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## Can the Fear of Death Inspire Creativity?

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CAN THE FEAR OF DEATH INSPIRE CREATIVITY?

A Thesis

Presented to

The Faculty of the Department of Psychology

San José State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

Michelle Murphy

August 2011

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The Designated Thesis Committee Approves the Thesis Titled

CAN THE FEAR OF DEATH INSPIRE CREATIVITY?

by

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APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

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August 2011

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## ABSTRACT

### CAN THE FEAR OF DEATH INSPIRE CREATIVITY?

by Michelle Murphy

The current study examined whether participant's creative performance changed after they became aware of their mortality. The main hypotheses predicted that (1) participants who have highly creative personalities would show an increase in creative performance following mortality salience, (2) participants with less creative personalities would show a decrease in creative performance following mortality salience. Highly creative individuals were distinguished from less creative individuals based on their personality composition. The Consequences Test (Guilford, 1970) was used to measure creative performance. To examine whether creative performance changed after mortality salience, participants completed Form 1A of the Consequences Test, a mortality salience manipulation, and then Form 1B of the Consequences Test. Form 1A and 1B of the Consequences Test are equivalent forms. The results of this study failed to support the main hypotheses. A potential explanation for the non-significant results is that issues about mortality are not relevant to college age participants. Future research may benefit from examining the effects of mortality salience on creative performance in seniors or individuals who are terminally ill.

## ACKNOWLEDGMENTS

Once upon a time, I was caught perusing through articles on psychology. What caught me was the topic of creativity. I was enamored. At that moment, I knew wholeheartedly that this was the topic I would like to study for a lifetime. It was authored by Dr. Gregory J. Feist.

A year later, Dr. Feist became my advisor and mentor. He helped open the doors that allowed me to pursue my dreams. For instance, under his mentorship I was able to swim freely in a ravine of ideas on creativity, and to be challenged by graduate level work. It is a great honor to have the opportunity to be mentored by him.

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always have the potential to do better. The last time I had a teacher like you was in the fifth grade—Mr. Don Ward. He is my favorite teacher. I am glad to know that teachers like you still exist.

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## **Introduction**

Can the awareness of our life's finiteness serve as an impetus to leave behind something that outlives us—our legacy? More specifically, are creative individuals more likely to be motivated to create if they have a heightened awareness of their mortality compared to less-creative individuals? In this study, we will be using Terror Management Theory as the philosophical backbone to examine the effects of mortality salience on creativity. More specifically, one of the primary goals of the current study is to examine the link between the fear of death and creative performance.

### **Terror Management Theory**

Humans are unique among animals because they know that they will eventually experience their own physical death (Feist, 2010, personal communication). Historically, philosophers and psychologists alike have theorized that the realization of our mortality induces existential angst. For instance, Ernest Becker (1973), Friedrich Nietzsche (1885/1961), and Otto Rank (1929/1978) entertained the notions that following the awareness of our life's finiteness, feelings such as meaningless, uncertainty, and social exclusion often occur. Becker (1973) argued that most human behavior is a consequence of the management of existential issues in general, and the fear of death in particular.

More recently, Greenberg, Pyszczynski, and Solomon (1986) consolidated these philosophical notions into what they call Terror Management Theory (TMT). TMT seeks to explain the psychological and emotional reactions that are exhibited following the presence of a stimulus, or event, which induces an individual to become aware of their

mortality. From TMT comes the term mortality salience (MS), which describes the unconscious or conscious awareness of the mortality of oneself or of others.

According to TMT, MS can potentially create an existential dilemma. Arndt and Vess (2008) describe this existential dilemma as the “conflict between our biological proclivity to survive and our cognitive capabilities to be aware that death is inevitable” (p. 910). The existential dilemma created by MS is a central tenant to the concept of mortality-induced terror (e.g., anxiety or fear).

The main proposition of TMT is that after an individual becomes aware of their impending death, he/she becomes motivated to manage the terror that is produced. According to Arndt and Vess (2008), humans utilize two main strategies to buffer MS induced terror: increase one’s worldview defense and increase one’s self-esteem. In particular, increasing one’s worldview defense is effective in blunting the negative effects of MS because it allows a person to invest in cultural worldviews or belief systems that provide meaning, order, security, and permanence (Routledge, Arndt, & Sheldon, 2004). Hence, living vicariously through one’s culture allows an individual to gain strength through being part of a collective. Alternatively, having high levels of self-esteem can be considered to be a more individualistic approach to increasing the feeling that one has meaning, strength, and security. Therefore, terror management theorists argue that having high levels of self-esteem is similarly effective to enacting a worldview defense in warding off external threats to one’s existence, which are generated by knowing that one will eventually die.

Previous research provides additional support for the use of worldview defense when one's in-group, or oneself, is threatened. For instance, when participants feel that their in-group is threatened, they will display significant increases in worldview defense, conformity, prejudice, nationalism, and intergroup bias (Crocker & Luhtanen, 1990; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Steele, 1988; Tajfel & Turner, 1979). Interestingly, these research findings strikingly resemble the occurrences that followed the 9/11 attacks on the World Trade Center and Pentagon within the United States. For example, a common depiction of Americans' reactions post-9/11 was an increase in patriotism and overwhelming support for "The War on Terror" (i.e., the war launched under the Presidency of George W. Bush, against the "terrorists" who threatened America during the 9/11 attacks).

TMT suggests that MS is not only a threat to one's existence, but a threat to one's in-group as well (Greenberg et al., 1994). Consistent with this notion, research findings on the effects of MS on worldview defense parallels those found on the effects of in-group threats. For instance, Greenberg and colleagues (1990), and Rosenblatt and Greenberg (1989) found that following MS participants reacted favorably towards individuals who support their worldview and unfavorably towards individuals who threaten them.

Support for TMT comes from research findings that show a relationship between MS and self-esteem. Greenberg and colleagues (Greenberg et al., 1992; Greenberg et al., 1993) found that after mortality was made salient, participants who have dispositional high self-esteem, or enhanced self-esteem through experimental manipulation exhibited

significantly less self-reported anxiety, physiological arousal, and anxiety-related defensiveness, compared to individuals with lower levels of self-esteem.

Although some previous research has found consistent support for the role that worldview defense and self-esteem have on MS effects, other research has found inconsistent results on the impact that MS has on terror. For instance, Greenberg and colleagues (1992) found that MS induces anxiety and physiological arousal—particularly for individuals who show lower levels of self-esteem. On the other hand, Greenberg and colleagues (1994) consistently failed to find a significant effect of MS on participant's negative affect or anxiety. Therefore, previous research on TMT points towards a questionable relationship between MS and the psychological constructs that are normally associated with terror (e.g., anxiety, physiological arousal, and negative affect).

### **The Creative and non-Creative Person**

In a meta-analysis on what constitutes the creative personality, Feist (1998) suggested that creative people in general are self-confident, self-accepting, driven, ambitious, dominant, hostile, impulsive, and are open to participating in novel experiences. Feist (1998) also described the creative person as low in conventionality and conscientiousness. In contrast, less creative individuals possess personality traits that lie on the opposing side of the personality continuum that constitutes the highly creative personality profile. For instance, less creative individuals are more rigid, conventional, conforming, conservative, submissive, and socialized (Feist, 1998).

Based on their personality traits, creative individuals might react to MS differently compared to less creative individuals. For instance, creative people may be

more accepting of the occurrences of MS, and/or they may be more inclined to use MS as a motivation to be creative. In other words, they may see their mortality as a challenge to do something about it while they still can—that is, create something that outlives them. In addition, if creative individuals already have a tendency and drive to create, they may have a better likelihood of forming the connection between occurrences of MS and the drive to create a legacy.

### **Death and Creativity**

At first glance one might think that the effects of MS are in direct opposition, or at least incompatible, with creative thought and behavior. As discussed earlier, previous research on threats to one's mortality and in-group suggests that the effects of MS are restrictive in nature (e.g., Crocker & Luhtanen, 1990; Greenberg et al., 1994; Steele, 1988; Routledge, Arndt, & Sheldon, 2004; Tajfel & Turner, 1979). Hence, MS seems to close down thinking rather than open it.

In contrast, creativity is defined as thought and behavior that are both novel and original, and involves being open to experience (e.g., Feist, 1998; George, & Zhou, 2001). Previous research has associated creativity with risk taking behavior (e.g., West, 1999), the generation of novel and original ideas, insights, or problem solutions (e.g., Amabile, 1983; Guilford, 1967; Runco, 2008; Simonton, 2000), and divergent thinking (e.g., Plucker, 1999; Silvia et al., 2008). Note that divergent thinking allows an individual to generate a large number of ideas in a relatively short period of time. Divergent thinking typically occurs in a free-flowing and spontaneous manner, in which ideas are generated in a random and unstructured fashion (McCrae, 1987).

