More than words: Contemplating death enhances positive emotional word use ☆

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A R T I C L E   I N F O

A B S T R A C T

Four experiments, three cross-sectional and one longitudinal, tested the hypothesis that contemplating one's own death produces a shift toward the use of positive emotion words. Participants who wrote about their own death, compared with those who wrote about dental pain, uncertainty, and meaningless, used more positive emotions words in their narratives (Experiments 1a and 1b). Experiment 2 found that contemplating one's own death enhanced positive emotional word use across different mortality salience manipulations and remained consistent over the course of a 6-day study. Experiment 3 showed that the more positive emotion words participants used when contemplating their mortality, the greater worldview defense they showed. These results suggest that word use offers insight into how the mind responds to the salience of mortality.

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1. Introduction

Words and death are among the most common and inevitable parts of life. But they are more than banal and fated parts of human existence—word use and awareness of death offer insight into the architecture of the human psyche. Most people are unaware of how their word use reflects their personality and current life situation. Humans, while aware of their own mortality, are often oblivious to the fact that a wide range of their thoughts and behaviors may protect them from the potential for debilitating anxiety that accompanies awareness of death's inevitability (Pyszczynski, Greenberg, & Solomon, 1999; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

The present work sought to demonstrate that contemplating one's own death promotes the use of positive emotion words. Grounded in Terror Management Theory (TMT), our first hypothesis was that when mortality is made salient by instructing people to consider their own death, there would be an increase in positive emotion word use in a writing task. Our second hypothesis was that compared with contemplation of a topic unrelated to death, people would increase positive emotional word use each time they contemplate their own death (i.e., continual reoccurrence of defensive reactions). Our third hypothesis was that greater positive emotion word use might be a healthy strategy in the immediate aftermath of contemplating one's death, but as time goes on, other immature, coping strategies might be activated to deal with unresolved death anxiety.

1.1. Words as fingerprints into the motivated mind

Freud (1989) believed that the words people use reveal critical information on the inner workings of the psyche. Cognitive psychologists have shown that words are "embodied" in that their meaning is intimately linked with motor movements (Siakaluk, Pexman, Aguilera, Owen, & Sears, 2008). Social psychologists have shown that word choice has substantial effects on social relationships and well-being (e.g., DeWall, Pond, Campbell, & Twenge,

2011; Pennebaker, Mehl, & Niederhoffer, 2003). These findings suggest that word use relates to a variety of psychological processes.

Relatively little research, however, has investigated how acute awareness of one's mortality influences positive emotion word use. TMT proposes a framework for how the mind defends itself against the dread of contemplating an inevitable demise (Pyszczynski et al., 1999). In the short term, *proximal defenses* such as suppression attempts push death-related thoughts outside of conscious awareness. When these proximal defenses are unsuccessful, existential dread manifests at the unconscious level. *Distal defenses*, such as affirmation of one's cultural worldview, serve as another line of defense to protect against the accessibility of death-related thoughts. A cultural worldview provides an explanation for existence and a set of values about how to behave in a socially acceptable way. By acting in accordance with the dominant values of one's culture, such as showing favoritism for one's in-group and hostility toward one's out-group, people can feel a sense of security and stability that in turn, temporarily wards off the threat of death (Burke, Martens, & Faucher, 2010).

The current experiments tested the hypothesis that when people are confronted with a conscious reminder of their eventual death, their word use would shift to include positive emotion words. Although the original TMT formulation does not draw a connection between positive word use and defensive reactions to death reminders, prior work suggests that mortality salience causes people to become attuned to positive emotional information and direct their attention away from painful stimuli. People who contemplated their own mortality, compared with those who contemplated dental pain, completed more word fragments with positive emotion words and gave greater weight to positive emotion in their judgments of word similarity (DeWall & Baumeister, 2007). When people were primed with death-related words (vs. pain-related words), they reported a more positive evaluation of their life (King, Hicks, & Abdelkhalik, 2009). Although prior investigations did not examine the effect of mortality salience on word use, they suggest that mortality salience increases attunement to positive thinking while shifting attention away from threatening stimuli.

