

Adjusting to Death: The Effects of Mortality Salience and Self-Esteem on Psychological Well-Being, Growth Motivation, and Maladaptive Behavior

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This research builds on terror management theory to examine the relationships among self-esteem, death cognition, and psychological adjustment. Self-esteem was measured (Studies 1–2, 4–8) or manipulated (Study 3), and thoughts of death were manipulated (Studies 1–3, 5–8) or measured (Study 4). Subsequently, satisfaction with life (Study 1), subjective vitality (Study 2), meaning in life (Studies 3–5), positive and negative affect (Studies 1, 4, 5), exploration (Study 6), state anxiety (Study 7), and social avoidance (Study 8) were assessed. Death-related cognition (a) decreased satisfaction with life, subjective vitality, meaning in life, and exploration; (b) increased negative affect and state anxiety; and (c) exacerbated social avoidance for individuals with low self-esteem but not for those with high self-esteem. These effects occurred only when death thoughts were outside of focal attention. Parallel effects were found in American (Studies 1–4, 6–8) and Chinese (Study 5) samples.

Keywords: self-esteem, mortality salience, well-being

Man is literally split in two: he has an awareness of his own splendid uniqueness in that he sticks out of nature with a towering majesty, and yet he goes back into the ground a few feet in order blindly and dumbly to rot and disappear forever. It is a terrifying dilemma to be in and to have to live with. (Becker, 1973, p. 26)

How do people maintain a positive view of their lives and function as psychologically healthy organisms with the knowledge that all roads in life are ultimately dead ends? According to terror management theory (TMT; Solomon, Greenberg, & Pyszczynski, 1991), the human awareness of inevitable death has the potential to produce enormous distress and thus undermine adaptive psychological functioning. However, most people, despite knowledge of their biological limitations, seemingly navigate through daily life happy and well-adjusted (Diener & Diener, 1996; Pew Research Center, 2006) rather than being debilitated by insecurities about mortality. TMT posits that people can function with relative psychological equanimity despite their awareness of death, in part, because they possess a sense of personal significance and value (i.e., self-esteem). Self-esteem mitigates concerns about human transience by bolstering a symbolic self that is more meaningful and ultimately more enduring than the physical self.

A key implication of the above proposition is that mortality awareness has the potential to undercut psychological adjustment for those who are not protected from mortality concerns with high self-esteem. Surprisingly, however, past literature has not examined the empirical links among self-esteem, death cognition, and psychological adjustment. Therefore, the current research addresses the following questions: Does contemplating one's mortality threaten psychological adjustment? Does self-esteem protect people from this potential threat to adaptive psychological functioning? Do these effects generalize beyond Western (i.e., American) samples to an East Asian (i.e., Chinese) sample? Further, research on terror management processes has primarily examined the effects of a single and short (i.e., within one experimental session) death priming condition. However, considering that adjustment may be particularly influenced by reoccurring threatening cognitions, we use a paradigm in which mortality salience is repeated over a period of time in the current research to examine longer term effects of existential threat. Do reoccurring contemplations of mortality perturb adaptive functioning among individuals with low self-esteem weeks later or, alternatively, are these health detriments confined to immediate thoughts and feelings?

Death as a Psychological Threat: TMT

Like other organisms, humans strive for self-preservation. However, humans alone must face the full realization that life is transient, and death can come at any time and be inflicted by causes that often cannot be predicted or controlled. Drawing largely from the work of cultural anthropologist Ernest Becker (1971, 1973), TMT (Solomon et al., 1991) asserts that people are highly motivated to avoid the anxiety that the knowledge of personal mortality may cause, and they do so, in part, with the

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construction, maintenance, and defense of cultural worldviews such as religious and secular ideologies. Worldviews facilitate symbolic conceptions of self (i.e., social and cultural identities) that are not constrained by the limitations of the physical self. For example, the Christian worldview takes a biological entity (i.e., a human being) and transforms her or him into a spiritual entity with a soul that will live eternally. Religious and nonreligious worldviews also offer a sense of symbolic self-endurance to the extent that they promote a collective self that will transcend the individual self. For example, every American will eventually die, but the United States has the prospect to persist long into the future and thus so does part of every American. People know that ultimately their bodies will die and decay. However, solace is found from feeling as if part of one's self and identity transcends physical death.

