to the researcher by placing identifying numbers on both the HDRA form and the signed consent form for the HDRA. The researcher separated the consent form and the HDRA, gave consent forms to an uninvolved peer, and analyzed all completed HDRA's using a modified form of the Framingham Heart Study scoring procedure. HDRA forms that scored as higher risk for a cardiac event were placed on a higher-risk list, and the researcher was given the names of these numbers. In this way, the researcher was aware of only the higher risk of these participants at the time of their experiment. In addition, a listing of times in which higher risk participants were signed up for the experiment was given to the University's Student Health Center, in case a participant became victim to a cardiac event during the experiment (this did not happen).

All qualifying participants were asked to sign up for the experiment in half-hour long timeslots. Participants appearing during their assigned time sat in front of the GSR system (BioPac MP150). After being informed that their extra credit was already obtained, consenting participants washed their hands and sterilized their non-dominant middle and ring fingers using an alcohol swab.

The experimenter attached the GSR system to participants' sterilized middle and ring fingers via electrodes. Participants were informed that the electrodes do not induce shocks, but simply measure minute changes in the amount of voltage across the skin. The experimenter then asked participants to place the headphones over their head, saying that the headphones are meant to reduce the amount of external noise which could

interfere with the GSR system measurements. The headphones were attached to a computer that served to deliver sound tones during the course of the study, calibrated to approximately 100db via the Radio Shack 7-Range Analog Display Sound Level Meter (model #33-4050).

The experimenter positioned himself across the desk, on the other side of the computer and the GSR system, and instructed participants to begin following the directions on their experiment packet while at the same time starting the GSR recording on AcqKnowledge software for Windows version 3.8.1. Participants turned the page, and began completing the packet using a pen in their dominant hand. After completing either the *MS* or dental pain manipulation, participants automatically turned the page to the distracter task and began reading the passage within it. Upon turning to the distracter task, the experimenter did two things on the computer: he marked the switch in the GSR recording program, and he also pressed a button on the computer to start playback of the sound tones.

During the next three minutes after starting playback, the tones were delivered three times, one at every sixty seconds. At every tone, the experimenter marked the point of the tone on the GSR recording program. Upon completion of playing three tones, the computer automatically stopped playback. Regardless of where participants were at that point, they continued working until they finished with the distracter task. Upon completion of the distracter task, the participant automatically switched to the Anti-U.S. essay. The experimenter marked this switch within the GSR recording program.

After completion of the Anti-U.S. essay, the experimenter stopped the GSR recording program and instructed participants to remove the headphones and electrodes.

The experimenter apologized for the sound tones and for the deception story about the headphones, and then asked participants to move to a next-door room to complete the rest of the study.

The second room consisted of only a chair and a desk, and participants sat at this until completion of the experiment. The experimenter asked participants that were previously labeled high-risk to see him after the experiment, and then excused himself from the room. Participants completed the WHOQoL or Multidimensional Health LOC scale, in the order determined by their group. This group was in accord with the 1-4 group random sequence. Upon completing both of these scales, participants automatically turned the page and completed measures of Death Experience and Death Awareness on the same page. They then turned the page automatically and completed the demographics form. Upon completion of these forms, participants were presented with a question asking whether or not information from their HDRA could be added to their data to be used in the study. Afterward, participants viewed the written debriefing which 1) described the true intent of the study, 2) apologized for the deception involved in the headphones and noise bursts, 3) thanked them for participation, and 4) provided information on how to contact the researchers for more information.

Higher-risk participants then came to the researcher as instructed, where they were informed of their risk for a heart attack within ten years, but cautioned that this risk level did not come from a clinically accepted method for determining the actual risk level. The experimenter then informed the instructor of each attending participant's class to provide extra credit.

The reader is encouraged to refer to figure 1 which diagrams the experimental procedure. To briefly summarize, after completing the HDRA and coming in for the experiment, participants signed consents, sterilized their hands, and the GSR was attached to their fingers. Headphones were placed and the participants were told that it was to reduce outside noise. Each participant was then given a packet which contained (in this order) the MS vs. DP induction, a distracter Literature preference survey during which the noise bursts were given, the Anti-U.S. essay, and a form to respond to the essay. GSR data collection was started at the beginning of this packet, and concluded upon finishing this section. Next participants completed, in another room, the Multidimensional Health LOC survey and the World Health Organization Quality of Life survey in random order. Afterward, they completed the demographics questionnaire, gave consent to use the HDRA data in the study, and were debriefed.

# CHAPTER III

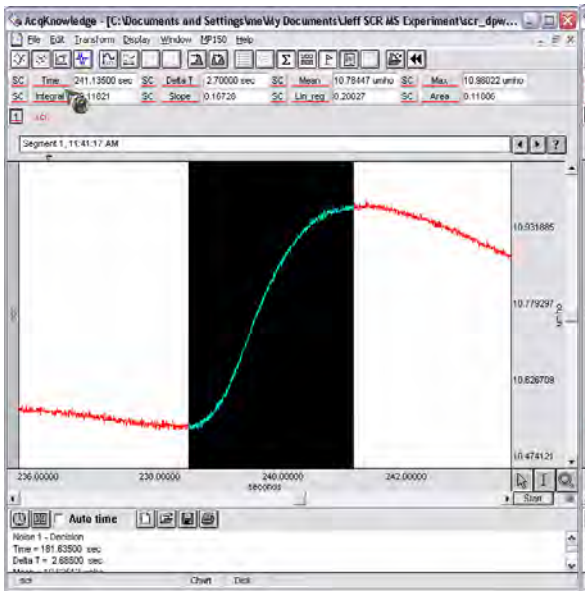
## RESULTS

### GSR Response Curve Preparation

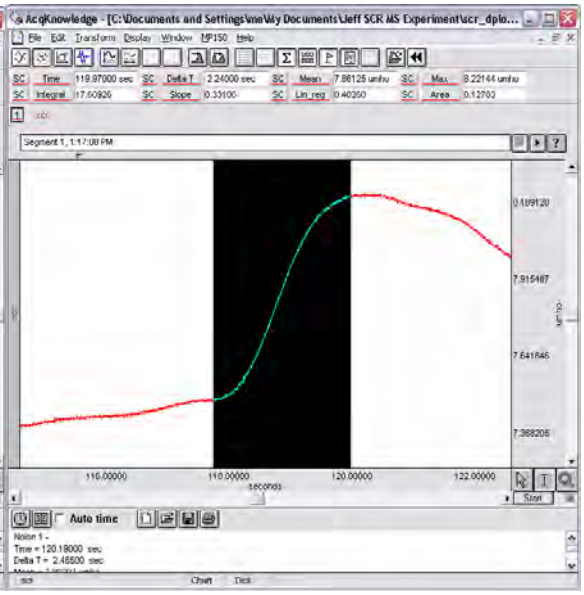
Collection of the GSR generates a continuous curve that is stored as a computer file using AcqKnowledge software. The researcher selected curves within AcqKnowledge by highlighting a portion beginning at the lowest point before the response, and highlighting the curve until the peak of the response. Figure 2 shows a diagram of several types of response curves that the researcher selected from. From each curve, the researcher then produced: 1) the length of response in seconds, 2) the change in µmho (amplitude), 3) the area under the selected curve, 4) the slope of the curve from crest to trough, 5) the linear regression of the curve, 6) the integral of the curve, and 7) the mean response of the curve. In addition to these measurements, the researcher also produced the 8) minimum and 9) maximum µmho of each curve, but these were primarily for the purposes of determining peaks and troughs during curve selection, and were not used in analysis.

**Figure 2: A depiction of four different types of response curves, from which valid response curves were chosen.**

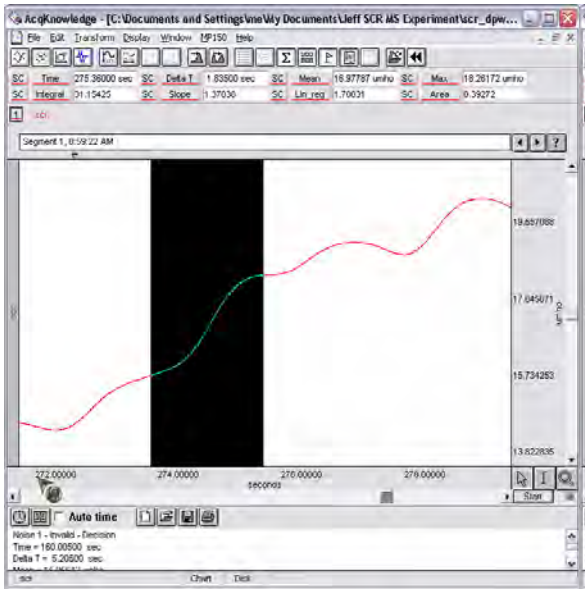
No Decision Needed



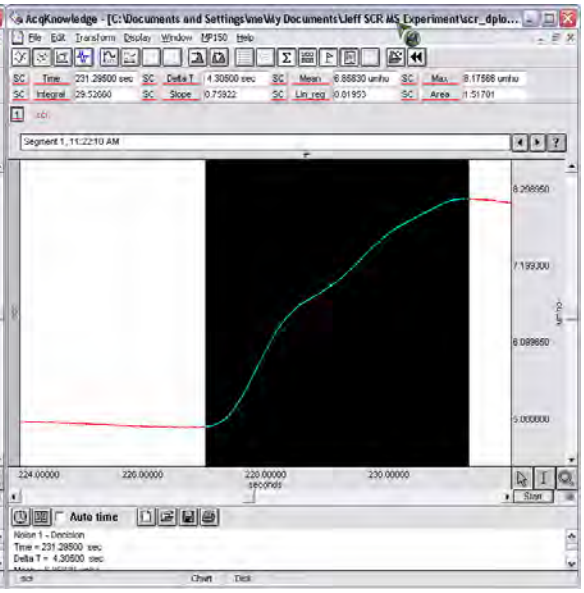
No Trough



Several Valid Curves



Difficult to Distinguish



Note that these measures represent different aspects of the curve, and although the ones chosen were done because they were promising aspects of the curve, the researcher was ultimately unsure of which (if any) would be related to health variables. The length

of the response in seconds was chosen to represent the amount of time that an individual reacted to the noise burst stimulus. The amplitude response of the curve was chosen to represent the change in conductance from before to after reaction to the stimulus, and the mean response was chosen to reference where this change in reaction occurred. The area under the selected curve and linear regression of the curve represented two different methods to calculate the amount of area under the curve, which is a combination of amplitude of the curve and length of response. The slope of the curve from crest to trough was chosen to show the average rate of the reaction response, and the integral of the curve was chosen to show the maximum rate of the reaction response.

Participants' GSR response curves were analyzed to determine valid responses. Validity criteria were adopted from Dawson, Schell, and Filion (2000). A valid response curve was defined as a curve that has an onset within one to four seconds after the stimulus sound tone, has a peak response within one-half to five seconds after the beginning of the response, and measures at least 0.2 μmho of change. In cases where several responses fit these criteria, the largest of the responses was selected as the response that was a result of the stimulus. See figure 2 above for an example of curves selected in this way.

In some cases, it appeared that there was more than one response within that period of time, but a defined peak did not exist for all of these responses (the next response started too soon). If this happened, it was not possible to use peaks and troughs as the selection criteria of the curve. Instead, the researcher selected an area that appeared to be the beginning to the end of the chosen response curve.

The researcher pasted information from these curves into a Microsoft Excel database and marked curves that were invalid by either length of time of curve or amount of change in µmho. A square-root transformation was performed on the data (the square root of each number was taken and entered), and the data were imported into the Statistical Package for the Social Sciences software for Windows (SPSS). Valid curves were analyzed along with the rest of the data collected within SPSS.

Including invalid curves, a total of 27 valid response curves were collected from Noise Startle 1. Of these, thirteen belonged to the DP group and fourteen belonged to the MS group. A total of 29 valid response curves were collected from Noise Startle 2. Of these, fourteen belonged to the DP group and fifteen belonged to the MS group. A total of 30 valid response curves were collected from Noise Startle 3. Of these, fifteen belonged to the DP group and fifteen belonged to the MS group.

Therefore, curves were selected by highlighting the curve within AcqKnowledge, and copying select data from that curve. Decisions needed to be made in some cases as to what curves represented the stimulus response, and curves that did not meet validity criteria were excluded from analysis. Results from the curves were converted within Microsoft Excel then transferred to SPSS for analysis along with the rest of the collected data.

## Control Testing

Of the 34 participants used in all analyses, seven belonged to the DP-LOC condition, ten belonged to the DP-WHO condition, seven belonged to the MS-LOC condition, and ten belonged to the MS-WHO condition.

Recall that one of the control tests was to determine whether or not class makeup affected experimental outcomes. Data from these participants were analyzed using a One-Way Analysis of Variance (ANOVA) to determine whether a difference existed in the participant makeup between classes, and furthermore whether the makeup by class affected the results of the experiment. The results of this analysis are presented in table 1 below. Briefly, of 61 comparisons, only 3 were significant ($p < .05$) which is what would reasonably be considered a chance finding. Because there were no significant differences in results based on class recruitment other than what would be expected by chance, participants from both classes were pooled together.

