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**WHAT'S DEATH GOT TO DO WITH IT?
THE ROLE OF PSYCHOLOGICAL UNCERTAINTY ON
IMPLICIT DEATH ACCESSIBILITY**

by

Neil K. Chaudhary

**A dissertation submitted to the Graduate Faculty in
Psychology in partial fulfillment of the requirements for the degree
of Doctor of Philosophy, The City University of New York**

2002

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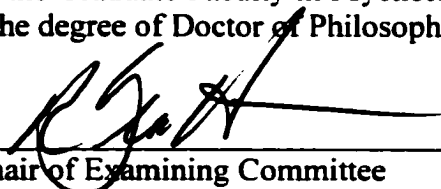
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This manuscript has been read and accepted for the Graduate Faculty in Psychology in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

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Abstract

**What's Death Got to do with it?
The Role of Psychological Uncertainty on
Implicit Death Accessibility**

by

Neil K. Chaudhary

Adviser: Professor R. Glen Hass

Terror management theory (TMT; Solomon, et al. 1991) asserts that the awareness of the inevitability, uncontrollability and possible finality of death is at the root of most human anxiety; and, that a substantial portion of human activity manifested in a wide variety of seemingly unrelated behaviors serve to manage the anxiety engendered by thoughts of our own demise. According to TMT, combined with a strong sense of self-esteem, a firm belief in a just and meaningful cultural worldview allows people to function normally despite the potentially incapacitating fear resulting from our knowledge that we will, without a doubt, die. Cultural worldviews are assumed to reduce death concerns by creating a realm in which an individual can immerse his or her life and by doing so become an integral part of that realm and live on through the continued existence of that culture thus, at least symbolically conquering death. Worldview defense (e.g. showing increased support for those who share one's worldview and increased animosity towards those who violate ones worldview) appears to be engendered whenever thoughts of death

are highly accessible, but not directly in focal attention. According to TMT heightened implicit death thought accessibility is a sufficient and necessary factor responsible for the production of defensive worldview bolstering behaviors. Recently however, researchers (e.g. McGregor, et al, 2001; van den Bos, 2001) have proposed that the worldview defensive behaviors are better accounted for by psychological uncertainty, and not death. These theorists assert that reminders of death are problematic because they instill a sense of uncertainty in the individual. McGregor et al (2001, 1998) demonstrated that making people “uncertain” produced worldview defense in the apparent absence of heightened death accessibility supporting their proposed role of uncertainty in worldview defense. The experiments presented in this dissertation examined implicit death accessibility following an uncertainty manipulation. Results indicated that uncertainty produced heightened death accessibility under a variety of situations. Uncertainty therefore appears to be psychologically problematic to the extent that it engenders implicit concerns about death. Consequently, the TMT claim that heightened death accessibility is necessary and sufficient to produce worldview defensive behavior is still sound.

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Chapter 1: Introduction

Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg & Pyszczynski, 1991) asserts that the awareness of the inevitability, uncontrollability and possible finality of death is at the root of most human anxiety; and that a substantial portion of human activity manifested in a wide variety of seemingly unrelated behaviors serves to manage the anxiety engendered by thoughts of our own demise. According to TMT, a firm belief in a just and meaningful cultural worldview, and a strong sense of self-esteem allow people to function “normally” despite the potentially incapacitating fear resulting from our knowledge that we will, without a doubt, die. Cultural worldviews are assumed to reduce death concerns by creating a realm in which an individual can immerse his or her life and by doing so become an integral part of that realm and live on through the continued existence of that culture. That is, by maintaining a belief in a cherished culture one can feel that he or she will gain death transcendence through contributions to that culture which will exist long after the individual’s demise. Self-esteem is defined by TMT as the degree to which one feels that she or he is a good upstanding participant in the culture; self-esteem thus buffers anxiety by allowing the individual to believe that she or he is a good enough member of the culture to qualify for the immortality offered by that culture.

Empirical support for terror management theory has been obtained from tests of hypotheses derived from the proposed functions of self-esteem and cultural worldviews. Specifically, given the claim that self-esteem serves an anxiety-buffering function, people

with dispositionally high or momentarily elevated self-esteem should be less threatened by anxiety provoking circumstances; research findings have been consistent with this proposition. Additionally, if a cultural worldview functions to reduce concerns of death, then being reminded of death should increase the need for, and defense of that worldview. Numerous experiments have shown that when asked to ponder their own deaths (mortality salience, MS), individuals engage in a wide variety of activities that have in common the support of one's beliefs regarding their cultural worldview. MS has been shown to affect prejudicial attitudes, aggression, creativity, attitudes towards different others, and attitudes towards sex, to name just a few.

Mortality salience effects seem to be unique to thoughts of death. That is, manipulations bringing to mind other non-lethal negative thoughts (e.g. taking a dental pain) fail to produce the worldview defense behaviors obtained by reminders of death. Additionally, worldview defense appears to be engendered whenever thoughts of death are highly accessible, but not directly in focal attention. Thus, according to terror management theory and research, thoughts of one's death is the specific factor responsible for the production of defensive worldview bolstering behaviors.

Recently however, several researchers (McGregor, Zanna, Holmes & Spencer, 2001; van den Bos, 2001) have suggested that the worldview defensive behaviors produced by mortality salience are better accounted for by psychological uncertainty, and not death. From this perspective, death is merely a special case of uncertainty. In support of this view, McGregor et al and van den Bos demonstrated that making people "uncertain" produces similar effects to those obtained by making them think about their

eventual death. In addition, McGregor et al, in support of their suggested role of uncertainty, show that while death reminders fail to produce changes in self-reported anxiety, positive affect and negative affect, both reminders of death and uncertainty manipulations lead to an increase in self-reported uncertainty. McGregor et al and van den Bos conclude that “mortality salience effects” are thus not driven by death awareness per se, but by uncertainty functioning as a self-integrity threat.

The purpose of this dissertation is to critically examine the veracity of the claim that MS effects are better understood as specific instances of uncertainty undermining self-integrity. I will argue that both McGregor et al’s (2001) and Van den Bos’ (2001) claims are theoretically, and in some cases methodologically suspect. Consequently it is presently unclear if the exclusion of “death” as a causal factor in the production of MS effects is warranted. Accordingly, the present research will more fully explore the role of death and uncertainty in the production of MS effects.

Chapter 2: Terror Management Theory

2.1 Theoretical Framework

Terror Management theory is derived from the work of cultural anthropologist Ernest Becker (1962, 1973, 1975), who proposed that humans are fundamentally motivated to control the anxiety associated with the awareness of their eventual and inevitable death. According to Becker, human evolutionary development paralleled the development of non-human animals. That is, the same pressures that guided the evolution of all other life forms also guided the evolution of humans: a biological predisposition towards survival in service of perpetuating the species.

According to the theory of evolution (see Darwin, 1859/1998) naturally occurring environmental and other (e.g. other species) threats led to the selection of genes in various populations that led the animal to out-survive the other members of the species¹. Being alive allowed for more opportunities to reproduce which, had the consequence of making the gene responsible for the extended life more prevalent in the population. Both human and non-human animals through evolutionary processes thus developed survival “tools” and instincts. For instance, camels acquired specialized pads on their feet that helped them manage the desert sand. Sharks that had a bony skeleton typical in vertebras failed to survive as well as those born with a cartilaginous structure well suited for speed

¹ Note that this description of Darwin’s theory totally excludes the notion of sexual selection. Survival in and of itself is only important because it allows for further reproduction. Other adaptations that produce increased opportunities for reproduction

and agility in the water. The three-toed sloth, despite its sluggish gait, survives because of the development of claws that make them exceptional climbers.

Humans on the other hand, seem at first glance to be inept and inadequate at this survival thing. We are paltry climbers, inferior swimmers, and slow runners. We possess pathetic teeth that are useless for both defense and hunting. Our “claws” are similarly worthless and are only mere tokens of the talons possessed by most of our fellow mammals. As a hunter the human body is paltry; we are more likely to be prey than predator. Yet we *are* here.

Humans compensated for their bodily deficiencies with their gregarious nature and wondrous intellect. Our comparatively massive brain allows humans the ability to fathom the future and collectively plan for it. We can ponder cause and effect relationships, think abstractly and be creative, resulting, for example, in the development of tools and language. Language enabled better group coordination, which let humans do as groups what their bodies denied them individually. Thus the evolution of the human mind has allowed humans to not only survive, but to dominate a wide variety of environmental niches.

Tool usage and communication, are however, only two examples of the products enabled by the human big brain. According to some theorists (e.g. Becker, 1973; following Kierkegaard) a consequence of our acquired abilities (e.g. pondering the future, delaying rewards) was “self-awareness.” That is, the fact that we know that we *are*. A

(e.g. becoming more desired by a member of the opposite sex) should also be selected during the process of evolution.

squirrel may go through life existing, but is unlikely to be aware of that fact. In addition to knowing of our own individual existence, humans have a concept of time (including the future - a time yet to be) and space. Unfortunately, this allows us to imagine a space in the future time in which we no longer exist. That is, by recognizing our existence, we simultaneously gain the ability to realize that our state of being is finite and that our dominion on earth (and perhaps elsewhere) *will* cease. As Yalom (1980) put it, "we are mortal creatures who because we are self-aware know that we are mortal" (p. 32). Langer (1982) also noted the role of self-awareness on death knowledge:

The sense of life becomes concentrated and reduced to a feeling of selfhood...and within the rise and gradual conception of the "self" as the source of personal autonomy comes, of course, the knowledge of its limits - the ultimate prospect of death. (p. 103)

Kierkegaard proposed this as the ultimate paradox in that we are simultaneously in "awe" at the beauty and wonder of existence and "dread" that existence is transitory. To know that one is alive can be fantastic. We can revel in the beauty of a sunrise, the coloring of a bird or even the detailed architecture of an ancient church. When aware that we are alive, humans come to appreciate, and celebrate life, but they also know that it is impermanent. We know we will die - plain and simple - and that we have no way to avoid it. That is the dread. We are only temporary. We will come and go like the snow, the fame of Vanilla Ice or Mike Tyson's Millions.

So here we are - enormously intelligent beings (comparatively) who are able to communicate effectively, modify the environment to suit our needs and pleasure, imaging the future and plan for it. We can reproduce a true vision of beauty with paint and

canvas, or create a fantasy world with fiction. We can train animals to do our bidding and eradicate those we cannot tame. We have “dominion over the fish...the birds... the cattle...and over every creeping thing that creeps upon the earth” (Genesis 1:26 Revised Standard Version) yet we know that despite all our accomplishments, great or small, we will die. As Becker (1973; discussing Eric Fromm) put it, man has a “symbolic self, that seems to give [him] infinite worth in a timeless scheme of things, and a body worth about 98 cents” (p. 28).

Now imagine facing that reality continually. Imaging constantly knowing that at any instance you could die; that death will “take away all [you’ve] got, and all [you’ll] ever have” (Clint Eastwood in “Unforgiven”). Imaging constantly knowing that you may die at anytime or place, whether it be by a stray bullet, flash flood, lightning, an untied shoelace, a misplaced incision by a surgeon, the bite of a mosquito, a homeless person with a brick or a really bad, untreated case of diarrhea. Imaging constantly knowing that your death may have an impact on the universe of no greater importance than the death of a carrot or a firefly squashed against the windshield of a car.

Making matters worse still is that despite our belief that we “rule” the planet, the terror of the knowledge that we will die is amplified by the fact that we are just animals. Humans consider themselves “special” and better; more important, and more deserving of life than the “creatures” of the earth. We exaggerate our uniqueness, and ignore the similarities to common beasts, but our distinctions are much less prevalent than our similarities. We are different from animals in that we exclusively walk on two legs, wear clothes, talk and create art. The similarities on the other hand are more numerous. For

example, just as animals do, so humans also defecate, fornicate, regurgitate, expectorate, menstruate, lactate, pass wind, perspire and belch. We are hairy, have teeth, blood and come from the same genetic material, as do “beasts.” How could a being created “in the image of god,” be one with the “lower” creatures of the earth?

The fact we are little more than bipedal talking apes and that our lives may be unimportant in the cosmic scheme and the fact that life will end, perhaps without reason, creates the potential for a paralyzing fear in humans. Following Becker, terror management theory (Solomon et al, 1991) asserts that self-esteem and a belief in a cultural worldview are complementary anxiety buffers that provide protection from the terror engendered by this knowledge of human mortality. The theory posits that a wide variety of seemingly unrelated behaviors exhibited by humans are actually functionally connected in that they boost self-esteem and provide a sense of confidence in the value of one’s culture (Solomon et al, 1991) in the service of providing psychological equanimity in light of our uniquely human awareness of death.

According to Becker and TMT, culture evolved (at least in part) as a way to manage the fear of death by providing meaning and value to life. A cultural worldview that includes meaning and value provides opportunities for literal and symbolic immortality. We search for answers to questions probing the “meaning of life.” We search for explanations for our existence. Why are we here? Where did we come from? Where are we going? When rational explanations fail to answer these queries, humans create their own explanations. All religions report an explanation of our origins to their followers. These stories describing “creation” range from the seemingly fantastic (a man

who has always existed made everything in and beyond the universe in a day less than a week) to the bizarre. According to an ancient Chinese myth, a dude named Pan Gu broke free from a big black egg with his battle-axe where he had resided for 18 thousand years. Part of the egg became the earth, part the heavens and each part grew at a rate of 10 feet per day with Pan Gu standing between them holding them apart. Another 18 thousand years pass and Pan Gu dies and his different dead parts become all the rest of world.

Similarly we have created an expected way of behaving that is consistent with, or provides a “reason” for existence. That is, all cultures provide their citizens with a “proper” way of behaving. The culture elucidates what is good and moral and prescribes acceptable behavior to achieve those values. Religions are often quite explicit about these rules of behavior (e.g. the Ten Commandments) and the benefits of adherence to them (e.g. heaven, nirvana). With the exception of written laws, society’s expectations are often less explicit (social norms) but still present. These social norms, which are the unwritten rules, are still followed sometimes more stringently than written laws. For example, while people often speed, they rarely violate another person’s personal space without just cause. Thus whether religious, societal, written or unwritten, cultural expectations provide guidance for one to be a cherished, respected member of the culture.

However, a belief in a meaningful culture is not sufficient to control the terror associated with knowledge of death. According to TMT, the belief in the *existence* of a righteous and worthwhile culture is insufficient unless an individual also believes that she or he is likely to reap the rewards of membership to that culture. That is, one must also believe that he or she is a good, productive and accepted member of the group in order to

be protected from the death fears. Accordingly, terror management theory defines self-esteem as “one’s belief regarding how well one is living up to the standards and value prescribed by the worldview” (Solomon et al, 1991). Therefore, people need a minimum level of self-esteem in order to be protected from the fear associated with their eventual death.

By living up to, or exceeding the standards of the culture, one can gain symbolic immortality by living on through the continued existence of the society. Thus, by contributing to family, business, or country, for example, an individual may gain a sense of immortality as these entities, which the person is a part of, will exist long after the individual’s physical death (Solomon et al, 1991). Living on through cultural contributions is a form of symbolic immortality. A belief in literal immortality can be achieved through religious worship and belief, where the devout practitioner will gain life everlasting (in some form). Whether by reincarnation, an immortal soul, becoming one with the universe, one with an immortal deity or by living in eternal paradise with a maximally benevolent god, religions provide ways for us to literally conquer death.

In sum, human beings simultaneously have a desire to live and are yet smart enough to know that we will die. Humans manage the “terror” engendered by the awareness of death through the creation of culture, which provides meaning and confers significance in pursuit of immortality. A substantial portion of human activity is thus hypothesized to be directed toward maintaining faith in a cultural worldview and meeting or exceeding the standards of that culture in order to obtain self-esteem: death-denial is thus a central dynamic motivational impetus for a substantial proportion of human affairs.

2.2 Empirical support

Initial empirical assessment of TMT was based on two hypotheses generated from the theory (Solomon et al, 1991). The *anxiety buffer hypothesis* states that if the function of a mechanism is to protect one from anxiety, then enhancing the mechanism should make one less likely to exhibit anxiety and behaviors associated with anxiety. Similarly, weakening the mechanism will make one more prone to anxiety and anxiety-related behaviors. Therefore, when self-esteem is strengthened, if it serves an anxiety buffering function, an individual should show less anxiety in response to threats. Conversely, if self-esteem is weakened, one should be more likely to exhibit anxiety related behaviors following a threat. The *mortality salience hypothesis* states that if a mechanism provides protection against anxiety, then having someone focus on the source of that anxiety should increase the need for the defensive mechanism. Consequently, if cultural worldviews serve a death-denying function, when one's mortality is made salient individuals should defend their cultural worldview more vigorously; and this should be reflected by more positive reactions to those who uphold cherished cultural values and more hostile reactions to those who violate (or do not share) these cherished cultural values.

2.2.1 Self-esteem and the anxiety buffer hypothesis

Support for the anxiety buffering effects of self-esteem comes from both previous work on self-esteem as well as terror management research. Research on self-esteem has consistently shown high negative correlations between self-esteem and general anxiety

(e.g. Rosenberg, 1965; Strauss, Frame & Forehand, 1987). The higher one's self-esteem the lower is that person's level of anxiety and vice versa, supporting a relationship between self-esteem and anxiety.

However, the problem with correlational research is that the interpretation of the results can be ambiguous. That is, there is no way to know with any degree of certainty if the above results are due to self-esteem reducing anxiety (as proposed by TMT) or anxiety damaging self-esteem and of course there is always the possibility of a third factor (e.g. depression) influencing both self-esteem and anxiety. Therefore, more important than the correlation between these variables, is establishing a causal connection between self-esteem and anxiety. Accordingly, in series of studies Greenberg et al (1992) showed that increasing participants' self-esteem reduced anxiety in response to threatening situations. In Study 1, participants were randomly assigned to receive either positive or negative feedback regarding their personality, based on personality assessments participants had completed at a mass testing session earlier in the semester. The feedback was bogus and designed to raise (positive feedback) or leave unaffected (neutral feedback) the participants' self-esteem. Participants (all men) then viewed scenes from *Faces of Death Volume 1*, which depicted graphic scenes of death (specifically an autopsy and electrocution) or a neutral video of comparable length depicting natural landscapes. Following this, participants completed a self-report measure of anxiety (Spielberger, Gorsuch & Lushene, 1970). A manipulation check showed that the manipulation of self-esteem was successful. Those participants in the raised self-esteem condition showed significantly higher scores on Rosenberg's self-

esteem scale (1965) than did those whose self-esteem was not manipulated. Additionally the manipulation of anxiety was also effective. Under conditions when self-esteem was not manipulated participants who viewed the death video reported higher anxiety than those who viewed the neutral video. However, consistent with the predictions of the study, those individuals who had their self esteem raised and viewed the death video had significantly lower scores on the anxiety measure than those who viewed the death video and did not have their self-esteem manipulated. Even more interesting is that for the raised self-esteem/death video participant's anxiety levels did not differ from the baseline anxiety levels measured in the neutral self-esteem/ neutral video condition!

