Our Optimism in the Face of Death

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Abstract

Methods I Students: Make sure that YOU provide the abstract!

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Though a truly diverse species, the one commonality we all face as a human race is the uncertainty concerning the end of our days. Terror management theory (TMT) addresses the universally debilitating anxiety that while we are consciously aware that we fight for survival on a daily basis, we are mortal animals and will inevitably experience death (Schimel, Hayes, Williams, & Jahrig, 2007). To deal with this notion, we structure our lives with self-implicated fundamental ideals and beliefs, whether religious or worldly, that provide a cultural set of norms and values fulfilling feelings of security and order (Rutjens, van der Pligt, & van Harreveld, 2009).

The anxiety buffer hypothesis states that when our self-esteem is reinforced, anxiety lessens, thereby acting as a buffer from the angst provoked at the thought of death (Schimel et al., 2007). Methods of coping include proximal, or conscious, efforts to distract our attention from our mortality (Friedman & Rholes, 2008). Such proximal efforts can be argued to include pro-social actions that let us attain a feeling of tranquility about the impact we want to make before our death. Pro-social behaviors are more likely to be acted upon if one's culture endorses it or when reminded of their own vulnerabilities (Zaleskiewicz, Gasiorowska, & Kesebir, 2015). Studies show that actions or characteristics that lead to the benefit of another, a seemingly selfless act, will allow one to "soothe concerns about one's fragility" and boost our self-esteem (Zaleskiewicz, Gasiorowska, & Kesebir, 2015, *p.* 68). A common example would be seeing a homeless man or woman begging for money at a street-light. Chances are they're holding up a sign describing their physical or mental affliction such as, "hungry, wounded veteran". The sight may have anyone wondering about how they are fighting to survive. Such death related thoughts might elicit some sympathy for the cards life dealt them and you may decide to give them some

money or go so far as to buy them a meal. The resulting satisfaction in your altruistic act should then allow you to be relieved of death-related thoughts.

Another line of defense against feeling the effects of TMT is the mortality salience theory. This idea posits that our reliance on fundamental beliefs and psychological structures only increase when individuals are reminded of the inevitability of their demise (Friedman & Rholes, 2008). Mortality salience is cultivated when opposing thought and arguments make a case against the values and traditions one chooses to rule their life by (Schimel et al., 2007). In a tumultuous world where nothing is certain but the choices we make, coming in contact with alternative conceptions to what we believe may leave us vulnerable to the anxiety described in TMT. When given the opportunity, our defense in mounted with the depreciation of the opposing voice in order to give ourselves confidence in the cultural foundations we identify with (Rutjens, van der Pligt, & van Harreveld, 2009). An interesting consequence, however, is that we tend to react paradoxically when reminded of our impermanence.

Thinking about death seems to shine a light on our optimistic outlook in societal progress and what the future may bring (Kelley & Schmeichel, 2015). This development was supported in an experimental study conducted by Rutjens, van der Pligt, and van Harreveld (2009) where they had participants rate on a scale of 1 (not at all) to 9 (completely) how much they agree with an excerpt in which the main idea was that progress was an illusion. Results found support with increased faith in progressive hope (Rutjens, van der Pligt, & van Harreveld, 2009). We tend to focus on positive aspects of our lives in order to avoid negative thoughts that are attached to mortality salience, such as fear for what may become of those we hold dear and have no choice but to leave behind (Friedman & Rholes, 2008). This innate response is supported by how quick

people are to stick to their moral codes and the popularity of religious explanations of

immortality after death (Kelley & Schmeichel, 2015).

There are several variations to experiments that catechize TMT and its conjugate topics.

Most studies begin with a short answer question asking participants to describe their emotions at

the thought of their death or to write about their experience in a neutral topic therefore placing

them in either the mortality salient condition versus a control condition. They may then choose to

test optimism with the presentation of a pessimistic essay threatening their worldviews. Typical

in some studies, like that of Kelley and Schmeichel (2015), is the addition of activities in

between measured tasks to allow delay in thoughts of death so that they fade from conscious

thought. This delay is then followed by a divulging word-completion task or word search that,

unbeknown to the participant, allows them to resurface. In order to explore the effect on

individuals when faced with their demise, we constructed a three-part study modeled after these

previous research ideas.

Study One

The first part of our study asks participants to answer a self-reflective question in one of

three different conditions on what they think of their own death, dental pain, or the how they got

into college. The second task involves all participants completing the same word fragment

activity. Finally, after reading an essay concerning the progress we've made as humans, they are

asked to answer questions on the excerpt using a scale from 1- 6 (1 being equal to answering

they strongly disagree and 6 as they strongly agree). First, we predict that participants who wrote

about death should complete more word-fragments with death-related words (e.g. SKU_ _ with

SKULL, COFF_ _ with COFFIN, and DE_ _ with DEAD) than participants who wrote about

dental pain or getting into college (who will complete the same word fragments with neutral

words, like SKUNK, COFFEE, and DEAL). Second, we predict that participants who wrote

about death will disagree with the pessimistic position of the human progress essay's author

more than participants in the other two conditions.