1.2. Word use and coping with threat

Emerging evidence suggests that words provide useful information on how people cope with threatening events. For instance, as people grow older, they face more reminders that their life will end. Increased awareness of the end of one's life causes people to shift their focus to positive emotional stimuli (Charles, Mather, & Carstensen, 2003), with a premium on repeating activities that successfully increased positive emotions in the past (Carstensen, Isaacowitz, & Charles, 1999). If people change their word use as the awareness of their death becomes increasingly salient, then people may use more positive emotion words as they grow nearer to the end of their lives. This is precisely the case: people use more positive emotion words in their narratives as their age increases (Pennebaker & Stone, 2003). Therefore, we predicted that young people would show increased use of positive emotion words when their own mortality is the focus of their attention.

1.3. Implications of positive emotion word use on distal defensive responses

In response to mortality salience, the use of positive emotion words may be associated with an increase in immature defensive strategies to cope with the threat of death. We tested this possibility in Experiment 3 by having participants evaluate essays that were ostensibly written by foreigners who immigrated to the United States and expressed positive or negative comments about the United States. We predicted that positive emotion word use would

interact with mortality salience condition to predict worldview defense, such that a pro-US bias would be stronger among those using a greater frequency of positive words when contemplating their own death.

1.4. Experiments 1a and 1b

Experiments 1a and 1b provided an initial test of the hypothesis that mortality salience produces a shift toward positive linguistic emotional word use. Experiment 1a compared mortality salience with a standard control condition used in TMT research, namely contemplation of experiencing dental pain. Experiment 1b supplemented the dental pain condition with two other control conditions by having some participants contemplate uncertainty in their lives and others contemplate meaninglessness.

2. Method

2.1. Participants

Participants in Experiment 1a ($N = 271$) and 1b ($N = 170$) were undergraduates. All participants received partial course credit for their participation. In Experiment 1a, neither age nor gender were recorded, but the sample was taken from introductory psychology courses in which students are approximately 19 years old and approximately 70% are women. In Experiment 1b, average age was 18.73 years and 53.5% were women.

2.2. Materials and procedure

Participants gave informed consent and then completed a series of questions ostensibly measuring their projective life attitudes, which in reality was the mortality salience manipulation. In Experiment 1a, participants were assigned randomly to one of two conditions: mortality salience or dental pain salience; used frequently in the TMT literature (Burke et al., 2010). In Experiment 1b, we included two additional conditions used by TMT researchers (e.g., Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006): uncertainty salience and meaninglessness salience.

Participants assigned to the mortality salience condition wrote two brief narratives in response to prompts about their own death ("Please briefly describe the emotions that the thought of your own death arouses in you," "Jot down, as specifically as you can, what you think will happen to *you* as you physically die and once you are physically dead"). Parallel prompts were used in the dental pain (e.g., "Please briefly describe the emotions that the thought of dental pain arouses in you"), uncertainty salience (e.g., "Please briefly describe the emotions that the thought of your being uncertain arouses in you"), and meaninglessness salience (e.g., "Please briefly describe the emotions that the thought of your being meaningless arouses in you") conditions.

To analyze the content of the narratives, we used the Linguistic Inquiry Word Count program (LIWC; Pennebaker, Booth, & Francis, 2007). The LIWC is a well-validated program that counts the percentage of words in a body of text that correspond to various categories (Mehl, 2006). The program uses an internal default dictionary comprised of several word categories according to how much a group of words relate to a particular topic. The LIWC word categories have adequate psychometric properties (Pennebaker et al., 2007). Examples of positive emotion words include "happy" and "good".

3. Results and discussion

Using hierarchical multiple regression analyses, we entered as a covariate the total number of words used in narratives. We also

controlled for the number of negative emotion words used to determine if contemplation of one's death influenced positive emotion word use above and beyond the effect of negative emotions. The narratives in Experiment 1a contained 14,944 total words, per person average of 55.14; Experiment 1b narratives contained 15,011 words, per person average of 88.30.