Study 2 used a different manipulation of self-esteem to demonstrate that self-esteem also buffers anxiety associated with threats to physical well-being. Participants were given bogus positive or neutral feedback about their verbal intelligence instead of personality and were then told that their level of physiological arousal would be measured while they receive some form of physical stimulation. Half of the participants were led to believe that they would receive a mild shock (threat condition) as their "physical stimulation" while the rest were told that the stimulation would come from flashing lights (no threat condition). While there were no shocks ever delivered skin conductance (a physiological indication of anxiety) was measured at the point in time when they expected the "physical stimulation" to occur. The results of this experiment were quite exciting in that they showed that not only does increased self-esteem reduce self reported anxiety under threat conditions (as shown in Study 1) but that it actually reduced a *physiological* indicator of anxiety under a threat condition. Specifically, the results

showed that those individuals who had their self-esteem raised and were threatened with shock had lower skin conductance levels (signaling less anxiety) than did those individuals whose self-esteem was left unchanged and were in the threat condition. However, those individuals for whom self-esteem was not altered, skin conductance under the threat condition was significantly higher than under the no-threat condition.

Study 3 replicated the findings of Study 2 but included a mood measure to rule out the possibility that the findings of Study 2 were driven by heightened positive mood produced by the positive feedback instead of heightened self-esteem. The results of Study 3 were the same as in Study 2 even after statistically removing any possible mood effects, indicating that the findings were not due to the influence of mood.

In a subsequent study Greenberg et al (1993) provided further support for the anxiety buffering effects of self-esteem. In this pair of experiments the effects of self-esteem on vulnerability denying defensive distortions was explored. Participants were led to believe either that either emotional people die younger or that unemotional people die younger. They were then given a self-report measure of emotionality. Previous research (e.g. Kunda 1987; Quattrone & Tversky, 1984) has demonstrated that people ordinarily bias their beliefs pertaining to self-attributes in whatever direction they believe is associated with longevity. However, Greenberg et al hypothesized that momentarily elevated or dispositionally high self-esteem would minimize or eliminate this defensive response. The results supported the hypothesis by showing that individuals whose self-esteem was not raised by bogus feedback (Study 1) or who had naturally low self-esteem (Study 2) reported less emotionality if they thought that trait was associated with

longevity and more emotionality if they thought that trait was the one associated with longer life compared to those who not given information about longevity and emotionality. This finding is consistent with the results of similar research (e.g. Quattrone & Tversky, 1984). However those with raised self-esteem (manipulated by bogus feedback in Study 1) or chronically high self-esteem measured by the Rosenberg (1965) Self-esteem scale (Study 2) did not show these vulnerability to early death denying defensive distortions.

In short, there is substantial empirical support for the *anxiety buffer hypothesis* in that research shows that self-esteem reduces self reported anxiety and physiological arousal in response to threatening circumstances. Furthermore, the research has shown that both naturally high and experimentally raised self-esteem produce these anxiety-buffering effects.

2.2.2 Mortality salience hypothesis and defense of the cultural worldview

According to the *mortality salience hypothesis*, to the degree that a mental structure protects us from death-related fears, a reminder of our eventual death should elevate the need for that structure (Solomon et al. 1991). Accordingly, when participants are made “mortality salient,” individuals should have a greater need for the anxiety-buffering qualities of their death-denying cultural worldviews and thus become more hostile toward those who threaten their cultural worldview and more favorable towards those who share or uphold their cultural worldview, when compared to individuals for whom mortality has not been made salient.

The typical MS study involves asking participants to write about their death, using the cover story of an experiment on “personality and attitudes.” After completing some filler questionnaires to sustain the cover story, participants are told that individuals differ in their attitudes related to death and are given two open-ended questions that ask them to 1) “Please describe the emotions that the thought of your own death arouse in you”, and 2) “Write down, as specifically as you can, what you think happens to you physically when you die.” Control participants complete parallel questions about a variety of benign or negative but non-lethal topics.

In one series of experiments Rosenblatt, et al (1989) showed that when presented with the task of assigning a bond for an alleged prostitute, mortality salient people, who were either actual judges or college students, assigned a higher bail than participants who had not been induced to think of their own death. This finding is consistent with terror management theory since prostitution is a behavior condemned by the American cultural worldview of the research participants. Therefore, the harsher bond setting by mortality salient participants shows less tolerance for the prostitute and therefore an increased upholding or reinforcement of their cultural worldview than control participants.

In contrast, Rosenblatt et al (1989) found that when given the chance to reward a hero who at great risk to him or herself, turned in a dangerous criminal, participants who were made mortality salient suggested a higher reward than control participants. Thus, the effect of a MS manipulation is not merely to produce harsh treatment of others (perhaps caused by negative mood or arousal, for example), but also affects participants

by making them embrace and treat more kindly those who support their cultural worldview.

Other research has shown that when made more aware of their death, subjects were less accepting of “out-groups” or those who do not share their cultural worldview and were more accepting of those who do share their cultural worldview. For example, Greenberg, Simon, Pyszczynski, Solomon & Chatel, (1992) had students read an essay apparently written by an American who either condemned or supported the U.S. When made mortality salient, participants were more critical of the author with anti-American sentiment and evaluated the author more negatively than did the subjects for whom death had not been made salient. However, when the essay read was pro-American, the mortality salient participants rated the authors more positively than when death awareness was not manipulated. Again, being made mortality salient leads participants to defend their beliefs in a just and meaningful culture by attacking those who hold competing beliefs and praising those who support their own beliefs. So the effects of MS shown here is an increased intergroup bias: higher praise for the in-group, more abhorrence for the out-group.

Religious attitudes provide an excellent opportunity to study the cultural worldview buffer in action. By adhering to one’s faith, religious individuals believe that they “literally” will live forever. Greenberg et al (1990) showed that following MS people tended to be less accepting of individuals who hold different religious beliefs. Specifically, mortality salient Christians rated Jews much more negatively than non-mortality salient Christians yet the Christians rated other Christians more positively

following MS than they did in the control condition. Such a bias in favor of Christians over Jews was not present in the non-mortality salient conditions.

The research described up to this point demonstrates that MS affects attitudes in predicted ways. Other research however demonstrates that MS can also affect behavior. Greenberg, Porteus, Simon, Pyszczynski, and Solomon (1995) showed that people seem to be more reverent of religious icons when made mortality salient. Individuals were put in a situation in which they were asked to hammer a nail into a wall in order to hang a crucifix. As there was no hammer provided, the optimal solution involved using the crucifix as a hammer to pound the nail. Those subjects who had been made mortality salient were much slower to solve the puzzle than those who were not made mortality salient. However, if the item to be used as a hammer was a chunk of wood, mortality salient participants did not differ in time to solve the puzzle from control participants. After completing the puzzle, mortality salient participants also reported more reluctance to use the religious symbol as a hammer. The reluctance of subjects to use the crucifix as a hammer suggests the participants' homage towards the religion, and thus their upholding of the part of their cultural worldview pertaining to their religious beliefs. The same study also showed how MS affects behaviors towards cherished nationalistic icons. In Greenberg, et al, (1995) participants, depending on their experimental condition had to use either an American flag or a piece of cloth as a filter to solve a puzzle in which they would try to separate sand from black dye. The use of the material as a filter would permanently discolor the fabric. When made mortality salient, participants in the flag

condition took much longer to solve the puzzle and reported more discomfort than mortality salient participants in the plain cloth condition.

Terror management researchers have also empirically addressed many potential alternative explanations of these MS effects. One possible alternative explanation is that thinking about one's death may put one in a bad mood and that the results of the aforementioned studies are due to poor mood instead of MS. Another alternative explanation deals with the issue of whether or not the thought of death per se is a necessary condition for the production of cultural worldview defense, or will any negative mood inducing thought or anxiety provoking thought generate the same results?

In more than 100 studies in which mood was measured following a MS manipulation there is no evidence that mood was significantly involved with the effect of the manipulation (see Greenberg , Pyszczynski, Solomon, Simon & Breus, 1997). It may seem surprising that contemplation of one's death does not always lead to negative mood, but apparently it did not. To be sure, the results of the studies remain the same when additional statistical measures have been taken to remove the effects of mood from the analysis. That is even if mood is affected, the results of the research to date cannot be attributed to any changes in mood.

Various control conditions have also been included in research to explore the role of aversive, but non-lethal thoughts in the production of MS effects. Studies have asked participants to think about taking an exam, experiencing dental pain, giving a speech in public, and becoming paralyzed (Greenberg et al., 1994; Greenberg, et al., 1995). None of these non-death (but still negative and anxiety provoking) manipulations produced the

worldview defensive behaviors found with contemplation of one's own death.

Researchers (Greenberg et al, 1997) have even looked at the effects of thinking about a loved one's death, which failed to produce the same magnitude of an effect as the self-mortality salience manipulation. It is important to note that while thinking about a loved one's death did produce slight MS effects, further analysis revealed that this effects was driven by the participants whose contemplation of a loved one's death reminded them of their own eventual death. MS effects thus appear to be unique to thoughts of one's own death.

Additionally, MS effects do not seem to be dependent on the open-ended question format of the manipulation. Other manipulations, including the use of death anxiety questionnaire (Chaudhary et al 1993), locating interviews in front of a cemetery or morgue (See Pyszczynski et al., 1997), viewing graphic death scenes from a movie (faces of death), viewing a film of a fatal car accident (Nelson, Moor & Olivetti, 1997) and even subliminal exposure to death related stimuli (Arndt, Greenberg, Solomon, Pyszczynski. & Simon, 1997) still produce the predicted MS effects.

2.2.3 Self esteem and Mortality salience

Additional research has examined the relationship between self-esteem and worldview defense in response to MS. Self-esteem should play a moderating role on MS effects because if one is secure in her or his value within the culture (i.e. high self-esteem) she or he should be less threatened by thoughts of death. Therefore, if self-esteem is raised or dispositionally high experimentally, reminders of death should reduce

or eliminate the defense of cultural worldview. Accordingly, Harmon-Jones et al (1997) showed that when self-esteem was boosted through bogus feedback, or was dispositionally high, MS manipulations failed to show increased intergroup bias when compared to individuals for whom self-esteem was not manipulated, or those who had naturally lower levels of self-esteem.

2.2.4 Summation of mortality salience hypothesis

In sum, there has been substantial empirical support for the *mortality salience hypothesis*. The research has shown that when made mortality salient, people behave in such a way as to bolster, support or reinforce their beliefs regarding their personal cultural worldview. Specifically, they behaved more favorably towards similar others or those who uphold cherished cultural values, and with greater hostility and disdain toward others who are different or violate important cultural values. The research has shown that both attitudes (e.g. feelings to others) as well as behavior (e.g. reluctance to do harm to culturally valued objects) are affected by MS. Mortality salience effects have been produced by a wide variety of different manipulations of MS, by multiple researchers and in at least 7 different countries, including Australian Aboriginals (Halloran, 2001). Furthermore these effects seem to be specific to death thoughts as several negative yet non-lethal manipulations fail to produce MS effects.

2.3 The psychodynamics of the mortality salience effects

Despite a substantial body of empirical research supporting the basic tenets produced by the original formulation of TMT, theoretical and empirical questions still remained. First, why is it that despite the fact that death is posited to be of central concern to humankind, people are generally not awash with constant focus on their looming demise? Second, when reminded via mortality salience manipulations, that they will die, participants do not report the negative affect (nor is there the physiological arousal!) that would be expected given the gravity of the topic they are asked to ponder—in other words, where's the *terror* in terror management? Finally, independent researchers (e.g. Oschmann, as cited in Greenberg, et al. 1994) initially reported being unable to replicate mortality salience effects.

The first of these concerns, regarding the lack of constant focus on our impending doom, is addressed by the original theory directly following Becker's *Denial of Death* (1973). As the title of the book suggests, Becker proposed that humans function "normally" despite the knowledge of death because we are able to remove such thoughts from conscious focus by repression. That is, Becker, and consequently TMT, assert that having adequate self-esteem and a strong belief in and adherence to cultural values allow humans to deny, via repression, the finality or imminence of death.

However, when confronted with the reality of impermanence by a MS manipulation, "fear and trembling" would certainly be expected, yet empirical studies showed neither self-reported anxiety or physiological arousal in response to reminders of

death; and, this lack of affect is undoubtedly problematic to the theoretical assertions of Becker and TMT in its initial form. Additionally, although early research reported that MS effects were quite robust, difficulties obtaining independent replications of MS effects were also a potentially serious problem to the theory. These issues led to research aimed at examining the underlying cognitive processes engendered by thoughts of death and subsequent worldview defenses.

2.3.1 Consciousness, death accessibility and suppression

As noted above, Oschmann (as cited in Greenberg, et al, 1994) reported initial difficulty reproducing mortality salience effects. However, there was a conspicuous difference in the manner in which mortality was rendered salient in Oschmann's lab and the procedure used in previous TMT research. Specifically, Oschmann's manipulation of mortality salience was "stronger" (in a superficially sensible effort to augment the power of the manipulation) than the one used in typical TMT studies: participants ruminated on their eventual passing away for a full 20 minutes as opposed to the traditional TMT manipulation, which asked the participants to "briefly" answer 2 open-ended questions regarding their deaths.

This difference in manipulation of MS led Greenberg et al (1994) to investigate the effect of the potency of the mortality salience manipulation on worldview defense. It was postulated that Oschmann's failure to replicate previous TMT findings was because of the intensity of the MS manipulation. Greenberg et al (Study 1) thus varied the strength of the MS manipulation to determine if there was a differential effect on

worldview defense. Specifically, participants either filled out the standard mortality salience manipulation followed by a mood measure, or filled out the manipulation and were then asked to continue thinking about their death for an additional three minutes and then complete the mood measure. Participants finally completed the measure of worldview defense (by rating pro-anti American essays). The prediction was that only the fairly subtle manipulation of mortality (i.e. the traditional MS manipulation) would produce worldview defense, but a more explicit and sustained consideration of death by having participants complete an additional questionnaire asking them to contemplate “their deepest emotions about their death” (p. 628) and then answering questions regarding, for example, the things they fear most about their death, would fail to do so. The results showed that when the directive to focus on one’s dying was subtle the expected worldview defense effects appear (i.e. greater affection for pro American target and disdain for anti-American target), replicating previous TMT research, but when the MS manipulation was “strengthened” by continued focus on death, there was no evidence of subsequent worldview defense (which would account for, although not explain, Oschmann’s failure to obtain MS effects in his original studies).

This finding led to the somewhat counterintuitive hypothesis that it is not a very explicit conscious experience of mortality, but a more subtle awareness of death that is somehow responsible for producing mortality salience effects. This premise was based on, in addition to the results in Study 1, the fact that in the original TMT research, but absent in Oschmann’s work, there was an inadvertent “delay” included between the mortality salience manipulation and the dependent measure. Specifically, earlier TMT

work often had participants go to a different room following the mortality reminder to obtain the dependent measures, in accord with a cover story where participants believed they were participating in two separate experiments. Thus, perhaps participants need time to be distracted from the horrific notion that they will, eventually “kick the bucket.” before worldview defense ensues. A second study explored this possibility.

In Study 2 of Greenberg et al (1994), participants were made mortality salient or asked to think about one of several non-lethal topics (i.e. television, intense pain, giving a speech). Three separate mortality salience conditions were created. Participants in the *distraction* condition were distracted from death thoughts by having them attempt to solve a “find the word” puzzle with television related non-death words (e.g. soap, dial) for three minutes. Participants in the *continued death focus* maintained their focus on death by attempting to solve a puzzle with death words hidden in it (e.g. burial, blood) for three minutes. The final “free-thought” MS group were asked to list words that came to mind with the instructions that they did not have to be related to a specific topic. The results showed that when death thoughts were not in active memory (distraction and free thought conditions) participants showed heightened intergroup bias following the death reminder compared to the control groups but the MS manipulation did not lead to the typical heightened worldview defense if the participants maintained focus on the death words by completing the death-word puzzle. Thus, mortality salience effects do not occur while one is explicitly focusing on death, but seem to require a distraction from thoughts of death.

A potential problem with this interpretation however, is that in Study 1 and Study 2, the amount of time spent focusing on death thoughts was confounded by condition. That is, in Study 1, participants in the deep rumination condition spent an extra time thinking about death and in Study 2, those that had the death puzzle also spent additional time concentrating on death issues. This could lead to an alternate explanation of the findings based on the time spent thinking about death, instead of distraction from death thoughts. For example, perhaps additional time spent in contemplation of death may allow individuals to, in effect, “come to terms” with death and therefore have no need to defend against such concerns via worldview defenses.

A third study was thus conducted to remove the potential time confound, by directly controlling the overall time spent thinking about death. The design included the MS/TV puzzle and MS/death puzzle conditions of Experiment 2 plus two additional mortality salience conditions where the total time spent on death focus was kept the same but the timing of death focus was varied. After a MS induction, one additional condition had participants complete the death puzzle and then non-death puzzle for three minutes each. In the other additional condition the order of the death and TV puzzles were swapped so that participants completed the TV puzzle and then the death puzzle. If greater time contemplating death caused the failure to produce worldview defense following MS in the earlier studies, then both of these conditions should be equal in their lack of worldview defense (relative to the to the MS/TV puzzle condition). But if the distraction prior to the dependent measure is the key component leading to worldview defense, then participants in the death puzzle then TV puzzle condition who are distracted

from death thoughts just prior to the dependent measure should still show worldview defense whereas participants in the TV then death puzzle condition who were thinking about death immediately prior to the dependent measure should fail to show increased defense.

The results of Study 3 replicated those in Study 2 in that MS/TV puzzle participants (distraction) showed heightened worldview defense relative to the control/TV puzzle conditions while MS/death puzzle participants (no distraction) did not. However, there was increased worldview defense in the MS/death puzzle/TV puzzle condition where distraction occurred but this effect was absent in the MS/TV puzzle/death puzzle where there was continued death focus right before the measure. Collectively then, the results of these studies suggest that worldview defense following MS occurs when thoughts of death are no longer in active memory.

But why is it necessary to remove thoughts of death from explicit memory for worldview defense following MS to occur? Greenberg et al (1994) argued that there were two reasonable explanations for these findings. First, perhaps worldview defense following contemplation of death occurs only when initially heightened accessibility of implicit death thoughts engendered by a MS manipulation dissipate over time. Research (e.g. Fiske & Taylor, 1991) has shown that while primed concepts are immediately more accessible (e.g. if you have just picked up Led-Zeppelin's fourth album – a prime of that band and their songs - and a discussion ensues regarding "the greatest rock-n-roll songs of all time" you might be quick to cast your vote for "Stairway to Heaven," but as time passes following the purchase of the album such a discussion might render that particular

song less likely to be selected and you may select, for example, the Beatle's "Hey Jude" instead). Such heightened accessibility fades over time following the prime unless the concept is re-primed (e.g. if thoughts of Led-Zeppelin were reintroduced - perhaps by someone else voting for another Led-Zeppelin song - then "Stairway to Heaven" would be more readily accessible to memory again). That is, it may be that death accessibility changes from MS-produced immediately high accessibility, to a lower level via the dissipation of death thoughts during the "diversion." This *reduction* in accessibility following distraction from the MS manipulation may produce the worldview defense. Thus, accordingly, distraction from the MS manipulation may serve to effect comparatively lower levels of implicit death thought accessibility.