Methods Study One

Participants

This study consisted of a total of 99 participants. Forty-six of the people in this sample

were male (47%) while 53 were female (54%). The age demographic ranged from as low as 14

to a maximum of 85 years of age ($M = 23.26$, $SD = 8.53$). Thirty-two percent of participants

identified as Caucasian ($N = 32$), 46% as Hispanic ($N = 45$), 2% as Native Indian ($N = 2$), 11% as

African American ($N = 11$), 6% as Asian American ($N = 6$), and 3% reported "Other" ($N = 3$). Of

the people participating in this study, 86% were identified as Florida International University

students ($N=85$) while 14% were not ($N=14$). *See Appendix A.*

Materials and Procedures

As students of a Research Methods class at Florida International University (FIU), we

were all asked to inhabit the role of a researcher in a study that tests whether or not being aware

of one's own mortality, or being mortality salient, can cause personal distress. This would result

in the participant's choice to cope by portraying a more optimistic outlook about the future. The

study consists of the completion of two phases. In the first phase researchers approached people

and asked them to participate in a study consisting of completing a survey. Those participating

had to be individuals of no personal connection to the researcher and not currently enrolled in a

psychology research methods class in the Spring semester of 2018. The objective was for each

researcher to have 3 completed surveys, one in each of the following conditions acting as the 3

levels to our independent variable: "Mortality Salience" (MS), "College" (C), and "Dental Pain"

(DP). Expressed to the potential participant in the initial introduction was that there were no risks

to their person if they consented. Benefits to their involvement would be purely be their

assistance in the completion of a class assignment. Verbal consent was taken after subjects were

informed that the study was for our research methods class and that the duration of their

involvement would only last approximately 5-10 minutes. Once a verbal assertion was noted, the

next phase of the study commenced.

In phase 2, randomly assigned surveys were divided into 2 parts and were identical in all

conditions with the exception of the first 2 questions in the second part. At the top of the page,

the introduction to the survey and its already previously voiced purpose was reiterated. Part I of

the survey asked the participant their demographic information. Included were questions that

asked for the participant's gender, age, race/ethnicity, if English was their first language, and

whether or not they were currently enrolled as an FIU student.

Part II had tasks a-e. Tasks a and b were the only short answer questions in the survey

and also introduced the independent variable for the study. Task a either asked the participant to

describe the emotions that the thought of their "own death" (MS condition), "having dental pain"

(DP condition), or "attending college" (C condition) aroused in them. Task b asked the

participant to write as specifically as they could what happens to them "physically when you die"

(MS condition), "when you have to undergo a painful dental procedure" (DP condition), or "the

physical steps you took to get to college" (C condition).

Task c, the measured dependent variable of the study, consisted of 12 word-completion

exercises asking the participant to fill in the spaces with letters that would complete the first

word they thought of (i.e. YE_ _ completed as YELL). Six of the twelve exercises were designed

so that they could only be completed with words unrelated to death (i.e. YE_ _ as YELL, FO_ _

as FORT, SHI_ _ as SHIRT, CLO_ _ as CLOWN, LI_ _ as LIES, and DRI_ _ as DRIPS). The

other six could either be completed as death-related or neutral words (i.e. STI_ _ as STIFF or

STILL, COFF_ _ as COFFIN or COFEE, SKU_ _ as SKULL or SKUNK, DE_ _ as DEAD or

DEAL, COR_ _ _ as CORPSE or CORAL, and GRA_ _ as GRAVE or GRAPE). The task was

scored by counting how many of the 6 words were completed with death-related words.

Following the word-fragment question is Task d. The instructions in all 3 conditions

introduces the following as an excerpt from a blog published some months ago that addressed the

issue of human progress:

The question of whether there is human progress is easy to answer; I think

progress is an illusion. We always seem to focus on progress in science and

technology, but meanwhile there wars and conflicts going on all around the world.

There is plenty of evidence that we haven't witnessed any real progress since the

Middle Ages! After all, we fail to find answers to environmental problems;

political systems do not function any better than they did 100 years ago; there is

still poverty in the world; and so on. We don't seem to learn from history, and we

keep making the same mistakes over and over again. Moreover, once we have

managed to control one disease, it always seems like there is another one to deal

with. That's why I do not believe that our children will encounter a world that is

any better than the world we live in today. People are people. Morally, politically,

and socially, we simply do not make any progress. All in all, I think we have to

face reality: progress is an illusion!

The instructions continue by asking the participant to answer the 10 questions following

the blog excerpt. All of these questions used the same 6-point Likert scale (1 = strongly

disagree to 6 = strongly agree) as potential answers. Question 1 had the participant rate whether they shared the author's views about progress. Question 2 and 3 had participants rate how they felt, if the author's views were too pessimistic or too optimistic for them respectively. Question 4-10 had them rate the following statements: I feel like I could have written this essay, I do not agree with anything in this essay, this essay makes some good points but I do not agree with all of them, the essay describes most American's attitudes about progress in the United States today, the essay describes most people's attitudes about progress throughout the world, I am optimistic about the future, and finally, the United States still allows people to achieve their dreams. The participant's response for Question 4 (whether or not they agree that they could have written the essay) is analyzed to address our hypothesis that a participant writing about death in Tasks a and b versus in the other conditions would be more likely to disagree with the pessimistic viewpoint of the author.

The final Task, e, simply asked the participant to recall without checking the beginning of the survey what they were asked to write about. They had to mark with an X one of the following options: death, dental pain, or getting into college. This serves as a manipulation check so researchers know if the subject was paying attention to Tasks a and b. After all parts of the survey are completed, participants were debriefed. They were informed of Terror Management Theory concept and the main hypothesis, participant's optimism about human progress would be enhanced when they think about death.