An empirical example that portrays the conflict between MS effects and creativity comes from the work of Arndt, Greenberg, Pyszczynski, Solomon, and Schimel (1999). On the one hand, previous research (Greenberg et al., 1990; Rosenblatt et al., 1989) indicates that the presence of MS induces individuals to feel more connected with people who are within their in-group. On the other hand, engaging in creative expression requires one to be isolated from others for an extended period of time. Therefore, the engagement in a creative act following MS would hypothetically predispose an individual to have feelings of guilt. The feeling of guilt arises, in this situation, because an individual chooses to be self-serving rather than socially connected. Arndt and colleagues (1999) found that participants who were made aware of their death and then participated in a creativity task showed an increase in self-report guilt scores and in motivation for social-connectedness.

Despite the potential for an increase in guilt, Routledge and Arndt (2009) found that individuals could still be motivated to be flexible following MS and participation in a creative act. More specifically, the participants in a creativity task showed significantly less worldview defense than participants in the non-creativity task condition. The authors argued that participating in a creativity task potentially primes individuals to become more open-minded and therefore exhibit less worldview defense following threats to their mortality and worldview. Note that this is the first and only empirical evidence that provides a glimpse that creativity and MS can thrive together.

The main difference between the study done by Routledge and Arndt (2009) and the current study is that the procedures are reversed. More specifically, the former

examined whether engaging in a creativity task and then being made aware of one's mortality could increase participant's open-mindedness towards others with worldviews different from their own. In contrast, the current study examined whether becoming aware of one's mortality and then engaging in a creativity task could increase participant's creative performance. Recall that in order to engage in creative behaviors and/or thoughts, a degree of open-mindedness is necessary (Feist, 1998; George & Zhou, 2001).

Further support for a positive relationship between creativity and MS comes from the hypothesis that highly creative and eminent individuals can be motivated to create in order to formulate a legacy (Feist, 2010, personal communication). More specifically, the creation of a legacy can serve as an effective enticement to create, simply because creations can survive the creators. Even TMT has a stake in the claim that creating can be motivated by MS. For instance, Arndt and Vess (2008) asserted that creating can be a venue to “transcend physical death via a sense of symbolic (e.g., contributing to a nation or family)...immortality” (p. 911).

Abra's (1995) review of the literature on creativity and death provides the most direct and comprehensive argument within the psychological literature that the motivation to create can stem from death awareness. He concluded that creativity provides a means to defeat, experience, deny, or placate the fear of death. Abra also provided an account of the life of Pablo Picasso that resoundingly illuminates his and the current study's main hypothesis. For instance, Picasso was extremely fearful of death—his own future death, and the concept of death—during his 80s. More specifically, his

fear of death seemed to be triggered by a sudden occurrence of physical illness. Consistent with the hypotheses of TMT, Picasso's physical illness can be considered to be his own type of mortality salience. Furthermore, during this time period, he also had a creative surge. Interestingly, Picasso's paintings also illuminate his race against death (refer to *Picasso Mosqueteros: The late works, 1962-1972*, by Richardson, Holloway, Hart, Koons, & Parmelin, 2009 for the collection of these paintings). For instance, during this "great late phase," Picasso painted images of individuals who fought against their own physical demise (e.g., bullfighters, musketeers, and Knights of Malta). Picasso believed that he could not die while he was still creating.

The link between the fear of death and creative performance has scarcely been examined empirically. If it is true that the fear of death can increase creativity in creative people, then this motivating fear should be included in the set of motivators known to facilitate creativity (e.g., Amabile, 1985, 2001; Prabhu, Sutton, & Sauser, 2008). In this case, creativity researchers would become aware that individuals do not engage in creative activities only for enjoyment, but also because they may be afraid of missing an opportunity to leave a legacy behind before they die.

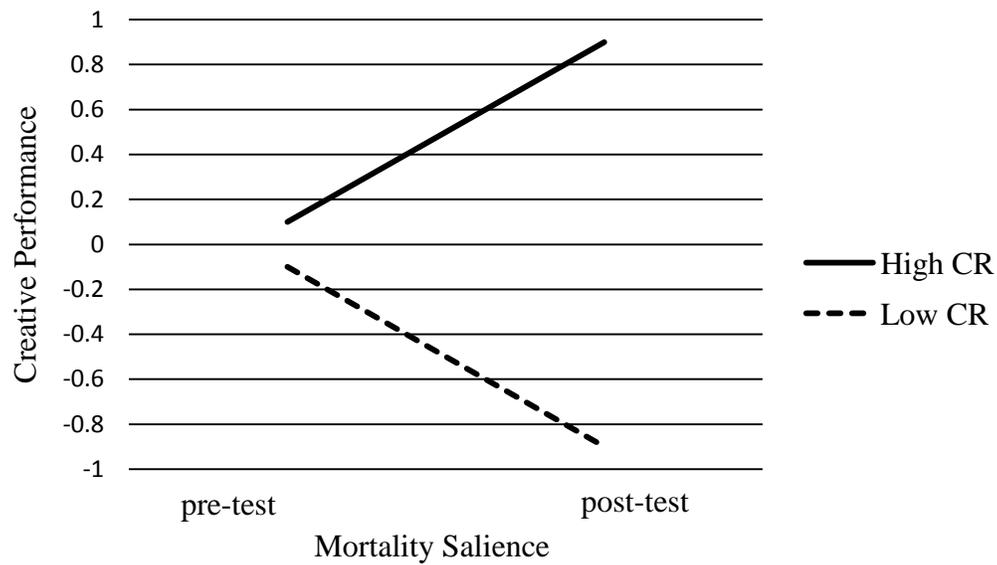
### **Current Study**

The purpose of the current study was to examine whether or not the fear of death can increase creative performance, at least for individuals who have creative personalities. In short, the main hypothesis of this study (i.e., Hypothesis 2) predicts an interaction between creative personality and creative performance following MS.

## **Hypotheses**

**Hypothesis 1.** Within either the MS (experimental) or Dental Pain (control) group, participants who have high Creative Personality Scale (CPS) scores will have higher levels of creative performance scores (measured by the Consequences Test, Form 1A) compared to participants who have lower CPS scores. This hypothesis mainly serves as a convergent validity check on the creativity measures used in this study (i.e., CPS and Consequences Test).

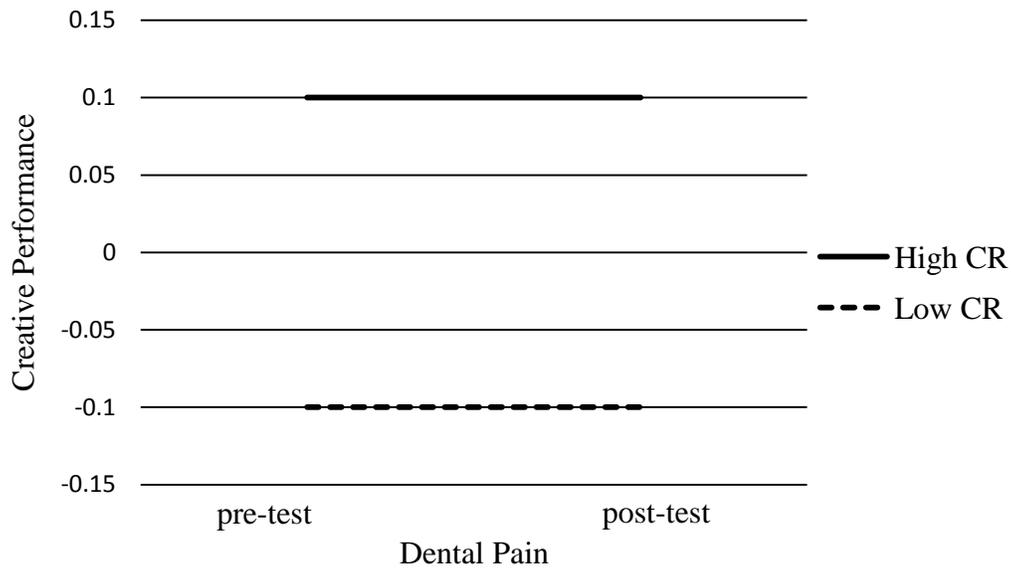
**Hypothesis 2.** Following the MS manipulation, participants who have high CPS scores will show an increase in creative performance on the Consequences Test (i.e., from pre- to post-test), whereas participants with low CPS scores will show a decrease in creative performance on the Consequences Test (i.e., from pre- to post-test). Therefore, Hypothesis 2 predicts an interaction between MS and dispositional creativity on creative performance (see Figure 1).