A second possibility is that MS instigates active suppression of death thoughts in order to remove them from conscious attention, and that such suppression may relax following a distraction from death thoughts. Following Wegner (1992), a relaxation of active suppression may result in "hyperaccessibility" of the previously suppressed images. According to Wegner, such thoughts may reside outside of current focal attention but still be easily accessed into consciousness. Wegner referred to this as "deep activation." Thus the second possibility suggests that distraction from the MS manipulation facilitates active suppression of death thoughts that is consequently relaxed, causing an increase in the implicit accessibility of death thoughts and it is this hyperaccessibility of death thoughts that produces the worldview defensive behaviors. In accord with this possibility, research by Martin and Tesser (discussed in Greenberg et al..

1994) showed that a failure in goal attainment led to an increase in rumination of thoughts related to the goal but only after a delay and distraction.

In order to judge the relative merits of these hypotheses, Greenberg et al (1994; Study 4) measured “death accessibility” at various times following a MS manipulation. Participants were made mortality or “TV” salient. Half the MS and all the TV participants were asked to read a short (7 page) neutral passage from a novel and then given a death accessibility measure while the other half of the MS participants completed the measure immediately following the manipulation and then read the passage. The accessibility of death thoughts was measured (adapted from Bassili & Smith, 1986) by having participants perform a “lexical word-stem completion task” whereby they completed 20 partial words (e.g. COFF_) six of which could either be completed to produce a death-related word (e.g. COFFIN) or a non-death related word (e.g. COFFEE). The greater the number of words completed as death words, the more highly accessible are implicit thoughts of death.

If mortality salience effects are due to lowering accessibility of death thoughts (as in a fading prime) then there should be high death accessibility immediately following MS and lower death accessibility only after the seven-page distraction. If however, the worldview defenses are produced by hyperaccessibility of death thoughts (as might be the case following the relaxing of active suppression) then death accessibility should be low immediately after the manipulation and higher following the distraction. The results showed that in the MS/no-distraction condition, death accessibility did not significantly differ from the control group, but that *after* the distraction, death accessibility was

significantly higher than the control and MS/no-distraction groups. That is, there is no initial heightened death accessibility immediately following MS compared to a control group, but following the distraction, heightened death thought accessibility did emerge. This pattern of results is consistent with the initial suppression followed by hyperaccessibility of death thoughts potentially due to relaxation of suppression (c.f. Wegner, 1992).

While these results are consistent with active suppression of death thoughts, they are not conclusive of, nor specific to such suppression. It is possible, for example, that death is a complex and abstract notion and that it takes time for the full impact of such a concept to affect an individual. That is, "distraction" from death thoughts may actually allow more time for rumination of such thoughts causing a gradual increase in the accessibility of death thoughts over time which elevate to a critical point after which worldview defense ensue. Note that this possibility, while accounting for the results of Greenberg et al (1994) does not involve active suppression. Thus further research proceeded to examine the possibility of active suppression of implicit death thoughts following MS.

Arndt, Greenberg, Solomon, Pyszczynski and Simon, (1997) demonstrated that mortality salience indeed leads to immediate suppression of death related thoughts. According to Wegner (1994) active suppression requires a great amount of our cognitive resources to implement; consequently denying an individual the ability to devote those resources to suppression (by having those resources occupied by another cognitive task) undermines the capacity to suppress. For instance, Wegner and Erber (1992) had

participants attempt to suppress thinking about a target word (e.g. *home*). In response to target related prompts (perhaps, for example the word *family*), participants under high cognitive load more often responded with the suppressed word (e.g. *home*) than did participants not under cognitive load. Thus, Wegner and Erber (1992) demonstrated that active suppression was thwarted under high cognitive load conditions. Given this, if we normally suppress death thoughts immediately following a MS induction and this process requires cognitive resources, depriving people of such resources with a high cognitive load should thwart the suppression resulting in an immediate increase of death thought accessibility.

To test this hypothesis (Arndt, Greenberg, Solomon, et al. 1997 Study 1) imposed a cognitive load on participants by a task asking them to remember an 11-digit number until some later time in the experiment. After completing some filler questionnaires, participants were then randomly assigned to either a standard mortality salience condition or a control condition where they were asked to imagine taking an important exam. Participants then completed a mood measure followed by one version of a death accessibility measure, a distraction passage, and finally a second version of a death accessibility measure. At different times during this procedure participants were asked to recall and then forget the 11-digit number and thus release the cognitive load. Some participants released the load immediately after the filler questionnaires (immediate release condition). Others held the load until immediately after the manipulations but prior to access 1 (low load at access 1), immediately following access 1 (high load at access 1), or following the second accessibility measure (high load at access 2).

Results showed that the immediate-release and low load at access 1 MS conditions replicated prior research findings: under low cognitive load death accessibility was low at access 1 but significantly higher following distraction at access 2 (all relative to the exam control condition). However, participants in the mortality salience condition who maintained the high cognitive load during the first accessibility measure had immediate heightened death accessibility compared to the control group. Results of Study 1 thus support the contention that mortality salience leads to an immediate suppression of death related thoughts. Specifically, under conditions where there is no or low cognitive load, allowing the resources for active suppression, mortality salience leads to lower death accessibility than in a control group, but if high cognitive load prevents suppression, then death thoughts are high immediately following mortality salience manipulations.

Consistent with the assertions of Greenberg et al (1994) that death thoughts need to be highly accessible in order to produce worldview defense following MS, Arndt, Greenberg, Solomon, et al (1997) then predicted and found that high cognitive load (presumably by producing immediate heightened death accessibility) should lead to immediate worldview defense following a mortality salience manipulation. Specifically, following a similar design as in Study 1, Arndt, Greenberg, Solomon, et al (1997), measured worldview defense instead of death accessibility. The results showed that when load was low, there was no immediate worldview defense but after the typical distraction worldview defense occurred. However, when cognitive load was high

following a MS manipulation worldview defense occurred immediately without the distraction.

Thus, heightened death accessibility appears to be a necessary and sufficient condition for worldview defenses to occur. Whether produced by relaxation of initial suppression of death thoughts due to distraction, or by immediate hyperaccessibility of death thoughts via cognitive load inhibiting suppression, the studies on accessibility show that when death thoughts are highly accessible but not explicit, worldview defenses arise. Consequently, conscious awareness of death thoughts may not even be required to produce mortality salience effects. If thoughts of death were introduced below the threshold of conscious awareness but still led such thoughts to become highly accessible, then worldview defense should occur in the complete absence of conscious thoughts of death.

In accord with this proposition, Arndt, Greenberg, Pyszczynski and Solomon, (1997) demonstrated that subliminal exposure to death words lead to immediate heightened death accessibility and worldview defense. In Study 1, participants were asked to decide if pairs of words flashed on a computer screen for 427.5 ms were related to each other or not. A very brief (42.8 ms) subliminal exposure to the word *death* (or the word *field* as a control) was introduced between the two words. Participants afterwards denied being able to see the subliminal word. When told that they had been exposed to a word subliminally and asked to pick which of four words from a list (including *death* and *field*) it was that appeared, they picked *death* and *field* equally often in both conditions and only at the chance level. However, immediately following these subliminal

exposures, death accessibility was significantly higher for the death prime, than the field prime.

By replacing the death accessibility measure employed in Study 1 with the pro-anti American essay worldview defense measure used in previous research, Study 2 (Arndt, Greenberg, Pyszczynski et al, 1997) showed that a subliminal death prime also produced immediate worldview defense. In addition to this change, the word *field* was replaced with *pain* and to maintain consistent word length, *dead* replaced *death*. Results showed that following a subliminal exposure to the word *dead*, participants exhibited more worldview defense than with subliminal exposure to the word *pain*. Study 3 (Arndt, Greenberg, Pyszczynski et al, 1997) added supraliminal (356.3 ms) exposures to the word *dead*. As the supraliminal exposure was posited to be conceptually similar to a traditional MS manipulation, it was hypothesized that immediate worldview defense should not occur following conscious exposure to the word *dead*. Indeed the results showed that supraliminal exposure to the word *dead* did not increase worldview defense (as compared to subliminal exposure to *pain*) but that once again subliminal *dead* produced worldview defense. Thus, it appears that anything that raises implicit death accessibility produces worldview defense.

Arndt, Greenberg, Solomon et al, (1997), Study 3 explored the effects of worldview defense on death accessibility. The question of interest here has to do with what worldview defense does to death accessibility. If increasing death accessibility serves to elicit worldview defenses, it may be that worldview defense functions to reduce death accessibility to prevent hyperaccessible death thoughts becoming conscious and

leading to potentially incapacitating fear. If so, an individual who is made mortality salient and given a chance to defend her or his worldview should, following that defense, should have lower death accessibility than someone made mortality salient but denied the opportunity to do so. In this experiment Arndt, Greenberg, Solomon et al (1997; Study 3) made two groups of participants mortality salient and a third group “exam” salient. The mortality salient participants then either had the opportunity to defend their cultural worldview by rating the author of a pro/anti American essay or were prevented from doing so by being “forced” to only provide a non-judgmental critique of the author. Following the essay and critiques, death accessibility was measured using the word completion task. Results showed that death accessibility was highest for those participants who were not given the opportunity to defend their cultural worldview. There was no difference in death accessibility between mortality salience participants who defended their worldview and the control group. This finding implies that cultural worldview defense serves to reduce the abnormally high death accessibility following a mortality salience manipulation and distraction.

2.3.2 Conclusion: Dual defensive processes in response to conscious and unconscious death concerns

Based on the aforementioned studies, Pyszczynski, Greenberg and Solomon (1999) proposed a dual-process model consisting of proximal defenses against conscious awareness of death and distal defenses against unconscious threats. Proximal defenses serve to remove death thoughts from consciousness (e.g. by distraction, minimizing the

threat by vulnerability denying defensive distortions, or active suppression). Proximal defenses are rational in nature (in that they directly confront the problem of death), and occur immediately following the introduction of death thoughts. The distal defenses occur only after death-related thoughts are removed from conscious awareness *but* are still highly accessible. These distal responses deal with the *implicit* knowledge that death is inevitable by making one see one's self as a valuable member of an "eternal death-transcending reality" (Pyszczynski et al, 1999). Distal defenses are experiential or not rational in that they have no obvious semantic connection to the problems associated with death. That is, it is not immediately apparent how greater abhorrence of a dissimilar other allows one to diffuse concerns about death.

In the traditional mortality salience paradigm, the dual process theory suggests a specific chronology in responses to an overt reminder of death (See figure 2.1). Consciousness of death instigates proximal defenses that facilitate the removal of thoughts of death from explicit awareness via active suppression. Next the active suppression slackens, allowing death thoughts to become hyperaccessible, and instigating distal defenses which function to reduce the accessibility of death thoughts and prevent terror from entering consciousness: "death thought accessibility is reduced and potential terror is averted" (Pyszczynski et al, 1999; p 840). Thus, according to TMT, heightened death accessibility is necessary and sufficient to induce distal defenses (e.g. worldview defense) following mortality salience.

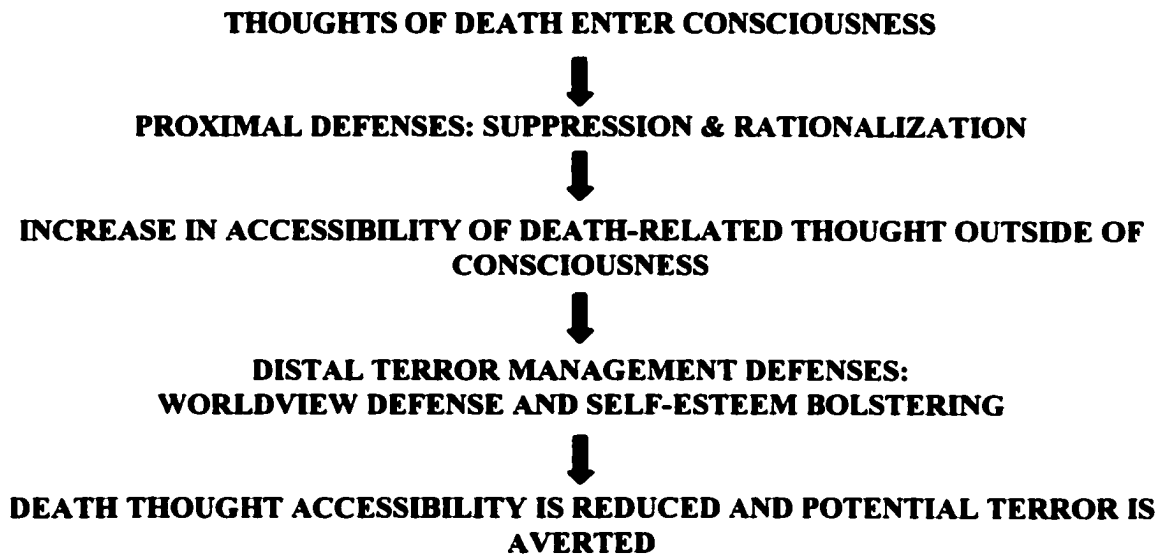


Figure 2.1. Defensive processes activated by conscious and unconscious death-related thought (adapted from Pyszczynski, Greenberg & Solomon, 1999)

2.4 Conclusion: Terror management theory

There is considerable empirical support for the TMT propositions that self-esteem and a confident belief in cultural worldview allow people to manage the potential terror engendered by the awareness of the inevitability of death. Studies have demonstrated that self-esteem serves to reduce the anxiety associated with death and anxiety in general. • Other research has shown that reminders of death lead participants to cling more strongly to the beliefs of their culture and behave in ways supportive of that culture. Furthermore mortality salience effects appear to be unique to thoughts of death in that worldview defense does not result from thinking about other negative, or anxiety producing, but non-lethal thoughts. Finally, worldview defense in response to mortality salience appears to be the result of heightened implicit accessibility of death thoughts. Such defense appears to be in the service of attenuating such thoughts and preventing the dread that lies beneath the surface of consciousness from breaking free and manifesting itself as terror.

Chapter 3: Uncertainty Management Theory

3.1 Uncertainty and Mortality Salience Effects

Recent bodies of work (McGregor et al, 2001; van den Bos, 2001) have challenged the TMT claim that death awareness is sufficient *and* necessary to produce MS effects. Instead, McGregor et al and van den Bos (2001; van den Bos & Miedema; 2000; van den Bos & Lind, in press) have independently proposed that MS effects are actually a result of psychological uncertainty. Thus, while MS may be sufficient to produce worldview defense, it is not necessary, as *any* instigator of uncertainty—the proposed necessary component—would result in worldview defense. Both McGregor et al and van den Bos posit that uncertainty threatens our sense of self. According to McGregor et al there is a basic human need to reduce uncertainty in the service of restoring or maintaining our sense of self. They refer to uncertainty as an “acute kind of identity crisis” that occurs when our various cognitions (related to self) are inconsistent (p. 473). Similarly, van den Bos and Lind (in press) maintain that uncertainty occurs when we perceive an inconsistency between cognitions and behavior, cognitions and experiences or between different cognitions. Van den Bos (2001) also purports that uncertainty also occurs when we are unable to predict the future or lack control over a situation, and that excessive uncertainty threatens the very meaning of our existence by calling into question the validity of thoughts pertaining to self.

Uncertainty is, from this perspective, of the utmost concern for individuals, and affects their self-concept, feelings and behaviors. Thus, in order to maintain a healthy

sense of self, people need certainty, especially for important self-relevant matters or those that are integral to their sense of meaning. Van den Bos and Lind (in press) go on to propose a link between certainty and self-confidence, control and self-esteem. Self-confidence is merely one's certainty with regards to her or his abilities. Similarly, issues pertaining to control are tied to uncertainty. The more control one has, the less uncertain one is about the outcome. Self-esteem is then defined as the degree to which one is certain about him or herself. Thus, van den Bos and colleagues (van den Bos, 2001; van den Bos & Lind, in press; van den Bos & Miedema, 2000) and McGregor et al (2001) contend that some of the most basic human anxieties can be reduced ultimately to concerns regarding levels of psychological uncertainty and *not* solely to the ability to manage potential terrors associated with knowledge of death.

In response to TMT, van den Bos and Miedema (2000) proposed that "fear of death" is a very basic type of uncertainty. These uncertainty theorists propose that death reminders produce uncertainty because death is the ultimate uncertainty and that thoughts of death lead individuals to be uncertain about the righteousness of the life they have lived, the lives of those left behind as well as the potential "futures" available. Martin (1999) provided empirical support for such contentions: specifically, being reminded of death caused individuals to report both being more uncertain and being more "out of control" when compared to a control group. Based in part on these findings, Van den Bos (2001) and McGregor et al argue that a MS manipulation is merely a particular instance of an uncertainty induction and that the MS effects discussed by terror management

theorists are actually reactions to uncertainty threatening self-integrity and not responses to death concerns per se.

3.2 Uncertainty Management via Fairness Judgments

Van den Bos and Miedema (2000) proposed a connection between fairness and uncertainty. Specifically they proposed that people need fairness when making decisions such as whether they can expect others to exploit them or not. This need for fairness is especially robust if the person in question is an authority figure. The issue of “fairness” of a procedure used to make a decision supplies information pertaining to the integrity of the authority. If other information regarding the figure already exists (e.g. you are told that a person can or cannot be trusted) then the issue of fairness of the procedure matters less. Therefore, fairness provides information regarding the degree to which people can be “certain about important issues.” Thus, the need for fairness is exacerbated when people are uncertain. That is, if certainty is a basic need and fair procedures provide certainty related to an issue, then when an individual is uncertain the need for fairness – to provide at least a modicum of certainty – is greater than if one is already psychologically certain.

Consequently Van den Bos and Miedema (2000) predicted that when rendered uncertain (by a mortality salience manipulation), participants would react more strongly to unfair procedures. This hypothesis was tested in three studies using a 2 (mortality salient, control) X 2(procedure: fair, unfair) factorial design. In Experiments 1 and 2 participants performed a computer task (identifying the number of various shapes present

in different patterns) with a (fictitious) “networked” partner. They were told that after the experiment that 200 lottery tickets for 100 Dutch Guilders would be distributed amongst the participants and that some portion of those would be split between the two “partners.” Participants received actual feedback regarding their own performance on the task and then feedback, which was always fabricated to be exactly equivalent to their own performance, regarding the success of their partner. Participants were then asked to ponder how many lottery tickets they should get compared to the “other.”