As predicted, mortality salience participants in both experiments used significantly more positive emotion words in their narratives compared with participants in other conditions. In Experiment 1a, mortality salience resulted in more positive words in narratives ($M = 3.67$, $SD = 3.78$) than did dental pain ($M = 1.35$, $SD = 1.87$), $F(1,267) = 24.02$, $p < .001$, $d = 0.78$. In Experiment 1b, mortality salience resulted in more positive emotion words in narratives ($M = 3.84$, $SD = 2.97$) than did dental pain ($M = 2.36$, $SD = 1.75$), meaninglessness salience ($M = 2.56$, $SD = 2.32$), and uncertainty salience ($M = 2.61$, $SD = 1.62$), all Fs > 6.29, ps < .02, ds > 0.51. In a focused contrast, mortality salience resulted in positive emotion words in narratives than did the other three conditions, $F(1,166) = 5.04$, $p < .03$, $d = 0.53$. Participants in the dental pain, uncertainty salience, and meaninglessness salience conditions did not differ in positive emotion word use, all ps > .61. Thus, mortality salience caused a shift toward positive emotion word use relative to three alternative negative topics—dental pain, uncertainty, and meaninglessness. The specificity of the effect to mortality salience supports the view that awareness of one's mortality increases positive emotion word use functions.

3.1. Experiment 2

Experiment 2 extended Experiments 1a and 1b in two ways. First, we analyzed word use in a study using experimental, experience-sampling methodology in which participants contemplated their own mortality (or dental pain) once each day over the course of six days (Lykins et al., 2007). We hoped to demonstrate that increased positive emotion use represents a basic proximal defensive response that remains consistent over time. This would be shown by relatively high levels of variability between conditions (showing enhanced use of positive emotion words between participants who contemplated their death and those who did not) and little variability within each condition over time. This is the first study of whether people become habituated to mortality salience manipulations over time. If responses to mortality salience manipulations are consistent over time, it would match TMT theorizing that awareness of death is something that people defend against each day.

Second, the presence in this study of an additional mortality salience condition permitted a test of the generalizability of increased positive emotion word use in response to reminders of one's own death. Following procedures from Cozzolino, Staples, Meyers, and Samboceti (2004), the additional condition (death reflection) had participants focus on their own death by imagining a real death, offering a review of their own life, and taking the perspective of others who would be affected by their own death. Because prior work has shown differences between death reflection and mortality salience conditions on distal defensive responses, adding the death reflection condition provided an ambitious test of whether enhanced use of positive emotion words constitutes a response to conscious reminders of one's own death (independent of how mortality is made salient).

4. Method

4.1. Participants

Undergraduates ($N = 149$) participated in exchange for partial course credit. Average age was 19.1 years and 80% were women.

The sample size decreased from 149 at Day 1–103 at Day 6 (31% attrition), but this was not significantly predicted by demographics or condition.

4.2. Materials and procedure

Participants arrived at a laboratory for the first session of a 6-day longitudinal study. Participants gave informed consent and then answered open-ended experimental questions. Participants were randomly assigned to one of three conditions: mortality salience, dental pain, and death-thought reflection. The mortality salience and dental pain instructions were identical to those used in Experiments 1a and 1b. Participants in the death-thought reflection group were asked to imagine themselves caught in a building fire, were frantically trying to escape, but eventually succumbed to the smoke and fire. Next, death-thought reflection participants wrote about the thoughts and emotions they felt while imagining the scenario, how they would handle the final moment before their death, how they would perceive their life up to that point, and how their friends and family would react if the event actually occurred.

Each day for the next 4 days (Days 2–5), participants completed their respective essay writing task as on Day 1 and submitted their daily responses through the Internet. On Days 2 and 4, mortality salience participants wrote about the thoughts, feelings, and emotions that the thought of their own death aroused in them; dental pain participants were given parallel instructions to write about dental pain; death-thought reflection participants wrote about their thoughts and emotions and how they would handle their final moments in life. On Days 3 and 5, the death-processing group was asked to write about the life they had led up to the point of their death and how their family and friends would react; the mortality salience group was asked to write about what will happen to them physically after death; and the dental-pain group was asked to write about what will happen to them physically as they experience dental pain. On the final day of the study (Day 6), participants returned to the lab and completed the final essay writing task, using the same prompts from Day 1.

5. Results and discussion

Because of our longitudinal, within-person design, we employed multi-level modeling procedures to account for the nesting of days within individuals (SAS Proc Mixed; Singer, 1998). We again included the number of words and negative emotion words as covariates. We controlled for day, but positive emotion word use did not significantly decrease over time after controlling for total number of words, $\gamma = -.019$ ($SE = .013$), $p < .13$. There was no random effect of day. The narratives contained a total of 107,181 words, per person daily average of 137.06.