Results Study One

Using the essay condition as our independent variable (Mortality Salient vs Dental Pain vs College) and whether participants recalled what they were asked to write about as the

dependent variable, we ran a manipulation check using chi-squared in which we saw a significant effect, $X^2(4) = 131.09$, $p < .001$. Most participants recalled writing about death (85%), dental pain (85%), and college (91%) in their respective MS, DP, and C conditions. These findings indicate that participants were paying attention to the instructions of the short answer task as was intended. *See Appendix B.*

We conducted a One-Way ANOVA with the three condition levels as our independent variable (Mortality Salient vs Dental Pain vs College) and the number of death-related words the participant completed as our dependent variable. Results showed a significance between the conditions, $F(2, 96) = 7.42$, $p = .001$. Further testing by administering a Tukey LSD post hoc test revealed that participants completed more word-fragments with death-related words in the mortality salience condition ($M = 2.91$, $SD = 1.01$) than in both the dental pain ($M = 2.15$, $SD = 0.62$) and college ($M = 2.24$, $SD = 0.94$) conditions. Participants in the dental pain and college conditions, however, did not differ in significance from one another. These results provide an affirmation of our hypothesis that participants that are death-aware are more likely to complete the word-fragment task with death related words than the dental pain or college conditions. *See Appendix C.*

We ran a second One-Way ANOVA with condition as our independent variable (Mortality Salient vs Dental Pain vs College) and the participant expression of whether they believe they could have written the essay as our dependent variable. The purpose of this analysis was to show if condition affects their optimism about human progress after being asked to read the human progress essay. Results show the analysis was significant, $F(2, 96) = 4.08$, $p = .020$. A Tukey HSD post hoc test showed that participants in the Mortality Salience condition significantly agreed the least that they could've written the essay ($M = 3.03$, $SD = 1.07$) as

compared to the Dental Pain condition ($M = 3.73$, $SD = 0.98$). However, results were not significant when compared to the College condition ($M = 3.45$, $SD = 0.94$). The Dental Pain and College conditions did not significantly differ from one another. This data set eludes to a more optimistic viewpoint concerning human progress when one is actively thinking of death. *See Appendix D.*

Discussion Study One

The conclusion of this study reflects support for our position in our hypotheses that mortality salience results in more death related words when doing the word-fragment completion task and the optimism we express on progress made by the human race. The non-significant effect of the college condition when compared to the mortality salient and dental pain conditions leads us to the idea that the next TMT experiment may only need to be limited to the latter conditions. Of interest for further study would be whether conscious awareness of being provoked to think about death would affect the direction participants may take on the pessimistic essay and the number death-related words completed in the word-fragment task.

Study Two

The premise of TMT is for humans to effectively calm the anxiety thoughts of death provoke within us in order to reassume normal stress levels. This begs the question; how may our coping methods be influenced when we are previously warned about the priming effect of the mortality salient condition?

The priming effect is a learned initial stimulus response recorded into the participant's implicit, or unconscious, memory that resurfaces when presented with a later stimulus (Hsu & Schütt, 2012). Any amount of realization on the subject's part that this effect is meant to shift the direction of their initial analyses may cause a change in their thought process. They might

intrinsically delve deeper into the topic than they were originally meant to. To put it into perspective, when someone with a phobia is told they are confronting their fears, they might already have an initial reaction going into the experience.

According to Petty and Cacioppo (1979), fore-knowledge may be concerned with revealing the position of the upcoming topic or it's persuasive content. Taking into consideration the positive or negative cues this knowledge may bestow upon the participant, they may change their original position to either reflect or oppose the given information (Neimeyer et al., 1991). The participant might find themselves agreeing with the direction of the warning in an effort to reduce threats to their self-esteem when they want to seem open to moderate views (Wood & Quinn, 2003). However, if the statement addresses in what ways the following topic is a persuasive priming, that would provoke a defensive opinion and the participant may want to break away form the normative response to find freedom in a seemingly original response (Wood & Quinn, 2003). When a participant is introduced to this revealing piece of information, it serves as a warning. The subject is already told what their initial attitude should be or what they are expected to feel, and what would have been their original viewpoint would change during the completion of the assigned task (Neimeyer, MacNair, Metzler, & Courchaine,1991). An early study conducted by Neimeyer, MacNair, Metzler, and Courchaine (1991) tested the effect of fore-warning versus no warning in the responses of university student when they took a survey on attitudes concerning honesty in relationships. The study's results show that the addition of relevant knowledge strengthened student's argument whether they were for or against honesty and contrasted to initial attitudes in previous entries.

When there is a resulting contrast in participant response from their actual experience, they've expressed response bias (Sedgwick, 2014). In a study by McGrath, Mitchell, Kim, and

Hough (2010), it was cited from an article published by Paulhus in 1984 that response bias could, in some cases, be motivated by the intent to purposely mislead the experimenter. On another note, it is most common, when participants are self-reporting behaviors that may go against societal/cultural norm or bring up feelings of embarrassment (Sedgwick, 2014). This addresses the problem of self-reporting in surveys and questionnaires. They are limited to the amount of information the participant is willing to unveil for fear of self-transparency despite their anonymity in the researcher's collective data (Schimel et al., 2007).

In our following study we continue to examine the effects of terror management theory with two main analyses. Each examines two main effects and one interaction for each of our main dependent variables, number of death-related words and agreement with the author of the human progress essay. For our first dependent variable, death-related words, we predict a main effect of condition. Participants in the mortality salience will complete more word fragments with death-related words than participants in the dental pain condition as was supported in study one. We do not expect the warning to have an effect on the number of death-related words, and therefore do not predict a main effect of warning for this dependent variable. We also do not predict an interaction of condition and warning.

For our second dependent variable, agreement with the author, we predict a main effect of condition. Those in the mortality salience condition will agree with the author less than participants in the dental pain condition, just as in study one. We also expect a main effect of warning such that those in the no-warning condition will agree with the author less than participants in the warning condition. We expect these main effects to be qualified by an interaction effect of condition and warning, whereby mortality salience participants disagree with the author more when they don't get the warning than when they do.