*Figure 1.* Expected, pre- and post mortality salience standardized total creative performance (Consequences Test) scores as a function of participant's creative personality level.

*Note.* High CR = participants with highly creative personalities. Low CR = participants with less creative personalities.

**Hypothesis 3.** Participant's creative performance will not significantly change from pre- to post-test (see Figure 2).



*Figure 2.* Expected, pre- and post dental pain standardized total creative performance (Consequences Test) scores as a function of participant's creative personality level.

*Note.* High CR = participants with highly creative personalities. Low CR = participants with less creative personalities.

Therefore, Hypotheses 2 and 3 together predict a three-way interaction between creative personality level, experimental condition, and time.

## **Methods**

### **Participants**

Participants were volunteers from both lower-division and upper-division undergraduate psychology courses at San Jose State University. Depending on the instructor, participants received either extra credit or course credit for participating in the study. Instructors provided students an alternative extra credit or course credit assignment in the case a student did not want to participate in the current study.

All participants were randomly assigned into either the MS experimental condition or the control condition (Dental Pain). Randomization of participants was accomplished by alternating the questionnaire packet that was handed out to the participants. For instance, one participant would receive a questionnaire packet that contained the MS manipulation, and the participant sitting behind the former participant would receive a questionnaire packet that contained the Dental Pain manipulation.

We used the G\* Power software program to calculate the necessary sample size. Based on the calculations, we collected data from 133 participants in order to have power = .80, assuming a medium effect size and an alpha level of .05. According to the power analysis, the study required 34 highly creative individuals and 34 less creative individuals within each group (i.e., MS and control).

### **Sample**

Out of the 133 participants, 66 participants were within the MS condition and 67 were in the Dental Pain condition. Furthermore, the entire data set only had three missing responses. Two missing responses were for the question asking about the

participant's age, and one missing response was for the item asking about the participant's ethnicity. Therefore, nearly all of the participants answered the items in the questionnaires used in the current study.

For our study, we used a median split on the participants' CPS scores in order to distinguish between individuals with highly creative personalities and less creative personalities. Based on the median, the CPS cutoff score in this study was five. Therefore, participants who had CPS scores above five were categorized as having highly creative personalities, whereas participants with CPS scores below five were categorized as having less creative personalities. We chose to use a median split to avoid losing any participants who would be considered, by other methods, to have moderately creative personalities. A breakdown of how many participants were categorized as either having a highly creative personality or less creative personality, within each experimental cell, is presented in Table 1.

Table 1

*Frequencies within Each Experimental Cell*

Condition	<i>N</i>
<b>Mortality Salience</b>	
High Creative	32
Low Creative	34
Total	66
<b>Dental Pain</b>	
High Creative	35
Low Creative	32
Total	67

The sample as a whole was relatively young ( $M = 21.53$ ,  $SD = 4.38$ ). Most participants were female ( $N = 98$ , 73.7%). In addition, participants in this study came from a wide range of ethnic backgrounds: Asian-American/Asian (32.8%); European-American/White (31.3%); Mexican American or Hispanic/Latino (13%); some other ethnicity (15.3%); African-American/Black (4.6%); Native Hawaiian/Pacific Islander (2.3%); American Indian/Alaska Native (.8%). “Some other ethnicity” included participants who had two or more ethnicities, or had an ethnicity that was not listed.

## **Design**

This study consisted of a 2 x 2 x 2 mixed factorial design. The three factors in this study were: the MS (experimental) vs. Dental Pain (control) manipulations, the creative personality level of the participants, and time. Creative personality level was a subject variable that had two levels: high creative personality and low creative personality, which was based on the median split mentioned earlier. The time variable had two levels: pre- and post-test creative performance measurements.

The between-subjects variables were the MS/Dental Pain manipulation and creative personality level, and the within-subject variable was time. The dependent variable in this study was participants' creative performance scores on the Consequences Tests.

## **Instruments/ Measures**

**Mortality salience.** The MS manipulation used in the current study was the same as in previous research (Greenberg, Pyszczynski, Solomon, Simon & Breus, 1994). More specifically, participants in the MS experimental condition were asked to write a response to the open-ended question: "Please briefly describe the emotions that the thought of your own death arouses in you" and "Jot down, as specifically as you can, what you think will happen to you physically as you die and once you are physically dead." It took approximately 5 min for participants to write a response to the MS prompt.

**Dental pain.** The Dental Pain manipulation used in the current study was the same as in previous research (Greenberg et al., 1994). Participants in the Dental Pain control condition were asked to write a response to an open-ended question that parallels

the one used as the MS manipulation. More specifically, the participants were asked to write a response to the following questions: “Please briefly describe the emotions that the thought of dental pain arouses in you” and “Jot down, as specifically as you can, what you think will happen to you as you physically experience dental pain and once you have physically experienced dental pain.” It took approximately 5 min for participants to write a response to the Dental Pain prompt.

**Creative personality.** The CPS (Gough, 1979; see Appendix A) was used to distinguish between people with creative personalities and those without such personalities. The CPS contains 30 adjectives that were empirically derived from the 300 items in the Adjective Check List (Gough & Heilbrun, 1965). The items are scored according to a True/False dichotomy. There are 18 positive items (e.g., capable, clever, confident) and 12 negative items (e.g., affected, cautious, conservative).

The alpha coefficient for the CPS has been shown to range from .73 to .81, depending on the sample type (see Gough, 1979 for details). The CPS significantly correlates with other measures of creativity, such as the creativity scales of Domino (1970, 1974), Schaefer (1969, 1973), and the Welsh A-1 to A-4 creativity measurement (Welsh, 1969, 1975). For instance, Welsh’s (1975) creativity measurement examines intellectual functioning and behavior, and originality and aesthetic sophistication. Furthermore, the CPS holds good validity across sample types (e.g., architects, psychology graduate students, research scientists, etc.; Gough 1979). In short, the CPS not only does a good job of distinguishing those with creative personalities from those

without such personalities, but also those who make creative achievements from those who do not. Participants completed the CPS in approximately 5 min.

**Time.** Creative performance was assessed two times, before (pre-test) and after (post-test) the MS or Dental Pain manipulations. Assessing creative performance during the pre-test allowed us to gauge the participant's baseline level of creative performance. Measuring creative performance during the post-test allowed us to examine whether creative performance changed from the pre- to post-test.

**Dependent variable/outcome: Creative performance task.** The Consequences Test (CQ; Guilford & Guilford, 1980) is a measure of creative performance. The CQ was based on Guilford's theory of creativity, which argues that creativity consists of fluency and originality of thought (Guilford, 1957, 1967; Guilford & Guilford, 1980). In addition, the CQ contains two identical forms—Form 1A (CQ-1A; see Appendix B) and Form 1B (CQ-1B; see Appendix C). Both CQ-1A and CQ-1B use different question prompts, which equally do a good job at measuring creative performance. For this study, we used the CQ-1A for the pre-test creativity performance task, and the CQ-1B for the post-test creativity performance task.

There are five timed activities within each form. In each activity, respondents were asked to write as many consequences as they can to a hypothetical situation. For instance, one activity contained the question: "What would be the results if humans lost their group feeling to the extent that they all preferred to live alone?" As the CQ scoring manual (Guilford & Guilford, 1980) suggests, respondents were given exactly 2 min to

complete each activity. Therefore, each CQ form took exactly 10 min of working time to complete.

In this study, three raters were trained to score respondents' answers to the hypothetical situations on fluency and originality. The raters consisted of two undergraduate research assistants, and the primary researcher of the current study. The raters read through the CQ scoring manual (Guilford & Guilford, 1980), and then scored five CQ Tests on their own. When the inter-rater reliability between the scores of each rater reached an acceptable level (i.e., an inter-rater reliability  $\geq .80$ ), the training period stopped.

Based on the CQ scoring manual (Guilford & Guilford, 1980), there were two general categories of unacceptable scores that we could assign to each participant's response to the CQ items: irrelevant or duplicate. An irrelevant score was given to an answer that was not germane to the question, whereas a duplicate score was given to an answer that was a rewording of a previous idea or was similar to one given in the printed examples for the activity.

In addition, there were two general categories of acceptable responses for the CQ items: remote (CQ-R) and obvious (CQ-O). In order to score a participant's response as remote, it needed to be a consequence that is far removed from what can normally occur. For instance, a remote answer to the question above (i.e., "...if humans lost their group feeling...") is: "loss of language." The CQ-R scores were used as indicators of originality. In contrast, an answer was scored as obvious if it is vague, and/or was closely connected to what can typically occur if the hypothetical situation came true

based on Guilford's norms (Guilford & Guilford, 1980). For example, an obvious answer to the same question listed above is: "end of progress." Based on the suggestions from the CQ scoring manual (Guilford & Guilford, 1980), we added the CQ-R and CQ-O scores for each activity to create a fluency (CQ-F) score. Fluency, in general, is the number of ideas that an individual can generate in any single point of time.