During a “break” in the experiment, half of the participants then completed a MS manipulation and mood measure (PANAS). MS was induced via the same two open-ended questions used by Greenberg et al (1994). Control group participants in Experiment 1 only completed the mood measure while those in Experiment 2 answered a pair of control questions regarding dental pain and then the mood measure. Participants then “returned” to the original experiment and were assigned to either a *fair* condition where they were allowed to “voice” their opinion concerning the distribution of the lottery tickets or an *unfair* condition where they were given “no voice.” Specifically, participants either typed in their thoughts regarding the distribution of the tickets or were explicitly told that their opinions would not be requested. According to van den Bos and Miedema (2000) the opportunity to voice one’s opinion regarding a procedure causes the procedure to be judged as “fair” more often than if the opportunity to state one’s opinion is absent; a manipulation check confirmed this claim.

Finally, participants provided self-reports of positive affect (Experiment 1; specifically, ratings of happiness, contentment and satisfaction) or negative affect

(Experiment 2; specifically, ratings of anger, hostility, furiousness and disappointment), which constituted the primary dependent measures. Results for Experiment 1 showed a main effect for fairness (participants in the fair conditions reported more positive affect than did those in the unfair conditions) qualified by the predicted interaction between MS and fairness. Specifically, the difference between ratings of positive affect between fair and unfair was greater following a death reminder than in the absence of that reminder. Experiment 2 replicated these results with the negative affect measure.

Experiment 3 used a different manipulation of procedural fairness and measured both positive and negative affect. Participants first filled out either the MS manipulation or a dental pain questionnaire followed by the PANAS mood measure and were then assigned to either the fair or unfair conditions. Participants read a scenario describing them applying for a job. The scenario described that as part of the application process for the job they applied for, participants had to take a 9-part test (e.g., Intelligence, personality, math language). They were then told, in the fair condition, that all nine parts of the test were used in the selection process or in the unfair condition, that only 1 of the 9 parts was used in the process. Participants then completed measures of positive and negative affect that served as the primary dependent variables.

A manipulation check confirmed that participants in the unfair condition reported the procedure was less fair than those in the fair condition and consistent with previous studies. The fair procedure produced higher positive affect and lower negative affect than did the unfair procedure, and this effect was greater following MS. Van den Bos and

Miedema (2000) concluded that mortality salience induced uncertainty exaggerates affective reactions to perceived unfairness.

Van den Bos (2001) then conducted a more direct test of the assertion that mortality salience is psychologically equivalent to uncertainty by replicating the previous studies with manipulations of uncertainty. Experiment 1 was similar to Experiment 2 of van den Bos and Miedema (2000) except that MS was replaced by an “uncertainty salience” manipulation where participants were asked to answer two open-ended questions, similarly formatted to the standard MS manipulation, but the word “death” was replaced by “being uncertain.” Participants were told that they would be performing a task with another (fictitious) participant and that lottery tickets would be split between the two of them and the other participants in the study. Participants were given either the uncertainty salience manipulation or the television control questionnaire followed by the PANAS mood scale, and then assigned to a voice—fair, or a no voice—unfair. condition. Finally participants’ negative affect was measured by asking them questions regarding their level of “sadness” and “disappointment.”

Similar to van den Bos and Miedema’s (2000) findings, the results showed a main effect for procedure, where unfair procedure led to more negative affect than did fair procedure; but this was qualified by the predicted uncertainty by fairness interaction where the differences between negative affect for fair vs. unfair were greater after US than after TV. Thus uncertainty amplified the emotional reactions to unfair procedures.

Experiment 2 sought to replicate these effects with a different manipulation of uncertainty and a different manipulation of fairness. Specifically, for this experiment

uncertainty was produced by having participants think about being “out of control” as loss of control was hypothesized (Martin, 1999) to be an important component of uncertainty. Participants in the uncertainty condition answered two open-ended questions asking them to describe thoughts and emotions pertaining to being “not in control” of a situation. Participants in the control condition completed similar questions regarding television. Fairness of procedure was manipulated in this experiment as it was in Experiment 3 of van den Bos and Miedema (2000), where participants imagined that they were applying for a job. Thus, after completing filler questionnaires participants were assigned to think about being out of control or to think about television, and then answered the PANAS mood measure. Next participants were assigned to the fair (all 9 parts of a hiring exam were used in the employment decision) or unfair (1 of 9 parts used) procedure condition followed by an assessment of negative affect measuring “anger.”

The results showed again that unfair procedures led to greater negative affect than did fair procedures. Once again this effect was qualified by an interaction, which showed that the effects were greater following US than TV. For this experiment however there were no simple significant difference between the uncertainty conditions (as was the case in Experiment 1). Van den Bos (2001) proposed that this lack of a simple effect may suggest that asking participants to think about being “out of control” is a less powerful manipulation of uncertainty than asking them to think about being uncertain. It is also possible according to van den Bos that the effects in question are specific to “disappointment” as measured in Experiment 1 and not “anger” measured in Experiment 2.

To explore these possibilities van den Bos (2001) conducted a third experiment. Experiment 3 followed the same manipulations of fairness and certainty (thinking about uncertainty and lottery tickets) used in Experiment 1 but included both the “disappointment” and “anger” items in the negative affect measure and also measured “relational judgment” to explore the effects of uncertainty and fairness on ratings of the experimenter. Results showed that unfair procedures led to more negative affect (both disappointment and anger) and more negative ratings of the experimenter than fair procedures. Again the interaction effect showed that all these effects were greater after pondering uncertainty than television. And finally for all three measures (disappointment, anger and relational judgment) there were significant simple differences between uncertainty and television only for the unfair procedure. Thus, the lack of simple effects in Experiment 2 seem to be due to a weaker manipulation of uncertainty and not via the specificity of the negative mood effected by uncertainty and fairness.

Based on the combined results of van den Bos and Miedema (2000) and van den Bos (2001), van den Bos claimed that there is an increased need for fairness when one is made “uncertain.” Van den Bos and Miedema proposed that MS produces uncertainty and further asserted that the higher negative affective responses by the participants in a variety of unfair situations evidenced a stronger desire for fairness when an unfair situation is detected. Supporting the claim that the results of van den Bos and Miedema were from uncertainty induced by MS, van den Bos reports that when MS is replaced with “uncertainty” these results are similar. Van den Bos argues therefore that MS is in fact an indirect manipulation of psychological uncertainty.

3.3 Fluid compensation, uncertainty and death

Recently McGregor et al (2001) have also proposed that MS produces uncertainty and thereby proposed an alternate explanation to the TMT findings based on self-affirmation theory (Steele, 1988). Following Self-affirmation theory, McGregor et al propose that individuals exposed to a self-integrity threat should seek to restore their sense of self through “fluid compensation.” Fluid compensation is a way of coping with a threat to self by reinforcing an aspect of the self that is unrelated to the part of the self threatened or damaged (Steele, 1988). Thus, according to Steele we can restore our sense of self while still being able to avoid direct confrontation with the threat itself.

According to previous theory (i.e. dissonance reduction; Festinger, 1957) a threat to an aspect of self would require a restoration of the specific aspect of the self (or attitude related to self concept) that was attacked or damaged. McGregor et al (2001) assert that, as per self affirmation theory, the repair does not need to be on the specific damaged attitude, but that emphasizing or bolstering any attitude related to self-concept will serve to compensate for the damage to other components of self-concept. Thus, according to McGregor et al, if uncertainty damages self-integrity, then an individual made uncertain should seek to restore his or her sense of self via fluid compensation. McGregor et al go on to propose that one example of uncertainty induced self-integrity threat is MS and that worldview defenses following MS are actually fluid compensations designed to mend damage to *self-integrity* and *not* reactions to knowledge of *mortality*.

3.3.1 Uncertainty and fluid compensation

In support of the proposed connection between uncertainty and fluid compensation McGregor et al (2001) conducted a series of studies to explore the effects of uncertainty on fluid compensation and test the hypothesis that self-uncertainty would engender behavior designed to restore sense of self. In Study 1, "personal uncertainty" (one type of identity crisis) was induced by having the participants think and write about a personal dilemma, which was complex, not easy to solve, and to which they had not yet made a decision regarding a solution. According to McGregor et al the question was designed to "confront participants with inconsistencies among self-elements such as goals, values, and possible selves" (p. 474). The control condition was identical except the participants were asked to write and think about a friend's dilemma. Following the manipulation, some participants were given the chance to engage in an integrity repair task. Participants in the integrity repair condition were asked to write a paragraph describing how their attitudes were consistent. According to McGregor et al this was designed to "highlight self-consistency and certainty" (p.474). Participants in the no integrity repair condition were asked how the attitudes could be important to other people. Finally, McGregor et al measured participants "attitude hardening." This was done by having participants read 15 statements about capital punishment and respond with how much they agreed or disagreed with the statement. Then they answered 4 questions about their conviction to their attitude or how firmly they believed in their position.

A second study replicated all of the procedures of Study 1 except the dependent variable was changed to “personal consistency.” Personal consistency or personal conviction was hypothesized to serve a similar function as attitude hardening did, in that it is an attempt to overcome the threat to self-integrity by evaluating oneself as more consistent with one’s beliefs about him or herself. McGregor et al (2001) measured personal consistency in two ways. The first was by examining scores on scale designed to measure different values and how consistent an individual was on each. The second measure of personal consistency was achieved by having participants list various projects related to their values. Then they were asked to answer questions regarding how important the project was to their sense of self.

Both attitude hardening (Study 1) and personal consistency (Study 2) are purported to measure of compensatory restoration of self-integrity damaged by another source (i.e. self-dilemma). The rationale was that self-concept would be restored by bolstering the belief (compensation) in a given value. If however prior to an opportunity to restore that sense of self, the participants engaged in an activity that already restored self-integrity, then there would be no need for further restoration and therefore no need to bolster a belief in the value. Thus McGregor et al (2001) predicted, consistent with a self-integrity-restoration role of attitude hardening and enhanced personal consistency, that a threat to self-integrity in the form of personal dilemma induced uncertainty should result in increased attitude hardening and personal consistency as long as there was no prior opportunity to restore self-integrity. The results of Studies 1 and 2 did indeed, show that participants, when asked to consider self-dilemma, had more attitude hardening (Study 1) and increased personal conviction (Study 2) than did participants asked to

ponder a friend's dilemma. Support for the integrity repair function of attitude hardening and personal conviction comes from the findings that given a chance to repair self-integrity following self-dilemma consideration, participants no longer hardened their attitudes or increased personal conviction. Thus if self-integrity is already restored, there is no need to enhance it further through other means.

3.3.2 Mortality salience and fluid compensation

McGregor et al (2001) then proposed that the effects that TMT research ascribed to MS are more easily explained as instances of uncertainty produced compensatory conviction. Specifically McGregor et al argued that MS may "prompt individuals to look at their lives as a whole and face confusing existential uncertainties about what to value in life and what kind of person to be" (p. 479) and thus perhaps create uncertainty or at the very least a threat to self-integrity. Studies 3 & 4 were "conceptual replications" of the first two studies, but included an MS condition for comparison to an uncertainty manipulation. For these two studies uncertainty was operationalized differently than in the first two studies; specifically, the self-dilemma uncertainty manipulation was replaced with *temporal discontinuity* (TD). TD was achieved by having participants think about an important childhood memory and then having them imagine how they might view that experience from the distant future (the year 2035). TD was considered to be a threat to self-integrity because one might view him or herself as being a very different person in the future from the person they are now. Such an effect would "violate Steele's (1988) 'unitary self' criterion for self-integrity" (McGregor et al 2001, p 479). That is, the realization that the self is a malleable changeable entity and that we may value and,

remember things differently from one time to another or even from one situation to another is threatening to self it may remove the comfort created by the notion of a consistent, stable self.

Study 3 examined the effects of TD and MS on intergroup bias. McGregor et al (2001) counter the proposition made by Greenberg et al (1994) that death awareness is the necessary and sufficient component for the increased intergroup in MS research and suggested that *any* threat to self-integrity should produce the MS effects. A manipulation of TD, a non-death manipulation that still threatens self-integrity, should therefore produce the same effects previously attributed exclusively MS by TMT researchers. In addition, if MS produces uncertainty, then participants should show heightened self-reports of uncertainty following the manipulation. Accordingly, participants in Study 3 either received a MS manipulation (using the typical open ended questions used in previous TMT research), a TD manipulation or a control/television manipulation. This was followed by a mood measure that included 5 items measuring felt uncertainty. Finally, participants rated both the author of an anti-Waterloo (the name of the college where the research was conducted) essay and the author of a pro-Waterloo essay. This measure of inter-group bias was similar to worldview defense measures used in TMT research (e.g. the pro/anti U.S. essays of Greenberg et al, 1990), and served as the primary dependent measure.

The results of Study 3 showed that both TD and MS produced increased inter-group bias when compared to a control group asked to think about television. In addition, both the MS and the TD groups showed higher levels of felt uncertainty than did the

control group. McGregor et al (2001) argued that this finding supports the claim that it is uncertainty guiding the defensive behaviors found in MS experiments.

Study 4 further explored this contention. In this study McGregor et al (2001) predicted that both MS and TD would lead to higher identity seeking scores and a greater desire to engage in self-relevant projects. Participants were once again split into the three conditions (MS, TD, or TV). Next participants filled out a series of mood measures followed by a scale that measures identity seek and lastly the same personal goals index used in Study 2 to explore motivation toward self-relevant projects. Results showed that the mortality salient group showed significantly higher identity seeking than the TV group; the planned comparison indicated that the TD group was “marginally” higher than the control group (McGregor et al, 2001). The results for the personal projects were also supportive of McGregor et al’s hypotheses. Both mortality salient and TD participants scored significantly higher on this measure of self-consistency than did the control group.

McGregor et al (2001) argued that this result supports the claim that MS effects are due to uncertainty, as TD, a non-lethal manipulation, produced worldview defense in the apparent absence of any consideration of death. Greenberg (as cited in McGregor et al; 2001) however disagreed with that assertion, and introduced the idea that TD may not be a manipulation completely devoid of death issues subsequently calling into question the validity of the interpretation of the results submitted by McGregor et al. Greenberg proposed that, asking someone to image him or herself 35 years in the future, as the TD manipulation did, may unintentionally cause participants to reflect on their mortality. That is, to an 18 or 20 year old, being in ones 50’s may seem like having one foot in the grave. To examine this possibility McGregor, Zanna and Holmes (1998) assigned

participants to MS, or TD and then measured death accessibility using a word completion task. The results indicated that while MS participants completed more word stems with death related words than did a control group, the TD group did not differ significantly from the control group on death accessibility. Thus, according to McGregor et al (1998) TD does not engender thoughts of death while MS did, thereby, according to McGregor et al (1998), ruling out the possibility that the ultimate cause of the results reported in the McGregor et al (2001) article were caused by heightened death accessibility.

3.4 Conclusions: Uncertainty management theory

Van den Bos and colleagues (2001; van den Bos & Miedema,2000; van den Bos & Lind, in press) and McGregor et al (2001; 1998) thus assert that the basic premise set forth by TMT theory that worldview defenses occur *only* following MS is now questionable. Van den Bos and Miedema (2000) showed that MS enhanced the emotional reactions to unfairness, and claimed that these effects were produced not by death awareness per se, but by uncertainty produced by reminders of mortality. This result was reproduced in later studies by van den Bos (2001) where the MS induction was substituted with a more direct manipulation of uncertainty. Thus at least for emotional reactions to unfairness, MS and uncertainty produce similar effects, consequently providing support for van den Bos and Miedema's (2000) assertions that MS produces uncertainty and that it was the uncertainty that produced the exacerbated emotional reactions to unfairness.

McGregor et al (2001) more directly examined the relationship between MS, uncertainty and worldview defenses. Specifically, McGregor et al reported worldview

defensive behaviors following considerations of self-dilemmas. They showed that such pondering produces “attitude hardening” and a more consistent evaluation of self, both of which are potential worldview defensive behaviors. Furthermore, McGregor et al showed in Studies 3 and 4 that both MS and “uncertainty” manipulations produced self-reports of psychological uncertainty and comparable worldview defenses as measured by intergroup bias and identity seeking. Finally, McGregor, Zanna and Holmes (1998) demonstrated that a temporal discontinuity manipulation does not engender heightened accessibility of death-thoughts (routinely produced by a standard mortality salience manipulation). The results of these studies, as interpreted by McGregor et al (2001) clearly establish that MS is not the sole instigator of worldview defense and that uncertainty can also produce “mortality salience effects.” Accordingly, based on McGregor et al (2001), terror management theory might be more appropriately named using van den Bos’s (2001) nomenclature: “uncertainty management theory.”

Chapter 4: Death or uncertainty?

TMT proposes that death awareness is a problem because it engenders potential terror associated with humans simultaneously being creatures that desire to live and their knowledge that such a desire is destined to be thwarted. Reminders of death lead to immediate, or proximal defenses that remove death awareness from consciousness via suppression, which relaxes over time, rendering death thoughts “hyperaccessible” and resulting in worldview defensive behaviors that reduce death accessibility and in so doing prevent thoughts of death from reaching consciousness and engendering terror. Furthermore, because of the immediate suppression of death thought by proximal defenses, there is no affect produced by contemplation of one’s mortality. Moreover, according TMT, worldview defenses *only* occur under conditions where death thoughts are hyperaccessible and hyperaccessibility is produced *only* by MS.

However, proponents of uncertainty management theory (UMT; e.g. McGregor et al, 2001; van den Bos, 2001) assert that TMT findings are produced by uncertainty and that the MS manipulation is a specific instance of uncertainty. They posit that thoughts of death produce uncertainty by calling into question any number of unanswerable questions ranging from existential issues pertaining to the validity of people’s beliefs regarding the afterlife to mundane topics like how their children will learn to drive in their absence. These unanswerable questions produce uncertainty, which undermines self-integrity upon which much of human equanimity hinges. Thus according to UMT, TMT is much too narrow in limiting the instigation of worldview defense to mortality salience and heightened death accessibility, and consequently argue that death

accessibility, while sufficient, is not necessary to produce worldview defenses. In support of these arguments van den Bos and others (van den Bos, 2001; van den Bos and Miedema, 2000) reported that uncertainty and mortality salience produce comparable effects regarding reactions to fairness and therefore infer that uncertainty and MS are psychologically equivalent. Additionally, McGregor et al (2001) demonstrated that worldview defense occurred following a temporal discontinuity (TD) manipulation in the apparent absence of heightened implicit death accessibility. Specifically, McGregor et al (2001) produced worldview defenses analogous to those produced by a MS manipulation using TD, and claimed that TD does not produce heightened death accessibility. Further support for UMT comes from research demonstrating that MS leads to an increase in self-reported uncertainty (Martin, 1999; McGregor et al 2001) despite the claims of TMT researcher that MS does not produce any changes in affect.

Thus based on UMT theory and research, TMT, in its current state, is questionable, or just plain wrong. Specifically, while TMT claims that MS doesn't produce affect, UMT claims that it does (at least) produce subjective reports of uncertainty. TMT proposes that only death thoughts produce worldview defense: UMT proposes that uncertainty produces the defenses and that MS is a special case of uncertainty. And finally, TMT asserts that heightened death thought accessibility is necessary for worldview defense, UMT suggests that worldview defense occurs in the absence of heightened death accessibility.