**Table 1: One-Way Analysis of Variance to determine if class makeup affected scores.**

| | *n* | *F* | *Sig.* | | *n* | *F* | *Sig.* |
|---|---|---|---|---|---|---|---|
| *Death Awareness* | 35 | 2.897 | 0.07 | *Noise 1 Max* | 35 | 0.203 | 0.817 |
| *Death Experience* | 35 | 0.844 | 0.44 | *Noise 1 Min* | 35 | 0.37 | 0.694 |
| *Anti-U.S. Total* | 35 | 0.705 | 0.502 | *Integral of Noise 1* | 35 | 0.363 | 0.699 |
| *Perceived SES* | 35 | 0.414 | 0.664 | *Mean Slope Noise 1* | 35 | 0.327 | 0.724 |
| *Age* | 35 | 0.298 | 0.744 | *Lin. Reg. of Noise 1* | 35 | 0.299 | 0.744 |
| *Gender* | 35 | 0.281 | 0.757 | *Area of Noise 1* | 35 | 0.305 | 0.739 |
| *Illness w/in 1 Month* | 35 | 0.664 | 0.522 | *Amplitude of Noise 1* | 35 | 0.276 | 0.761 |
| *Illness w/in 6 Months* | 35 | 2.691 | 0.084 | *Time at Noise 2* | 33 | 2.024 | 0.15 |
| *Illness w/in 1 Year* | 35 | 3.634 | 0.038* | *Noise 2 Time Length* | 33 | 7.171 | 0.003* |
| *Lifetime Illness* | 35 | 0.884 | 0.423 | *Mean of Noise 2* | 33 | 1.053 | 0.362 |
| *Missed w/in 1 Month* | 35 | 0.467 | 0.631 | *Noise 2 Max* | 33 | 0.797 | 0.46 |
| *Missed w/in 6 Month* | 35 | 0.099 | 0.906 | *Noise 2 Min* | 33 | 1.339 | 0.278 |
| *Missed w/in 1 Year* | 35 | 0.4 | 0.674 | *Integral of Noise 2* | 33 | 1.099 | 0.347 |
| *Lifetime Missed* | 35 | 1.405 | 0.26 | *Mean Slope Noise 2* | 33 | 0.474 | 0.627 |
| *Smoking* | 35 | 0.166 | 0.848 | *Lin. Reg. of Noise 2* | 33 | 0.468 | 0.631 |
| *# Smoke* | 35 | 0.81 | 0.419 | *Area of Noise 2* | 33 | 0.964 | 0.393 |
| *Smoke3* | 7 | 0.047 | 0.954 | *Amplitude of Noise 2* | 33 | 0.187 | 0.83 |
| *Avg. # Hours Sleep* | 30 | 2.089 | 0.141 | *Time at Noise 3* | 31 | 2.196 | 0.131 |
| *Gender* | 34 | 0.374 | 0.691 | *Noise 3 Time Length* | 31 | 0.973 | 0.391 |
| *Physical QOL* | 35 | 1.492 | 0.241 | *Mean of Noise 3* | 31 | 0.483 | 0.622 |
| *Psychological QOL* | 34 | 2.082 | 0.142 | *Noise 3 Max* | 31 | 0.367 | 0.696 |
| *Social Relation QOL* | 35 | 2.019 | 0.15 | *Noise 3 Min* | 31 | 0.636 | 0.537 |
| *Environment QOL* | 34 | 1.124 | 0.338 | *Integral of Noise 3* | 31 | 0.118 | 0.889 |
| *Internal LOC* | 33 | 0.267 | 0.767 | *Mean Slope Noise 3* | 31 | 0.568 | 0.573 |
| *Chance LOC* | 35 | 3.027 | 0.063 | *Lin. Reg. of Noise 3* | 31 | 0.612 | 0.55 |
| *Powerful Other LOC* | 35 | 0.748 | 0.482 | *Area of Noise 3* | 31 | 1.175 | 0.324 |
| *Time at Noise 1* | 33 | 1.707 | 0.198 | *Amplitude of Noise 3* | 31 | 0.911 | 0.414 |
| *Noise 1 Time Length* | 35 | 2.277 | 0.12 | *Valid Rsp. Noise 1* | 35 | 1.877 | 0.17 |
| *Noise 1 Mean* | 35 | 0.264 | 0.77 | *Valid Rsp. Noise 2* | 35 | 4.596 | 0.018* |
| | | | | *Valid Rsp. Noise 3* | 35 | 2.992 | 0.065 |

* Significant at the .05 level, two-tail.

Recall also that a control test was to determine if presentation order of the WHOQoL and Multidimensional Health LOC affected scores. These data were similarly analyzed using a One-Way ANOVA, but only variables occurring after these scales were

analyzed. The results of this analysis are presented in table 2 below. Of eighteen different comparisons, it appears that the order of presentation of these two surveys only affected the scores of the Environment dimension of the WHOQoL, $F(31, 1) = 5.391$, $p = .027$. All other analyses were not significant ($p > .05$), and so for the rest of the analysis, data were collapsed according to presentation order, but data on the Environment dimension of the WHOQoL were not used for interpretation.

**Table 2: Effect of presentation order on self-report health measures.**

| | *N* | *F* | *Sig.* |
|---|---|---|---|
| *Death Awareness* | 34 | 0.099 | 0.755 |
| *Death Experience* | 34 | 0.340 | 0.564 |
| *Perceived SES* | 34 | 0.380 | 0.542 |
| *Illnesses within 1 Mo.* | 34 | 1.262 | 0.270 |
| *Illnesses within 6 Mo.* | 34 | 0.000 | 0.991 |
| *Illnesses within past year.* | 34 | 0.008 | 0.929 |
| *Illnesses in Lifetime* | 34 | 0.167 | 0.686 |
| *Misses within 1 Month* | 34 | 0.056 | 0.815 |
| *Misses within 6 Months* | 34 | 0.048 | 0.827 |
| *Misses within 1 Year* | 34 | 0.019 | 0.892 |
| *Misses in Lifetime* | 34 | 1.314 | 0.260 |
| *Physical QOL* | 34 | 0.308 | 0.583 |
| *Psychological QOL* | 34 | 1.552 | 0.222 |
| *Social Relations QOL* | 34 | 1.951 | 0.172 |
| *Environment QOL* | 33 | 5.391* | 0.027 |
| *Internality LOC* | 34 | 1.089 | 0.305 |
| *Chance LOC* | 34 | 0.729 | 0.400 |
| *Powerful Others LOC* | 32 | 0.006 | 0.938 |

* Significant at the .05 level, two-tailed.

The experimenter also needed to determine whether or not data from the three separate noise bursts could be collapsed, so seven repeated-measures ANOVA were performed on the response curve data sets. This analysis yielded significant results for all comparisons among the three noise bursts on: 1) the length of response in seconds, $F(2, 58) = 23.677$, $p < .001$; 2) the change in µmho (amplitude), $F(2, 58) = 20.117$, $p < .001$;

3) the area under the selected curve, $F(2, 58) = 26.914$, $p < .001$; 4) the mean slope of the curve, $F(2, 58) = 9.245$, $p < .001$; 5) the linear regression of the curve, $F(2, 58) = 8.225$, $p = .001$; 6) the integral of the curve, $F(2, 58) = 15.631$, $p = .001$; and 7) the mean response of the curve, $F(2, 58) = 6.885$, $p = .002$. The results of these ANOVA are summarized in table 3 below, with their pair-wise comparisons included. Based on the results of this analysis, the noise bursts were analyzed as separate from each other instead of being collapsed.

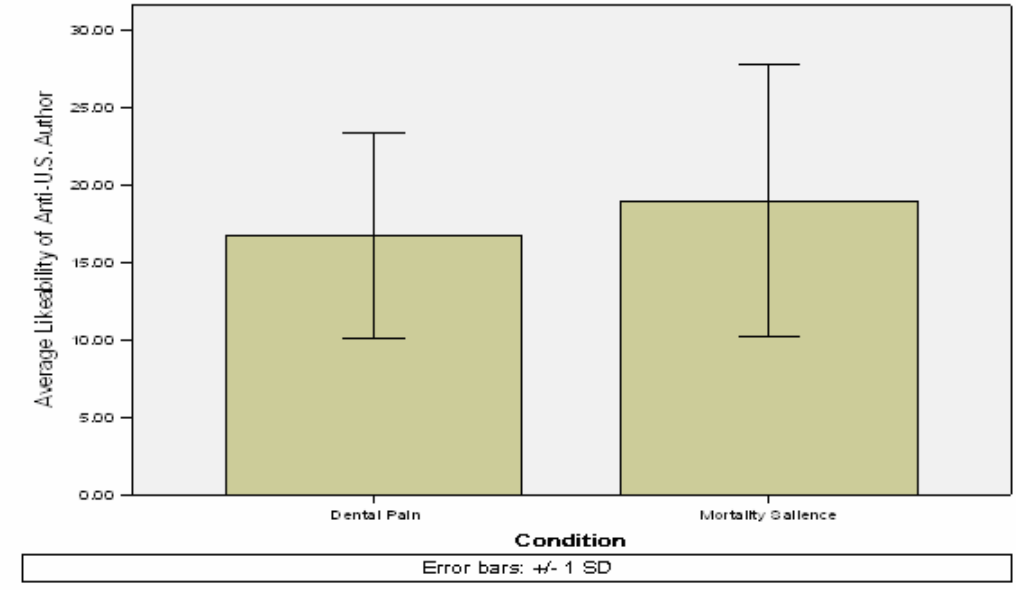
**Table 3: Comparison between noise burst 1, noise burst 2, and noise burst 3 on reactivity measures.**

| *Source* | | *df* | *F* | *Sig.* |
|---|---|---|---|---|
| *Length of Time of Response* | Overall | 2, 58 | 23.677* | 0.000 |
| *Pair –Wise* | Noise 1 vs. Noise 2 | 1, 29 | 57.312* | 0.000 |
| | Noise 2 vs. Noise 3 | 1, 29 | 3.735 | 0.088 |
| *Mean of Response* | Overall | 2, 58 | 6.885* | 0.002 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 8.857* | 0.006 |
| | Noise 2 vs. Noise 3 | 1, 29 | 0.382 | 0.541 |
| *Integral of the Response Curve* | Overall | 2, 58 | 15.631* | 0.000 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 13.730* | 0.001 |
| | Noise 2 vs. Noise 3 | 1, 29 | 3.267 | 0.081 |
| *Mean Slope of the Response Curve* | Overall | 2, 58 | 9.245* | 0.000 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 0.045 | 0.834 |
| | Noise 2 vs. Noise 3 | 1, 29 | 15.074* | 0.001 |
| *Linear Regression of the Response Curve* | Overall | 2, 58 | 8.225* | 0.001 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 0.043 | 0.838 |
| | Noise 2 vs. Noise 3 | 1, 29 | 14.022* | 0.001 |
| *Area Under the Response Curve* | Overall | 2, 58 | 26.914* | 0.000 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 25.056* | 0.000 |
| | Noise 2 vs. Noise 3 | 1, 29 | 12.933* | 0.001 |
| *Amplitude of the Response Curve* | Overall | 2, 58 | 20.117* | 0.000 |
| *Pair-Wise* | Noise 1 vs. Noise 2 | 1, 29 | 11.047* | 0.002 |
| | Noise 2 vs. Noise 3 | 1, 29 | 18.462* | 0.000 |

* Significant at the .05 level, two-tailed.

Next, to determine whether or not the MS manipulation invoked the same MS paradigm as explained in the MS hypothesis of TMT, the results of likeability for the Anti-U.S. essay were compared between the MS and DP conditions ($M$ = 18.64, SD = 9.65 and $M$ = 15.82, SD = 4.22, respectively). This comparison is presented in figure 3 below. An independent samples $t$-test was performed on these data, but this difference was not significant, $t(32) = 1.105$, $p > .05$. Therefore, there is no evidence that this manipulation had the same effect as it had in past TMT studies. Possible reasons for this are presented in the discussion section of this study.

**Figure 3: Average likeability of author of anti-U.S. essay between the Mortality Salience and Dental Pain conditions.**



Last, recall that pre-existing Death Anxiety and Death Experience were possible mediators of Mortality Salience. A regression analysis was run on the noise burst data with death anxiety and death experience, and the residuals of these mediators on the noise burst data were obtained. In this way, any effect of these mediators was accounted for.

To summarize the results of the control analyses, it appears that class did not affect the results but that presentation order of WHOQoL and LOC affected answers to the Environmental section of the QOL. In addition, reactions to the three noise bursts were generally different per noise burst, and the MS manipulation cannot be considered to be the same as in past TMT studies. This concluded preparations for the experimental analyses.

## Testing the Hypotheses

### *Testing the Relationship Between LOC and Health-Related Variables*

Recall that the measure of Internality LOC is one dimension of the Multidimensional Health LOC measurement and is different from the LOC measure typically used in past TMT literature. To determine whether this measurement of Internality LOC functions as a mediator as discussed in previous literature, the researcher performed a set of correlations between Internality LOC and many of the health measures taken here. The results of these analyses are presented within table 4 below.

**Table 4: Relationship between Internality Health LOC and health-related variables.**

| | *R* | *Sig.* | *n* | |
|---|---|---|---|---|
| *Death Awareness* | 0.156 | 0.378 | 34 | |
| *Death Experience* | 0.034 | 0.849 | 34 | |
| *Perceived SES* | 0.133 | 0.454 | 34 | |
| *# Times Ill Within 1 Month* | -0.185 | 0.295 | 34 | |
| *# Times Ill Within 6 Months* | -0.086 | 0.628 | 34 | |
| *# Times Ill Within 1 Year* | -0.106 | 0.549 | 34 | |
| *Amount Ill in Past Lifetime* | -0.295 | 0.090 | 34 | |
| *# Times Missed Work/School Within 1 Month* | -0.332 | 0.055 | 34 | |
| *# Times Missed Work/School Within 6 Months* | -0.269 | 0.124 | 34 | |
| *# Times Missed Work/School Within 1 Year* | -0.199 | 0.259 | 34 | |
| *Amount Missed Work/School in past Lifetime* | -0.379 | 0.027 | 34 | * |
| *Avg. Amount of Sleep* | 0.015 | 0.934 | 33 | |
| *Physical QOL* | -0.252 | 0.150 | 34 | |
| *Psychological QOL* | -0.075 | 0.672 | 34 | |
| *Social Relations QOL* | 0.152 | 0.390 | 34 | |
| *Environment QOL* | -0.079 | 0.663 | 33 | |

* Significant at the .05 level, two-tailed.