Results revealed significant variation between the three experimental groups in how many positive emotion words participants included in their narratives, $F(2,145) = 11.12$, $p < .001$. Compared with dental pain (0.16, $SD = 0.47$), the mortality salience condition resulted in more positive emotion words (0.50, $SD = 0.71$), $\gamma = .31$ ($SE = .07$), $p < .001$. Death-thought reflection also resulted in more positive emotion words (0.42, $SD = 0.65$) relative to dental pain, $\gamma = .26$ ($SE = .07$), $p < .001$. Mortality salience and death-thought reflection conditions did not differ in positive emotion word use, $\gamma = .05$ ($SE = .07$), $p = .47$.

Experiment 2 extended the previous studies in two ways. First, we found enhanced positive emotion word use among participants who contemplated their own death in two ways: by making mortality salient and by vividly contemplating the circumstances surrounding one's death in a concrete situation. Although prior work has shown that mortality salience and death reflection

manipulations can produce different effects (e.g., Cozzolino et al., 2004; Lykins et al., 2007), the similarity in positive emotion word use in both conditions suggests that a shift toward positive emotions may represent a basic response to the threat of one's own death. Second, we found that enhanced positive emotional expression among mortality salience and death-thought reflection participants remained constant over the course of 6-days (controlling total words). Thus, the salience of one's own death remains a potent threat each day and therefore linguistic shifts in positive emotional word use emerge each time people contemplate their own mortality. What they did not demonstrate, however, was whether these shifts in positive emotion word use may have implications for worldview defense. To test this possibility, we conducted a final experiment.

5.1. Experiment 3

In this study, we directly examined whether an attunement toward positive words reflects a proximal defense strategy to manage death anxiety. Automatic activation of positive imagery, as indexed by positive word use, could aid in the suppression of death-related thoughts and feelings, and in turn, lead to greater downstream, distal defenses, as indexed by worldview defense. Specifically, positive word use was hypothesized to moderate terror management processes—amplifying worldview defense.

Worldview defense was operationalized as a biased preference for foreigners writing essays with positive comments about the United States and disdain toward foreigners writing essays with negative comments about the United States. We hypothesized a two-way interaction of positive word use with induction condition, such that the effect of morality salience on pro-US bias would be stronger among those using a greater frequency of positive words when contemplating their own death. Supportive findings would show that positive word use reflects a coping strategy outside of conscious awareness to handle existential concerns.

6. Method

6.1. Participants

Undergraduates ($N = 64$) participated in exchange for partial course credit. Average age was 19.5 years and 78% were female.

6.2. Materials and procedure

Participants gave informed consent and were randomly assigned to one of two conditions: mortality salience or television salience (e.g., briefly describe emotions felt while imagining watching television and jot down what will happen to you physically as you watch as well as afterwards). Participants in each condition wrote brief essays with instructions similar to Experiments 1–2. Experimental conditions were followed by an assessment of mood, which served as a delay between the induction and the worldview defense outcome. In the second phase, participants were told that the experimenter collected essays written by foreigners who immigrated to the US and was interested in how students respond to these essays. Counterbalanced for order, participants read one pro-US essay and one anti-US essay (for details, see Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992). After reading each essay, using a 9-point scale from 1 (*not at all*) to 9 (*very much*), participants made evaluations of both the author (liked them, thought they were intelligent and knowledgeable; $\alpha = .84$) and the essay (agreed with the opinion; thought the opinion was valid; ($\alpha = .86$).

7. Results and discussion

Hierarchical multiple regression analyses were performed. We expected to find an interaction effect such that the effects of mortality salience on worldview defense would be greater in the presence of higher use of positive emotion words. We again included both the number of words and negative emotion words as covariates. The narratives contained a total of 5,167 words, per person average of 80.73.

As predicted, we found evidence that positive word use moderated the effect of mortality salience on pro-US bias (indicator of worldview defense), $t(62) = 2.03$, $p = .046$, $d = 0.52$. Upon examining simple slopes by using dummy codes for experimental conditions (Cohen, Cohen, West, & Aiken, 2003), we found evidence that when mortality was made salient, greater positive word use tended to associated with greater worldview defense (pro-U.S. bias), $b = 0.46$, $t = 1.85$, $p = .06$, and in the control condition, positive word use had no association with worldview defense, $b = -0.15$, $t = -0.88$, $p = .38$. Thus, the influence of mortality salience on worldview defense was amplified for people showing evidence of higher use of positive emotion words.