4.1 The Role of Uncertainty in the production of Death Thoughts

While UMT certainly poses a problem for TMT, the findings by UMT research are not “deadly” to TMT but may make some modifications to the theory prudent. Specifically, MS may produce uncertainty but this is an issue only if it is the uncertainty, and not the death awareness, that produces the MS effects. Additionally, worldview defenses may be engendered by manipulations other than MS, but this is only problematic to TMT if such thoughts fail to raise death accessibility. In light of this, if uncertainty manipulations can be shown produce heightened death accessibility (which McGregor et al, 1998 may have failed to because of specific idiosyncrasies in their design), then UMT research findings would not threaten the veracity of the main contentions of TMT, because uncertainty would become a special case of a death reminder. That is, if uncertainty can be shown to produce heightened death accessibility then TMT would need to be modified to accommodate the notion that there are other concerns that produce implicit thoughts of death other than MS but, despite this, the evidence still would support the contention that implicit concerns regarding death are required to produce worldview defense. There is ample evidence that uncertainty in general and TD specifically are theoretically problematic because of their capacity to elicit concerns about death.

4.1.1 The problem of time and death

Time is by nature moving and fleeting. It moves in one direction, and in terms of a lifespan, along a path towards only one final unequivocal destination: death. Time, may continue interminably, but a person’s experiences within time are ephemeral. A

contemplation of time and its components – past present and future— facilitates musings regarding the transient nature of our existence. The past is eternally in the past and will stay behind forever, yet despite that our futures are relentlessly becoming shorter, the unreachable past lengthens, and the present is virtually nonexistent in its infinitesimally brief presence.

Kierkegaard conceptualized humans as being able to focus on two aspects of their being. We have a “finite,” or temporal self, and an “infinite” or immortal self. In *Sickness unto Death* Kierkegaard writes “man is a synthesis of the infinite and the finite, of the temporal and the eternal....” Focusing on the temporal, according to Kierkegaard reminds us that we are similar to animals; we are temporary and our tomorrows are finite. Thus a manipulation that directs the participant to ponder their temporality (as McGregor et al, 2001, did by using TD) may reduce one, in his or her mind, to a temporary thing akin to animals. As per Becker’s (1973) adaptations of Kierkegaard’s writings, such a focus may have the consequence of reminding one of his or her eventual death.

Nietzsche similarly expounded on the relationship between time – in this case the future– and death. For although, according to Nietzsche, we seek novel adventure in the future and are entranced by its unknown features, its greatest impact on us is what is known about the future; its terminus – unswervingly assured to be the same for everyone. Nietzsche observed: “Everyone wants to be the first into this future – and yet death and the silence of death is the only certain thing and the thing common to all in this future” (*Gay Science*).

Spengler (1932/1971) also asserted that cogitating on the nature of the past ultimately produces thoughts regarding mortality:

Man is the only being that knows death; all others become old, but with a consciousness wholly limited to the moment which must seem to them eternal... they die and they see death without knowing anything about it. Only man ... comes to possess... the notion of transience, that is a memory of the past as the past. We are time but we possess also an image of history and in this image death (p. 166).

Therefore, at least based on some great thinkers of our time and times past, thoughts pertaining to time— specifically ourselves proceeding within time – have the potential of rendering us highly cognizant of the frailty and fleeting nature of existence. Yet despite this, McGregor et al (2001) use just such contemplation explicitly as a *non-death* manipulation. The TD manipulation has participants imagining themselves many years from now thinking about a time many years in the past. That is, they are asked to imagine themselves as much older beings (contemplation of the future) think about a youthful event (contemplation of the past – from the future). Given the potential of such cognitions to conjure thoughts of death, it may be theoretically problematic to treat TD as a manipulation completely devoid of death issues.

4.1.2 The role of uncertainty as a threat to self on death accessibility

In Studies 1 and 2, McGregor et al (2001) manipulated uncertainty by having participants think about a personal dilemma and obtained worldview defenses, again in the apparent absence of concerns about death. That is, personal dilemma focus produced worldview defense behaviors without an obvious introduction of death thoughts. Consistent with the view of both McGregor et al (2001) and van den Bos (2001), a

healthy consistent image of self and maintenance of self-integrity are necessary for human well-being. Van den Bos and Lind (in press) write that “self-certainty [is] very important because self-concept is the critical organizing principle, referent point or integrative framework for diverse perception, feelings and behaviors” and as such being certain regarding the self is crucial. The self serves an executive function in the maintenance of human equanimity *and* that in the service of that function the self may manage the flow of implicit death knowledge into consciousness. Damage to the integrity of self may therefore hinder its ability to perform such a function and subsequently render an individual unable to prevent issues pertaining to death from becoming conscious. Thus damage to self-integrity, as is the purported effect of uncertainty (or self-dilemma focus), may produce increased awareness of death. In response a person must engage in activities to restore a consistent sense of self or engage in anxiety buffering behaviors and, by doing so, return death concerns to a more controlled state. Several theoretical works support such a contention.

Kierkegaard articulated a somewhat complicated connection between self and consideration of the finite nature of being. He proposed – in different terms– that the ability to engage in meta-cognitions regarding the concept of self allows one to maintain a psychological distinction between him or herself and other non-human animals. That is, our ability to acknowledge our own self, as being attributable solely to us as individuals and none other, and that we are able to know that we know this relationship, is in Kierkegaard’s words “man’s advantage over the beast, and this advantage distinguishes him far more essentially than the erect posture, for it implies the infinite erectness or loftiness of being spirit” (*Sickness unto Death*). That is, according to

Kierkegaard, the fact that we know that we *are* and that we are unique *and* that we know that we know that we are, produces a sense of immortality. However, such protection gained by the illusion of the infiniteness of self may be shattered when the concept of self is tarnished – as would be the result of a self-integrity threat – rendering one no longer “special” or immortal but subject to the same laws of decay and death as the other creatures of the Earth.

Becker (1973) too makes a similar claim. He discussed the self in terms of “character armor” which serves as a protective barrier against intrusions of death thoughts. A “chink” in the armor may therefore leave one susceptible to attack from such death thoughts. According to Becker (1973) ones “character” serves to protect her or him from the “full realization of the human condition” (p. 57), that condition being mortal. Thus according to Becker, a well functioning sense of self – undamaged by attack – is crucial to the functioning of our anxiety buffers.

Langer (1982) wrote about the self in a manner consistent with the claims that the self is fundamentally and integrally connected with thoughts of death. Langer (1982) as does McGregor et al (2001) claims that uncertainty is of serious consequence to human well being as it endangers the structure of the self. But, unlike McGregor et al (2001), Langer asserts that the seriousness is not due solely to damage to the self per se, but of its consequential effect of bringing to mind human frailty and death. Langer writes that the “horror of doubt” threatens the structure of the mind and that as a result of such doubt we developed “self-affirmation.” According to Langer the self functions to handle the burden of the knowledge of the finite nature of “being” and consequently the realization of ultimate death. Thus doubt threatens self and as such prevents it from being able to

cope with the burden of mortality. Langer wrote: “and with the rise and gradual conception of the ‘self’ as the source of personal autonomy comes, of course, the knowledge of its limit – the ultimate prospect of death” (p.103). She continues with:

The effect of this intellectual advance is momentous. Each person’s deepest emotional concern henceforth shifts to his own life, which he knows cannot be indefinitely preserved. Instead of the typical savage careless of death as an episode in the course of communal acts, personally only a change in status, one finds a new seriousness meeting “the blight man was born for” – the impending relinquishment of all power, the end of self. (p. 103)

Thus according to Langer, the “individuation” of humans had the consequence of rendering them more concerned with life based on the almost ironic or paradoxical effect of knowledge of self. If we know that we are, we consequently know that we can also not be. That is, knowing the self makes us become aware of personal death.

McGregor et al (2001) themselves explore the writings of Yalom (1980) who ties *uncertainty* directly to death anxiety. To support their claims, McGregor and his colleagues cite Yalom (1980). McGregor asserts that Yalom proposes that *irreversible decisions* are a way of removing uncertainty. McGregor suggests that as per Yalom, such decisions can impact one as much as a consideration of his or her own death (Yalom, 1980). McGregor et al cite the following passage from Yalom (1980):

Decision, especially an irreversible decision, is a boundary situation in the same way that awareness of “my death” is a boundary situation. Both act as a catalyst to shift one from the everyday attitude to the “ontological” attitude –that is, to a mode of being in which one is mindful of being. (p. 319)

Certainly this quote seems to imply that Yalom’s views are consistent with the proposed role of uncertainty advocated by McGregor et al (2001), but McGregor et al end Yalom’s quote too soon. The very next sentence of that quote contradicts McGregor et

al's main goal in using the quote and suggests that perhaps McGregor completely misunderstood Yalom². Yalom states as the next line to the quote above that a "major decision not only exposes one to the anxiety of groundlessness but also threatens one's defenses against death anxiety" (1980; p. 319). Yalom proposed that critical decisions are of such importance because they may actually lead to thoughts of death or remove protection from death awareness. So it is not, according to Yalom, that uncertainty is a horrid manifestation impacting all aspects of our lives and should therefore be the central focus of much psychotherapy, but rather that uncertainty may lead to the terrifying reminder that we are finite and the impact of this knowledge needs to be addressed in psychotherapy. Thus according to Yalom, and consistent with the view being proposed here, concerns regarding uncertainty become important psychologically because of their potential to elicit death anxiety.

Thus according to many theorists, (e.g. Becker, 1973; Langer, 1982; Yalom, 1980), uncertainty and TD are a problem—but not solely for their impact on the self; rather, more importantly, because uncertainty and TD hinder our ability to manage the terror engendered by the knowledge we are mortal and will die. Recent theory and research support the proposition that themes other than death, but with the ability to impact anxiety buffers, increase death accessibility.

² It is important to note that the main goal of Yalom's *Existential Psychotherapy* is to instill an awareness of the consequences of death anxiety by practitioners during therapy. Thus any suggestion that any relevant excerpt from the text is devoid of death issues is to ignore the basic goal of the work.

4.2 Non-lethal instigators of Worldview Defense

Consistent with the proposition that self-integrity threats induce thoughts of death, there are several empirical findings evidencing *non-lethal* manipulations that produce heightened death accessibility. While on the surface these manipulations appear very different they are all quite similar in that they threaten self-integrity. That is, research where self-integrity is threatened (as was the case in McGregor et al's 2001 studies) has produced heightened death accessibility in the absence of a MS manipulation.

For instance, based on Becker (1973) and Kierkegaard, an image of self that includes a feeling of being fundamentally distinct from animals is a commonality in (most) people. Becker declared that such a dichotomous view of the humans and creatures served a death denying function by allowing humans to believe that their superiority over animals includes a freedom from natural laws causing the creatures to succumb to death. A threat to that image of self may therefore hinder our ability to ward off reminders of death. Following Becker, researchers, (Goldenberg, Cox, Pyszczynski, Greenberg, & Solomon, 1999) proposed that our ability to see ourselves as clearly distinct from non-human animals serves an anxiety buffering function. Participants reminded that we are essentially animals and then asked to ponder an action confirming that belief (i.e. physical as opposed to romantic aspects of sex) had higher death accessibility than a control group without a *direct* reminder of mortality. Thus an apparent self-integrity threat produced heightened death accessibility.

Additionally, Silvia (2001) provided empirical support for Langer's claim that focusing on the self necessitates the concurrent realization that the self may cease to exist.

He states:

The self-concept is not simply a representation of what the self concretely and momentarily is; it includes representations of what is, is not, ought, might, could and hopefully will not be. To consider the self is thus also to consider these alternatives and oppositions (p. 74)

Thus according to Silvia (2001) extreme attention paid to the self (i.e. self-awareness) would lead to focus on the lack of self. That is, self-awareness would not only bring to mind the fact that we exist, but bring to mind "a self that does not exist" (p. 75) or one's death. Accordingly, individuals made self-aware either by sitting in front of a mirror, or by writing down ways in which they were unique from others, completed more word fragments with death words than did a control group. Thus Silvia showed once again that a manipulation, which on the surface appears to be unrelated to death, has the potential to elicit death thoughts.

According to Mikulincer, Florian, Birnbaum and Malishkevich (2002), based on Bowlby's attachment theory (as cited in Mikulincer et al 2002), close relationships serve as a buffer against mortality concerns. Separation in childhood from a caregiver, for example, depending on the "attachment style," can be quite distressing to the child. Mikulincer et al reported that similar effects have also been shown for older people when they are separated from a close relationship other. Mikulincer et al propose that separation from such another is so distressing because close relationships serve a death anxiety buffering function. Consequently, undermining that buffer by having participants

imagine the destruction of a close relationship would cause the previously buffered anxiety to surface.

Mikulincer et al (2002) recently reported just such a finding. Consistent with the death protection view of interpersonal relationships, heightened death accessibility occurred when participants were asked to imagine being separated from a close relationship partner. Specifically in Study 1, Mikulincer et al had participants think about being separated from a close relationship partner or specifically the death of such a partner. Results showed that both of these groups compared to a control group had significantly higher implicit death accessibility in the absence of a direct manipulation of death thoughts. Study 2 showed that imagining separation from a mere acquaintance did *not* produce increased access to death thoughts, and a third study showed that the effect was not due to participants' interpreting "separation" to mean death. In this Study (3) Mikulincer et al added a *permanent* separation, *long-term* (but not permanent) separation, and a *brief* separation condition. Results showed that while the permanent separation led to higher death accessibility than did the long-term separation, the long-term separation (clearly not due to death) produced higher death accessibility than did thoughts of a brief separation (which did not differ from the control group). Once again the findings support the notion that a non-lethal manipulation (the separation w/o explicit regard to death) increases death accessibility.

Similarly—and guided by the same reasoning—Florian, Mikulincer and Hirschberger (2002) proposed that romantic relationships may serve to protect people from death concerns. They reported that when participants were asked to think about a problem in their romantic relationship, they had higher implicit death thoughts than did

participants asked to think about an exam or TV did. This study again showed that the introduction of threatening but non-deadly thoughts might produce death awareness when they impact issues important and relevant to self-integrity.

But it is not the case that all threatening non-lethal ruminations produce heightened death accessibility. Certainly thinking about pain, taking an important exam or being paralyzed would be threatening to people yet they do not produce heightened death accessibility. Again, all of the above non-MS producers of death awareness do so by impacting the self in a way that renders its death protective functions momentarily incapacitated thereby allowing an escape of previously controlled death thoughts into pre-consciousness. Thus, other manipulations that threatened self-integrity, just as TD threatens self-integrity, produce heightened death awareness. It can even be argued that Mikulincer et al's (2002) manipulation asking people to imagine separation from a loved one, or Florian et al's (2002) manipulations asking participants to ponder problem with a romantic relationship threaten self-integrity in the very same manner that TD does. According to Anderson, Chen and Carter (2000) the self is "fundamentally interpersonal, bound up with the significant others that predominate in people's lives" (p. 270). Therefore, to the extent that a "close other" or romantic partner is part of one's self, then imagining being separated from that person may lead one to address the reality of a different self than the one presently in place (that includes the "other"). This is functionally identical to the TD manipulation used by McGregor et al (2001) in that both threaten a secure sense of self by bringing to mind the fragility and changeability of that concept of self. That is, realizing that the "secure" consistent image of self (the entire construct of "me") is actually a volatile entity that will change over time and situation is

threatening to self-integrity. Given this, it is reasonable to expect that if damage to self-integrity induced by thoughts of separation from a close other (for example) produced increased death accessibility, then other self-integrity threats should also produce an increase in death accessibility.

Chapter 5: Experiment 1

In light of the proposed connection between uncertainty as a self-integrity threat and implicit awareness of death, the results of McGregor et al's (1998) study are indeed puzzling. That is, McGregor et al (1998) manipulated both TD and MS; but only MS led to heightened death accessibility when compared to a control group. Given the similarity between the TD manipulation and other self-integrity threats (e.g. Mikulincer et al's 2001 separation from close other) which do produce an increase in death accessibility, TD should also—based on this line of theory and research—produce an increase in the ease with which implicit thoughts of death are elicited.

An examination of the procedure used by McGregor et al (1998) revealed a slight and ostensibly unimportant difference in the distraction following the TD and MS manipulations, and prior to the measure of death accessibility, from previous TMT research. Prior TMT research typically uses one of two distractions. Earlier research (e.g. Greenberg et al, 1994) had participants complete a "find-the-word" puzzle containing TV related words. More recently researchers have used a brief passage from Camus' *The Dark Drive*. For this distraction participants read a portion of a passage describing an individual being driven to an area by a river where he receives a "signal" from another person before leaving (see Appendix E). Both distractions were chosen because they have nothing to do with death and thus should distract participants from death thoughts. Instead of the Camus passage, McGregor et al (1998) used a passage from Plato's *Allegory of the Cave*(see Appendix F) as their distraction, with the good intention of giving their participants something interesting and "educational" to read. "The Cave"

is a piece of Plato's *Republic* containing a conversation between Socrates and Glaucon regarding the nature of reality. Plato—through the voice of his teacher Socrates—proposes that our “reality” is primarily only a “shadow” of the true reality, which humans can never know with absolute certainty.

The main problem with the use of “The Cave” is that it is possible that such a distraction may impact TD differently than MS; specifically, in a manner that inhibits the emergence of heightened death accessibility following TD but does not interfere with the emergence of death accessibility following MS. One possible explanation for why this might occur is that there are aspects of “The Cave” that may keep uncertainty (temporal or otherwise) salient. That is, Plato wrote *The Republic* about 3,000 years ago. While the details of authorship may slip past some participants, the very “ancient” nature Plato's missive might not go unnoticed by its readers and as such may keep the temporal issues in TD salient. Second, regarding uncertainty in general, the notion that nothing can ever be known with absolute certainty may produce a great deal of psychological uncertainty. Thus, *The Allegory of the Cave* may keep death thoughts suppressed for “uncertainty” conditions by failing to distract the reader from such concerns, but would have no impact on death accessibility for MS groups, as it *is* a distraction from mortality concerns.

Another possibility regarding the differential impact of “The Cave” on TD and MS lays in almost the opposite direction; that is, perhaps “The Cave” reduces the impact of TD by consoling individuals about their uncertainty. Specifically, since The Cave advances the idea that most people are unable to distinguish between “shadow” and reality, people may take solace in the knowledge that since everyone and everything is “uncertain,” then perhaps one's own uncertainty is no big deal. Ultimately, however, the

precise effect of “The Cave” is not the main issue here. Rather, there is ample cause for doubting that it impacts TD and MS equally. That is, the same passage from *The Allegory of the Cave* may serve a different function in the TD condition than in the MS condition, and is thus a possible confound that obscures the heightened death accessibility that might otherwise be engendered by TD.

Consequently, Experiment 1 replicated McGregor et al’s 1998 experiment with one important modification: specifically, replacing “The Cave” with *The Dark Drive* by Camus as the distraction prior to obtaining a measure of death accessibility. If, as I propose, temporal discontinuity is a self-integrity threat, and the self is a psychological structure that is constructed in part to ward off thoughts of death, then temporal discontinuity should produce heightened death accessibility, as does mortality salience, when compared to a neutral control group.