Furthermore, because Guilford (1957) argued that both fluency and originality are key components in creative thought and behavior, whereas obvious responses are not, we decided to combine the CQ-R and CQ-F scores for each participant to create a total creativity performance score. In addition, because the CQ-R and CQ-F scores are originally on different scales from one another, we standardized the scores first, and then added them.

Therefore, for this study we combined z-scored remote and fluency scores for the CQ activities completed in the pre-test to create a total standardized score of creative performance for the pre-test (Totcreatpre). Then, we did the same thing for the post-test, which created a total standardized score of creative performance for the post-test (Totcreatpost). In this study, each participant ended up having a Totcreatpre and a Totcreatpost score. We then used the total standardized creative performances scores for our subsequent analyses. To note, the procedure for combining the CQ-R and CQ-F into a total creative performance score has been used in previous research on creativity (Garwood, 1964).

The published reliability of the CQ is quite acceptable. For instance, reliabilities relating CQ-1A to CQ-1B range between .69 and .80; and test-retest reliabilities are

between .61 and .78 (Guilford & Guilford, 1980). Furthermore, the inter-reliability coefficients of the CQ are typically around .88 to .98. For the current study, the inter-rater reliabilities for the CQ-O, CQ-R, and CQ-F scores were between  $r = .85$  and  $r = .91$ . Evidence from factor loadings suggests that the CQ contains good validity as well. For instance, Wilson, Guilford, Christensen, and Lewis (1954) found that the CQ-O loaded onto ideational fluency (.55), and CQ-R onto originality (.42).

**Filler questionnaires.** According to Greenberg (personal communication on May 27, 2010), to have an effective manipulation of mortality, one needs to have a 10-15 min distraction period following the induction of MS and prior to the measurement of the dependent variable. Therefore, participants in this study completed filler questionnaires in order to have a distraction from the MS manipulation. To maintain a similar experimental structure between the participants within the experimental and control conditions, participants within the control condition completed the filler questionnaires as well. The filler questionnaires used in this study were the Rosenberg Self-Esteem Scale (SES; Rosenberg, 1989) and the Big Five Inventory (BFI; John, Donahue, & Kentle, 1991). We used the SES because TMT and previous research (Greenberg, Solomon et al., 1992; Greenberg, Pyszczynski et al., 1993) has connected the effects of mortality salience with self-esteem. We used the BFI as a filler questionnaire, because we believed that it would be interesting to examine the relationships between personality traits and the other variables in this study, at a later time.

Moreover, in order to fill up the 10-15 min distraction period, we asked participants to complete the CPS (5 min), SES (2 min), and then BFI (5 min), during the

distraction period. Therefore, the approximate time of the distraction period for our study was 12 min.

**The Self-Esteem Scale.** The SES (Rosenberg, 1989; see Appendix D) is a 10-item scale, with five negatively worded items and five positively worded items. Participants indicated their agreement to the questions based on a 4-point scale, ranging from *strongly agree* to *strongly disagree*. The SES has high reliability. For instance, test-retest reliability generally range from .82 to .88, and the Cronbach's alphas of various samples range from .77 to .88 (see Blascovich & Tomaka, 1993; Rosenberg, 1986). Participants completed the SES in approximately 2 min.

**The Big Five Inventory.** The BFI (John et al., 1991; see Appendix E) is a 44-item scale that measures the Big Five dimensions (i.e., Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism). The item stems consist of short phrases that are relatively easy to understand. Participants indicated their agreement to the questions based on a 5-point scale, ranging from *disagree strongly* to *agree strongly*. Previous research using U.S. and Canadian samples suggest the BFI scale has alpha coefficients that typically range from .75 to .90. Three-month test-retest reliabilities of the BFI range from .80 to .90. Furthermore, the BFI has good convergent, divergent, and external validities (see John, Robins, & Pervin, 2008). Participants completed the BFI in approximately 5 min.

**Demographic questionnaire.** In addition to completing the above measures, participants responded to a series of questions about themselves (e.g., their gender, age, and ethnicity). In addition, we asked participants if they were bothered by the contents of

the study to perform a check examining whether the MS prompt harmed the participants in any way. The results of our study suggest that most participants were not bothered by the contents of the study (94.1%). Participants completed the demographic questionnaire (see Appendix F) in approximately 1 min.

## **Procedures**

**Prior to data collection.** We printed 68 questionnaire packets that contained the MS prompt, and 68 questionnaire packets that contained the Dental Pain prompt. Afterwards, the primary researcher alternated the questionnaire packets in a way that upon distribution to participants, each participant had an equal probability of being placed within the MS or the Dental Pain condition. The primary researcher then distributed the alternated questionnaire packets, along with the consent forms, to the research assistants.

The primary researcher requested that the research assistants not look through the questionnaire packets. Although the questionnaire packets looked almost identical, other than the page with the MS or Dental Pain prompt, this procedure was used to ensure that the assistants were blind to the condition each participant was going to be a part of. Using this procedure served to negate any experimenter expectancy effects within the study (Rosenthal, 1968).

**Data collection.** Upon entering the laboratory, the experimenter told the participants to sit quietly until the start of the study. Each experiment session consisted of 10 to 30 participants. At the beginning of the study session, the experimenter told the participants that the purpose of the study concerned how personality traits relate to

cognition. In addition, the experimenter told the participants that there were several studies within each questionnaire packet that is handed out. The reason for indicating to the participants that they will fill out material for several studies was to deter them from knowing the purpose of the study.

The experimenter then told the participants that the sections within the study will be timed, and therefore each participant will finish the study at the same time. The experimenter also explained to the participants that their responses within the study were strictly confidential. Finally, the experimenter noted that it was nearly impossible to connect a participant with their responses.

Following the experimenter's explanation of the purpose of the study, consent forms were distributed to the participants (see consent form in Appendix G). After the experimenter collected the signed consent forms, he/she indicated that the study would begin. The experimenter then handed out a questionnaire packet, which included the CQ-1A, either the MS or the Dental Pain open-ended question prompt, several lines to write the response to the MS/Dental Pain open-ended question, the CPS, SES, BFI, CQ-1B, and the demographic questionnaire, respectively.

The experimenter provided exactly 2 min for the participants to complete each section of the CQ (i.e., in both Form 1A and 1B). Approximately 10 to 15 min was provided to participants to write a response to the MS/Dental Pain prompt, and complete the CPS, the SES, and the BFI. The experimenter adjusted the time to complete the MS/Dental Pain prompt, the CPS, SES, and the BFI based on the time it takes for the

participants in each study session to complete the scales. An overview of the procedures is as follows:

1. CQ-1A—Creative Performance Pre-test
2. Mortality Salience or Dental Pain manipulation
3. CPS, SES, and BFI
4. CQ-1B—Creative Performance Post-test
5. Demographic Questionnaire

At the completion of the study, the experimenter thanked the participants for their participation, and then debriefed them. The debriefing of the study included a brief summary of the purpose of the study, and how the data collected could provide an answer to the main hypothesis (see Appendix H). The experimenter also stressed to the participants, that they should avoid discussing the procedures and purpose of the study with anyone following the completion of the experimental session—otherwise they might contaminate the expectations of future participants.

### **Statistical Analyses**

A 2 x 2 x 2 mixed factorial ANOVA was used to examine whether creative performance was a function of having a creative personality, and/or being subject to the MS/Dental Pain manipulation. This analysis is appropriate because we have a mixture of between-group factors (experimental group and creative personality level), and a within-group factor (time). Furthermore, this analysis allows for an examination of the relationship discussed above, while simultaneously taking into account the main variables

in this study (i.e., time, experimental group, creative personality level, and creative performance).

To examine whether participants' CQ-R scores result in a significant interaction with creative personality and time, we conducted an additional three-way ANOVA. More specifically, we conducted a three-way ANOVA with CQ-R scores, creative personality level, and time.

We decided to also examine the hypotheses in this study according to each experimental group (i.e., MS vs. Dental Pain condition). We conducted these two analyses, in order to get a more detailed understanding of what occurred within each experimental group (i.e., more than what the three-way ANOVA can provide). Hence, we conducted two 2 x 2 mixed factorial ANOVAs using the data from participants first in the MS group, and then in the Dental Pain group.