Methods Study Two

Participants

A total of 232 people took part in this study. Eighty- nine of the people in this sample were male (38%) while 143 were female (62%). The age ranged from as low as 16 to a maximum of 68 years of age ($M = 30.69$, $SD = 12.10$). Eleven percent of participants identified as Caucasian ($N = 25$), 72% as Hispanic ($N = 167$), 10% as African American ($N = 23$), 1% as Asian American ($N = 2$), and 7% reported "Other" ($N = 15$). Of the people participating in this study, 28% were identified as Florida International University students ($N=66$) while 72% were not ($N=166$). Our sample included 41.8% of participants that spoke English as their first language (n = 97) while the remaining 58.2% did not (n = 135). Also asked was the highest level of education completed of which only 2 participants declined to provide (0.9%). Five participants completed less than a high school education (2.2%), 35 completed high school or had a GED (15.1%), 60 had some college education (25.9%), 52 had an associate's degree (22.4%), 44 had a bachelor's degree (19.0%), 12 had some graduate education (5.2%), 12 had a master's degree (5.2%), and 10 had a doctorate degree or PhD (4.3%). *See Appendix E.*

Materials and Procedures

As an extension of study one, study two tests two independent variable and the effect that they may have on our original dependent variables. This study has the independent variable of condition with two levels (mortality salience condition vs dental pain condition). We introduced a second independent variable in which subjects will have either a warning or no warning of how being mortality salient will affect optimism. Therefore, we are testing the presence of warning and mortality salience, presence of warning and dental pain, no warning and mortality salience, and no warning and dental pain on our dependent variables: number of death-related words used

to complete the word fragments and responses to the "I share the author's views about progress" question concerning the human progress essay.

Participants were asked to take part in an online study being conducted for research purposes. They were instructed to open the survey that was constructed through Qualtrics software. The survey opened up to a page informing them of potential risks or benefits of their participation in which they had to agree to participate before starting the actual study. If they chose not to participate, the survey design was instructed to exit the survey automatically.

The first section of the survey asked the participant to provide demographic information. They were asked about their gender, age, race/ethnicity, whether English was their first language, if they were students at FIU, and what their highest level of education was. For race/ethnicity the options included Caucasian, Hispanic American, African American, Asian American, or Other. Options for recording highest level of education were to select one of the following: less than high school diploma, High school diploma/GED, Some college, Associate's degree, Bachelor's degree, Some graduate or professional school, Master's degree, or Doctorate's degree or PhD.

The following section implemented our new independent variable, presence of a warning about mortality salience or not. The Qualtrics survey randomized which participants were given the warning. If the participant was given no warning they read the following statement:

Recent research suggests that your feelings and attitudes about significant aspects of your personal and community life can tell us a considerable amount about your personality. For the following questions, we'd like your responses to a variety of issues as well as a fun word completion task. Your honest responses to the questions that follow are greatly appreciated.

If the participant were given the warning they read the following statement:

> Recent research suggests that being reminded of one's own mortality can make people
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> feel more optimistic. In this study, we're testing this hypothesis. For the following
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> questions, we'd like your responses to a variety of issues as well as a fun word
>
> completion task. Your honest responses to the questions that follow are greatly
>
> appreciated.

The statements introduced the next section of the survey in which they answered a short answer question that placed them in either mortality salience or dental pain condition, the condition being the second possible main effect. The short answer question they were given was randomized by the Qualtrics system. The mortality salience condition asked subjects to describe the emotions that the thought of their own death arouses in them. The dental pain condition asked them to describe the emotions that the thought of having dental pain arouses in them. The college condition from the previous study was excluded as there was no significance between dental pain and college condition in the results.

The next sections of the survey consist of the online version of the word fragment exercise given in study one followed by as the same article excerpt on the issue of human progress given in the first study and the related ten questions. The same 12 word fragments were given, six of which could be completed with a neutral word or a death associated word (i.e. COFF_ _ as COFFIN or COFEE). The questions pertaining to the article were to be answered with the same 1-6 Likert scale as study one, 1 being that they strongly disagree and 6 that they strongly agree. Question 1 asked the participant to rate whether they shared the author's views about progress. Question 2 and 3 had participants rate how they felt, if the author's views were too pessimistic or too optimistic for them respectively. Question 4-10 had them rate the

following statements: I feel like I could have written this essay, I do not agree with anything in this essay, this essay makes some good points but I do not agree with all of them, the essay describes most American's attitudes about progress in the United States today, the essay describes most people's attitudes about progress throughout the world, I am optimistic about the future, and finally, the United States still allows people to achieve their dreams.

After these exercises are completed, subjects answered two manipulation checks in multiple choice format. These were added to ensure that the participants were being attentive to the survey from the beginning. It also allowed for us to easily identify and eliminate possible misrepresentative responses from the data. The first question asked the participants to recall whether the short-answer question in the beginning of the survey asked about death, dental pain, or getting into college. The second question was meant to be answered correctly only by those in the warning condition. It asked the participant if at the beginning of the study they were told we expected people reminded of death to be more pessimistic, optimistic, or angry. The answer options for this question were pessimistic, optimistic, angry, or I don't know.

Before the participants were allowed to exit the survey they were thanked for their participation in the concluding debrief. They were informed about Terror Management Theory as well as our hypotheses that people tend to embrace their optimism about progress if they are reminded of their own death and that they will disagree with the pessimistic essay more than participants not thinking about death, unless they are warned ahead of time.