Of seventeen different comparisons, only one relationship existed: an inverse relationship between Internality LOC and the participants' ratings of the amount of times missed school or work in their lifetimes ($r$ = -.379, n = 34, p = .027), such that the more internal health LOC an individual has, the less likely they are to have missed school or work in their lifetime. It was the intention of the researcher to process the data with this variable as a mediator if sufficient evidence for this was obtained; however, because this measure was different than those in the past TMT literature and because only minimal support for this variable as a mediator was obtained, the researcher chose not to process Internality LOC as a covariate or for residuals for the remainder of the analyses.

*Between & Within-Groups Section*

For the between & within-groups section of the analysis, seven repeated measures ANCOVA (RM-ANCOVA) were performed that compared the effect of MS vs. DP on the GSR measurements taken *for each noise burs*t. Recall that these measurements were:

1) mean response, 2) amplitude of the response, 3) mean slope of the response curve, 4) length of time of the response, 5) linear regression of the response curve, 6) integral of the response curve, and 7) area under the curve. The results of these RM-ANCOVA analyses are summarized in table 5, which shows for each of these seven comparisons: A) main effects of mortality salience vs. dental pain across the three noise bursts; B) interactions of Death Awareness between the three noise bursts; C) interactions of Death Experience between the three noise bursts; and D) interactions of mortality salience vs. dental pain groups between the three noise bursts. Although data on the interactions of Death Awareness and Death Experience are shown in table 5, this analysis was done only to take into account the effect of these variables, and thus the effects of Death Anxiety and Death Experience were not considered for further analyses.

**Table 5: Effects of MS/DP condition on noise bursts, controlling for death awareness and experience.**

| *Amplitude of Response to Noise Burst* | *df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.264 | 0.769 |
| Noise Burst * Death Awareness Interaction | 2, 38 | 1.500 | 0.236 |
| Noise Burst * Death Experience Interaction | 2, 38 | 1.914 | 0.161 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 1.512 | 0.233 |

| *Length of Response to Noise Burst* | *df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.777 | 0.467 |
| Noise Burst * Death Awareness interaction | 2, 38 | 2.957 | 0.064 |
| Noise Burst * Death Experience Interaction | 2, 38 | 5.383 | 0.009 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 0.735 | 0.486 |

| *Mean Reaction to Noise Bursts* | *df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.289 | 0.751 |
| Noise Burst * Death Awareness interaction | 2, 38 | 0.376 | 0.689 |
| Noise Burst * Death Experience Interaction | 2, 38 | 0.765 | 0.472 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 0.611 | 0.548 |

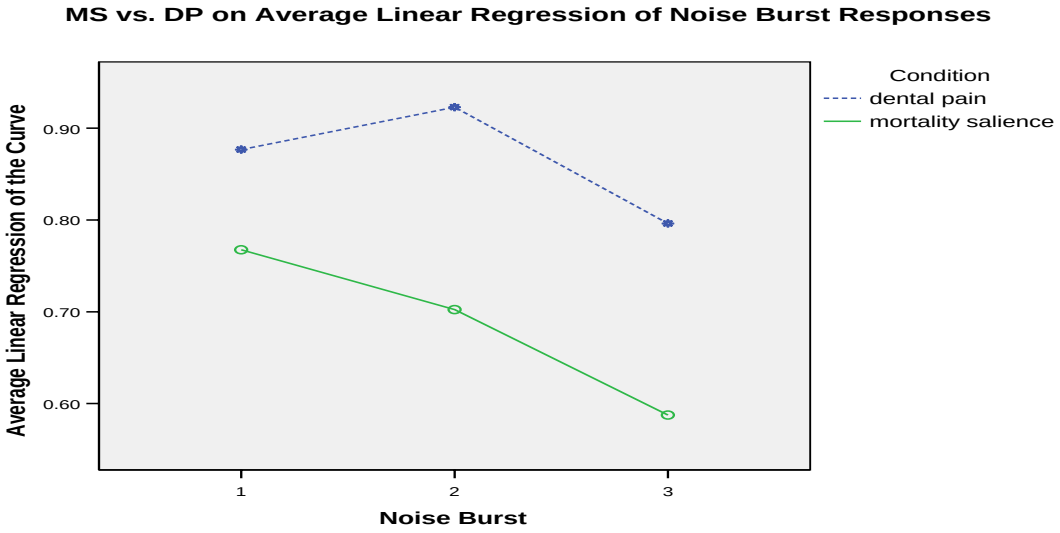
| *Integral of the Noise Burst Response Curve* | *df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.517 | 0.600 |
| Noise Burst * Death Awareness interaction | 2, 38 | 1.177 | 0.319 |
| Noise Burst * Death Experience Interaction | 2, 38 | 1.694 | 0.197 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 0.151 | 0.860 |

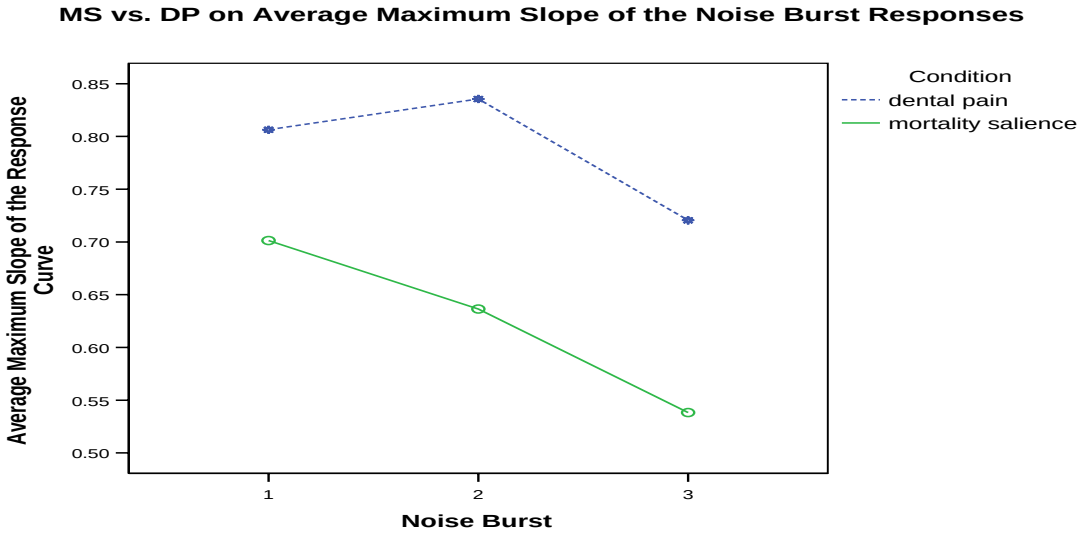
| *Linear Regression of the Noise Burst Response Curve* | *df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.057 | 0.944 |
| Noise Burst * Death Awareness interaction | 2, 38 | 0.447 | 0.643 |
| Noise Burst * Death Experience Interaction | 2, 38 | 0.407 | 0.668 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 2.341 | 0.110 |

| *Area Under the Noise Burst Response Curve* | *Df* | *F* | *Sig.* |
|---|---|---|---|
| Noise Burst Main Effect | 2, 38 | 0.579 | 0.565 |
| Noise Burst * Death Awareness interaction | 2, 38 | 1.390 | 0.261 |
| Noise Burst * Death Experience Interaction | 2, 38 | 2.290 | 0.115 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 0.674 | 0.516 |
| *Mean Slope of the Noise Burst Response Curve* | *df* | *F* | *Sig.* |
| Noise Burst Main Effect | 2, 38 | 0.033 | 0.967 |
| Noise Burst * Death Awareness interaction | 2, 38 | 0.486 | 0.619 |
| Noise Burst * Death Experience Interaction | 2, 38 | 0.283 | 0.755 |
| Noise Burst * Condition Interaction After Covariates | 2, 38 | 2.262 | 0.118 |

Measures from the GSR data that did not produce either a significant main effect or significant interaction were excluded from further analyses. There appeared to only be an interaction approaching significance between the MS or DP induction and noise burst measurements for the mean slope of the response curve, $F(2, 38) = 2.262$, $p = .118$; and an interaction approaching significance between the MS or DP induction and noise burst measurements for the linear regression of the curve, $F(2, 38) = 2.341$, $p = .110$. Graphs of these interactions are presented in figure 4. All other situations were excluded from further analysis as they were not significant ($p > .05$).

**Figure 4: Average linear regression and mean slope of the response curve to each noise burst, between the Mortality Salience and Dental Pain conditions.**



Pair-wise comparisons for the interaction between MS or DP and mean slope of the curve reveal that individuals within the DP condition showed significantly greater reactivity than the MS condition under both noise burst 2, $t(21) = 2.295$, $p = .032$, and noise burst 3, $t(21) = 2.648$, $p = .015$. Pair-wise comparisons for the interaction between MS or DP and linear regression of the curve reveal very similar results in which individuals within the DP condition showed significantly greater reactivity under noise burst 2, $t(21) = 2.295$, $p = .032$ and noise burst 3, $t(21) = 2.657$, $p = .015$. These results were significant in the opposite direction of what was the researcher expected, and possible reasons for these results are presented within the discussion.

Again, RM-ANCOVA were performed comparing MS with DP and reactions to the different curve measures across the three noise bursts, while taking into account the effect of Death Anxiety and Death Experience. These results only showed marginal significance for the interaction between MS and DP on slope of the curve between the three noise bursts, and between MS and DP on the linear regression of the curve between the three noise bursts. The comparisons were in the opposite direction of what was expected. This concluded the between & within groups section of the analysis.

*Regression Section*

For the regression portion of the analysis, twelve linear regressions were performed with the noise burst data from mean slope and linear regression as independent measures, and several health-related variables as dependent measures. The regression model used was a hierarchical linear regression model, ordered by the health-related variables that the researcher expected would have the greatest predictive effect on these slopes and linear regressions. Then, the researcher reported the model that predicted the

most variability in this linear regression equation. A regression was run for the MS and DP conditions, for each of the noise burst data, for both the linear regression of the curve and the slope of the curve (i.e. 2x3x2 regressions). The results of these linear regressions are presented in the following pages within table 6. Table 6 which shows the conditions for each regression run, the Adjusted $R^2$ of the model, the β predictive value of each variable under that regression, and whether each variable's β caused a significant change in the $R^2$

**Table 6: Regression coefficients for slope and linear regression noise bursts between DP and MS.**

| *Group* | *Measurement* | *Noise* | *Adjusted R-square* | *Model Coefficients* | *Beta* | *Sig.* | |
|---|---|---|---|---|---|---|---|
| DP | Slope | 1 | 0.964 | Internality LOC | -0.015 | 0.91 | |
| | | | | Chance LOC | 0.454 | 0.10 | |
| | | | | Powerful Others LOC | -1.416 | 0.03 | * |
| | | | | Physical QOL | -2.848 | 0.01 | *+ |
| | | | | Psychological QOL | 3.568 | 0.01 | * |
| | | | | Social Rel. QOL | -2.887 | 0.01 | *+ |
| | | | | Environment QOL | -1.046 | 0.03 | * |
| | | | | Avg. Hrs. Sleep | 0.957 | 0.01 | * |
| MS | Slope | 1 | 0.872 | Internality LOC | 1.099 | 0.01 | * |
| | | | | Chance LOC | 0.240 | 0.20 | |
| | | | | Powerful Others LOC | 0.140 | 0.47 | |
| | | | | Physical QOL | 0.871 | 0.02 | *+ |
| | | | | Psychological QOL | 0.694 | 0.06 | |
| | | | | Social Rel. QOL | -1.082 | 0.02 | *+ |
| | | | | Environment QOL | 0.223 | 0.49 | |
| | | | | Avg. Hrs. Sleep | 0.077 | 0.64 | |
| | | | | # Missed at 6 Months | 1.453 | 0.02 | * |
| DP | Slope | 2 | 0.844 | Internality LOC | 1.293 | 0.11 | |
| | | | | Chance LOC | 2.575 | 0.08 | * |
| | | | | Powerful Others LOC | 0.767 | 0.08 | * |
| | | | | Physical QOL | 0.222 | 0.43 | |
| | | | | Psychological QOL | -4.511 | 0.05 | * |
| | | | | Social Rel. QOL | 4.647 | 0.04 | * |
| | | | | Environment QOL | 3.285 | 0.06 | |
| | | | | Avg. Hrs. Sleep | 1.389 | 0.04 | *+ |
| MS | Slope | 2 | 0.528 | Internality LOC | 0.526 | 0.11 | |
| | | | | Chance LOC | 0.309 | 0.25 | |
| | | | | Powerful Others LOC | 0.459 | 0.20 | |
| | | | | Physical QOL | 0.254 | 0.42 | |
| | | | | Psychological QOL | -0.277 | 0.54 | |
| | | | | Social Rel. QOL | -0.343 | 0.38 | |
| | | | | Environment QOL | 0.467 | 0.25 | |
| | | | | Avg. Hrs. Sleep | -0.678 | 0.03 | *+ |