Method

Participants

Fifty-four introductory psychology students at Brooklyn College participated in groups of about four to 11 for partial completion of a course requirement.

Design and Procedure

Students first completed filler questionnaires (Eysenck & Eysenck’s 1967 Neuroticism Inventory; Rosenberg’s 1965 Self-esteem Scale) to support the cover story that the experiment was a study of personality and attitudes. Participants were then randomly assigned to one of three conditions: mortality salience (MS), temporal discontinuity (TD), or Music Control. MS was induced by having participants answer

two open-ended questions regarding their eventual death: 1) “Please describe the emotions that the thought of your own death arouse in you”, and 2) “Write down, as specifically as you can, what you think happens to you physically when you die” (See Appendix A). TD was induced by asking participants to: 1) “Please briefly describe the events, people and scene (i.e. location, sounds, smells etc) associated with an important, vivid memory from your childhood or adolescence” and 2) “Jot down how you image the physical scene of this above memory might be different if you revisited it in the year 2035. (please be specific). How does this make you feel to imagine this?”(see Appendix B). The music control group was asked: 1) “Please describe the emotions that the thought of music arouse in you” and 2) “Write down, as specifically as you can, what you think happens to you physically when you listen to music.”

Next participants completed a mood measure (PANAS; Watson, Clark & Tellegen, 1988) that included the five extra items measuring “felt uncertainty” (*bothered, uneasy, aroused, anxious, and excited*) used by McGregor et al (2001)³. Participants were asked to indicate the extent to which they were currently experiencing each of 65 mood related words. Students then read a brief story from Camus’ *The Dark Drive* (Appendix E) and then answered 2 questions about the passage—this passage served as a distraction prior to obtaining the dependent measure.

After reading *The Dark Drive* and responding to the questions about it, participants completed a death accessibility measure that constituted the primary dependant measure for the experiment. The measure of death accessibility was a modified version of one created by

³ Note that this operational definition of uncertainty was taken directly from McGregor et al 2001 and was used solely to keep the operational definitions consistent for comparison purposes, however, based on face validity, it is unclear that these five items actually represent the construct of “uncertainty.”

Wenzlaff (2001; see Appendix C). This accessibility measure has 25 sets of 6 words that can be “unscrambled” to create a grammatical 5–word sentence (always excluding one word). For ten of these “sentences,” the sentence could include a death related word or not. For example, *arrival not was death her expected* could be either *her arrival was not expected*—a non-death related answer—or *her death was not expected*—a death related response. The measure was scored by counting how many sentences were completed using death words as an index of accessibility of death thoughts. This measure of death accessibility was used instead of the word completion task typically employed in prior TMT work (e.g. COFF ___ could be either COFFEE or COFFIN) because previous research has shown that this population of students had some difficulty successfully completing the word completion task ⁴. Finally, participants completed a demographical questionnaire asking about age, gender, ethnicity and GPA. The experiment at this point was concluded; participants were thoroughly debriefed and dismissed.

Results

Participant attrition

Of the 54 participants from whom data was obtained, the data from 14 participants was eliminated immediately because they failed to properly complete the dependent measure. That is, on the scrambled-sentence-death-accessibility measure, these 14 participants consistently failed to select 5 and only 5 words to include in the sentence.

⁴ Brooklyn College is a very heterogeneous environment where I suspect language difficulties resulted in too many uncompleted word-stems. I hoped that replacing the more difficult word stem completion task with the sentence task would avert this problem.

Typically they attempted to use all 6 and sometimes (less frequently) selected 3 or 4 words to form a sentence. This made it impossible to score their responses. Data from an additional 5 participants was rejected later when re-examination of their responses revealed that although they selected the appropriate number of words, their selection appeared random and non-grammatical. Although the loss of this many participants was troubling, the fact that participant attrition was equally distributed between the conditions (6 Music, 7 MS, 6 TD) was somewhat comforting.

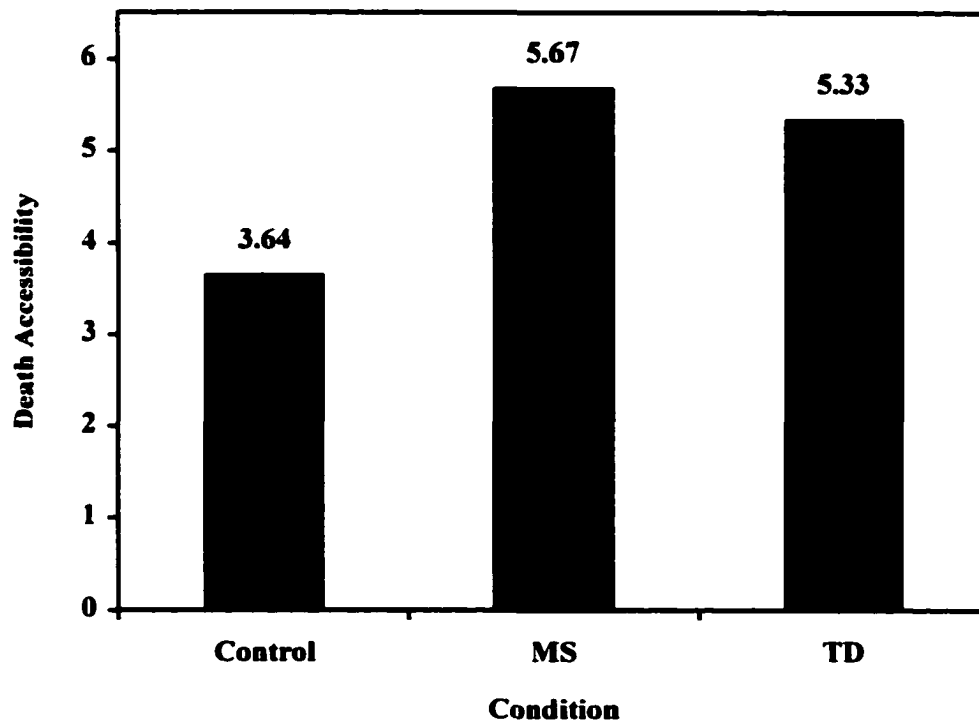
Death Accessibility

A one-way ANOVA to assess omnibus differences between conditions produced a significant effect, ($F(2,32) = 3.842, p = .032$, see Table 5.1 and Figure 5.1 for means). A planned comparison indicated that death accessibility for MS ($M = 5.67$; out of 10) was significantly greater than for the control group ($M = 3.64$; $t(32) = 2.601, p = .014$). This finding thus replicated previous TMT research showing an increase in death accessibility following MS after a distraction. Then, in order to test the hypothesis that TD also produces heightened death accessibility, a planned comparison was performed comparing TD to the music control group. As predicted, death accessibility following TD ($M = 5.33$) was also significantly higher than in the control group ($t(32) = 2.174, p = .037$). However the mean difference in death accessibility for TD and MS participants was not significant ($t(32) = .437, p = .665$).

Table 5.1

Main effect of conditions on death accessibility

Condition	Mean	n	SD
Music	3.64	11	1.69
MS	5.67	12	1.44
TD	5.33	12	2.35

*Figure 5.1 Means death accessibility by condition*

Uncertainty

The five items McGregor et al (2001) used to assess uncertainty (*bothered, uneasy, aroused, anxious, and excited*) were averaged to create an overall uncertainty score (possible min = 1, possible max = 5). An ANOVA revealed no effect of condition on felt uncertainty ($F(2,32) = 1.481, p = .242$; see table 5.2 for means). Thus, unlike McGregor et al (2001), MS and TD had no effect on self-reported uncertainty.

Nevertheless, to be sure that heightened death accessibility scores obtained in response to MS and TD were not the result of subtle variations in self-reported uncertainty, an analysis of covariance (ANCOVA) was conducted on the death accessibility scores with the overall uncertainty scores used as a covariate. This analysis reproduced the significant effect for conditions ($F(2,31) = 3.967, p = .029$). Furthermore, planned comparisons showed that the simple effects were still intact. Specifically, using adjusted means, MS ($M = 5.528$) was significantly greater than the music control ($M = 3.613, t(31) = 2.49, p = .019$), and TD ($M = 5.493$) was also significantly greater than the music control condition ($t(31) = 2.4, p = .023$). Once again the MS and TD conditions did not differ significantly ($t(31) = .43, p = .965$).

Table 5.2

Main effect of conditions on self-reported uncertainty

Condition	Mean	N	SD
Music	1.758	11	.612
MS	1.903	12	.361
TD	1.528	12	.361

Affect

In order to explore the effect of the manipulations on mood to determine if the death accessibility effects were driven by affect, separate one way ANOVAs (see tables in Appendix H) were conducted on each of the PANAS subscales (*fear, hostility, guilt, sad, fatigue, shy, happy, assertive, attentive, serene, and surprised*). The ANOVA's reveals several significant or near significant differences on the various negative mood subscales (*fear, $p = .054$, hostile, $p = .038$; guilt $p = .064$; sad $p = .066$; fatigue, $p = .089$; shy, $p = .083$; see tables in Appendix G). All of these effects were driven by higher means in the MS condition compared to Music and TD. None of the positive mood subscales (*happy, assertive, attentive, serene, surprised*) were significant (all F 's < 1; see tables in Appendix G).*

An ANOVA exploring the effects of condition on negative mood reveal a significant effect ($F(2, 31) = 6.351, p = .005$; see tables in Appendix H). Using planned comparisons, the negative mood score for MS ($M = 1.9$; see table 5.3) was significantly different from both the Music control score ($M = 1.37; t(31) = 2.846, p = .008$) and TD ($M = 1.29; t(31) = 3.298, p = .002$). Negative mood scores did not differ between Music and

TD ($t(31) = .39, p = .699$). The ANOVA on positive mood ($F(2,32) = .735, p = .488$) was not significant.

In order to determine if the greater negative mood engendered by MS influenced death accessibility, an ANCOVA was conducted on the death accessibility scores using negative mood as a covariate. While this analysis resulted in a slightly weaker effect of condition ($F(1,33) = 3.056, p = .063$), the simple effects as measured by planned comparisons, still indicated that MS (adjusted $M = 5.542$) was significantly different from music (adjusted $M = 3.707, t(30) = 2.00, p = .055$) and TD (adjusted $M = 5.438$) was significantly different from music ($t(30) = 2.16, p = .039$). The difference between TD and MS was still not significant ($t(30) = .11, p = .912$).

Table 5.3

Main effect of conditions on PANAS positive and negative mood

		N	Mean	SD
Positive mood	Music	11	2.6566	.6353
	MS	12	2.9722	.5958
	TD	12	2.9630	.8506
Negative mood	Music	11	1.3636	.4610
	MS	11	1.9000	.5899
	TD	12	1.2917	.2021

Discussion

The results of this experiment are consistent with the hypothesis that temporal discontinuity elevates implicit accessibility of death-related thoughts. Death accessibility for both TD and MS participants was significantly higher than Music control group participants. Thus, there is evidence that psychological uncertainty is indeed related to, and engenders implicit thoughts of death; therefore uncertainty appears to be a specific instance of “death” rather than death being a special case of uncertainty as claimed by proponents of uncertainty management theory. Ian McGregor (personal communication, October 16, 2001) replicated this finding, using a word stem completion death accessibility measure. Specifically, McGregor compared death accessibility following TD using either *The Allegory of the Cave*, or *The Dark Drive* passage as the distracter, and reported that TD indeed produce significantly higher death accessibility ($M = 1.22$) using *The Dark Drive* distracter than when using “The Cave” as a distracter ($M = .72$; $F(1,17) = 4.64, p = .046$). While McGregor conceded that TD *may* produce heightened death accessibility, and that using “The Cave” as a distraction may have somehow mitigated this effect, he proposed that there might be something specific about TD combined with *The Dark Drive* that induces heightened death accessibility, and that temporal discontinuity would not otherwise produce heightened death accessibility. Experiment 2 was conducted, in part, to assess the merits of this proposition.

Chapter 6: Experiment 2

Experiment 2 was a conceptual replication and extension of Experiment 1. A different group of students were used as participants; the original word stem completion task was used as a measure of death accessibility to be certain that the findings from Experiment 1 were not due to the new “scrambled sentence” death accessibility measure: and an additional set of conditions were added to rule out the possibility that the results of Experiment 1 were due to the specific nature of the delay materials (as McGregor posits above). Specifically, a second set of conditions was included where there was no delay between the manipulations of MS and TD and the measure of death accessibility. While heightened death accessibility following MS usually requires a delay and distraction—to allow time for suppression and subsequent hyperaccessibility of death thoughts—research has also shown immediate heightened death accessibility following subliminal reminders of death, or when suppression is undermined by imposing a high cognitive load. Furthermore, when Mikulincer et al (2002) and Florian et al (2002) found heightened death accessibility following considerations of separation from important others, they did so in the absence of delay or distraction from the contemplation of separation. Immediate elevation of death accessibility after pondering the loss of a loved one may occur because in situations when one does not contemplate death directly (as with subliminal death primes), death thoughts never enter consciousness, thus circumventing the suppression process instigated by a conscious confrontation with mortality.

Thus, it is possible that while asking people to directly ponder death does not produce heightened death accessibility until after a distraction, pondering thoughts other

than death that threaten the self but do not cause death thoughts to enter consciousness may elicit immediately heightened death accessibility. Consequently, I predicted that MS would induce heightened death accessibility only after delay and distraction, but TD would produce heightened death accessibility immediately following the manipulation (as well as after the delay and distraction as in Experiment 1).

Method

Participants

Ninety-nine students from an upstate New York college participated for a chance at a lottery drawing of \$100. Students were recruited on campus at the library close to final exam week.

Design and Procedure

The materials used in Experiment 2 were nearly identical to those used in the first experiment, except that the death accessibility measure was changed to the word stem completion task used in many prior TMT studies (see appendix D). The only other difference between this experiment and Experiment 1 was the placement of the death accessibility measure in order to create *delay* and *no-delay* conditions, thus creating a 3(MS, TD, Music Control) X 2 (delay, no-delay) factorial design. Specifically, following the filler questionnaires, participants answered MS, TD, or Music salience induction questionnaires. Then half the participants (those assigned to the delay condition) filled out the PANAS mood measure, read *The Dark Drive* (and answered two questions about it) and completed the death accessibility measure, as did all the participants in Experiment 1. Participants in the no-delay condition completed the death accessibility measure *immediately* following the respective salience inductions, and then

completed the PANAS followed by *The Dark Drive* “distraction” to equate the delay and no delay conditions for experiment running time. All participants then completed a demographics questionnaire (about age, gender, ethnicity and GPA). This ended the experiment; participants were thanked, debriefed and asked to fill out contact information—which was kept separate from the actual data—for the distribution of the prize.

Results

Death accessibility

A two-way ANOVA (condition X delay) on death accessibility scores (the number of word stems completed with death-related words) produced significant main effects for both delay ($F(1,93) = 5.640, p = .02$; see Figure 6.1) and condition ($F(2,93) = 3.753, p = .027$; See Figure 6.2). The expected two-way interaction between condition and delay was not significant ($F(2,93) = .464, p = .63$; see Table 6.1).

The difference—or at least the direction of the difference—between the no-delay and delay conditions was unexpected. That is, the significant main effect for delay was due to death accessibility scores being higher in the no-delay condition ($M = 1.14$) than the delay condition ($M = .75$). I predicted an interaction between condition and delay because of the prior evidence that MS increases death accessibility only after a delay. Thus the main effect for delay (if there was one) should have been in the opposite direction; the delay condition should have had higher levels of death accessibility than the no-delay condition.

Planned comparisons were used to examine the main effect for condition. As expected, the mean death accessibility score for MS participants ($M = 1.18$) was significantly greater than the mean for the Music control ($M = .635$; $t(93) = 2.69$, $p = .009$), but the difference between TD ($M = 1.01$) and the Music Control only *approached* significance ($t(93) = 1.84$, $p = .069$). However, as predicted, the difference between the means for MS and TD was not significant ($t(93) = .835$, $p = .404$). Thus, as in Experiment 1, there is evidence that both MS and TD produced heightened death accessibility, but the lack of traditional levels of significance for the difference between TD and the control led to a desire to explore the combined effects of Experiment 1 and Experiment 2.

Table 6.1
Cell Means and n for death accessibility

	Music		MS		TD	
	No Delay	Delay	No Delay	Delay	No Delay	Delay
Mean	0.8	0.47	1.29	1.06	1.3.1	0.71
n	15	17	17	17	16	17

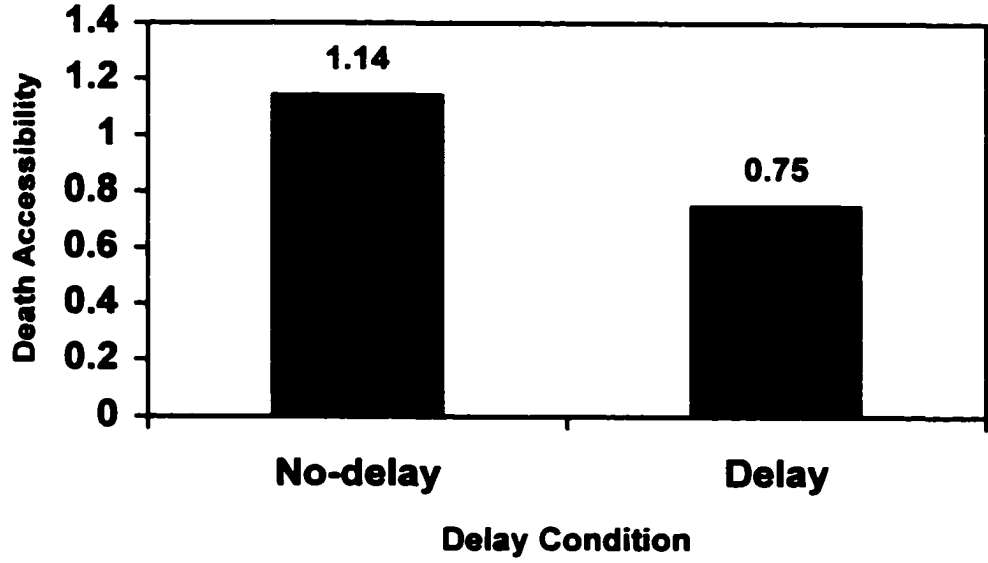


Figure 6.1 Means for death accessibility by delay

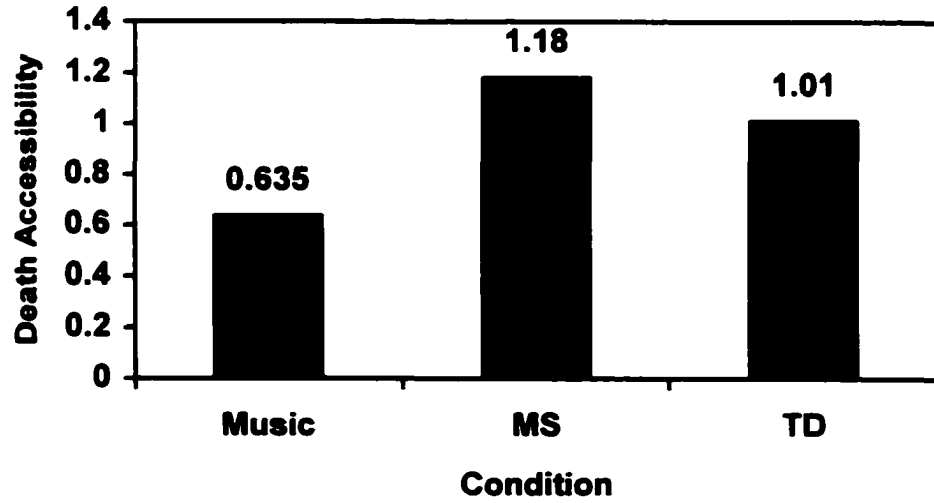


Figure 6.2 Means for death accessibility by condition

Consequently the death accessibility scores from Experiment 1 (using the scrambled word measure) and those from Experiment 2 (using the word stem completion task) were converted to standardized z-scores. A two-way ANOVA (Experiment by Condition) was conducted. The results showed that only the main effect for condition was significant ($F(5,128) = 6.826, p = .002$; see Figure 6.3). Neither the main effect for Experiment ($F(1, 128) = .003, p = .953$), nor the interaction effect ($F(1, 128) = .443, p = .643$) were significant.