Results Study Two

Using condition as the independent variable (Mortality Salient vs Dental Pain) and whether participants answered correctly to the condition manipulation check as the dependent variable, we conducted a chi-square test. It was significant which illustrates that participants

were paying attention to condition during this study, $X^2(2) = 175.89, p < .001$. Ninety-three

percent of the participants remembered writing about death in the mortality salience condition

($n=106$) and in the dental pain condition, 93.2% of participants recalled writing about dental pain

($n=110$). Phi showed a large effect. *See Appendix F*

A second chi-square test was conducted with presence of warning (warning vs. no

warning) as the independent variable and participants' responses to the warning manipulation

check as the dependent variable. This test was significant, $X^2(3) = 106.18, p < .001$. This shows

evidence that most participants who received the warning remembered that people who are

reminded of their own death are expected to be more optimistic (88.2%). Those that received no

warning more often selected "pessimistic" (36.3%) or "I don't know" (36.3%) as their answers

for this manipulation check than "optimistic" (21.2%) or "angry" (6.2%). Phi showed a medium

effect. *See Appendix G.*

Our first dependent variable, the number of death-related words used to complete the

word fragments, was tested to determine how it was affected by condition and forewarning with

a 2X2 ANOVA. Condition (mortality salience vs dental pain) and forewarning (warning vs. no

warning) were computed as the independent variables and the number of death-related words

was the dependent variable. There was a significant main effect of condition, $F(1, 228) =$

133.82, $p < .001$. Analogous to study one, those placed in the mortality salience condition

completed more word fragments with death-related words ($M = 2.31, SD = .58$) than participants

in the DP condition ($M = .77, SD = .42$). As for the presence of forewarning, there was not a

significant main effect, $F(1, 228) = .54, p = .464$. The number of death-related words was not

significantly different between participants in the warning condition ($M = 1.64, SD = .90$) and

the no warning condition ($M = 1.41, SD = .93$). The interaction effect of condition and

forewarning was found to be not significant, F (1, 228) = .20, p = .655. This means that participants did not differ in their number of death related words between the mortality salient and warning group (M = 2.28, SD = .54), mortality salient and no warning group (M = 2.36, SD = .65), dental pain and warning group (M = .76, SD = .43), and dental pain and no warning group (M = .78, SD = .42). *See Appendix H*

Using another 2X2 ANOVA we tested our second dependent variable, responses to the "I share the author's views about progress" question concerning the human progress essay against the same independent variables, condition and presence of forewarning. There was a significant main effect of condition, F (1, 228) = 5.36, p = .022. Participants placed in the mortality salience condition agreed with the human progress essay author 's pessimism less (M = 2.48, SD = 1.52) than participants in the dental pain condition (M = 2.77, SD = 1.32). There was also a significant main effect of warning vs no warning, F (1, 228) = 14.18, p < .001. Those that didn't receive a warning agreed with the human progress essay author 's pessimism less (M = 2.32, SD = 1.46) than participants in the Warning group (M = 2.92, SD = 1.33). Furthermore, there was a significant interaction effect of condition and warning, F (1, 228) = 3.92, p = .049. Additional testing of simple effects showed that for participants in the mortality salient condition they disagreed with the author significantly less with no warning (M = 1.84, SD = 1.13) than in the warning condition (M = 2.90, SD = 1.60), F(1, 112) = 14.72, p < .001. Participants in the dental pain condition did not differ in their agreement with the author when there was no warning (M = 2.63, SD = 1.57) and with a warning (M = 2.96, SD = .832), F(1, 116) = 1.80, p = .183. Those in the warning condition did not show a difference in their agreement with author in the mortality salient condition (M = 2.90, SD = 1.60) and the dental pain condition (M = 2.96, SD = .832) , F(1, 117) = .062, p = .805. Alternatively, those in the no warning condition disagreed with the

author significantly less in the mortality salient condition ($M = 1.84$, $SD = 1.13$) than in the

dental pain condition ($M = 2.63$, $SD = 1.57$), $F(1, 111) = 8.42$, $p = .004$. *See Appendix I*

Discussion Study Two

 In accordance with our hypothesis, the results showed that there was only a significant

main effect of condition in relation to number of death-related words in the word-completion

task. Those in the Mortality Salient condition completed more death-related words than those in

the Dental Pain condition regardless of the presence of a warning. There was also no significant

interaction effect just as we had initially predicted before the study was run.

 In relation to whether the presence of a warning had an effect on responses to the human

progress essay, there was a main effect of condition, as was expected. Participants in the

Mortality Salient condition agreed less with the author of the human progress essay than those in

the Dental Pain condition. Additionally, results supported our conjecture of a main effect of

forewarning. Those whom had not received a warning about how being reminded of death may

make them more optimistic agreed with the author less than those who had. Finally, there was

evidence in support of our hypothesis that there would be a significant interaction effect of

warning and condition on participant responses on the essay. Participants disagreed with the

author more when they didn't get the warning than when they did when in the Mortality Salient

condition. In the Dental Pain condition there was no difference in between those that had or had

not received the warning. Subjects that were in the warning condition did not differ in agreement

with the author whether they were in the Mortality Salient or Dental Pain condition while in the

no-warning condition they agree with the author significantly less in the former condition.

General Discussion

Our first hypothesis stated that being mortality salient would results in more death-related words and was backed by the results of Study one and two. We also saw evidence that we defend our fundamental beliefs when they are being threatened as participants were more inclined to disagree with the author of the pessimistic human progress essay when they were asked to think about death. The opposition with the author can be viewed as an act to reinforce out self-esteem in order to lessen our anxiety of the legacy we leave behind after death (Rutjens, van der Pligt, & van Harreveld, 2009). Though forewarning did not seem to affect the number of death-related words the participant completed, it did make an impact on their agreement with the author of the excerpt. Those that didn't receive the warning tended to disagree with the other more-so than those that did. Also found was an interaction effect of condition and forewarning. Those in the Mortality salience condition agreed most with the author when they were forewarned on how being primed to think of death may boost our optimism in societal progress. This shows evidence of response bias in the case that participants' original viewpoint concerning the topic was skewed due to the provided information (Neimeyer et al., 1991).