The ANOVAs conducted in this study examined whether participants who have creative personalities also had higher levels of pre-test creativity performance scores, compared to participants who had less creative personalities. In addition, the ANOVAs examined whether the differences in creative performance between the two creativity groups significantly changed from pre- to post MS/Dental Pain manipulation (see Figures 1 and 2).

Using the results of the ANOVAs, interaction effects and main effects were examined. Examining the interaction effects provided an answer to whether or not there were group differences in pre- and post-test creativity performance scores between the

highly creative group and the less creative group, when they were subject to the MS condition. This analysis provided an answer to the main hypotheses of the study.

In addition, main and interaction effects were calculated for the results of the Dental Pain condition. These analyses tested Hypothesis 3: There will be a main effect, but no interaction, between creative performance and creative personality. More specifically, we expected there would be no real change in creative performance before and after the Dental Pain manipulation for either the creative or the less creative groups.

As a convergent validity check for the creativity measures used, we examined the correlations between participants' CPS, Totcreatpre, and Totcreatpost scores. In addition, we examined the main effect of creative personality level and creative performance. We then examined the cell and marginal means within the main effect analysis. Looking at these means would give us the answer to whether participants with highly creative personalities also had significantly higher creative performance scores, compared to participants with less creative personalities (Hypothesis 1).

## Results

### Descriptive Statistics

**Creative personality.** As noted previously, participants' CPS scores were used to distinguish between individuals with high creative personalities from individuals with less creative personalities. For our sample ( $N = 133$ ), the average CPS score was 4.41 ( $SD = 3.47$ ).

Considering that most of the participants in this study were female undergraduates (73.7%), it is reasonable to compare our sample's average CPS score against another sample that has the most similar demographics. Hence, we found that the average CPS score for our sample was slightly below the mean value reported in Gough's (1979, p. 1402) original study for 51 female college seniors ( $M = 5.10$ ,  $SD = 4.24$ ). However, the average CPS score for our sample was slightly higher than the average CPS score for 256 "other assessed" males ( $M = 3.57$ ,  $SD = 3.99$ ) reported by Gough.

The 66 participants in the low creative group in our study, had an average CPS score of 1.64 ( $SD = 2.24$ ). In contrast, the 67 participants in our study who were categorized as being highly creative, had an average CPS score of 7.13 ( $SD = 1.98$ ). It is interesting to note that the average CPS score of participants in the high creative group were a lot higher than the highest sampled norms provided by Gough's original study (1967). For instance, research scientists had an average CPS score of 5.98 ( $SD = 3.71$ ), and psychology graduate students had an average of 5.96 ( $SD = 3.86$ ).

**Creative performance.** Descriptive statistics for the standardized creative performance scores, within each experimental cell, is in Table 2.

Table 2

*Descriptive Statistics for Standardized Creative Performance Scores*

	<i>M</i>	<i>SD</i>	<i>N</i>
<hr/>			
Pre-test	Mortality Salience		
High Creative	0.43	2.16	32
Low Creative	-0.33	1.48	34
Total	0.04	1.86	66
<hr/>			
Post-test			
High Creative	0.22	1.88	32
Low Creative	-0.13	1.62	34
Total	0.04	1.75	66
<hr/>			
Pre-test	Dental Pain		
High Creative	0.52	1.80	35
Low Creative	-0.65	1.70	32
Total	-0.04	1.84	67
<hr/>			
Post-test			
High Creative	0.64	1.63	35
Low Creative	-0.77	1.75	32
Total	-0.04	1.82	67
<hr/>			

*Note.* The creative performance scores noted above were created by converting participant's total remote and fluency scores on the Consequences Test into z-scores, and

then adding the standardized remote and fluency scores to create a total standardized creative performance score.

As you can see, at the group level the means are slightly above zero, and all of the standard deviations for the standardized creative performance scores listed in Table 2 are above 1.00. Having a standard deviation above 1.00 may be a red flag that something went wrong in the statistical analyses. However, we confirmed that the z-scores used were valid scores. More specifically, the z-scores for the CQ-R and CQ-F scores for the entire sample had means of 0.00 and standard deviations of 1.00.

**CQ-R.** For the entire sample ( $N = 133$ ), the average CQ-R score (across time) was 14.65 ( $SD = 6.82$ ). See Table 3 for descriptive statistics of participants' CQ-R scores in each experimental cell.

Table 3

*Descriptive Statistics for CQ-R Scores*

	<i>M</i>	<i>SD</i>	<i>N</i>
<hr/>			
Pre-test	Mortality Salience		
High Creative	15.28	8.75	32
Low Creative	12.71	6.18	34
Total	13.95	7.59	66
<hr/>			
Post-test			
High Creative	16.28	6.92	32
Low Creative	14.82	6.22	34
Total	15.53	6.56	66
<hr/>			
Pre-test	Dental Pain		
High Creative	15.23	8.75	35
Low Creative	10.44	6.27	32
Total	12.94	6.91	67
<hr/>			
Post-test			
High Creative	16.20	6.69	35
Low Creative	11.13	6.47	32
Total	13.78	7.02	67
<hr/>			

*Note.* CQ-R = Consequences Test remote scores.

### **Three-way ANOVA—Time, Experimental Group, Creative Personality**

The three factors used in the three-way ANOVA were time (pre-and post-test), experimental group (MS and Dental Pain), and creative personality level (high vs. low). The between-subjects factors were experimental group and creative personality level. The within-subject factor was time. The dependent variable was creative performance. Cell means for this analysis are in Table 2.

**Hypothesis 1—ANOVA results.** For the between-subjects analyses, creative personality level had a statistically significant main effect ( $F(1, 129) = 10.68, p = .001$ ). More specifically, participants with less creative personalities had significantly less creative performance scores ( $M = -.47, SE = .20$ ), compared to participants with highly creative personalities ( $M = .45, SE = .20$ ). Therefore, Hypothesis 1 was supported. Hypothesis 1 predicted that participants with highly creative personalities would have higher creative performance scores, compared to participants with less creative personalities.

Further correlation analyses indicated significant positive correlations between participants' CPS, Totcreatpre, and Totcreatpost scores (see Table 4).

Table 4

*Pearson Correlation Coefficients for Scores on the CPS, Totcreatpre, and Totcreatpost*

Creativity Measure	1	2	3
1. CPS	----		
2. Totcreatpre	.30*	----	
3. Totcreatpost	.32*	.73*	----

*Note.* CPS = Creative Personality Scale; Totcreatpre = total standardized pre-test creative performance score; Totcreatpost = total standardized post-test creative performance score.

\* $p < .001$ , two-tailed.

**Hypothesis 2—ANOVA results.** The three-way interaction result between time, experimental group, and creative personality level was not significant ( $F(1, 129) = 1.91$ ,  $p = .17$ ). Therefore, Hypothesis 2 was not supported. Hypothesis 2 predicted that following the MS manipulation, participants who have high CPS scores will show an increase in creative performance on the Consequences Test (i.e., from pre- to post-test). In addition, Hypothesis 2 predicted that following the MS manipulation, participants with low CPS scores will show a decrease in creative performance on the Consequences Test (i.e., from pre- to post-test). Refer to Figure 1 to see Hypothesis 2 in graph form.

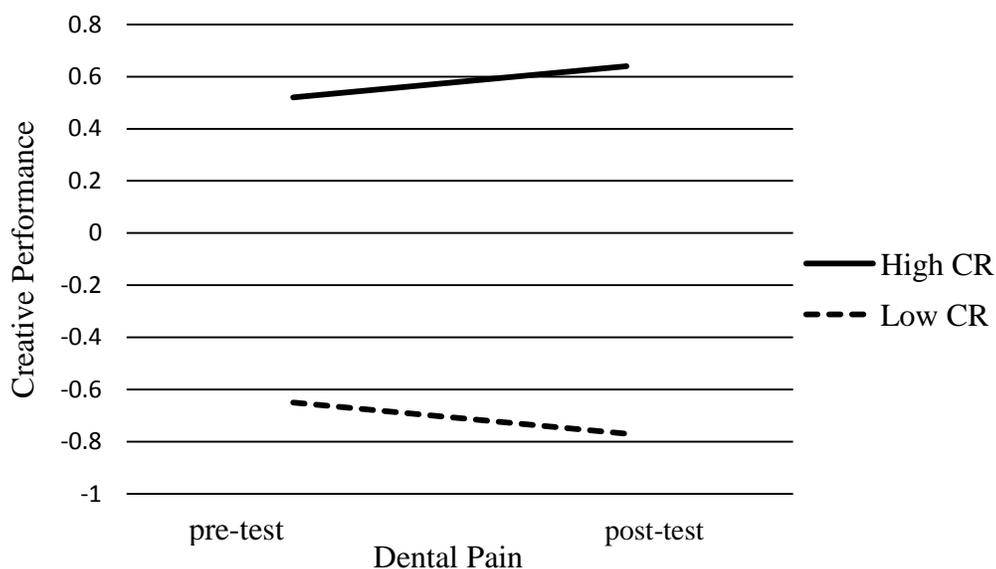
**Hypothesis 2 and 3—trends in data.** On average, participants who had high creative personalities showed a decrease in creative performance scores after MS. In contrast, participants who had high creative personalities tended to have an increase in

creative performance scores after the Dental Pain manipulation. Furthermore, participants who had less creative personalities tended to have an increase in creative performance scores after MS. Participants with less creative personalities, however, showed a slight decrease in creative performance scores after the Dental Pain manipulation. Refer to Figures 3 and 4 to see the results of the MS and Dental Pain condition, respectively.