Additional analyses showed that people in the mortality salience condition ($M = 3.89$, $SD = 7.36$) did not significantly differ from the television condition ($M = 2.59$, $SD = 7.51$) in the use of positive emotion words, $t(62) = 1.10$, $p = .28$, $d = 0.28$. However, the directionality and effect size replicated results of the three previous studies.

8. General discussion

The current work offers novel evidence regarding the close relationship between word use and awareness of death. When asked to contemplate their own death, people use positive emotion words to direct attention away from death. Insofar as death poses a consistent and potent threat, we found that the effect of mortality salience on positive emotion word use was stable across various manipulations and an increase in positive emotion word use occurs each time mortality is made salient over time.

In Experiments 1a, 1b and 2, participants who contemplated their own death used more positive emotion words in written narratives compared with participants who wrote about dental pain, uncertainty, and meaninglessness. Experiment 3 showed a similar, albeit non-significant, pattern of results. In Experiment 2, the shift toward the use of positive emotion words occurred across two different mortality salience manipulations. Over the course of a 6-day study, Experiment 2 showed that participants contemplating their own mortality used a higher frequency of positive emotion words each day relative to participants contemplating dental pain, an effect that did not show signs of habituation.

Experiment 3 demonstrated that positive emotion word use had direct implications for distal defensive responses, namely worldview defense. Specifically, participants using frequent positive emotion words expressed the highest pro-U.S. bias when evaluating essays ostensibly written by immigrants who expressed positive or negative comments about the United States. The implication is that automatic activation of positive imagery through positive word use aids in the suppression of death-related thoughts and feelings, which has implications for greater use of downstream, distal defenses. These findings dovetail with recent suggestions that in certain, predicable situations, the presence of positive words, emotions, and thoughts are not inherently healthy, and this mental activity can reflect an unwillingness to be contact with distress (in this case, the inevitability of one's death) (Gruber, Mauss, & Tamir, 2011).

More broadly, language and awareness of death are intimately linked. Language enables people to imbue their surroundings with meaning and likely gave rise to modern culture. Culture, in turn, provides people with the necessary means to direct their attention away from the potential for anxiety that accompanies awareness of death by seeking meaning through adherence to a cultural worldview and maintaining a positive sense of self that is aligned with that cultural worldview. The current work suggests that in addition to providing people with an effective means of transmitting information, word use shifts according to the salience of one's mortality. Words work to both decrease fear and direct attention away from the awareness of death. Our four studies contribute to a burgeoning literature suggesting that the awareness of death can promote positive experiences such as motivating people to re-prioritize goals to improve social relationships, enhance physical health, and contribute to causes bigger than the self (Vail et al., 2012). Formal and informal interventions to improve people's reactions to death, increasing a receptive and accepting mindset, may increase the likelihood of these healthy trajectories (Niemiec et al., 2010).

9. Limitations and future directions

Despite the consistency of our effects, several limitations warrant consideration. First, we did not examine potential moderators of our effects. It is possible that people already facing the prospect of their own mortality (e.g., hospice patients) would be relatively unaffected by our mortality salience manipulations because their positive emotion word use would already be relatively high. In contrast, some people may be relatively immune to the effect of mortality salience on positive emotion word use. Depressed people, for example, show relatively poor recovery to negative and stressful events (Koole & Jostmann, 2004; McFarland & Buehler, 1998). Depressive (DeWall et al., 2011) and social anxiety (Kashdan & Steger, 2006) symptoms relate to lower positive attunement in the wake of negative experiences. People with these emotional disturbances may not use more positive emotion words when contemplating their mortality.

Future research can explore whether and how positive emotion word use explains other distal defensive responses that often accompany mortality salience. For example, mortality salience increases aggression toward people who threaten one's worldview (McGregor et al., 1998). Might this relationship be strongest among people who frequently use positive emotion words when contemplating mortality? If so, this raises questions regarding whether positive emotion word use can be considered an inherently "positive" response.

Humans, unlike any other animal, have a keen awareness of their own mortality. People also have sophisticated defensive responses that help undermine the potential crippling anxiety that accompanies mortality salience. The current research uncovered yet another means by which people defend themselves against the threat of death. When describing our own death, we alter our speech to include more positive emotion words. This linguistic adjustment has implications for more distal defensive responses, such as defending one's worldview. By demonstrating that mortality salience increases positive word use, the current work illustrates another way that humans use our unique language abilities to defend against the dread of death.

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