Though this study was designed as an extension of previous studies such as that of Kelley and Schmeichel (2015) , it was conducted by a research methods class of psychology students therefore there is bound to be errors of internal validity. Errors in our study may include that of instrumentation in the way students approached participants for the study. Researchers may have veered off the script provided to introduce the study and so the amount of information subjects were given beforehand may vary. Also condition in which the subject took the surveys may vary due to environment or mood. In order to limit these extraneous variables we could screen participants beforehand and have them take the survey in the same room. Further testing may also include putting the author's credibility under scrutiny. We could include an independent

variable in which in one version of the survey the introduction of the excerpt tells the participant the author's credentials so they know that the author is well-versed on the human progress topic. The other version could could be kept the same. This way we could test whether credibility in the author plays a role in the position the participants take whether they agree or disagree with the author.

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Appendix A- Demographics- Study One

Statistics

		Gender (1 = M, 2 = F)	Age	Race	FIU Student (1 = Y, 2 = N)
N	Valid	99	99	99	99
	Missing	0	0	0	0
Mean		1.5354	23.2626	2.2222	1.1414
Median		2.0000	21.0000	2.0000	1.0000
Mode		2.00	20.00	2.00	1.00
Std. Deviation		.50129	8.52677	1.33673	.35022
Minimum		1.00	14.00	1.00	1.00
Maximum		2.00	85.00	6.00	2.00

Gender (1 = M, 2 = F)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	46	46.5	46.5	46.5
	Female	53	53.5	53.5	100.0
	Total	99	100.0	100.0	

Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Caucasian	32	32.3	32.3	32.3
	Hispanic	45	45.5	45.5	77.8
	Native Indian	2	2.0	2.0	79.8
	African American	11	11.1	11.1	90.9
	Asian American	6	6.1	6.1	97.0
	Other	3	3.0	3.0	100.0
	Total	99	100.0	100.0	

FIU Student (1 = Y, 2 = N)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	85	85.9	85.9	85.9
	No	14	14.1	14.1	100.0
	Total	99	100.0	100.0	

Appendix B – Crosstabs and Chi Square – Study One

Condition (1 = MS, 2 = DP, 3 = C) * Manipulation Check (1 = MS, 2 = DP, 3 = C) Crosstabulation

			Manipulation Check (1 = MS, 2 = DP, 3 = C)			
			Mortality Salience	Dental Pain	College	Total
Condition (1 = MS, 2 = DP, 3 = C)	Mortality Salience	Count	28	3	2	33
		% within Condition (1 = MS, 2 = DP, 3 = C)	84.8%	9.1%	6.1%	100.0%
	Dental Pain	Count	0	28	5	33
		% within Condition (1 = MS, 2 = DP, 3 = C)	0.0%	84.8%	15.2%	100.0%
	College	Count	0	3	30	33
		% within Condition (1 = MS, 2 = DP, 3 = C)	0.0%	9.1%	90.9%	100.0%
Total		Count	28	34	37	99
		% within Condition (1 = MS, 2 = DP, 3 = C)	28.3%	34.3%	37.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	131.089[a]	4	.000
Likelihood Ratio	133.250	4	.000
Linear-by-Linear Association	72.551	1	.000
N of Valid Cases	99		

a. 0 cells (0.0%) have expected count less than 5.
The minimum expected count is 9.33.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	1.151	.000
	Cramer's V	.814	.000
N of Valid Cases		99	

Appendix C – ANOVA Word Fragments – Study One
Descriptives

Number of word fragments completed with death

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Mortality Salience	33	2.9091	1.01130	.17604	2.5505	3.2677	1.00	5.00
Dental Pain	33	2.1515	.61853	.10767	1.9322	2.3708	1.00	3.00
College	33	2.2424	.93643	.16301	1.9104	2.5745	1.00	5.00
Total	99	2.4343	.92760	.09323	2.2493	2.6193	1.00	5.00

ANOVA

Number of word fragments completed with death

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.293	2	5.646	7.422	.001
Within Groups	73.030	96	.761		
Total	84.323	98			

Post Hoc Tests

Number of word fragments completed with death

Tukey HSD[a]

Condition (1 = MS, 2 = DP, 3 = C)	N	Subset for alpha = 0.05	
		1	2
Dental Pain	33	2.1515	
College	33	2.2424	
Mortality Salience	33		2.9091
Sig.		.906	1.000

Means for groups in homogeneous subsets are displayed.
a. Uses Harmonic Mean Sample Size = 33.000.

Appendix D – ANOVA Optimism About the Future– Study One

Descriptives

I feel could have written this essay

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Mortality Salience	33	3.0303	1.07485	.18711	2.6492	3.4114	1.00	5.00
Dental Pain	33	3.7273	.97701	.17008	3.3808	4.0737	2.00	5.00
College	33	3.4545	.93845	.16336	3.1218	3.7873	2.00	5.00
Total	99	3.4040	1.02936	.10345	3.1987	3.6093	1.00	5.00

ANOVA

I feel could have written this essay

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.141	2	4.071	4.084	.020
Within Groups	95.697	96	.997		
Total	103.838	98			

Post Hoc Tests

Multiple Comparisons

Dependent Variable: I feel could have written this essay

Tukey HSD

(I) Condition (1 = MS, 2 = DP, 3 = C)	(J) Condition (1 = MS, 2 = DP, 3 = C)	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Mortality Salience	Dental Pain	-.69697*	.24579	.015	-1.2821	-.1118
	College	-.42424	.24579	.201	-1.0094	.1609
Dental Pain	Mortality Salience	.69697*	.24579	.015	.1118	1.2821
	College	.27273	.24579	.511	-.3124	.8579
College	Mortality Salience	.42424	.24579	.201	-.1609	1.0094
	Dental Pain	-.27273	.24579	.511	-.8579	.3124

*. The mean difference is significant at the 0.05 level.