**Table 6 (continued): Regression coefficients for slope and linear regression noise bursts between DP and MS.**

| *Group* | *Measurement* | *Noise* | *Adjusted R-square* | *Model Coefficients* | *Beta* | *Sig.* | |
|---|---|---|---|---|---|---|---|
| DP | Slope | 3 | 0.627 | Internality LOC | 2.944 | 0.02 | *+ |
| | | | | Chance LOC | -0.545 | 0.21 | |
| | | | | Powerful Others LOC | -0.889 | 0.11 | |
| | | | | Physical QOL | 1.667 | 0.04 | *+ |
| | | | | Psychological QOL | -2.296 | 0.03 | * |
| | | | | Social Rel. QOL | -1.611 | 0.09 | |
| | | | | Environment QOL | 1.234 | 0.08 | |
| | | | | Avg. Hrs. Sleep | -0.972 | 0.07 | |
| | | | | Amount of Illness in Life | 2.220 | 0.04 | * |
| MS | Slope | 3 | 0.855 | Internality LOC | 1.846 | 0.01 | *+ |
| | | | | Chance LOC | 0.960 | 0.02 | * |
| | | | | Powerful Others LOC | -0.266 | 0.34 | |
| | | | | Physical QOL | 2.529 | 0.01 | *+ |
| | | | | Psychological QOL | 0.768 | 0.08 | |
| | | | | Social Rel. QOL | -0.968 | 0.03 | * |
| | | | | Environment QOL | -1.034 | 0.04 | * |
| | | | | Avg. Hrs. Sleep | -0.518 | 0.05 | * |
| | | | | # Missed at 1 Month | 1.982 | 0.01 | * |
| DP | Linear Reg. | 1 | 0.963 | Internality LOC | -0.056 | 0.69 | |
| | | | | Chance LOC | 0.394 | 0.14 | |
| | | | | Powerful Others LOC | -1.413 | 0.03 | * |
| | | | | Physical QOL | -2.897 | 0.01 | *+ |
| | | | | Psychological QOL | 3.539 | 0.01 | *+ |
| | | | | Social Rel. QOL | -2.849 | 0.01 | *+ |
| | | | | Environment QOL | -1.071 | 0.03 | * |
| | | | | Avg. Hrs. Sleep | 0.980 | 0.01 | * |

* Significant at the .05 level (2-tailed)
+ Significant in both MS & DP conditions

**Table 6 (continued): Regression coefficients for slope and linear regression noise bursts between DP and MS.**

| *Group* | *Measurement* | *Noise* | *Adjusted R-square* | *Model Coefficients* | *Beta* | *Sig.* | |
|---|---|---|---|---|---|---|---|
| MS | Linear Reg. | 1 | 0.856 | Internality LOC | 1.086 | 0.01 | * |
| | | | | Chance LOC | 0.190 | 0.31 | |
| | | | | Powerful Others LOC | 0.085 | 0.67 | |
| | | | | Physical QOL | 0.902 | 0.02 | *+ |
| | | | | Psychological QOL | 0.780 | 0.05 | *+ |
| | | | | Social Rel. QOL | -1.135 | 0.02 | *+ |
| | | | | Environment QOL | 0.213 | 0.53 | |
| | | | | Avg. Hrs. Sleep | 0.125 | 0.48 | |
| | | | | # Missed at 6 Months | 1.547 | 0.02 | * |
| DP | Linear Reg. | 2 | 0.868 | Internality LOC | 1.328 | 0.09 | |
| | | | | Chance LOC | 2.537 | 0.07 | |
| | | | | Powerful Others LOC | 0.736 | 0.07 | |
| | | | | Physical QOL | 0.263 | 0.33 | |
| | | | | Psychological QOL | -4.503 | 0.04 | * |
| | | | | Social Rel. QOL | 4.596 | 0.03 | * |
| | | | | Environment QOL | 3.247 | 0.06 | |
| | | | | Avg. Hrs. Sleep | 1.367 | 0.04 | * |
| | | | | # Times Ill at 6 Months | -4.242 | 0.04 | * |
| MS | Linear Reg. | 2 | 0.526 | Internality LOC | 0.510 | 0.12 | |
| | | | | Chance LOC | 0.294 | 0.27 | |
| | | | | Powerful Others LOC | 0.452 | 0.21 | |
| | | | | Physical QOL | 0.249 | 0.43 | |
| | | | | Psychological QOL | -0.251 | 0.58 | |
| | | | | Social Rel. QOL | -0.349 | 0.38 | |
| | | | | Environment QOL | 0.464 | 0.25 | |
| | | | | Avg. Hrs. Sleep | -0.690 | 0.03 | * |
| DP | Linear Reg. | 3 | 0.054 | Internality LOC | 0.906 | 0.22 | |
| | | | | Chance LOC | -0.195 | 0.74 | |
| | | | | Powerful Others LOC | -0.163 | 0.79 | |
| | | | | Physical QOL | 0.276 | 0.63 | |
| | | | | Psychological QOL | -0.830 | 0.37 | |
| | | | | Social Rel. QOL | 0.175 | 0.80 | |
| | | | | Environment QOL | 0.381 | 0.60 | |
| | | | | Avg. Hrs. Sleep | -0.118 | 0.80 | |

* Significant at the .05 level (2-tailed)

+ Significant in both MS & DP conditions

**Table 6 (continued): Regression coefficients for slope and linear regression noise bursts between DP and MS.**

| *Group* | *Measurement* | *Noise* | *Adjusted R-square* | *Model Coefficients* | *Beta* | *Sig.* | |
|---|---|---|---|---|---|---|---|
| MS | Linear Reg. | 3 | 0.859 | Internality LOC | 1.837 | 0.01 | * |
| | | | | Chance LOC | 0.917 | 0.03 | * |
| | | | | Powerful Others LOC | -0.290 | 0.30 | |
| | | | | Physical QOL | 2.524 | 0.01 | * |
| | | | | Psychological QOL | 0.795 | 0.07 | |
| | | | | Social Rel. QOL | -0.999 | 0.03 | * |
| | | | | Environment QOL | -1.021 | 0.04 | * |
| | | | | Avg. Hrs. Sleep | -0.511 | 0.05 | * |
| | | | | # Missed at 1 Month | 1.994 | 0.01 | * |

* Significant at the .05 level (2-tailed)
+ Significant in both MS & DP conditions

The models included the variables within the model and all those in models before it, and were (in order): 1) internal to external Multidimensional Health LOC, 2) high to low chance Multidimensional Health LOC, and 3) high to low powerful others Multidimensional Health LOC, 4) Physical Quality of Life, 5) Psychological Quality of Life, 6) Social Relationships Quality of Life, 7) Environment Quality of Life, 8) Average amount of sleep. In addition, the following were entered in stepwise fashion as model 9) perceived SES, amount of illness in the past month, amount of illness in the past six months, amount of illness in the past year, ratings of illness in lifetime, amount of school or work missed in the past month, amount of school or work missed in the past six months, amount of school or work missed in the past twelve months, and ratings of school or work missed in lifetime. Because model 9 variables were entered in stepwise format, model 9 included all the variables before it, but only those variables within model 9 that significantly predicted the slope and linear regression values. Only variables that

caused a significant β change in $R^2$ for both MS and DP conditions were used in the last portion of the experiment analysis, described below.

To rephrase, linear regressions were performed on the two measures that showed up significant from the between & within experiment analysis. As this turned out to be mean slope and linear regression of the curve, and the regressions were analyzed for all three noise bursts between the MS and DP conditions, this resulted in twelve linear regressions. The regressions compared MS and DP on health-related variables, and the results are shown in table 5. Several health variables were significant, but only those that significant for both MS and DP continued to the next portion of the analysis.

*Comparison of Significant Health-Related Variables*

To test the hypothesis that the significant predictor variables in the mortality salience condition would be above and beyond the predictor variables in the dental pain condition, the researcher compared the beta-weight regression coefficients that were significant in both conditions. Common significant predictor variables within the noise 1 slope regression were physical QOL (β = -2.848, p = 3.568 for the dental pain group and β = .871, p = .021 for the mortality salience group) and social relations QOL (β = -2.887, p = .013 for the dental pain group and β = -1.082, p = .024 for the mortality salience group). Common significant predictor variables within the noise 2 slope regression were only the average number of hours of sleep (β = 1.228, p = .009 for the dental pain group and β = -.678, p = .033 for the mortality salience group). Common significant predictor variables within the noise 3 slope regression were internality LOC (β = 2.944, p = .021 for the dental pain group and β =1 .667, p = .043 for the mortality salience group) and

physical QOL (β = 1.667, p = .043 for the dental pain group and β = 2.529, p = .007 for the mortality salience group).

Common significant predictor variables within the noise 1 linear regression of the curve were physical QOL (β = -2.897, p = .014 for the dental pain group and β = .902, p = .022 for the mortality salience group), psychological QOL (β = 3.539, p = .010 for the dental pain group, and β=.780, p=.051 for the mortality salience group), and social relations QOL (β=-2.849, p=.014 for the dental pain group and β = -1.135, p = .025 for the mortality salience group). There were no common significant predictor variables within the noise 2 and noise 3 linear regressions of the curve. These results are summarized within table 5 above, and scatter plots showing these predictors in relation to each other are presented in figure 5 within the next few pages.

**Figure 5: Overlayed scatter plots of each predictor variable significant for both the Mortality Salience and Dental Pain conditions, with best fit linear regression lines.**

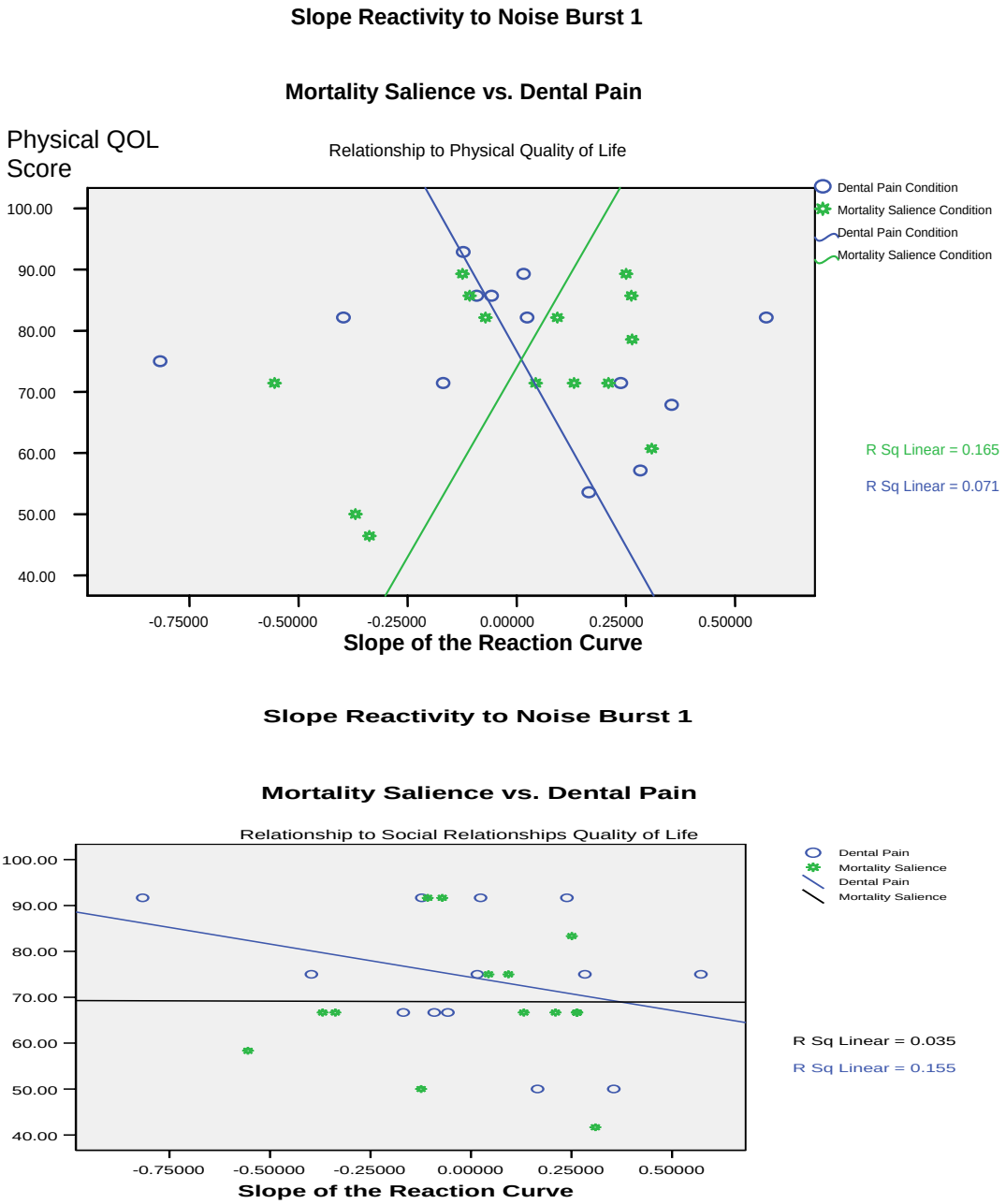
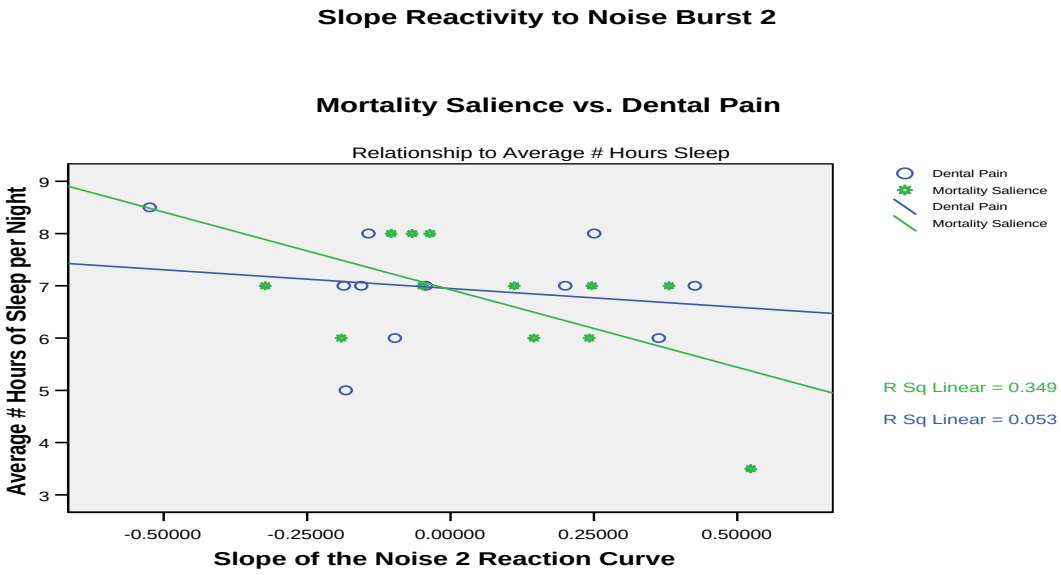