*Figure 3.* Actual, pre- and post mortality salience standardized total creative performance (Consequences Test) scores as a function of participant's creative personality level.

*Note.* High CR = highly creative group; Low CR = low creative group.



*Figure 4.* Actual, pre- and post dental pain standardized total creative performance (Consequences Test) scores as a function of participant's creative personality level.

*Note.* High CR = highly creative group; Low CR = low creative group.

Therefore, these results run counter to Hypothesis 2, which states that participants with highly creative personalities would show an increase in creative performance scores after MS, whereas participants with less creative personalities would show a decrease in creative performance scores. In addition, the results described above seem to not support Hypothesis 3, which states that participants who are in the Dental Pain condition (control) will not have a change in creative performance scores from pre-test to post-test.

**Additional three-way ANOVA results.** The two-way interaction between time and experimental group was not significant ( $F(1, 129) = 0.00, p = .992$ ). Additionally, the two-way interaction between time and creative personality level was not significant

( $F(1, 129) = .13, p = .72$ ). The main effect of time was also non-significant ( $F(1, 129) = 0.00, p = .96$ ).

The between-subjects analyses showed a non-significant interaction between creative personality level and experimental group ( $F(1, 129) = 1.73, p = .19$ ). In addition, the experimental group did not have a significant main effect within the between-subjects analyses ( $F(1, 129) = .17, p = .68$ ). Therefore, participants in the MS condition did not have statistically different creative performance scores, compared to participants within the Dental Pain condition.

### **More Specific Comparisons**

By examining the results of this study within each experimental group (i.e., MS/Dental Pain), we hoped to develop a more comprehensive understanding of what occurred in our study, above and beyond what was provided by the results of the three-way ANOVA.

**MS condition.** In the following analyses, we only used data from the participants who were a part of the MS condition. Therefore, the following analysis was a 2 x 2 mixed factorial ANOVA. The factors in this ANOVA were time (pre- and post-test) and creative personality level (high vs. low). The dependent variable was creative performance (Consequences Test) scores.

As in the three-way ANOVA, the results indicated non-significant relationships between the variables examined. For instance, there was a non-significant main effect of time ( $F(1, 64) < 0.01, p = .97$ ), and a non-significant interaction between time and creative personality ( $F(1, 64) = 1.25, p = .02$ ). However, the trends in the data indicated

that participants with low creative personalities tended to have an increase in creative performance scores from before to after the mortality salience manipulation (see Table 2). In contrast, participants with highly creative personalities tended to show a decrease in creative performance scores from pre- to post-test (see Table 2). Hence, a regression towards the mean in this sample's creative performance scores might have occurred.

**Dental Pain condition.** Similarly, we conducted the same 2 x 2 between-subjects ANOVA with the Dental Pain group only. Akin to the previous analyses, there was a non-significant interaction between time and creative personality level ( $F(1, 65) = .66, p = .42$ ), and a non-significant main effect of time ( $F(1, 65) < .01, p = .98$ ).

**Hypothesis 3—results.** There was a significant main effect of creative personality level ( $F(1, 65) = 10.73, p = .01$ ), suggesting that the CPS did a good job at distinguishing individuals who were likely, or not likely, to have a creative personality and engage in creative activities. Hence, this result supports Hypothesis 3: that there will be a main effect between creative personality level and creative performance for participants in the Dental Pain condition.

These more specific analyses provide additional support that the participants' creative performance scores conflicted with our main hypotheses. For instance, participants with low creative personalities showed a decrease in creative performance scores from pre- to post-test (see Table 2). However, what was most interesting was that participants with highly creative personalities showed an increase in creative performance scores from pre- to post-test (see Table 2). Therefore, dental pain may provide more

motivation to be creative, compared to MS, for individuals that have highly creative personalities and similar demographics with the sample used in this study.

**Three-way ANOVA—CQ-R, time, and experimental group.** We examined participants' CQ-R scores (pre- and post-test) by creative personality and experimental group. The result of this analysis indicates a significant main effect of time ( $F(1, 129) = 6.59, p = .01$ ). All other effects were non-significant. For instance, the interaction between time and creative personality level was non-significant ( $F(1, 129) = .20, p = .66$ ). In addition, the interaction between time and experimental group was non-significant ( $F(1, 129) = .61, p = .44$ ). Finally, the interaction between time, experimental group, and personality level was also non-significant ( $F(1, 129) = .57, p = .45$ ).

## **Discussion**

### **Mortality Salience and Creativity**

The main purpose of this study was to examine whether the fear of death can motivate a person who has a disposition to be highly creative to engage in creative activities. In addition, we hypothesized that the opposite would be true for less creative individuals—that is, less creative individuals will show a decrease in creative performance after being made aware of their own mortality. In this study, we used a MS manipulation to induce an underlying fear of death in our participants. Interestingly, the results of our study suggest that MS tends to decrease creative performance in highly creative individuals, and increase creative performance in low creative individuals! To note, these findings reflect trends in our data, and are not reflective of statistically significant relationships.

### **Dental Pain and Creativity**

For our control condition, we used a Dental Pain manipulation. The goal of the Dental Pain manipulation was to make participants aware of their impending dental pain experience, rather than their impending death. Results from the analyses of our control condition also conflicted with our predictions. Our findings suggest that highly creative individuals tended to show an increase in creative performance following the Dental Pain manipulation, whereas less creative individuals tended to show a decrease in creative performance. Therefore, these findings reflect what we hypothesized to occur in the MS condition, and not in the Dental Pain condition. Again, please note that these findings reflect trends in the data, and are not reflective of statistically significant relationships.

### **Implications of Research Findings**

In our study, we predicted that the fear of death can inspire creativity in highly creative individuals, and decrease creativity in less creative individuals. However, the results of the current study run contrary to Abra's theory, our logic, and our main prediction. More specifically, the results of our study suggest that being made aware of one's mortality does not significantly affect creative performance in highly creative individuals (nor in low creative individuals).

### **Limitations**

The discussion of our findings leads us into the topic of the difference between trends in results, compared to statistically significant findings. The heart of the matter is that the results of our study failed to find significant results that supported our main hypothesis (Hypothesis 2). The only results that were significant—were ones that supported the validity of the creativity measures used (i.e., CPS and CQ; Hypotheses 1 and 3). Although this wins us a point for research design, it does not do so for theory and/or scientific literature building.

Our explanations for the lack of support for our main hypothesis lay in the demographics of our sample. We currently hypothesize that young adults may not think their prospects of dying in the near future are very likely. More specifically, young adults may not have much "death anxiety" (Beshai, 2008), compared to seniors or the terminally ill. Hence, mortality salience may not be truly salient for young adults—at least not when creative performance is involved.

In addition, our main hypothesis may not be applicable to individuals who have high levels of little-c creativity (Richards, 2010). Little-c creativity is also known as *everyday creativity*. Some examples of everyday creativity are: using an iron to heat up a waffle when the toaster is broken; using dishwasher soap to wash a car when out of car washing soap; or using a book to prop up an uneven table.

Furthermore, the CPS (Gough, 1979) may only be effective at measuring little-c creativity and not Big-C Creativity (Simonton, 2010). More specifically, the CPS may not have been able to distinguish between participants in this study who have little-c creativity from participants who have Big-C Creativity. Alternatively, it is possible that none of the participants in this study had high levels of Big-C Creativity. To note, according to Simonton (2010) the effects of Big-C Creativity endures for decades, centuries, and in some cases—millennia. Some examples of the result of Big-C Creativity are Einstein’s theory of gravity, the Bible, and the poem *Iliad*.