Planned comparisons showed that Mortality Salience ($M = .325$) produced significantly higher death accessibility than the Music Control group ($M = -.500; t(128) = 3.54, p = .001$). Temporal Discontinuity ($M = .139$) also produced significantly higher death accessibility than the control group did ($t(128) = 2.74, p = .007$). There was no difference between MS and TD ($t(128) = .81, p = .418$).

Uncertainty & Affect

As in Experiment 1, there were no uncertainty effects: A two-way ANOVA (condition X delay) on self-reported uncertainty scores revealed no significant main effects or interactions (all p 's $> .4$; see Appendix F; Table F.1). However, to be convinced that heightened death accessibility scores produced by MS and TD were not due to self-reported uncertainty, when self-reported uncertainty was used as a covariate, the main effect for condition remained significant ($F(2,92) = 3.543, p = .033$; see ANCOVA Table 6.2). Subsequent planned comparisons showed, using means adjusted for the role of self-reported uncertainty, that MS ($M = 1.177$) was still significantly greater than the Music control group ($M = .645, t(92) = 2.62, p = .01$). Similarly, the difference between TD (M

= 1.001) was still nearly significantly greater than the Music Control ($t(92) = 1.73, p = .087$). The difference between TD and MS remained non-significant ($t(92) = .88, p = .383$). Thus, as in Experiment 1 there was no measurable influence of uncertainty underlying the heightened death accessibility produced by MS and TD.

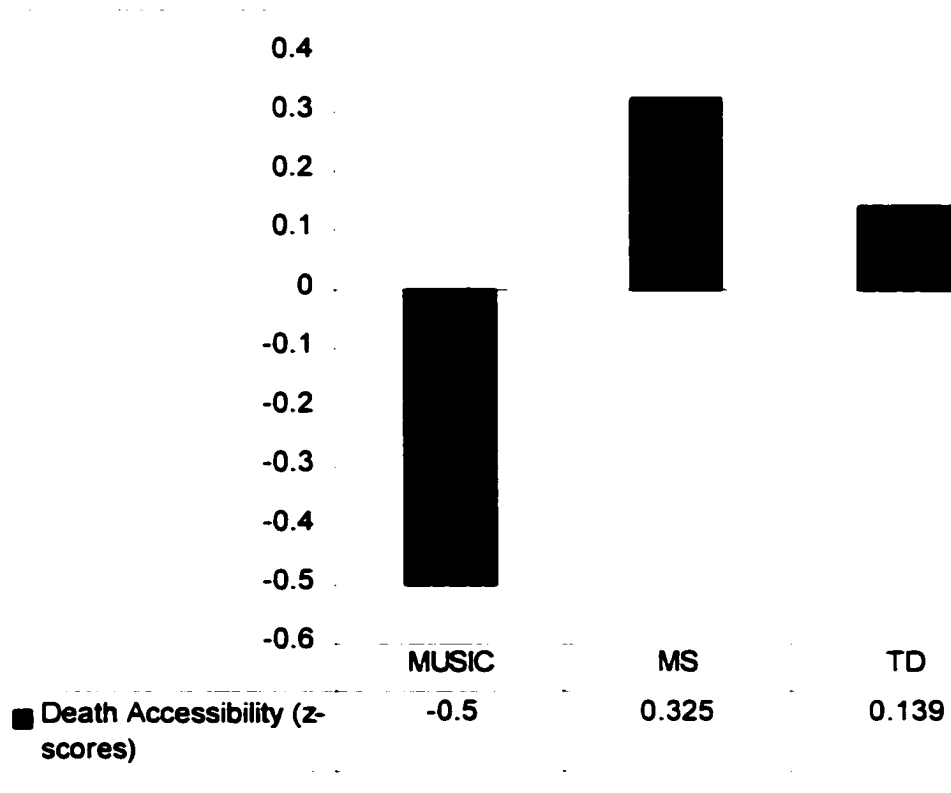


Figure 6.3 Means for DA (z-scores) by condition (Exp. 1 & Exp. 2)

Table 6.2

ANCOVA: the effect of condition and delay on death accessibility using uncertainty as a covariate

Source	SS	df	MS	F	p
UNCERTAINTY	.277	1	.277	.413	.522
COND	4.759	2	2.380	3.543	.033
DELAY	3.848	1	3.848	5.729	.019
COND X DELAY	.665	2	.333	.495	.611
Error	61.796	92	.672		
Total	159.000	99			

To determine if MS or TD had any affective consequences 2-way ANOVAs (condition x delay) were conducted on the subscales of the PANAS mood scale. None of the analyses on subscales (and the overall negative mood and positive mood scales) produced any significant effects⁵ (See Appendix G). Thus, unlike Experiment 1 negative mood was not affected by MS (or TD).

However, to be sure that negative mood was not producing the main effect of condition on death accessibility, an additional analysis was conducted using negative mood as a covariate. The ANCOVA revealed that the main effect of condition remained significant ($F(2,92) = 3.694, p = .029$). Planned comparisons showed that, using means adjusted for negative mood, mortality salience participants ($M = 1.182$) still had significantly higher death accessibility than the Music control participants ($M = .641$):

⁵ Note that the p value for the main effect for condition on the subscale "surprise" approached significance ($p = .081$; see appendix G) and therefore was used as a covariate

$t(92) = 2.68, p = .009$). Death accessibility for Temporal Discontinuity participants ($M = .999$) was also marginally greater ($t(92) = 1.76, p = .083$) than the Music Control participants. Again, there was no significant difference between TD and MS ($t(92) = .91, p = .365$).

Discussion

The purpose of Experiment 2 was to 1) test the hypothesis that—based on theory and prior research—TD but not MS would lead to immediate heightened death accessibility (and that both would produce heightened death accessibility following the delay—as shown in Experiment 1), and 2) test McGregor’s suggestion that perhaps there was something about *The Dark Drive* in combination with temporal discontinuity that led to heightened death accessibility.

Regarding the prediction that there should be an immediate increase in death accessibility for TD but not for MS and elevated death accessibility for both experimental conditions after the delay, the results reveal that there was the expected immediate increase in death accessibility relative to the control for TD. This finding alone supports the claim that TD does arouse implicit concerns about death. And—because this effect is supported by the main effect of condition—it demonstrates that the effect is irrespective of the nature of the delay and therefore renders McGregor’s assertion regarding the role of TD and *The Dark Drive* implausible.

to ascertain if “surprise” played a role in the production of death accessibility. The ANCOVA results were almost identical to the ANOVA.

The prediction that MS should not lead to immediate heightened death accessibility was not supported in that contrary to the prediction; the interaction needed to show a difference between TD and MS when delay was absent was not significant. This is surprising because unlike prior research, which has shown increased death accessibility following MS occurs only after a distraction—with the exception of subliminal primes and under conditions of high cognitive load—Experiment 2 showed immediate heightened death accessibility following MS. However, despite that this unexpected effect did not interfere with the ability to test the main hypothesis that TD would produce heightened death accessibility, it does beg for an explanation. In retrospect, selecting participants close to finals time and while studying may have entailed the unintended consequence of selecting many participants who were in fact under high cognitive load. That is, a fair number of the participants were interrupted during their studying and asked to participate in the experiment. Many set aside their studying in order to complete the questionnaires. It is therefore reasonable to assume that these participants may have wanted to return to their studying and consequently retained in conscious memory some part of what they were studying thus inducing high cognitive load. Arndt, Greenberg, Solomon et al (1997) showed that cognitive load impedes capacity for initial suppression of death thoughts and causes MS to engender *immediate* death accessibility. Thus the speculation for the immediate production of heightened death accessibility following MS is that due to studying imposed cognitive load, participants were unable to suppress issues pertaining to death and thus exhibited immediate heightened death accessibility.

Again, despite that this unexpected result, the main contention that TD caused heightened death accessibility independent of the nature of the delay and distraction was

still somewhat supported and certainly lends doubt to McGregor's (personal communication) argument that TD only produces heightened death accessibility when coupled with *The Dark Drive*.

Additionally, the findings of Experiment 2 are not subject to some of the potentially problematic concerns present in Experiment 1. First, these results were unhampered by large participant attrition. Second, the predicted results were obtained using the "traditional" word stem accessibility measure employed in previous research rather than the scrambled sentence task used in Experiment 1. Finally there were no uncertainty effects or negative mood effects. The results of Experiment 2 thus further support the contention that McGregor et al's (2001) findings showing increased worldview defense following temporal discontinuity were driven by heightened implicit death accessibility and not by uncertainty as a self-integrity threat per se.

More importantly however is that the combined results of Experiment 1 and Experiment 2 clearly demonstrate that TD produces death accessibility across several conditions. That is, when examining the findings irrespective of death accessibility measure, which population was used, and whether or not there was a delay, it is apparent that TD participants experienced higher levels of implicit death accessibility than did a control group and at levels relatively the same as those produced by MS. Thus, McGregor et al's (2001) assertions that TD produced worldview defense in the absence of heightened death accessibility are, based on this evidence, unfounded.

Chapter 7: General Discussion

Terror management theory, based on the writings of cultural anthropologist Ernest Becker (1962, 1973, 1975), asserts that much of human behavior has at its root the underlying goal of assuaging the fear and anxiety engendered by the knowledge that the consequence of life—death—is truly unavoidable. This potential terror is averted by anxiety buffers—self-esteem and a belief in a meaningful cultural worldview—that imbue one’s life with a sense of meaning and value, thereby producing feelings of immediate security and ultimately immortality. That is, the belief that one is a useful, productive and worthwhile member of an enduring, meaningful and cherished culture confers a sense of immortality by providing the individual with opportunities to live forever through his or her contributions to that death transcending culture. According to TMT, confrontations with death thoughts are first met with proximal defenses that psychologically minimize the impact of threats to life and then expel death thoughts from immediate focal attention via suppression. Following the relaxing of the suppression, the re-emergence of death thoughts to a level just outside conscious awareness are combated by distal defenses in the form of cultural worldview defense which remove death thoughts from “pre-consciousness,” thereby averting potential terror and allowing the individual to maintain “normal” functioning in everyday life. Thus, TMT argues that it is this state of heightened implicit awareness of death that produces cultural worldview defense.

Recently, however, proponents of uncertainty management theory have provided evidence supporting an alternative explanation for much of the TMT research findings

derived from the mortality salience hypothesis. Van den Bos and others (van den Bos, 2001; van den Bos & Miedema, 1999) have shown that both thoughts of death and thoughts of uncertainty produce similar effects. That is, van den Bos and Miedema showed that mortality salience produces an enhanced need for fairness. Van den Bos later showed that uncertainty salience produced the same effect. Van den Bos asserted that both results were due to uncertainty and that thoughts of death caused people to focus on the uncertainties regarding the end of their life.

Similarly, McGregor et al (2001) have demonstrated that psychological uncertainty, which is produced—according to the researchers—by reminders of death, self-inconsistency and temporal discontinuity also leads to worldview defense. Thus McGregor et al asserted that death reminders are actually a specific instance of uncertainty, which is the necessary and sufficient condition for the production of worldview defense and therefore TMT is fundamentally wrong by proposing that heightened implicit death accessibility is the primary impetus for mortality salience effects.

McGregor et al's findings do call into question many of the arguments proposed by proponents of TMT. Specifically TMT claims that mortality salience does not produce affect, but McGregor et al showed that MS induces uncertainty. TMT asserts that only MS should produce worldview defense but McGregor et al showed that at least two other non-lethal but self-integrity threatening manipulations also produced worldview defense. TMT claims that all worldview defense can be accounted for as being a reaction to heightened implicit death accessibility but McGregor et al 1998 showed that temporal discontinuity—which does produce worldview defense—did not

also produce heightened death accessibility. Thus according to McGregor et al's research and theory, TMT is just plain wrong.

However, van den Bos (2001; van den Bos & Miedema, 1999) and McGregor et al (2001) ignore the theoretical relationship between death and uncertainty. Specifically, uncertainty as a self-integrity threat may impact our ability to manage death concerns. That is, theoretical arguments have been put forth (e.g. Becker, 1973; Langer, 1980) suggesting a link between the self and our ability to control thoughts of death. Becker argued that the self serves as armor against thoughts of death and that damage to the self may therefore render one incapable of protecting him or herself from death thoughts. Langer argued that the self formed as a reaction to our knowledge of death as a means to defend against that ultimate burden. Additionally, philosophers and other thinkers (e.g. Spengler, 1932/1971; Nietzsche, *Gay Science*) contend that the concept of *time*—the main focus of the temporal discontinuity manipulation—is inseparable from the notion of death. Thus uncertainty—as a self-integrity threat—and TD—as either a self-integrity threat or a time reminder—are special cases of death rather than the other way around as espoused by uncertainty management proponents.

Despite this theoretical assertion, McGregor et al (1998) apparently provided evidence that TD does not engender thoughts of death. That is, they measured heightened death accessibility following a distraction for MS, but not for TD. However there may be a problem with McGregor et al's study in that *The Allegory of the Cave*, as the distraction/delay, may have differentially affected TD and MS by either keeping uncertainty salient or minimizing its influence in the TD condition—thus preventing

heightened death accessibility—but still distracting the MS participants from death thoughts and thereby allowing the typical increase in death accessibility following MS.

Therefore in Experiment 1 we replicated McGregor et al's (1998) experiment replacing "The Cave" with *The Dark Drive*—a neutral distraction. The results did indeed support the hypothesis that TD as well as MS should produce heightened death accessibility. That is, when *The Dark Drive* was substituted for "The Cave" unlike McGregor et al's findings, TD did produce significantly higher levels of death accessibility than a control group supporting the proposed relationship between uncertainty and death concerns.

However, there were some potential problems with Experiment 1. The death accessibility measure was a new one that may have had some unforeseen problems with it rendering the interpretation of the results debatable. Also, despite that participants were rejected fairly equally across condition, the participant attrition rate was unusually high adding more doubt to the veracity of the results. And lastly, McGregor proposed that the heightened death accessibility produced by TD in Experiment 1 might have not been due to TD per se, but by some combination of TD and *The Dark Drive* that rendered participants scared and highly cognizant of their death.

Experiment 2 was designed to overcome these potential problems and to test other hypotheses. Experiment 2 included a set of no delay condition where participants' death accessibility was measured—using the traditional word stem completion—immediately after the confrontation with death or temporal discontinuity. Furthermore, to avoid high participant error, student volunteers from a more academically oriented college were used. The results of this experiment moderately support the contention that TD—

regardless of distraction—produced heightened death accessibility. However when combining these results with those of Experiment 1 it becomes quite apparent that TD as well as MS produce heightened death accessibility compared to a control group. That is, a significant main effect for condition was driven by the means for both TD and MS being significantly greater than the Music control group.

Moreover, McGregor et al (2001) reported that both TD and Ms produced high levels of self-reported uncertainty and that it was this uncertainty driving worldview defense. Since neither of the current experiments showed that MS produced self-reported uncertainty, the claim that all accounts of MS producing worldview defense can be explained by psychological uncertainty is therefore questionable. That is, certainly, even if MS produces uncertainty⁶ the fact that it does not always produce it (as it did not in these two experiments) suggests that uncertainty is unlikely to account for all instances (or perhaps any instances) of worldview defense following MS. More importantly, even when any—perhaps slight—effects of uncertainty were covaried out of the analyses in both experiments, MS and TD still produced much higher levels of death accessibility than did the Music control questions. Thus the claim that uncertainty is the primary variable of consequence in the production of mortality salience effects is once again dubious.

⁶ The veracity of McGregor et al's (2001) and Martin's (1999) findings showing that MS produced high levels of uncertainty is not being questioned here, but only that it is this uncertainty, which is producing the worldview defense reported by McGregor et al. Indeed earlier research (Chaudhary & Solomon, 2001) also demonstrated that MS produced higher levels of self-reported uncertainty but when uncertainty was used as a covariate, there were still higher levels of death accessibility for TD and MS.

Furthermore, TMT's claim that heightened implicit death thought accessibility is a necessary and sufficient condition to produce worldview defense remains viable because McGregor et al's findings that TD produced worldview defense in the absence of heightened death accessibility is now questionable. That is, both of the experiments reported here showed that TD (and MS) did produce increased levels of death thought accessibility. Therefore McGregor et al's (2001) assertion that uncertainty-produced worldview defense in the complete absence of death thoughts is clearly suspect.

This is not to say that McGregor et al's findings are unimportant—indeed TMT must be revised in light of the new evidence of heightened death accessibility produced from other sources besides direct confrontations with death. In addition to McGregor et al's TD manipulation producing worldview defense and, as evidenced here, heightened death accessibility, Mikulincer et al (2002) and Florian et al (2002) showed that other threats, like being separated from an important companion, which potentially have a negative impact on self integrity also produced heightened death accessibility. Goldenberg et al (2001) too showed that a threat to self-integrity by having participants think of themselves as being indistinct from an animal produced heightened death accessibility and Silvia (2001) demonstrated that extreme self-focus (i.e. self-awareness) also engenders heightened accessibility of death thoughts. While TMT needs to now incorporate the role of non-lethal factors that elicit thoughts of death, and perhaps the role of self-integrity threats specifically in the production of mortality salience effects, the main tenet of the theory—that heightened implicit death accessibility is necessary and sufficient to produce worldview defense—remains intact.

Additionally, the impact of self-dilemma salience—the other manipulation used by McGregor et al (2001) that produced worldview defense—on death accessibility has yet to be empirically examined. Theoretically, any self-integrity threat should produce heightened death accessibility and thereby instigate worldview defense, but additional research should be conducted to examine this possibility more fully.