Appendix E- Demographics- Study Two

Statistics

		Gender (1=Male, 2=Female)	Age	Race/Ethnicity (1=Caucasian, 2=Hispanic, 3= Native Indian, 4=African American, 5= Asian American, 6=Other)	Is English your first language	Are you a student at FIU	Highest level of education completed
N	Valid	232	232	232	232	232	230
	Missing	0	0	0	0	0	2
Mean		1.62	30.69	2.38	1.58	1.72	4.00
Std. Deviation		.487	12.103	1.217	.494	.452	1.625
Minimum		1	16	1	1	1	1
Maximum		2	68	6	2	2	8

Gender (1=Male, 2=Female)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	89	38.4	38.4	38.4
	Female	143	61.6	61.6	100.0
	Total	232	100.0	100.0	

Race/Ethnicity (1=Caucasian, 2=Hispanic, 3= Native Indian, 4=African American, 5= Asian American, 6=Other)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Caucasian	25	10.8	10.8	10.8
	Hispanic American	167	72.0	72.0	82.8
	African American	23	9.9	9.9	92.7
	Asian American	2	.9	.9	93.5
	Other	15	6.5	6.5	100.0
	Total	232	100.0	100.0	

Is English your first language

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	97	41.8	41.8	41.8
	No	135	58.2	58.2	100.0
	Total	232	100.0	100.0	

Are you a student at FIU

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	66	28.4	28.4	28.4
	No	166	71.6	71.6	100.0
	Total	232	100.0	100.0	

Highest level of education completed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than HS	5	2.2	2.2	2.2
	High school/ GED	35	15.1	15.2	17.4
	Some College	60	25.9	26.1	43.5
	Associates degree	52	22.4	22.6	66.1
	Bachelors degree	44	19.0	19.1	85.2
	Some grad school	12	5.2	5.2	90.4
	Master's Degree	12	5.2	5.2	95.7
	Doctorate/PhD	10	4.3	4.3	100.0
	Total	230	99.1	100.0	
Missing	System	2	.9		
Total		232	100.0		

Appendix F – Crosstabs and Chi Square – Study Two

Condition (1=MS, 2=DP) * Without looking back, tell me whether the open-ended question you completed at the beginning asked you to write about death, dental pain, or getting into college. Crosstabulation

			Without looking back, tell me whether the open-ended question you completed at the beginning asked you to write about death, dental pain, or getting into college.			Total
			Death	Dental Pain	College	
Condition (1=MS, 2=DP)	Mortality Salience	Count	106	8	0	114
		% within Condition (1=MS, 2=DP)	93.0%	7.0%	0.0%	100.0%
	Dental Pain	Count	7	110	1	118
		% within Condition (1=MS, 2=DP)	5.9%	93.2%	0.8%	100.0%
Total		Count	113	118	1	232
		% within Condition (1=MS, 2=DP)	48.7%	50.9%	0.4%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	175.887[a]	2	.000
Likelihood Ratio	210.549	2	.000
Linear-by-Linear Association	172.669	1	.000
N of Valid Cases	232		

a. 2 cells (33.3%) have expected count less than 5. The minimum expected count is .49.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.871	.000
	Cramer's V	.871	.000
N of Valid Cases		232	

Appendix G – Crosstabs and Chi Square – Study Two

Warning (1=Warning, 2=No Warning) * Based on what we told you at the beginning of the study, do we expect people reminded of death to be more pessimistic, optimistic, or angry? Crosstabulation

			Based on what we told you at the beginning of the study, do we expect people reminded of death to be more pessimistic, optimistic, or angry?				Total
			Pessimistic	Optimistic	Angry	I don't know	
Warning (1=Warning, 2=No Warning)	Warning	Count	4	105	1	9	119
		% within Warning (1=Warning, 2=No Warning)	3.4%	88.2%	0.8%	7.6%	100.0%
	No Warning	Count	41	24	7	41	113
		% within Warning (1=Warning, 2=No Warning)	36.3%	21.2%	6.2%	36.3%	100.0%
Total		Count	45	129	8	50	232
		% within Warning (1=Warning, 2=No Warning)	19.4%	55.6%	3.4%	21.6%	100.0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	106.179[a]	3	.000
Likelihood Ratio	117.348	3	.000
Linear-by-Linear Association	5.065	1	.024
N of Valid Cases	232		

a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 3.90.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.677	.000
	Cramer's V	.677	.000
N of Valid Cases		232	

Appendix H – ANOVA Word Fragments – Study Two

Descriptive Statistics

Dependent Variable: Number of word fragments completed with death-related words

Condition (1=MS, 2=DP)	Warning (1=Warning, 2=No Warning)	Mean	Std. Deviation	N
Mortality Salience	Warning	2.28	.539	69
	No Warning	2.36	.645	45
	Total	2.31	.582	114
Dental Pain	Warning	.76	.431	50
	No Warning	.78	.418	68
	Total	.77	.422	118
Total	Warning	1.64	.899	119
	No Warning	1.41	.932	113
	Total	1.53	.921	232

Tests of Between-Subjects Effects

Dependent Variable: Number of word fragments completed with death-related words

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	136.954[a]	3	45.651	176.744	.000
Intercept	533.079	1	533.079	2063.868	.000
Condition	133.818	1	133.818	518.090	.000
Warning	.139	1	.139	.538	.464
Condition * Warning	.052	1	.052	.200	.655
Error	58.890	228	.258		
Total	736.000	232			
Corrected Total	195.845	231			

a. R Squared = .699 (Adjusted R Squared = .695)

Between-Subjects Factors

		Value Label	N
Condition (1=MS, 2=DP)	1	Mortality Salience	114
	2	Dental Pain	118
Warning (1=Warning, 2=No Warning)	1	Warning	119
	2	No Warning	113