It is also possible that we did not find results that supported the main hypotheses of the current study because the MS and Dental Pain prompts used were not effective manipulations for our research design. Support for this comes from our finding that there were no significant differences in creative performance between participants in the MS and Dental Pain conditions. This means that participants performed just as well in creative activities in the MS condition and Dental Pain condition.

### **Future Directions**

Future investigations on the topic of mortality and creativity could examine a sample of various ages, including those with a high mortality rate (e.g., terminally ill

patients, seniors). In a cross-sectional research, future researchers may want to compare the effects of MS on individuals who are 18 to 25, 26 to 45, 46 to 65, and 66 + years of age. Participants with a high mortality rate can be recruited from retirement communities or cancer treatment facilities. However, researchers need to be careful while collecting data on creative performance from individuals who may be physically, psychologically, or mentally ill or have any other type of cognitive decline associated with aging. These groups of individuals may have levels of creative performance that are related to their illness or cognitive decline. In addition, seniors or individuals who are terminally ill may not have the physical or cognitive ability to sit through a lengthy research study like ours.

A well-suited hypothesis for any of the research designs discussed above is that the more an individual believes that he or she will die soon, the more likely MS will have effects on creative performance. This hypothesis seems to be more reflective of Abra's (1995) theory about the effects of MS on creativity and Pablo Picasso's scenario of his "great late phase." For instance, Picasso had his last surge of creative productivity shortly after believing he was terminally ill.

We also suggest that a possible future hypothesis would be that only people of demonstrably high creativity may be motivated by mortality. Students who score high on the CPS are not of demonstrably high creativity and so the effect may be washed out in such a sample. Therefore, one possible future study would be to survey artists, musicians, scientists, and/or writers who have won national and/or international awards (i.e., who are Big-C Creative). In this study, participants can be given a hypothetical situation where they are told to imagine that they will die in the next six months.

Participants will then respond to a “bucket list” question: “If you were told you had one year to live, what would you do with your remaining time?” As a control, one would ask the same bucket list question to less creative people (i.e., little-c and/or non-creative people). Our prediction would be that individuals who are Big-C Creative would spend more of their remaining time in creative activities than would non-Big C Creative individuals.

Future research should also consider using a death anxiety scale to measure how anxious participants are about the inevitability of their own death. More specifically, by using a death anxiety scale a researcher can directly measure whether death anxiety is related to creative performance. In addition, using the death anxiety scale can measure how effective the MS manipulation used in the study is at inducing MS.

One particular death anxiety scale seems to be a good candidate for future research examining the effects of MS on creativity. The Templer Death Anxiety Scale (Templer, 1970) holds good construct validity, and has been used in numerous cross-cultural investigations (Abdel-Khalek, 2005; Lester, 2003; Templer & Dotson, 1970, 1991). Furthermore, we believe that if a researcher chooses to use the same research design as in this study, it would be ideal to place the death anxiety scale right before the MS or Dental Pain manipulations. Placing the scale in this order would allow for the participants’ pre-test creative performance scores to not be confounded by any thoughts of death and/or death anxiety.

In addition, we recommend that future researchers search for a MS manipulation that may be more effective at influencing creative performance. Researchers may

consider using a MS manipulation that is either more subtle than the one used in this study or more blatant. For instance, one of the most blatant MS manipulation's in the TMT research literature is having participants be in a close proximity to a funeral home (Reynolds, 2008). In contrast, if researchers would like to use a more subliminal death prime than what we used in the current study, they will need to either personally contact Arndt, Greenberg, or Cook to inquire about what manipulations to use, or create one that would fit their research question best. The reason for this is because there are no explicit examples of subliminal death primes in the research literature.

### **Conclusion**

The goal of the current study was to examine whether the fear of death can motivate highly creative individuals to be creative, and de-motivate less creative individuals from being creative. However, the results of our study failed to support the notion that MS is a good motivator for creative performance, at least for young adults. Because our study is the first to empirically examine whether MS can influence creative performance, and it is impossible to prove a null hypothesis to be true, future research should not be deterred from studying this research topic further. More specifically, future research should examine the strengths and limitations that were a part of our study, and build upon them to make a more effective research study compared to ours. We look forward to seeing the results of these ventures.

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*Appendix A*

## Creative Personality Scale (Gough, 1979)

PLEASE INDICATE WHICH OF THE FOLLOWING ADJECTIVES BEST DESCRIBE YOURSELF. CHECK ALL THAT APPLY.

- |                       |                        |
|-----------------------|------------------------|
| _____ Capable         | _____ Honest           |
| _____ Artificial      | _____ Intelligent      |
| _____ Clever          | _____ Well-mannered    |
| _____ Cautious        | _____ Wide interests   |
| _____ Confident       | _____ Inventive        |
| _____ Egotistical     | _____ Original         |
| _____ Commonplace     | _____ Narrow interests |
| _____ Humorous        | _____ Reflective       |
| _____ Conservative    | _____ Sincere          |
| _____ Individualistic | _____ Resourceful      |
| _____ Conventional    | _____ Self-confident   |
| _____ Informal        | _____ Sexy             |
| _____ Dissatisfied    | _____ Submissive       |

\_\_\_\_\_ Insightful

\_\_\_\_\_ Snobbish

\_\_\_\_\_ Suspicious

\_\_\_\_\_ Unconventional

*Appendix B*

## Consequences Test—Form 1A (Guilford &amp; Guilford, 1980)

**Directions**

This is a test of your ability to think of a large number of ideas in connection with a new and unusual situation.

Below is a sample question:

What would be the results if people no longer needed or wanted sleep?

**SAMPLE RESULTS:**

1. Get more work done.
2. Alarm clocks not necessary.
3. No need for lullaby song books.
4. Sleeping pills no longer used.
5. \_\_\_\_\_

Of course, there are many other possible results that could have been written.

Following are five different situations that are similar to the one above. Each question is on a separate page and is followed by four sample responses. You will be given *two* minutes to respond to each question. Write as many different consequences or possible results of the specified change as you can; your answers need not be complete sentences. Your score will be determined by the total number of *different* consequences or results that you provide for each question in the allotted time.

If you any questions, ask the administrator.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the result if none of us needed food any more in order to live?

- a. No need for farmers.
- b. No plates, knives, and forks
- c. no grocers
- d. save time

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

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20. \_\_\_\_\_

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if humans lost their group feeling to the extent that they all preferred to live alone?

- a. No more marriages
- b. Population decline
- c. More hermits
- d. No more cities

1. \_\_\_\_\_
2. \_\_\_\_\_
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20. \_\_\_\_\_

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if the entire United States west of the Mississippi became an arid desert?

- a. Shortage of water
- b. People would move East
- c. Food shortage
- d. Trees would die

1. \_\_\_\_\_
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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if everyone suddenly lost the sense of balance and were unable to stay in the upright position for more than a moment?

- a. People would fall down
- b. Could not walk
- c. Many accidents
- d. Confusion

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20. \_\_\_\_\_

STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if all the people in the world lost the ability to reproduce offspring?

- a. Race would die out
- b. No more babies
- c. No more baby doctors
- d. save more diapers, toys, etc.

1. \_\_\_\_\_
2. \_\_\_\_\_
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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

*Appendix C*

## Consequences Test—Form 1B (Guilford &amp; Guilford, 1980)

**Directions**

This is a test of your ability to think of a large number of ideas in connection with a new and unusual situation.

Below is a sample question:

What would be the results if people no longer needed or wanted to eat?

**SAMPLE RESULTS:**

1. People would get fewer cavities.
2. Diets would no longer be necessary.
3. Less pollution due to large scale animal farming.
4. There would no longer be any restaurants.
5. \_\_\_\_\_

Of course, there are many other possible results that could have been written.

Following are five different situations that are similar to the one above. Each question is on a separate page and is followed by four sample responses. You will be given *two* minutes to respond to each question. Write as many different consequences or possible results of the specified change as you can; your answers need not be complete sentences. Your score will be determined by the total number of *different* consequences or results that you provide for each question in the allotted time.

If you any questions, ask the administrator.

**STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.**

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the result if it appeared certain that within three months the entire surface of the earth would be covered with water, except for a few of the highest mountain peaks?

- a. Everyone will move to mountain peaks
- b. Increased sale of boats
- c. Business failure
- d. Panic

1. \_\_\_\_\_
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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if everyone suddenly lost the ability to read and write?

- a. No newspapers or magazines
- b. No libraries
- c. No mail or letters
- d. TV sales increase

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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if human life continued on earth without death?

- a. Overpopulation
- b. More old people
- c. Housing shortage
- d. No more funerals

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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if the force of gravity were suddenly cut in half?

- a. Jump higher
- b. More accidents
- c. Less effort to work
- d. Easier to lift things

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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

LIST AS MANY DIFFERENT CONSEQUENCES AS YOU CAN.