**Figure 5 (continued): Overlayed scatter plots of each predictor variable significant for both the Mortality Salience and Dental Pain conditions, with best fit linear regression lines.**



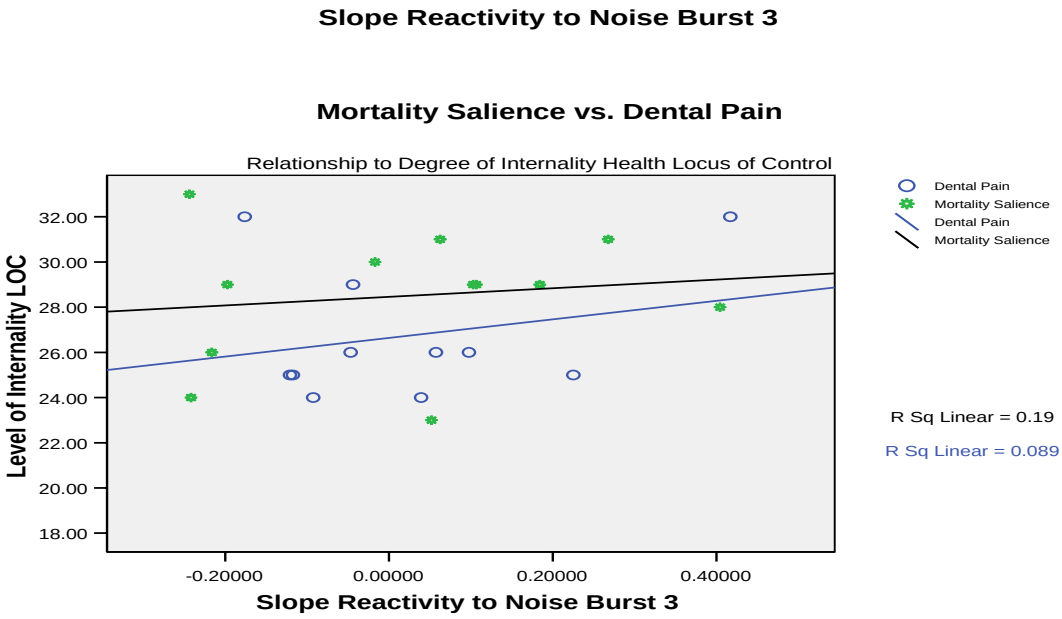
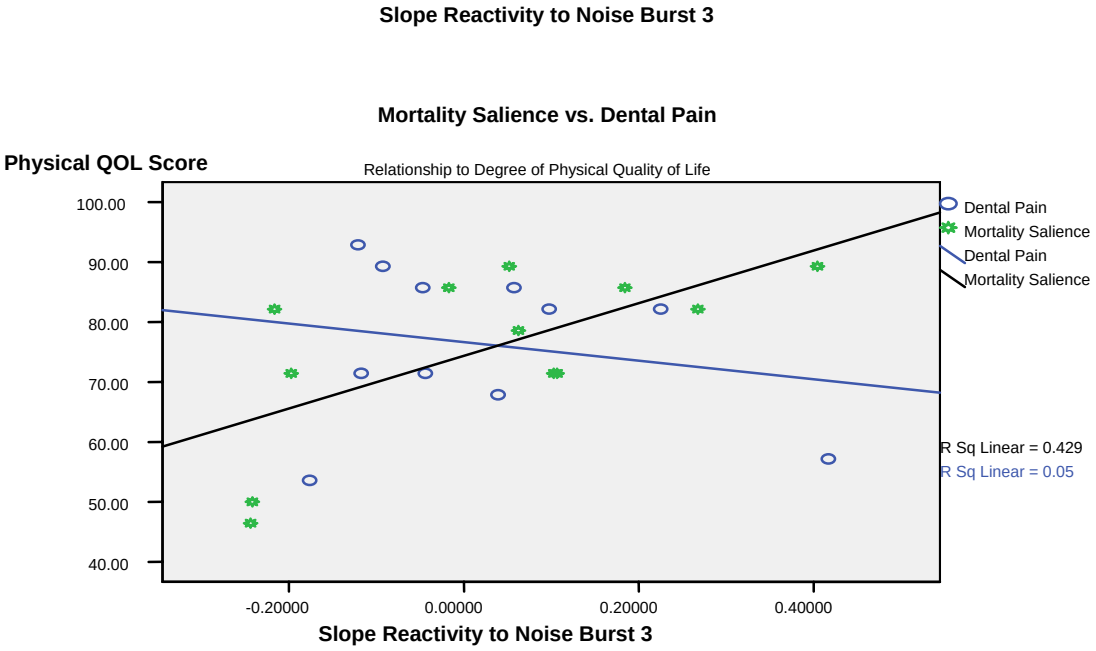



**Figure 5 (continued): Overlayed scatter plots of each predictor variable significant for both the Mortality Salience and Dental Pain conditions, with best fit linear regression lines.**



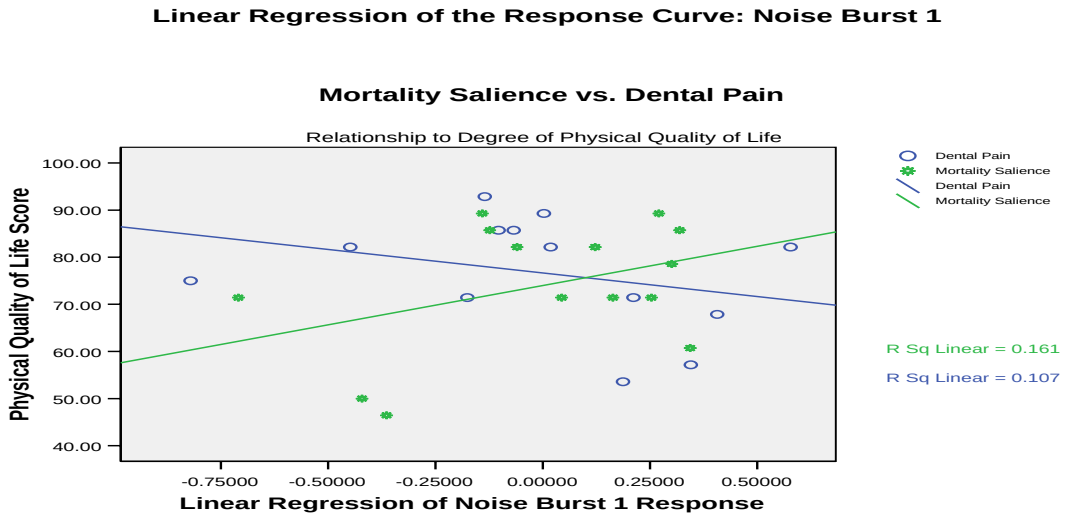
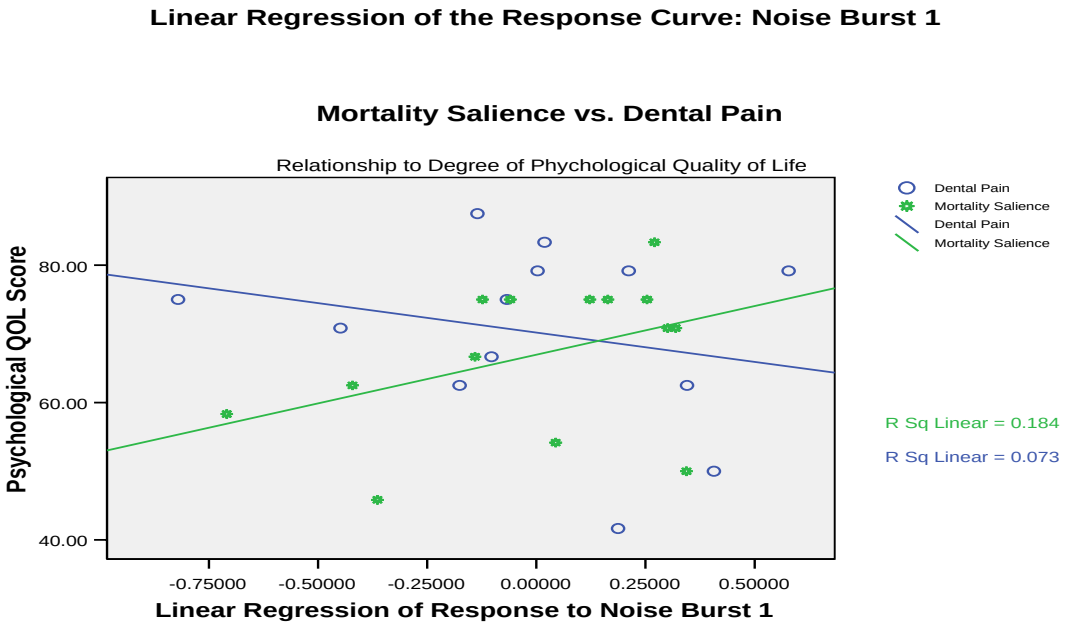
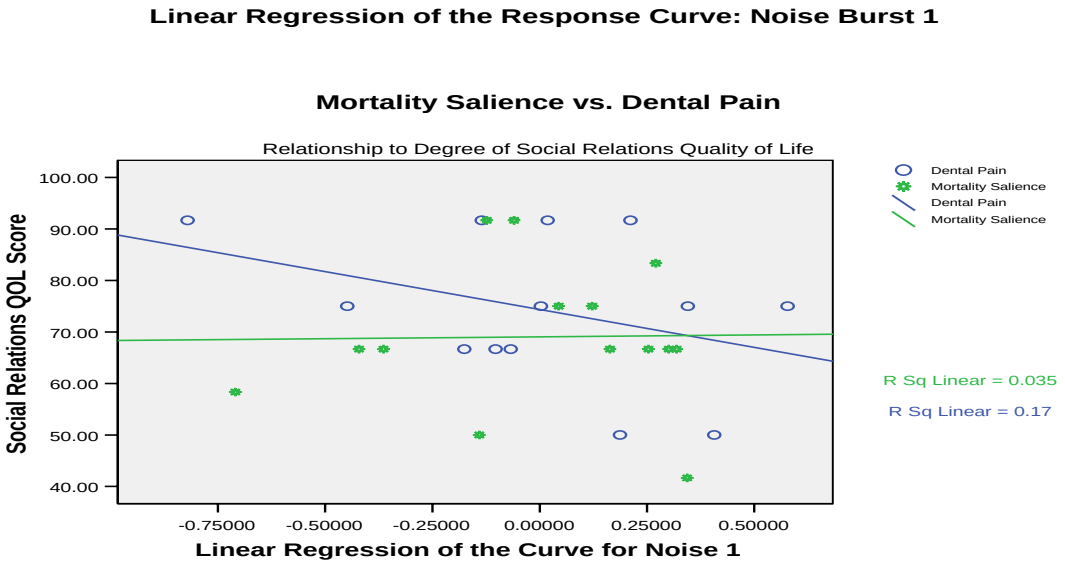



**Figure 5 (continued): Overlayed scatter plots of each predictor variable significant for both the Mortality Salience and Dental Pain conditions, with best fit linear regression lines.**



To determine whether the predictors had significantly different values from each other between the MS and DP conditions, the researcher combined the effect of MS and the significant health variables, or the effect of DP and the significant health variables. The researcher did this by computing the product of the values for each comparison. For example, a common predictor variable in noise 1 of the slope model was physical QOL. A variable was created with values for each individual that represented the combined result of noise 1 with physical QOL for each participant, and in this case the variable represented noise 1 of the slope model times physical QOL. After creating these variables, several between-groups One-Factor ANOVA were performed, with the MS or DP condition as the independent variable and each of these products as the dependent variables. The results of these analyses are presented in table 7 below. None of these comparisons were significant ($p > .05$). Therefore, though many health-related variables significantly predicted the variability in reaction to MS and DP, none of these health-related variables predicted reaction to a greater extent in the MS or DP group.

**Table 7: Comparison between common significant predictors on DP and MS.**

| *Measurement* | *Noise* | *Predictor* | *n* | *F* | *Sig.* |
|---|---|---|---|---|---|
| Slope | 1 | Physical QOL | 27 | 0.077 | 0.78 |
| Slope | 1 | Social Relations QOL | 27 | 0.033 | 0.86 |
| Slope | 2 | # Hours Sleep | 23 | 0.341 | 0.57 |
| Slope | 3 | Internality LOC | 23 | 0.000 | 1.00 |
| Slope | 3 | Physical QOL | 23 | 0.145 | 0.71 |
| Linear Reg. | 1 | Physical QOL | 27 | 0.087 | 0.77 |
| Linear Reg. | 1 | Psychological QOL | 27 | 0.073 | 0.79 |
| Linear Reg. | 1 | Social Relations QOL | 27 | 0.039 | 0.84 |

# CHAPTER IV

## DISCUSSION

### General Discussion

To remind the reader, the hypotheses for this study were: 1) that there will be an overall negative (or inverse) relationship between individuals' reactions to a MS induction and startle procedure, and that individual's health; 2) that this relationship will be stronger than any similar relationship seen by anxiety-induced controls; and 3) that low internal LOC individuals will show lower health than high internal LOC individuals. Also, recall that in order to determine that these relationships are due to MS and not simply anxiety, the results needed to show that these relationships were stronger in the MS group than the DP group.