Appendix I – ANOVA Optimism About the Future– Study Two

Between-Subjects Factors

			Value Label	N
Condition (1=MS, 2=DP)	1		Mortality Salience	114
	2		Dental Pain	118
Warning (1=Warning, 2=No Warning)	1		Warning	119
	2		No Warning	113

Descriptive Statistics

Dependent Variable: I share the author's views about progress

Condition (1=MS, 2=DP)	Warning (1=Warning, 2=No Warning)	Mean	Std. Deviation	N
Mortality Salience	Warning	2.90	1.601	69
	No Warning	1.84	1.127	45
	Total	2.48	1.518	114
Dental Pain	Warning	2.96	.832	50
	No Warning	2.63	1.573	68
	Total	2.77	1.317	118
Total	Warning	2.92	1.329	119
	No Warning	2.32	1.459	113
	Total	2.63	1.424	232

Tests of Between-Subjects Effects

Dependent Variable: I share the author's views about progress

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	38.191[a]	3	12.730	6.751	.000
Intercept	1495.633	1	1495.633	793.163	.000
Condition	10.101	1	10.101	5.357	.022
Warning	26.732	1	26.732	14.177	.000
Condition * Warning	7.389	1	7.389	3.919	.049
Error	429.930	228	1.886		
Total	2072.000	232			
Corrected Total	468.121	231			

a. R Squared = .082 (Adjusted R Squared = .069)

Condition (1=MS, 2=DP) = Mortality Salience

Between-Subjects Factors[a]

		Value Label	N
Warning (1=Warning, 2=No Warning)	1	Warning	69
	2	No Warning	45

a. Condition (1=MS, 2=DP) = Mortality Salience

Descriptive Statistics[a]

Dependent Variable: I share the author's views about progress

Warning (1=Warning, 2=No Warning)	Mean	Std. Deviation	N
Warning	2.90	1.601	69
No Warning	1.84	1.127	45
Total	2.48	1.518	114

a. Condition (1=MS, 2=DP) = Mortality Salience

Tests of Between-Subjects Effects[a]

Dependent Variable: I share the author's views about progress

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	30.264[b]	1	30.264	14.724	.000
Intercept	612.720	1	612.720	298.108	.000
Warning	30.264	1	30.264	14.724	.000
Error	230.201	112	2.055		
Total	963.000	114			
Corrected Total	260.465	113			

a. Condition (1=MS, 2=DP) = Mortality Salience

b. R Squared = .116 (Adjusted R Squared = .108)

Condition (1=MS, 2=DP) = Dental Pain

Between-Subjects Factors[a]

		Value Label	N
Warning (1=Warning, 2=No Warning)	1	Warning	50
	2	No Warning	68

a. Condition (1=MS, 2=DP) = Dental Pain

Descriptive Statistics[a]

Dependent Variable: I share the author's views about progress

Warning (1=Warning, 2=No Warning)	Mean	Std. Deviation	N
Warning	2.96	.832	50
No Warning	2.63	1.573	68
Total	2.77	1.317	118

a. Condition (1=MS, 2=DP) = Dental Pain

Tests of Between-Subjects Effects[a]

Dependent Variable: I share the author's views about progress

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3.093[b]	1	3.093	1.796	.183
Intercept	901.127	1	901.127	523.363	.000
Warning	3.093	1	3.093	1.796	.183
Error	199.729	116	1.722		
Total	1109.000	118			
Corrected Total	202.822	117			

a. Condition (1=MS, 2=DP) = Dental Pain

b. R Squared = .015 (Adjusted R Squared = .007)

Warning (1=Warning, 2=No Warning) = Warning

Between-Subjects Factors[a]

		Value Label	N
Condition (1=MS, 2=DP)	1	Mortality Salience	69
	2	Dental Pain	50

a. Warning (1=Warning, 2=No Warning) = Warning

Descriptive Statistics[a]

Dependent Variable: I share the author's views about progress

Condition (1=MS, 2=DP)	Mean	Std. Deviation	N
Mortality Salience	2.90	1.601	69
Dental Pain	2.96	.832	50
Total	2.92	1.329	119

a. Warning (1=Warning, 2=No Warning) = Warning

Tests of Between-Subjects Effects[a]

Dependent Variable: I share the author's views about progress

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	.109[b]	1	.109	.062	.805
Intercept	995.067	1	995.067	559.161	.000
Condition	.109	1	.109	.062	.805
Error	208.210	117	1.780		
Total	1226.000	119			
Corrected Total	208.319	118			

a. Warning (1=Warning, 2=No Warning) = Warning

b. R Squared = .001 (Adjusted R Squared = -.008)

Warning (1=Warning, 2=No Warning) = No Warning

Between-Subjects Factors[a]

		Value Label	N
Condition (1=MS, 2=DP)	1	Mortality Salience	45
	2	Dental Pain	68

a. Warning (1=Warning, 2=No Warning) = No Warning

Descriptive Statistics[a]

Dependent Variable: I share the author's views about progress

Condition (1=MS, 2=DP)	Mean	Std. Deviation	N
Mortality Salience	1.84	1.127	45
Dental Pain	2.63	1.573	68
Total	2.32	1.459	113

a. Warning (1=Warning, 2=No Warning) = No Warning

Tests of Between-Subjects Effects[a]

Dependent Variable: I share the author's views about progress

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	16.811[b]	1	16.811	8.416	.004
Intercept	542.723	1	542.723	271.704	.000
Condition	16.811	1	16.811	8.416	.004
Error	221.720	111	1.997		
Total	846.000	113			
Corrected Total	238.531	112			

a. Warning (1=Warning, 2=No Warning) = No Warning

b. R Squared = .070 (Adjusted R Squared = .062)