Conclusions

Regardless of the questions left unanswered or produced by these studies, the main assertion that temporal discontinuity elicits heightened death accessibility was supported. And in light of these findings, the role of uncertainty proposed by uncertainty management theory is not tenable. Death is not an exceptional case of uncertainty, but rather uncertainty is a specific case of death. Thus Becker's (1973, 1975) and subsequently terror management theory's central claim regarding the role of concerns about death as the motivational momentum for a significant proportion of human activity remains fundamentally intact.

Men fear death, as children fear to go in the dark; and as that natural fear in children is increased with tales, so is the other.

-Sir Francis Bacon

Appendix A

Mortality salience

The Projective Life Attitude Assessment

This assessment is a recently developed, innovative personality assessment. Recent research suggests that feelings and attitudes about significant aspects of life tell us a considerable amount about the individual's personality. Your responses to this survey will be content-analyzed in order to assess certain dimensions of your personality. Your honest responses to the following questions will be appreciated

1. PLEASE DESCRIBE THE EMOTIONS THAT THE THOUGHT OF YOUR OWN DEATH AROUSE IN YOU.

2. WRITE DOWN, AS SPECIFICALLY AS YOU CAN, WHAT YOU THINK HAPPENS TO YOU PHYSICALLY WHEN YOU DIE.

Appendix B

The Projective Life Attitude Assessment

This assessment is a recently developed, innovative personality assessment. Recent research suggests that feelings and attitudes about significant aspects of life tell us a considerable amount about the individual's personality. Your responses to this survey will be content-analyzed in order to assess certain dimensions of your personality. Your honest responses to the following questions will be appreciated

1. PLEASE DESCRIBE THE EVENTS, PEOPLE AND SCENE (i.e., locations, sounds, smells etc.) ASSOCIATED WITH AN IMPORTANT VIVID MEMORY FROM YOUR CHILDHOOD OR ADOLESCENCE.

2. JOT DOWN HOW YOU IMAGINE THE PHYSICAL SCENE OF THIS MEMORY MIGHT BE DIFFERENT IF YOU REVISITED IT IN THE YEAR 2035 A.D. (please be specific). HOW DOES IT MAKE YOU FEEL TO IMAGINE THIS?

Appendix C

Death Accessibility Measure Experiment 1

For this section your task is to unscramble sentences to form statements. Each of the scrambled sentences contains six words. **Unscramble five words in each sentence** by placing a number over each of five words indicating the proper order. For example:

3 2 1 5 4
has green child the eyes blue

Unscramble the sentences to form statements, not questions. Each sentence can be unscrambled into more than one statement, but you should choose only one statement to unscramble.

Unscramble the sentences to form whatever statement comes to mind first. Work as quickly as you can because your time will be limited. Do not correct errors. If you make a mistake simply move on to the next item.

1. year fly south birds every north
2. black the turned dark sky blue
3. arrival not was death her expected*
4. make slow trips days long cars
5. floor swiftly painted swept she the
6. before upward dying beginning gazed he*
7. stone float won't a balloon metal
8. threw he the game purposefully ball
9. sealed worker coffin the envelope the*
10. the humid was dry quite air
11. arm his right flexed tattooed was
12. was eulogy the moving very ceremony*
13. lemons he away free advice gave
14. was grave the marked site construction*
15. too most talk much fight people
16. will facts report only newspapers lies
17. cried people wedding the at funeral*
18. ears it behind barn the scratch
19. the drove store she to cemetery*
20. cookies he four donuts dry ate
21. will lawyer the notarized contract the*
22. helps weather wet some animals dry
23. rate interest the mortality high was*
24. sleepy mother fun her today was
25. quickly thief was assassin the apprehended*

(Adapted from Wenzlaff, 2001)

Appendix D**Death Accessibility Measure Experiment 2****Word Completion Exercise**

USING THE SPACES PROVIDED, PLEASE COMPLETE THE FOLLOWING WORD FRAGMENTS WITH THE FIRST WORD THAT COMES TO YOUR MIND.

- | | |
|-------------|---------------|
| 1. TI ___ | 10. BE ___ |
| 2. STI ___ | 11. LI ___ |
| 3. TR ___ | 12. DE ___ |
| 4. YE ___ | 13. COR _____ |
| 5. COFF ___ | 14. DRI ___ |
| 6. FO ___ | 15. CHAN ___ |
| 7. SHI ___ | 16. GRA ___ |
| 8. CLO ___ | 17. TR ___ |
| 9. SKU ___ | 18. DA ___ |

Appendix E

Camus' *The Dark Drive* distraction

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 metal roofs. On the right near the second one, a tower of coarse the beams could be made out in the light fog. From the top of the tower a metal cable, invisible at its starting point, shone as it sloped down 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 hut.

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 behind the car, solidly planted on the ground and weighed 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 whites from 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, and then 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 swung back and forth several times. At a final signal from the lookout, the man disappeared into the night. With the lights out, the river was shining 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 this story?

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

You think the author of this story is male or female?

____ male ____ female

Appendix F

Plato's The Allegory of the Cave

SOCRATES: And now let me show you in a story to what degree we are enlightened or unenlightened. Can you see human beings living in a cave, which has a mouth open toward the light? Here they have been from their childhood and have their legs and necks chained so they cannot move. They can only see in front of them, being prevented by the chains from turning their heads around. Above and behind them a fire is blazing at a distance, and between the fire and the prisoners there is a raised walkway. You will see, if you look, a low wall built above the walkway like the screen which puppet players have in front of them, over which they show the puppets.

GLAUCON: I see.

SOC: And do you see men passing along the wall carrying all sorts of vessels and statues and figures of animals made of wood, stone, and various materials, which appear over the wall? Some of the men are talking, others silent.

GLAU: You show me a strange image, and they are strange prisoners.

SOC: Like ourselves, and they see only their own shadows, or the shadows of one another, which the fire throws on the opposite wall of the cave.

GLAU: True, how could they see anything but the shadows if they were never allowed to move their heads?

SOC: And of the objects which are being carried, in the same manner they would see only the shadows?

GLAU: Yes.

SOC: And if they were able to talk to each other, would they suppose they were naming what was actually before them?

GLAU: They would.

SOC: And suppose further the prison had an echo which came from the cave wall. Would they be sure to believe when one of the passers-by behind them spoke that the voice which they heard came from the passing shadow?

GLAU: Yes.

SOC: To them the truth would be literally nothing but the shadows of the images.

GLAU: That is certain.

SOC: And now look again and see what will naturally follow if the prisoners are released and their error is corrected. At first, when any of them is liberated and suddenly compelled to stand up and turn his neck around and walk and look toward the light, he will suffer sharp pains. The glare will hurt him and he will be unable to see the realities

of which, in his former state, he has only seen the shadows. Then imagine someone says to him what he saw before was an illusion; but now, when he is approaching nearer to reality and his eye is turned toward more real existence, he has a clearer vision. What will be his reply? You may further imagine his instructor is pointing to the objects as they pass and requiring him to name them—will he not be confused? Will he not believe the shadows he formerly saw are truer than the objects which are now shown to him?

GLAU: Far truer.

SOC- He will then proceed to argue that this is what controls the seasons and the years, and is the guardian of all that is in the visible world, and in a certain way the cause of all things which he and his fellows were accustomed to behold?

GLAU- Clearly, he would first see the sun and then its nature

SOC- And when he remembered his old dwelling and the wisdom of the cave and his fellow prisoners, do you suppose he would be happy about his change and pity the prisoners?

GLAU: Certainly, he would.

SOC- And if the prisoners were in the habit of conferring honors among themselves on those who were quickest to observe the passing shadows and to discuss which of them went before, and which followed after and which were together, and who were therefore best able to draw conclusions as to the future, do you think he would care for such honors and glories or envy the possessors of them? Would he not say with Homer, "Better to be the slave of a slave," and to endure anything rather than think as they do and live in their way?

GLAU: Yes, I think he would rather suffer anything than entertain those false notions and live in that miserable manner.

SOC- Imagine once more, such a one coming suddenly out of the sun and returning to his old situation. Would he not be certain to have his eyes full of darkness?

GLAU: Certainly.

SOC- And if there was a contest and he had to compete in measuring the shadows with the prisoners who had never moved out of the den, while his sight was still weak and before his eyes had become steady, would he not seem ridiculous? Men would say of him that he left and returned without his eyes and that it was better not even to think of leaving. If anyone tried to free another and lead him up to the light, let them only catch the offender, and they would put him to death.

GLAU: No question.

SOC- This entire allegory you may add, dear Glaucon, to the previous argument. The cave is the world of sight, the light of the fire is the sun, and you will not misunderstand me if you interpret the journey upwards to be the ascent of the soul into the world of Forms, which according to my poor belief, at your desire, I have described-

whether rightly or wrongly the god knows. But, whether true or false, my opinion is that in the higher world the Form of the Good appears last of all, and is seen only with an effort. When seen it is also inferred to be the universal author of all things beautiful and right, parent of light and the sun in this visible world, and the immediate source of reason and truth in the higher world. This is the power upon which he who would act rationally either in public or private life must have his eye fixed.

GLAU- I agree as far as I am able to understand you.

SOC- Moreover you must not wonder that those who achieve this wonderful vision are unwilling to descend to human affairs. Their souls are always hastening into the upper world where they desire to dwell.

This desire of theirs is very natural, if our allegory can be trusted.

GLAU: Yes, very natural.

SOC: And is there anything surprising in one who passes from divine contemplations to the evil state of man, appearing in a ridiculous manner; if, while his eyes are blinking and before he has become accustomed to the surrounding darkness, he is compelled to fight in courts of law, or in other places, about the shadows of images of justice and is trying to answer the ideas of those who have never yet seen the Form of Justice?

GLAU: Anything but surprising.

SOC: Anyone who has common sense will remember there are two kinds and two causes of confused eyesight. These come either from coming out of the light or from going into the light, which is true of the mind's eye just as much as of the bodily eye. He who remembers this, when he sees anyone whose vision is confused and weak, will not be too ready to laugh. He will first ask whether the soul of that man has come out of the brighter light and is unable to see because unaccustomed to the dark or, having turned from darkness to the day, is dazzled by excess of light. And he will believe the one happy in his condition and he will pity the other. Or, if he wants to laugh at the one who comes from below into the light, there will be more reason in this than in laughing at one who returns from the light into the cave.

GLAU: That is a very just distinction.

SOC: But then, if I am right, certain teachers must be wrong when they say they can put knowledge into the soul which was not there before, like sight into blind eyes.

GLAU: They undoubtedly say this.

SOC: Whereas, our argument shows the power and capacity of learning exists in the soul already. Just as the eye was unable to turn from darkness to light without the whole body, so too the mind can only by the movement of the whole soul be turned from the world of Change into that Unchanging reality, and learn by degrees to endure the sight of reality, and of the brightest and best of reality, or in other words, of the Good.

Appendix G

Additional Analyses & Statistics—Experiment 1

Table G.1

ANOVA table for the effect of condition and delay on self reported uncertainty

Source	SS	df	MS	F	p
COND	24.248	2	12.124	.894	.413
DELAY	2.495	1	2.495	.184	.669
COND X DELAY	12.075	2	6.038	.445	.642
Error	1261.543	93	13.565		
Total	13455.000	99			

Table G.2

Cell means of Condition for PANAS negative mood subscales

		N	Mean	SD
<i>FEAR</i>	Music	11	1.4242	0.4676
	MS	11	1.8636	0.6701
	TD	12	1.3611	0.3612
<i>HOSTILE</i>	Music	11	1.2182	0.3628
	MS	11	1.6545	0.4987
	TD	12	1.2167	0.4549
<i>GUILT</i>	Music	11	1.1667	0.3651
	MS	11	1.6212	0.5967
	TD	12	1.2639	0.3857
<i>SAD</i>	Music	11	1.5273	0.8451
	MS	11	2.2182	0.8554
	TD	12	1.5333	0.5929
<i>FATIGUE</i>	Music	11	1.9318	0.7913
	MS	11	2.6136	1.296
	TD	12	2.8542	0.8357
<i>SHY</i>	Music	11	1.4773	0.6657
	MS	11	2.1818	0.8298
	TD	11	1.7727	0.627

Table G.3
Cell means of Condition for PANAS positive mood subscales

		N	Mean	SD
<i>HAPPY</i>	Music	11	2.2500	.7267
	MS	12	2.5104	1.0559
	TD	12	2.2396	.9849
<i>ASSERTIVE</i>	Music	11	2.5909	.8345
	MS	12	2.6806	.7570
	TD	12	2.4722	1.1210
<i>ATTENTIVE</i>	Music	11	3.3409	.6545
	MS	12	3.3750	.8360
	TD	12	3.6042	1.0470
<i>SERENE</i>	Music	11	3.3030	.9598
	MS	12	2.9444	.9410
	TD	12	2.8889	1.0380
<i>SURPRISE</i>	Music	11	1.3030	.3787
	MS	12	1.5000	.8103
	TD	12	1.5278	.5766

Table G.4
 2 way ANOVA for Condition X Delay on PANAS negative mood subscales

		<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
<i>FEAR</i>	Between Groups	1.683	2	.841	3.216	.054
	Within Groups	8.112	31	.262		
	Total	9.795	33			
<i>HOSTILE</i>	Between Groups	1.422	2	.711	3.625	.038
	Within Groups	6.080	31	.196		
	Total	7.502	33			
<i>GUILT</i>	Between Groups	1.268	2	.634	3.009	.064
	Within Groups	6.531	31	.211		
	Total	7.798	33			
<i>SAD</i>	Between Groups	3.520	2	1.760	2.977	.066
	Within Groups	18.325	31	.591		
	Total	21.845	33			
<i>FATIGUE</i>	Between Groups	5.182	2	2.591	2.613	.089
	Within Groups	30.739	31	.992		
	Total	35.921	33			
<i>SHY</i>	Between Groups	2.754	2	1.377	2.709	.083
	Within Groups	15.250	30	.508		
	Total	18.004	32			

Table G.5

2 way ANOVA for Condition X Delay on PANAS positive mood subscales

		<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
HAPPY	Between Groups	.558	2	.279	.316	.731
	Within Groups	28.216	32	.882		
	Total	28.774	34			
ASSERTIVE	Between Groups	.262	2	.131	.155	.857
	Within Groups	27.092	32	.847		
	Total	27.354	34			
ATTENTIVE	Between Groups	.482	2	.241	.321	.728
	Within Groups	24.029	32	.751		
	Total	24.511	34			
SERENE	Between Groups	1.144	2	.572	.594	.558
	Within Groups	30.805	32	.963		
	Total	31.949	34			
SURPRISE	Between Groups	.340	2	.170	.442	.647
	Within Groups	12.314	32	.385		
	Total	12.654	34			

Appendix H

Additional Analyses & Statistics—Experiment 2

Table H.1

2 way ANCOVA for Condition X Delay with surprise covaried on Death Accessibility

Source	SS	df	MS	F	p
SURPRISE	1.332	1	1.332	2.017	.159
COND	4.867	2	2.433	3.686	.029
DELAY	3.776	1	3.776	5.719	.019
COND X DELAY	.851	2	.426	.645	.527
Error	60.741	92	.660		
Total	159.000	99			

Table H.2

2 way ANOVA for Condition X Delay on PANAS Positive Mood

Source	SS	df	MS	F	p
COND	1.609	2	.804	1.268	.286
DELAY	.417	1	.417	.657	.420
COND X DELAY	.339	2	.170	.267	.766
Error	58.985	93	.634		
Total	900.444	99			

Table H.3

2 way ANOVA for Condition X Delay on PANAS Subscale Fear

Source	SS	df	MS	F	p
COND	.682	2	.341	1.268	.286
DELAY	.180	1	.180	.670	.415
COND X DELAY	.979	2	.490	1.820	.168
Error	25.019	93	.269		
Total	235.278	99			

Table H.4

2 way ANOVA for Condition X Delay on PANAS Subscale Hostile

Source	SS	df	MS	F	p
COND	.426	2	.213	.563	.571
DELAY	.147	1	.147	.390	.534
COND X DELAY	.280	2	.140	.370	.692
Error	34.748	92	.378		
Total	243.680	98			

Table H.5

2 way ANOVA for Condition X Delay on PANAS Subscale Guilt

Source	SS	df	MS	F	p
COND	.615	2	.308	.825	.441
DELAY	.250	1	.250	.670	.415
COND X DELAY	1.759	2	.880	2.358	.100
Error	34.690	93	.373		
Total	219.972	99			

Table H.6

2 way ANOVA for Condition X Delay on PANAS Subscale Sad

Source	SS	df	MS	F	p
COND	.819	2	.410	.801	.452
DELAY	.534	1	.534	1.045	.309
COND X DELAY	2.756	2	1.378	2.695	.073
Error	47.559	93	.511		
Total	292.480	99			

Table H.7

2 way ANOVA for Condition X Delay on PANAS Subscale Happy

Source	SS	df	MS	F	p
COND	2.700	2	1.350	1.358	.262
DELAY	.218	1	.218	.219	.641
COND X DELAY	1.586E-02	2	7.928E-03	.008	.992
Error	91.478	92	.994		
Total	836.938	98			

Table H.8

2 way ANOVA for Condition X Delay on PANAS Subscale Assertive

Source	SS	df	MS	F	p
COND	3.958	2	1.979	2.184	.118
DELAY	1.446E-02	1	1.446E-02	.016	.900
COND X DELAY	3.872E-02	2	1.936E-02	.021	.979
Error	83.378	92	.906		
Total	847.889	98			

Table H.9

2 way ANOVA for Condition X Delay on PANAS Subscale Attentive

Source	SS	df	MS	F	p
COND	1.527	2	.764	.936	.396
DELAY	1.450	1	1.450	1.777	.186
COND X DELAY	1.579	2	.790	.968	.384
Error	75.077	92	.816		
Total	1024.188	98			

Table H.10

2 way ANOVA for Condition X Delay on PANAS Subscale Serene

Source	SS	df	MS	F	p
COND	.637	2	.319	.343	.710
DELAY	.167	1	.167	.180	.672
COND X DELAY	2.649	2	1.325	1.426	.245
Error	85.424	92	.929		
Total	1061.111	98			

Table H.11

2 way ANOVA for Condition X Delay on PANAS Subscale Surprise

Source	SS	df	MS	F	p
COND	2.513	2	1.256	2.582	.081
DELAY	2.862E-04	1	2.862E-04	.001	.981
COND X DELAY	2.758	2	1.379	2.834	.064
Error	45.256	93	.487		
Total	299.444	99			

Table H.12

2 way ANOVA for Condition X Delay on PANAS Subscale Fatigue

Source	SS	df	MS	F	p
COND	.259	2	.129	.119	.888
DELAY	2.654E-02	1	2.654E-02	.024	.876
COND X DELAY	1.579	2	.789	.728	.485
Error	100.796	93	1.084		
Total	696.625	99			

Table H.13

2 way ANOVA for Condition X Delay on PANAS Subscale Shy

Source	SS	df	MS	F	p
COND	.831	2	.416	.876	.420
DELAY	.283	1	.283	.597	.442
COND X DELAY	.774	2	.387	.816	.445
Error	44.119	93	.474		
Total	280.063	99			

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