The test to determine whether a difference exists in reactivity to noise bursts between MS and DP revealed that individuals in the DP group were more reactive to noise bursts than individuals in the MS group. This finding suggests that the DP manipulation was actually more stressful to the participant than the MS manipulation. This was surprising to the researcher, as it contradicted findings by Arndt, Allen, and Greenberg (2001) that individuals were more reactive to subliminal death primes than subliminal pain primes. A possible explanation for this opposite result may simply be that the current study used a different physiological measure of reactivity than Arndt, Allen, and Greenberg (2001), and that the two measures do not necessarily coincide;

furthermore, the manipulation within that study was subliminal, with participants not perceiving the masked death or pain word. The manipulation used here, however, was an explicit manipulation in which participants perceived the stimulus and processed it for some time. Previous studies within TMT literature had used the PANAS (Positive and Negative Affect Scales; Watson, Clark, & Tellegen, 1988) to determine the overall mood of the participant after the manipulation (Arndt, Greenberg, Pyszczynski, & Solomon, 1997; Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992). These studies have shown that mood typically is affected more by thoughts of anxiety from an exam or thoughts of anxiety from experiencing pain. The finding within this study that individuals are more reactive under the DP than the MS condition therefore may actually lend limited support to the notion that the mood changes shown via the PANAS in previous studies result in more reactivity.

Whether this is actually the case should be determined in further research, however, as this study's MS manipulation did not produce worldview defense as expected. Recall that a manipulation check to determine whether or not the MS manipulation produced worldview defense did not yield the expected worldview defense among individuals in the MS condition. Therefore, even though the wording used within the MS/DP experimental procedure was the same as those described in past TMT studies, it nevertheless cannot be said that the manipulation actually was the same and cannot be said that the findings and presented here generalize to TMT literature. In actuality, it appeared that the DP group tended to show more worldview defense than the MS group, although this was not significant as mentioned previously ($p>.05$).

The reader may conclude from the lack of worldview defense in the MS condition that: A) This study's induction procedure did not actually induce MS as described in past TMT research. B) Worldview defense actually results from some factor other than from mortality salience as described within past TMT research, and TMT research has not yet found this factor. C) The lack of finding here was a chance occurrence. Or D) one or more of the issues with the study defined below resulted in worldview defense failing to occur when it should have. The researcher suspects D to be the case, particularly because the distracter task may not have actually served to distract participants from Mortality Salience as is required to produce worldview defense. Reasons for this being a possibility are given within the section below titled "Limitations of the Study".

## Discussion of the Hypotheses

In regards to the first hypothesis, the regressions outlined above and summarized within table 5 yielded partial support for the hypothesis that there will be an overall negative relationship between individuals' reactions to an MS induction and startle procedure, and that individual's health. This partial support for negative relationships was shown for several health-related variables within the slope and linear regression of the curve measurements. However, these same regression analyses also showed several significant positive relationships which are in opposition to this hypothesis. This makes stating that there is an *overall* inverse relationship between mortality salience and health difficult. It is possible that relationships exist for some certain health related variables, but the findings do not point to a relationship to overall health. Furthermore, these regressions also resulted in similar significant positive and negative relationships for reactivity to the noise bursts within the dental pain condition.

Hypothesis two follows directly from hypothesis one: Since there were several health-related variables that significantly predicted reactivity in both the DP and MS conditions, the researcher needed to test hypothesis two to determine if health is negatively related to MS outside of other variables. Unfortunately, since the comparisons between the two conditions on the common significant relationships revealed no significant differences, there appears to be no support for the hypothesis that health-related variables are more related to reactivity to mortality salience than dental pain. It may be possible that relationships could have been found, but were not due to the problems inherent with this study as outlined within the next section.

Finally, regarding hypothesis three, there was only minimal support for internality health LOC as being a mediator for health related variables. Recall that more internality LOC was related to missing school or work less during the individuals' lifetimes, but that this appeared to be the only relationship internality LOC had to the health-related variables measured here. Locus of Control had been identified within past TMT research as a mediator of the effects of mortality salience, but this research typically used a different LOC measure than the one used here. Furthermore, the measure of LOC within this study focuses on LOC as it relates to health. It is possible that the effects of LOC noted in the past TMT research were not seen here due to these differences.

It is also possible that these effects of LOC were seen because the experimental manipulation apparently did not induce MS in the same way as in past TMT literature, as mentioned above. If this is the case, then there is relatively little knowledge of the effects that the manipulation done in the research actually had on the participants. It could be that effects of the manipulation altered responses to the multidimensional health LOC

measure in such as way as to obscure any relationships that may actually exist between internality health LOC and other health related variables.

With that said, it is interesting to note that there were indeed several health-related variables that predicted reactivity to MS. Despite the fact that there were no significant differences between MS and DP, this lends at least partial evidence to the notion that MS either takes a toll on health, or that taking a toll on health increases MS.

It should be noted that the distracter task was meant to increase cognitive load during the three minutes on something unrelated to MS. This would have caused participants to use distal defenses rather than proximal defenses in accord with the dual-process model of TMT, and resulted in the defense of the worldview that was expected in response to the Anti-U.S. essay. The sound tones occurred during this distracter task, and it may be that the sound tones themselves served to keep the individual worried and primed for MS. If this was the case, then participants may have spent that three minutes reading through the distracter but processing the manipulation instead. This would have kept them in the proximal defense paradigm, and resulted in no defense of the worldview.

Also, reactions to the sound tones themselves may have been influenced by the mode of thought about MS – proximal or distal. The first tone occurred one minute after finishing the MS manipulation and this is not likely enough time to have an individual start dealing with MS in the distal sense. Therefore, at least one of the sound tones may have occurred while the individual was experiencing proximal defense of the worldview, whereas the last of the sound tones may have occurred while the individual was experiencing distal defense of the worldview. This explanation may be at least partially the reason that many of the most significant findings within this study were of the

differences in responses from noise 1 to noise 2 to noise 3, and provides partial support to the dual-defense extension of TMT.

## Limitations of the Study

There are several other possible explanations for these results, particularly in the study procedure. As a limitation to administering the experiment, participants were first given the HDRA prior to the study. Although care was taken to lower the negative tone of the form, it may nevertheless have primed participants for mortality salience beforehand. The researcher took steps to minimize the effects of the HDRA on the study by creating a time lapse between completing the HDRA and participating in the experiment, and by taking care not to mention any highly death-related constructs within the HDRA. Nevertheless, because of the topic of the HDRA, it is still possible that participants came in to the experiment already under somewhat of a heightened awareness of death.

The consent form of the experiment may also have primed MS within participants. As another limitation to administering the experiment, two consent forms were created that included the following statements: 1) The experiment was meant to measure the relationship between thoughts of death and health variables for the mortality salience condition, or 2) the experiment was meant to measure the relationship between thoughts of dental pain and health variables for the dental pain condition (Appendices G and H, respectively). These statements may have primed participants to their experimental condition before signing the consent form, allowing them to prepare for the manipulation. This preparation may have resulted in different reactions to the manipulation than previously seen in the literature.

In addition, the consent form had another statement that may have had an effect on the outcome. As a limitation to administering the experiment, both consent forms included the statement, "Second, you may be startled by some of the procedures and you may experience some anxiety in the course of the study and in answering some of these questions. Although it is highly unlikely that these startling and anxiety-provoking procedures will be harmful, we require those who have been diagnosed with a form of Heart Disease to not participate in this study." While the experimenter took every effort to make this statement sound routine, participants needed to be aware of this risk before continuing with the study. As a result, many of the participants may have been primed for death-related thoughts before the manipulation, even if they belonged to the DP group. Some of the participants had indicated during the debriefing that they had expected some form of shock to occur after reading this statement.

Aside from the consent form and HDRA, there were environmental limitations to this study such as the requirement for the researcher to be in the room with the participants while they were being recorded by the GSR. This was because, unlike past research by Greenberg et al. (1992) in which the participant sat alone in a room, the recording computer was located within the room that included the GSR measurement apparatus (the BioPac MP150), and this required the researcher to be in the room to administer the experiment. This caused interaction between the experimenter and participant. Interactions such as these could have influenced the amount of effort a participant places on the study, influenced participants' moods, and given unintended cues to the participant.

Another environmental limitation was that administering the sound tones during the study required using a corded set of headphones as opposed to cordless headphones, in an attempt to ensure the same level of sound tones and to ensure that audible static does not occur that would hint at a noise event. However, the corded headphones were required to be plugged into the computer in plain eyesight in order to deliver the sound tones, and observant participants may have noticed this. This knowledge could have hinted at a noise event, and may have influenced the credibility of the experimenter's cover story that the headphones were meant to lower the amount of distracting sounds within the room.

Regarding procedural limitations, because the sounds were delivered through headphones, it was difficult at points to ensure a constant 100db sound tone. While the researcher used a sound decibel meter in order to calibrate the sound volume, the decibel meter would register different amounts depending on where the microphone was placed in relation to the headphones. Essentially, the farther that the meter was from the center of the headphone speakers, the lower the volume would register. Placing the meter directly at the center of one of the headphone speakers allowed for a constant sound volume from one participant to the next, but this also made it so that the experimenter could not guarantee the sound was indeed at a volume of 100db.

Furthermore, the counter to deliver the sound tones was started by hand, and so the sound tones were not directly linked to the GSR recording system. As a result, marking the time at which a sound tone happened also was done manually by the researcher. There is some error associated with manual input of timed data, although marking of the sounds within AcqKnowledge generally happened at a time very close to

when the sound tone occurred. This error could in rare cases have caused incorrect choices in response curves, response curves marked invalid that were in fact valid, and response curves marked valid that were in fact invalid.

Also regarding procedural limitations, there were two unexpected issues that occurred while administering the sound tones. First, the sound tones were spaced apart in three increments of one minute each. Pilot trials of the experiment indicated that the distracter task was likely to take at least the three minutes required to play back all of the sound tones. This was shown to not be the case, however, as 11 participants finished the distracter task prior to hearing the third of the three noise bursts, and as a result moved on to the Anti-U.S. essay while the GSR was still recording. Since it was possible that these participants' responses to the Anti-U.S. essay could have been influenced by a noise burst occurring during it (as opposed to before as was intended), and also since it was likely that these participants did not take the required time to read and process the distracter task enough to effectively distract them from the manipulation, the researcher excluded these participants' data from the study. This brought the total number of participant data used down from 45 to 34, a 24.4% drop.

In regard to the design of the study, overall health was not defined, nor was there a defined method of combining data to determine a measure of overall health, even though the hypotheses predicted results on overall health. Inclusion of a model of overall health may have been beneficial in the analysis and interpretation of the data.

Also in regard to the design of the study, valid noise burst data were only collected from 34 participants, which may be enough to conduct correlations and make comparisons. However, this design used a between measures manipulation in addition to

the within measures and regression designs. Therefore, in many cases, the maximum number of participants that could be used in analyses to answer these hypotheses was 34/2, or 17 (and in some cases less due to missing or invalid response curves). Statistical power on findings may be lacking as a result.

## Suggestions for Future Research

Given the number of health-related relationships shown despite the limitations to this study, modifications to this experiment that fix many of the limitations presented here may yield interesting and valuable results. If this repeat does show some support for the hypotheses presented here, a case could be made for the direct effect of reactions to MS on health. At the same time, the case could be made for creating a model for predicting health that incorporates the level of Mortality Salience in an individual. In addition, support could be gained for the use of a highly sensitive tool within TMT research (SCR).

However, if this experiment is repeated and results are similar, this could provide support for the notion that anxiety-provoking stimuli such as a noise burst could increase awareness of an individual's mortality, despite the two being seemingly unrelated. If, for example, a third control group that does not receive noise bursts results in worldview defense in response to an Anti-U.S. essay, then this would provide further support for this notion. It may also provide the case for a reassessment of the TMT model.

While this experiment incorporated previous amounts of death anxiety, death experience, and Multidimensional Health LOC internality as mediator effects, there are still several more constructs that have been identified as mediators within the literature. Given the limited number of cases within this study, it may be that the results would have

been different if the experimenter had factored out many more of these identified covariates before analysis. A modification of this experiment that incorporates many more covariates may result in significant findings. If, however, this modification still results in few effects of MS after factoring out these mediators, this may be indicative of the degree that mediators have a role in MS effects.

Beyond this experiment, suggestions for future research include the use of well-accepted measurements of health such as quality of life, ratings of fitness level, and the like. Researchers interested in measuring overall health might design the study to use a previously developed health model, rather than simply a measuring a set of health-related questions of interest. In addition, future research designed to relate several areas of health to mortality salience should focus on modifying this design to create one that is capable of being administered to a wider audience in the same time span, whether this is in group or survey settings.

If support in the future is shown for relationships between MS and a number of different health measures, it may be possible to develop a model for the prediction of an individual's health based on their reactivity to MS (or reactivity to MS based on their health). These models could then be used for the planning and development of treatment or prevention interventions.

In addition, future research should explore the notion of what time and level of distraction is generally required to bring an individual from proximal to distal defense of the worldview as a result of MS. As mentioned, one possibility for the lack of difference between MS and DP is that the individuals who had gone through the experiment were not dealing with MS under the distal defense mechanism. It may be that other

procedures, such as the subliminal death primes procedure outlined in Arndt, Allen, and Greenberg (2001), may more readily draw distal defenses.

The finding that likely has the most potential for avenues in future research is that the MS/DP induction procedure produced more reactivity among individuals within the DP condition (almost). As this is contradictory to Arndt, Allen, and Greenberg's (2001) findings, it may be that the physiological responses to MS are different based on location of the body or on type of response. Therefore, it may be that different physiological measures will reveal a different response pattern. This finding, if corroborated with future evidence, also may attest to the sensitivity of SCR measurements with a startle procedure to produce discernable differences.