What would be the results if suddenly no one could use their arms or hands?

- a. Learn to use feet more
- b. No need for gloves
- c. Clothing would be changed
- d. Couldn't drive cars

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STOP HERE. WAIT FOR FURTHER INSTRUCTIONS.

*Appendix D*

Self-Esteem Scale (Rosenberg, 1989)

PLEASE CHECK THE BOX ABOVE THE RESPONSE CHOICE THAT BEST DESCRIBES YOU.

I feel that I am a person of worth, at least on an equal basis with others.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

I feel that I have a number of good qualities.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

All in all, I am inclined to feel that I am a failure.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

I am able to do things as well as most other people.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

I feel I do not have much to be proud of.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

I take a positive attitude toward myself.

**Strongly agree**                      **Agree**                      **Disagree**                      **Strongly disagree**

On the whole, I am satisfied with myself.

**Strongly agree**

**Agree**

**Disagree**

**Strongly disagree**

I wish I could have more respect for myself.

**Strongly agree**

**Agree**

**Disagree**

**Strongly disagree**

I certainly feel useless at times.

**Strongly agree**

**Agree**

**Disagree**

**Strongly disagree**

At times I think I am no good at all.

**Strongly agree**

**Agree**

**Disagree**

**Strongly disagree**

*Appendix E*

Big Five Inventory (John, Donahue, & Kentle, 1991)

YOU WILL HAVE HERE ARE A NUMBER OF CHARACTERICTICS THAT MAY OR MAY NOT APPLY TO YOU. FOR EXAMPLE, DO YOU AGREE THAT YOU ARE SOMEONE WHO LIKES TO SPEND TIME WITH OTHERS? PLEASE WRITE A NUMBER NEXT TO EACH STATEMENT TO INDICATE THE EXTENT TO WHICH YOU AGREE OR DISAGREE WITH THAT STATEMENT.

---

Disagree strongly 1	Disagree a little 2	Neither agree nor disagree 3	Agree a little 4	Agree strongly 5
---------------------------	---------------------------	------------------------------------	------------------------	------------------------

---

I see Myself as Someone Who...

- |  |   |
|--|---|
| <p>___ 1. Is talkative</p> <p>___ 2. Tends to find fault with others</p> <p>___ 3. Does a thorough job</p> <p>___ 4. Is depressed, blue</p> <p>___ 5. Is original, comes up with new ideas</p> <p>___ 6. Is reserved</p> <p>___ 7. Is helpful and unselfish with others</p> <p>___ 8. Can be somewhat careless</p> <p>___ 9. Is relaxed, handles stress well</p> <p>___ 10. Is curious about many different things</p> | <p>___ 23. Tends to be lazy</p> <p>___ 24. Is emotionally stable, not easily upset</p> <p>___ 25. Is inventive</p> <p>___ 26. Has an assertive personality</p> <p>___ 27. Can be cold and aloof</p> <p>___ 28. Perseveres until the task is finished</p> <p>___ 29. Can be moody</p> <p>___ 30. Values artistic, aesthetic experiences</p> <p>___ 31. Is sometimes shy, inhibited</p> <p>___ 32. Is considerate and kind to almost everyone</p> |
|--|---|

- \_\_\_11. Is full of energy
- \_\_\_12. Starts quarrels with others
- \_\_\_13. Is a reliable worker
- \_\_\_14. Can be tense
- \_\_\_15. Is ingenious, a deep thinker
- \_\_\_16. Generates a lot of enthusiasm
- \_\_\_17. Has a forgiving nature
- \_\_\_18. Tends to be disorganized
- \_\_\_19. Worries a lot
- \_\_\_20. Has an active imagination
- \_\_\_21. Tends to be quiet
- \_\_\_22. Is generally trusting
- \_\_\_33. Does things efficiently
- \_\_\_34. Remains calm in tense situations
- \_\_\_35. Prefers work that is routine
- \_\_\_36. Is outgoing, sociable
- \_\_\_37. Is sometimes rude to others
- \_\_\_38. Makes plans and follows through  
with them
- \_\_\_39. Gets nervous easily
- \_\_\_40. Likes to reflect, play with ideas
- \_\_\_41. Has few artistic interests
- \_\_\_42. Likes to cooperate with others
- \_\_\_43. Is easily distracted
- \_\_\_44. Is sophisticated in art, music, or  
literature

*Appendix F*

## Demographic Questionnaire

What is your gender (please check your answer)? Male \_\_\_ Female \_\_\_

How old are you? \_\_\_\_\_

Were you bothered by the contents of the study at any point in time? If so, please provide us with your comments/concerns:

---

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What is your ethnicity (please check the one(s) that apply)?

\_\_\_ European-American/White

\_\_\_ African-American/Black

\_\_\_ American Indian/ Alaska Native

\_\_\_ Asian-American

\_\_\_ Native Hawaiian/ Pacific Islander

\_\_\_ Mexican American or Hispanic/Latino

\_\_\_ Some other ethnicity (please specify)

---

What country were you born in?

---

What country was your mother born in?

---

What country was your father born in?

---

What language(s) do you speak?

---

What is your major?

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*Appendix G*

## Consent Form

**Agreement to Participate in Research****Responsible Investigator(s):**

Michelle Murphy, candidate M.A. Experimental psychology student, SJSU

Gregory J. Feist, PhD, Primary Project Advisor

Megumi Hosoda, PhD, Secondary Project Advisor

**Title of Study:** Connection between Personality and Cognition.

1. You have been asked to participate in a research study investigating the relationship between cognition and personality. A more detailed explanation of the purpose and hypotheses of the study will be provided at the end of the study.
2. You will be asked to complete a questionnaire packet. The entire study session should last for approximately one hour.
3. This research should not cause any risk or discomfort to you.
4. No discernable benefits are expected.
5. Although this study may be published, the questionnaire packet is anonymous, and no information that could identify you will be included in the study.
6. Although the results of this study may be published, no information that could identify you will be included in the study.
7. Participants will receive partial credit towards their class requirements by participating in this study (even if they should decide to withdraw or otherwise not complete the survey). No other compensation will be offered.
8. Questions about this research may be addressed to Michelle Murphy via email: michelle.murphy01@students.sjsu.edu Complaints about the research may be presented to Ron Rogers, PhD, Chair, Department of Psychology, San Jose State University, San Jose, CA 95195. (408) 924-5652. Questions about a research subjects' rights, or research-related injury may be presented to Pamela Stacks, Ph.D., Associate Vice President, Graduate Studies and Research, at (408) 924-2427.
9. No service of any kind, to which you are otherwise entitled, will be lost or jeopardized if you choose not to participate in the study.
10. Your consent is being given voluntarily. You may refuse to participate in the entire study or in any part of the study. You have the right to answer questions you do not wish to answer. If you decide to participate in the study, you are free to withdraw at any time without any negative effect on your relations with San Jose State University.
11. At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator.

**The signature of a subject on this document indicates agreement to participate in the study.**

**The signature of a researcher on this document indicates agreement to include the above named subject in the research and attestation that the subject has been fully informed of his or her rights.**

---

Participant's Signature

---

Date

---

Investigator's Signature

---

Date

*Appendix H*

## Debriefing Form

**Debriefing on: *Can the Fear of Death Inspire Creativity?***

Our study addressed the following question: Are creative individuals more likely to be motivated to create because of a heightened awareness of their mortality compared to less-creative individuals?

At the beginning of the study the researcher told you that the questionnaire packet that you were asked to fill out consisted of several studies. However, the questionnaire packet actually only examined issues related to one study. More specifically, the study that you were a part of examined the effects of mortality salience (i.e., being consciously or unconsciously aware of your life's finiteness) on creative performance. The main reasons why we conducted this study: (1) nobody has empirically examined this relationship before; (2) a passionate curiosity in obtaining the answers to the hypotheses stated below.

The main hypotheses of the study are: (1) participants who are high in creative personality will show an increase in creative performance scores following the Mortality Salience manipulation; (2) participants who have less creative personalities will show a decrease in creative performance scores following the Mortality Salience manipulation; (3) participants who are a part of the Dental Pain condition (control) , despite their creative personality level, will not exhibit a change in creative performance scores following an induction to the Dental Pain stimuli.

**Please do not discuss the process, purpose, or hypotheses of this study with anyone once you leave the study room.** This will protect potential future participants' responses to the study to be inadvertently influenced. If you have any questions, or would like to know the results of the study once it is complete, please email Michelle Murphy at [michelle.murphy01@students.sjsu.edu](mailto:michelle.murphy01@students.sjsu.edu)

Thank you for your time and participation!