This experiment was fairly ambitious and included many procedures that had not readily been used in TMT research. It measured reactivity to a startling stimulus compared between MS and DP, unlike many studies in which reactivity is measured to a MS or DP stimulus itself. It then attempted to relate a number of preexisting health-related variables to MS, and attempted to use health-related concepts such as Multidimensional Health LOL and the WHOQoL under a TMT paradigm. Future TMT researchers may wish to use some of these new ideas in an attempt, for example, to relate preexisting health traits to MS and begin to provide a case for the occurrence of MS outside of laboratory environments, for preexisting reactivity and proneness to MS (trait MS), and furthermore for long term effects of reactions to MS. Many of MS's effects predicted within laboratory settings would be much more persuasive if there were more direct evidence of MS effects in the real world, and the author would recommend this route for future TMT research.

**Table 8: A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Arndt, Allen, & Greenberg, 2001* | **Main Variables** | Subliminal Death Primes vs. Subliminal Pain Primes (IV), Anti-U.S. Essay (Worldview Defense) vs. No Anti-U.S. Essay (No Worldview Defense) (IV), Facial Electromyography (EMG) measurements (DV) |
| | **Results** | Exposure to subliminal death primes caused more negative evaluation of the Anti-U.S. author. Exposure to death primes showed more corrugator EMG than pain primes. Corrugator EMG responses not related to worldview defense. |
| | **Conclusions** | Death primes outside of consciousness yield worldview defense, but not affective response. |
| *Arndt, Greenberg, Pyszczynski, & Solomon, 1997* | **Main Variables** | A. Subliminal Death Primes vs. Subliminal Neutral Primes (IV1), Death Accessibility Measure (DV1), MS Induction vs. Exam Salience (IV2), Pro-U.S. and Anti-U.S. Essay (DV2);<br>B. Subliminal Pain vs. Subliminal Neutral (IV1), Pain Accessibility (DV1), Subliminal Pain vs. Subliminal Death, (IV2), PANAS-X (DV2A), Anti-U.S. (DV2B);<br>C. Subliminal Death Prime vs. Subliminal Pain Prime vs. Perceived Death Prime (IV), Pro-U.S. and Anti-U.S. (DV) |
| | **Results** | A. Exposure to subliminal death primes caused more death accessibility. MS induction resulted in more pro-U.S.;<br>B. Exposure to subliminal pain primes caused more pain accessibility. Pain affected mood more as measured by PANAS-X. MS induction resulted in more pro-U.S.;<br>C. Only exposure to subliminal death prime resulted in more pro-U.S. |
| | **Conclusions** | Death primes outside of consciousness yield worldview defense, but not pain or neutral primes, and not perceived death primes. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Arndt & Solomon, 2003* | **Main Variables** | A. Neuroticism scale (Pre), MS Contemplation vs. Dental Pain, Desire for Control Scale (DV).<br><br>B. anti-U.S. essay vs. registering for classes (IV) , rest is same. |
| | **Results** | A. High Neuroticism MS didn't desire control as much as Neutrals, Low Neuroticism MS desired it more.<br>B. After MS, low neuroticism desired less control than neutrals. |
| | **Conclusions** | MS influences desire for control, and influences behavior toward the more neurotic thought type. |
| *Arndt, Schimel, & Goldenberg, 2003* | **Main Variables** | A. MS vs. Dental Pain (IV1), Self-esteem for fitness (IV2), Importance level of fitness (DV);<br>B. MS vs. Dental Pain (IV1), Self-esteem for fitness (IV2), Immediate or delayed assessment (IV3), Importance level of fitness (DV) |
| | **Results** | A. MS generally caused higher intention of increasing fitness than DP;<br>B. MS caused higher intention of increasing fitness, but only when self-esteem for fitness was high in the delayed condition. |
| | **Conclusions** | The type of defense is different based on whether or there is a delay in the MS processing, and the change in type of defense is related to self-esteem. |
| *Cicirelli, 2002* | **Main Variables** | Older Adults: Multidimensional Fear of Death Scale (IV), Self-Esteem, Religiosity, Locus of Control, Socioeconomic Status, Social Support, and Current Health (DV's). (Regression Analysis) |
| | **Results** | Religiosity, Externality LOC, Social Support were significant predictors of Fear of the Unknown. Religiosity, Externality LOC were significant predictors of Fear of the Known. |
| | **Conclusions** | More anxiety about death is related to less religiosity, less social support, and more external LOC. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Cook, Arndt, & Lieberman, 2004* | **Main Variables** | Contemplate MS vs. Dental Pain (IV), Judge criminal using admissible, inadmissible, or omitted (IV), Participants' verdict (DV). |
| | **Results** | MS slightly more likely to vote guilty in admissible evidence, significantly more likely in no evidence, significantly less likely in inadmissible evidence. |
| | **Conclusions** | MS reversed backfire effect (people were more influenced by inadmissible than admissible evidence), because caused individual to think more of their worldview. |
| *Depaola, Griffin, Young, & Neimeyer, 2003* | **Main Variables** | Older Adults: Ethnicity (IV), Multidimensional Fear of Death Scale (IV), Social Value of the Elderly Scale (DV1), Personal Anxiety Toward Aging (DV2), Stereotypic Age Decrement Scale (DV3). |
| | **Results** | Age negatively associated with fear of premature death, positively correlated with fear of being destroyed. Anxiety towards aging related to fear of death. Negative attitudes toward elderly related to death anxiety. Stereotyping of elderly related to more fear of dying process, fear of the dead, and fear of being destroyed. Anxiety about aging, participants' age, and fear of the unknown significantly predicted negative attitudes toward the elderly. Caucasian Americans higher fear of the dying process than African Americans. African Americans showed higher levels of death anxiety than Caucasian Americans. Women related to more death anxiety than men. |
| | **Conclusions** | Fears of death vary based on age, ethnicity, and gender. In addition, negative attitudes toward and stereotyping of the elderly was related to more fear of death. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Goldenberg, Arndt, Hart, & Brown, 2005* | **Main Variables** | A. MS or Control Manipulation (IV1), Men vs. Women (IV2), Restriction of eating a fattening food (DV);<br>B. (Women only) MS or Control Manipulation (IV1), BMI (IV2), Restriction of eating a fattening food within a group (DV);<br>C. (Women only) MS or Control Manipulation (IV1), Assessment of body perceptions (IV2), Restriction of eating a fattening food within a group (DV). |
| | **Results** | A. Women under MS restricted intake of a fattening food, but not men.<br>B. Under MS, women with high BMI more likely to restrict intake of a fattening food when in a group.<br>C. Under MS, women who were further from their ideal were more likely to restrict intake of a fattening food when in a group. |
| | **Conclusions** | Concerns about mortality can make women take steps in an attempt to achieve a thinner body. |
| *Grabe, Routledge, Cook, Anderson, & Arndt, 2005* | **Main Variables** | MS or DP Manipulation (IV1), Gender (IV2), Self-Objectification Questionnaire (DV1), Objectification of Other Women (DV2) |
| | **Results** | Females self-objectify more than males in the MS condition, but not in the DP condition. Females but not males objectified other women more when under the MS condition. Males objectify other women more than females except when under the MS condition. |
| | **Conclusions** | Mortality Salience leads to objectification among women, towards themselves and towards other women. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Greenberg, Martens, Jonas, Eisenstadt, Pyszczynski, & Solomon, 2003* | **Main Variables** | High belief in herbal medicines (Pre Selection), MS vs. DP Manipulation (IV1), "Anxiety Blocker" vs. "Memory Enhancer" Placebo (IV2), Pro-U.S. vs. Anti-U.S. Essay (DV) |
| | **Results** | MS participants show more worldview defense than DP under the "Memory Enhancer" Placebo. No effect under the "Anxiety Blocker" Placebo |
| | **Conclusions** | Effects of MS manipulation eliminated when there is no potential for anxiety. |
| *Greenberg, Pyszczynski, Solomon, Pinel, Simon, & Jordan, 1993* | **Main Variables** | A. Measure of emotionality (Pre), Informed people tend to "Die Young" or "Live Long", e.g. emotionality manipulation. (IV1), favorable or neutral personality assessment, e.g. Self-Esteem manipulation (IV2), MS or Television Control (IV3), Measure of emotionality (Post);<br><br>B. Measure of emotionality (Pre), Patriotic or Neutral Music Video (IV1), Informed people tend to "Die Young" or "Live Long", e.g. emotionality manipulation. (IV2), favorable or neutral personality assessment, e.g. Self-Esteem manipulation (IV3), Impressions of the Music Video (Post) |
| | **Results** | A. Main effect of emotionality manipulation. Increasing self esteem resulted in lower emotionality under the DP condition but not the MS condition. Post measures yielded only a main effect of emotionality manipulation on it.<br><br>B. Main effect of emotionality manipulation. Low self-esteem participants showed more emotionality than high self-esteem participants when said people tend to "Live Long", less when said people tend to "Die Young". |
| | **Conclusions** | Supports TMT's proposition that self-esteem buffers anxiety. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994* | **Main Variables** | A. Standard MS Manipulation vs. Standard Television Manipulation (IV1), Deeper MS Manipulation vs. Deeper Television Manipulation (IV2), Pro-U.S. vs. Anti-U.S. Essay (DV);<br><br>B. MS Manipulation vs. TV Manipulation (IV1), Puzzle to Distract from MS vs. Puzzle to Keep MS in mind vs. Writing whatever they wanted (IV2), Pro-U.S. vs. Anti-U.S. Essay (DV).<br><br>C. MS Manipulation with Death Puzzle then Distraction Puzzle vs. MS Manipulation with Distraction Puzzle then Death Puzzle.<br><br>D. MS vs. TV Manipulation (IV1), Death Accessibility Measure before or after a bland essay (IV2), Amount of Death Accessibility (DV) |
| | **Results** | A. Subtle MS individuals more Pro-U.S. than Subtle TV individuals. Deep MS individuals more Pro-U.S. than Deep TV individuals. Subtle MS individuals more Pro-U.S. than Deep MS individuals;<br>B. Subtle MS individuals more Pro-U.S. than Subtle TV individuals. Distraction Puzzle yield more Worldview Defense in MS group than in Puzzle to Keep MS in Mind.<br><br>C. MS with Death then TV puzzles yielded more Pro-U.S. than MS with TV then Death puzzles;<br>D. Death though accessibility higher in MS with distraction before measure than MS with distraction after. Death thought accessibility higher in MS than DP. |
| | **Conclusions** | Distraction after MS results in more worldview defense than no distraction. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Greenberg, Schimel, Martens, Solomon, & Pyszczynski, 2001* | **Main Variables** | A. Essay describing how a White vs. Black man believes is proud and should assert heritage and secure place in the world (IV), Contemplate MS vs. Dental Pain (IV), Participants white or black (IV), ratings of author of passage (DV)<br><br>B. MS vs. Dental Pain (IV), Description of White vs. Black supervisor discriminating in hiring and justifying his cause, evaluation of person and year sentence (DV) |
| | **Results** | A. Essay claiming white pride seen as less racist when MS made salient.<br>B. MS rated White racist higher on approval, rated Black racist lower on approval. |
| | **Conclusions** | Stereotypes to the point of racism are preferred when individual is reminded of death. |
| *Greenberg, Simon, Pyszczynski, Solomon, Chatel, 1992* | **Main Variables** | A. Conservative vs. Liberal Subjects (IV1), MS vs. TV Manipulation (IV2), Politically Similar vs. Dissimilar Individual (IV3), Reactions to the individual (DV);<br>B. Primed Tolerance vs. No Prime (IV1), MS vs. TV Manipulation (IV2), Pro-U.S. vs. Anti-U.S. statements (IV3), Reactions to the authors of the statements (DV) |
| | **Results** | A. Main effect of politically similar vs. dissimilar individual on reaction to the individual. 3-way interaction for MS, Conservative vs. Liberal, and Individual Political Similarity. Conservatives had more negative reactions to the dissimilar individual than liberals, and more positive reactions to the similar individual;<br>B. 3-way interaction for MS vs. TV Manipulation, Tolerance vs. No Tolerance Prime, & Pro-U.S. vs. Anti-U.S. statements on reactions to the authors of the statements. More negative reactions to the Anti-U.S. statements in the MS condition than TV condition. Tolerance Prime made this effect smaller. |
| | **Conclusions** | Tolerance counteracts the tendency to react negatively towards others. |

**Table 8 (continued): A summary of Terror Management Theory articles.**

| | | |
|---|---|---|
| *Greenberg, Solomon, Pyszcznynski, Rosenblatt, Burling, Lyon, et al., 1992* | **Main Variables** | A. Positive or Neutral feedback from a personality test (IV1), Graphic Death-Related Video vs. Neutral Video (IV2), Self-Report Anxiety (DV);<br>B. Positive or Neutral feedback from an intelligence test (IV1), Graphic Death-Related Video vs. Neutral Video (IV2), Anxiety measured by Skin Conductance (DV); |
| | **Results** | A. Anxiety higher in the neutral self-esteem, Graphic Video condition than others;<br>B. Higher self-esteem were less aroused (anxious) than others, Anxiety generally highest in the neutral self esteem, Graphic Video situation.; |
| | **Conclusions** | Self-Esteem serves as a buffer for the anxiety that occurs as a result of death primes. |

## Appendix A

Heart Disease Risk Assessment

This form has been distributed in order to increase your awareness of many of the risk factors of Heart Disease, which is common in the United States and is on the rise. This form may also be used in an academic research study that you will be asked participate in.

Please indicate whether or not you wish to allow this information to be used in a future study:

____ Yes, my information may be used as part of this future research study.

____ No, my information may not be used as part of this future research study.

- Have you ever been diagnosed with a form of Heart Disease? Yes No (circle one)

- What is your gender? Male Female (circle one)

- What is your current age? ____

- Has a doctor told you, or have you found through measurements, that you have a borderline, high, or very high cholesterol level?

  No or N/A Normal Borderline High Very High (circle one)

- Has a doctor told you, or have you found through measurements, that you have a borderline, high, or very high blood pressure?

  No or N/A Normal Borderline High Very High (circle one)

- Do you currently use tobacco products? Yes No (circle one)

  If Yes: What kind(s)? _____

  Approximately how many cigarettes do you smoke per week? _____

  If No: Did you previously smoke on a regular basis? Yes No (circle one)

- How often do you exercise?

  Rarely Somewhat Rarely Average Somewhat Often Often

- BMI

  What is your height? _____

  What is your weight? _____

- Have either of your parents been diagnosed with a form of Heart Disease? Yes No (circle one)

- Have you ever been diagnosed with either Type-I or Type-II diabetes? Yes No (circle one)

**Appendix B**

# Heart Disease Risk Assessment

You are invited to be in a research study looking at the risks of Heart Disease among college students. You were selected as a possible participant because you are enrolled in Health Psychology at Texas State University. This study is being conducted by:

Department of Psychology
Texas State University-San Marcos

**Background Information:**

This form has been distributed in order to increase your awareness of many of the risk factors of Heart Disease, which is common in the United States and is on the rise. In addition, this form will also be used in an academic research study that you may be asked participate in.

**Procedures:**

If you agree to be in this study, we will ask you to do the following things:
Tell us some information about yourself and your habits.
Tell us about your health.

**Risks and Benefits of Being in the Study:**

The study has the following risks: First, you may find some of the questions to be a bit sensitive in nature. Second, you may experience some slight anxiety in the course of the study and in answering some of these questions.

The benefits of participation are: First, you will add to the body of science. Second, you may find some of the procedures and questions to be interesting. Third, you may become more aware of your own risk of Heart Disease

**Confidentiality:**

Any and all identifiable information you give will be considered strictly confidential. If you agree during the course of this questionnaire, these results will be used in a future research study that you may be asked to participate in. In this case, these results will be used to identify participants who may have a higher risk for cardiovascular disease.

Strict measures will be taken to protect your confidentiality. If you agree to have your data be included in a future study, a double-blind masking procedure will be used to ensure that your instructor and the researcher do not gain extra information about you.

This masking procedure will be as follows: Your instructor will translate your names into a number code, and the researcher will score your data using only this number code. A third instructor that is not involved in your course and not involved in the data collection will retrieve the names of those who scored high on this scale, and give them to the researcher. The names

will only be used to determine participation in the future study and to inform those who scored high on this measure. In this way, your instructor will not gain special knowledge about you, and the researcher will only know the names of those who scored high on this measure.

**Voluntary Nature of the Study:**

Your decision whether or not to participate will not affect your current or future relationship with Texas State University. You may decide to stop participating now, and any time after. There is no penalty to you for not participating in this experiment.

**Contacts and Questions:**

The researchers conducting this study are:
Jeffrey Swanson
Dr. Randall Osborne
Dr. Reiko Graham
Dr. John Davis
Dr. Sheldon Solomon

You may ask any questions you have now. If you have questions later, you may contact the researchers at:

Department of Psychology
Psychology Bldg., Room 208
Texas State University-San Marcos
601 University Drive
San Marcos, TX 78666
(512) 245-2526

If you want to talk to someone other than the researchers:

Dr. Theron Stimmel
Psychology Department Chair
(512) 245-2526

Texas State University Counseling Center
(512) 245-2208

Texas State University Student Health Center
Information: (512) 245-2161
Appointments: (512) 245-2167

You will be given a copy of this consent form to keep for your records.

**Statement of Consent:**

I have read the above information. I have asked needed questions and have received answers. I consent to participate in the study.
Signature _____ Date _____

## Appendix C

Please carefully read the following excerpt from a statement made by a fellow college student. Then, answer the questions on the following page:

> "That's an easy question to answer—I think this country basically totally sucks—it's ugly, unfriendly, and out of control. There is no real freedom here. It's easy to see why so many other countries hate us. The only way things can change is if we have a new government. And I don't mean a new president. Somebody should get things together to overthrow the government—the president, congress and all that. And put in a new type of government that would be better. America thinks this is a great country but it is not. People who are happy with America are stupid."

Page Break Here

Now please answer the following questions about the college student who made this statement. Use the following scale:

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| Not at all | | | | Somewhat | | | | Totally |

1. How much do you like this person? _____
2. How intelligent do you think this person is? _____
3. How knowledgeable do you think this person is? _____
4. How much do you agree with this person's opinion? _____
5. From your perspective, how true do you think the person's opinion is? _____

## Appendix D

Please respond to the questions below:

What is your age in years? _____

What is your gender? (circle one)

Male Female

What socioeconomic group do you consider yourself to be in? (circle one)

Lower Lower-Medium Medium Upper-Medium Upper

Approximately how many times have you felt ill:

In the last month? _____

In the last six months?_____

In the last year? _____

Compared to others, how often have you felt ill during your lifetime? (circle one)

Rarely Somewhat Rarely Average Somewhat Often Often

Approximately how many times did you miss work or school due to illness:

In the last month? _____

In the last six months?_____

In the last year? _____

Compared to others, how often have you missed work or school due to illness during your lifetime? (circle one)

Rarely Somewhat Rarely Average Somewhat Often Often

Do you currently smoke? Yes No (circle one)

If Yes: Approximately how many cigarettes do you smoke per week? _____

If No: Did you previously smoke on a regular basis? Yes No (circle one)

Do you currently drink alcoholic beverages? Yes No (circle one)

If Yes: Approximately how many drinks do you have per week? _____

If No: Did you previously drink on a regular basis? Yes No (circle one)

## Appendix E

On March 8, 2006, you completed a questionnaire entitled "Heart Disease Risk Assessment" during your Health Psychology course. This questionnaire asked several questions related to your health levels and risk of Heart Disease. The researchers would like to include this information when the analyzing the data for this experiment.

Would you allow the researchers to use the information you provided in this form during the data analysis? Your information will not be used for any other purpose. There is no penalty of any kind for not agreeing to allow this data to be included.

____ Yes, I allow the researchers to use the information I provided in the Heart Disease Risk Assessment. I understand that this information will not be used in analyzing the data for this experiment, and will not be used for any other purpose.

____ No, I do not allow the researchers to use the information I provided in the Heart Disease Risk Assessment.

## Appendix F

Literary Preference Questionnaire

Please read the following short passage from a novel and answer the questions below it.

The automobile swung clumsily around the curve in the red sandstone trail, now a mass of mud. The headlights suddenly picked out in the night-first on one side of the road, then on the other-two wooden huts with sheet metal roofs. On the right near the second one, a tower of course beams could be made out in the light fog. From the top of he tower a metal cable, invidislbe at its starting-point, shone as it sloped won into the light from the car before disappearing behind the embankment that blocked the road. The car slowed down and stopped a few yards from the huts.

The man who emerged from the seat to the right of the driver labored to extricate himself from the car. As he stood up, his huge, broad frame lurched a little. IN the shadow beside the car, solidly planted on the ground and weighted down by fatigue, he seemed to be listening to the idling motor. Then he walked in the direction of the embankment and entered the cone of light form the headlights. He stopped at the top of the slope, his broad back outlined against the darkness. After a moment he turned around. In the light from the dashboard he could see the chauffeur's black face, smiling. The man signaled and the chauffeur turned off the motor. At once a vast cool silence fell over the trail and the forest. Then the sound of the water could be heard.

The man looked at the river below him, visible solely as a broad dark motion flecked with occasional shimmers. A denser motionless darkness, far beyond, must be the other bank. By looking fixedly, however, one could see on that still bank a yellowish light like an oil lamp in the distance. The big man turned back toward the car and nodded. The chauffeur switched off the lights, turned them on again, than blinked them regularly. ON the embankment the man appeared and disappeared, taller and more massive each time he came back to life. Suddenly on the other bank of the river, a lantern held up by an invisible arm back and forth several times. At a final signal from the lookout, the man disappeared into the night. With the light out, the river was shinning intermittently. On each side of the road, the dark masses of forest foliage stood out against the sky and seemed very near. The fine rain that had soaked the trail an hour earlier was still hovering in the warm air, intensifying the silence and immobility of this broad clearing in the virgin forest. In the black sky misty stars flickered.

How do you feel about the overall descriptive qualities of the story?

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|
| not at all descriptive | | | | somewhat descriptive | | | | very descriptive |

Do you think the author of this story is male or female?

_____male _____female

**Appendix G**

# Relationship between Health and Reactivity to Mortality Salience

You are invited to be in a research study looking at the relationship between thoughts of death and health variables.

You were selected as a possible participant because you are enrolled in Health Psychology at Texas State University.

We ask that you read this document and ask any questions you may have before deciding whether you agree to participate in this study. This study is expected to take approximately 50 minutes.

This study is being conducted by:

Department of Psychology
Texas State University-San Marcos

**Background Information:**

The purpose of this study is to determine if there is any relationship between the way people think about death and how healthy they are.

**Procedures:**

If you agree to be in this study, we will ask you to do the following things:
Tell us your thoughts about death and dying.
Allow us to record your amount of excitement.
Tell us about your health.
Tell us about your quality of life.

**Risks and Benefits of Being in the Study:**

The study has the following risks: First, you may find some of the questions to be a bit sensitive in nature. Second, you may be startled by some of the procedures and you may experience some anxiety in the course of the study and in answering some of these questions. Although it is highly unlikely that these startling and anxiety-provoking procedures will be harmful, we require those who have been diagnosed with a form of Heart Disease to not participate in this study. Please inform the researcher if you have been diagnosed with a form of Heart Disease, or have shown signs indicating Heart Disease.

The benefits of participation are: First, you will add to the body of science. Second, you will gain some experience as to how experiments are performed. Third, you may find some of the procedures and questions to be interesting.

**Confidentiality:**

Any and all identifiable information you give will be considered strictly confidential. Any information that can be used to identify you will not be included when looking at the results of the experiment.

**Voluntary Nature of the Study:**

Your decision whether or not to participate will not affect your current or future relations with the institution. You have already received your extra credit. You may decide to stop participating now, and any time after. There is no penalty to you for not participating in this experiment.

**Contacts and Questions:**

The researchers conducting this study are:
Jeffrey Swanson
Dr. Randall Osborne
Dr. Reiko Graham
Dr. John Davis
Dr. Sheldon Solomon

You may ask any questions you have now.

If you have questions later, you may contact the researchers at:

Department of Psychology
Psychology Bldg., Room 208
Texas State University-San Marcos
601 University Drive
San Marcos, TX 78666
(512) 245-2526

If you want to talk to someone other than the researchers:

Dr. Theron Stimmel
Psychology Department Chair
(512) 245-2526

Texas State University Counseling Center
(512) 245-2208

Texas State University Student Health Center
Information: (512) 245-2161
Appointments: (512) 245-2167

You will be given a copy of this form to keep for your records.

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature _____ Date _____

Signature of Investigator or Person Obtaining Consent _____
Date _____

**Appendix H**

# Relationship between Health and Reactivity to Dental Pain

You are invited to be in a research study looking at the relationship between thoughts of dental pain and health variables.

You were selected as a possible participant because you are enrolled in Health Psychology at Texas State University.

We ask that you read this document and ask any questions you may have before deciding whether you agree to participate in this study. This study is expected to take approximately 50 minutes.

This study is being conducted by:

Department of Psychology
Texas State University-San Marcos

**Background Information:**

The purpose of this study is to determine if there is any relationship between the way people think about dental pain and how healthy they are.

**Procedures:**

If you agree to be in this study, we will ask you to do the following things:
Tell us your thoughts about dental pain.
Allow us to record your amount of excitement.
Tell us about your health.
Tell us about your quality of life.

**Risks and Benefits of Being in the Study:**

The study has the following risks: First, you may find some of the questions to be a bit sensitive in nature. Second, you may be startled by some of the procedures and you may experience some anxiety in the course of the study and in answering some of these questions. Although it is highly unlikely that these startling and anxiety-provoking procedures will be harmful, we require those who have been diagnosed with a form of Heart Disease to not participate in this study. Please inform the researcher if you have been diagnosed with a form of Heart Disease, or have shown signs indicating Heart Disease.

The benefits of participation are: First, you will add to the body of science. Second, you will gain some experience as to how experiments are performed. Third, you may find some of the procedures and questions to be interesting.

**Confidentiality:**

Any and all identifiable information you give will be considered strictly confidential. Any information that can be used to identify you will not be included when looking at the results of the experiment.

**Voluntary Nature of the Study:**

Your decision whether or not to participate will not affect your current or future relations with the institution. You have already received your extra credit. You may decide to stop participating now, and any time after. There is no penalty to you for not participating in this experiment.

**Contacts and Questions:**

The researchers conducting this study are:
Jeffrey Swanson
Dr. Randall Osborne
Dr. Reiko Graham
Dr. John Davis
Dr. Sheldon Solomon

You may ask any questions you have now.

If you have questions later, you may contact the researchers at:

Department of Psychology
Psychology Bldg., Room 208
Texas State University-San Marcos
601 University Drive
San Marcos, TX 78666
(512) 245-2526

If you want to talk to someone other than the researchers:

Dr. Theron Stimmel
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(512) 245-2526

Texas State University Counseling Center
(512) 245-2208

Texas State University Student Health Center
Information: (512) 245-2161
Appointments: (512) 245-2167

You will be given a copy of this form to keep for your records.

**Statement of Consent:**

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Signature _____ Date _____

Signature of Investigator or Person Obtaining Consent _____
Date _____

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# VITA

Jeffrey Nathanael Swanson was born in LaSalle-Peru, Illinois, on February 27, 1982, the son of Carl Jeffrey and Donna Rae Swanson. Jeffrey attended high school at Edgren High in Misawa Air Base, Japan from 1996-1999. In 2000, Jeffrey attended Pierce Community College in Fort Steilacoom, Washington.

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