A large body of research supports these basic tenets of TMT. One way these tenets are tested is with the *mortality salience hypothesis*, which proposes that if certain structures (e.g., worldviews) provide protection from the psychological consequences of death awareness, then heightening the awareness of death (i.e., mortality salience) will, in turn, increase investment in these structures. In support of this hypothesis, mortality salience inductions (e.g., writing about one's own mortality, being primed with death-related imagery or words, standing in front of a funeral home, engaging in death-related health screenings) relative to other threat inductions (e.g., uncertainty, failure, public speaking, social exclusion, paralysis, dental pain) increase (a) affinity for those who share important cultural beliefs and traditions (Greenberg et al., 1990), (b) hostility and aggression toward those perceived as threats to important cultural beliefs (H. A. McGregor et al., 1998), (c) the sacred treatment of cultural icons (e.g., American flag, crucifix; Greenberg, Simon, Porteus, Pyszczynski, & Solomon, 1995), (d) negativity toward stimuli that undermine perceptions of a meaningful and coherent world (e.g., modern art; Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006), (e) feelings of ingroup entitativity (i.e., belief that culturally derived social groups are real entities; Castano, Yzerbyt, Paladino, & Sacchi, 2002), (f) belief that one's collective self (e.g., cultural identity) will continue to thrive in the future (Sani, Herrera, & Bowe, 2009), (g) belief in the divine and supernatural (Norenzayan & Hansen, 2006), and (h) efforts to deny similarities to other biological organisms (Goldenberg et al., 2001).

In sum, one prevalent response to situations that heighten an awareness of physical transience is an increased investment in a culturally derived symbolic world that allows humans to be more than mortal. However, according to the theory, believing in a cultural worldview that facilitates an enduring symbolic sense of self is necessary, but not sufficient, for a successful psychological defense against death awareness. People also need to feel as if they are valued and meaningful contributors to their culture and thus worthy of the self-transcendence that it affords. That is, they need self-esteem.

The Existential Role of Self-Esteem

Self-esteem has been credited with bolstering health and well-being in response to a broad range of psychological threats. For example, self-enhancement predicts psychological well-being and physical health in times of stress (Marshall & Brown, 2007;

Sedikides, Gregg, & Hart, 2007; S. E. Taylor, Lerner, Sherman, Sage, & McDowell, 2003a, 2003b). Affirming a positive view of self also helps provide the psychological fortitude needed to accept self-threatening but potentially lifesaving information about risky health behavior (Sherman, Nelson, & Steele, 2000). Finally, distress, hopelessness, and pathology (e.g., depression) often result when people lack self-esteem (Orth, Robins, & Roberts, 2008). Thus, consistent with the assertion of numerous scholars (Beck, 1967; Brown, 1998; Sedikides & Gregg, 2003; Sheldon, Elliot, Kim, & Kasser, 2001; Swann, Chang-Schneider, & McClarty, 2007; S. E. Taylor et al., 2003b; Trzesniewski et al., 2006), TMT maintains that feelings of personal significance and worth are critical for optimal psychological functioning. However, TMT focuses particularly on the notion that self-esteem is a vital resource in countering existential threat (e.g., death-related ideation). Given that reflections on the transient nature of the physical self motivate a heightened investment in worldview-derived symbolic conceptions of self, TMT proposes that self-esteem, the extent to which one feels that he or she is living up to cultural standards of value, plays a pivotal role in buffering people from the harmful psychological consequences of death awareness.

Although self-esteem protects from a variety of psychological threats, how might this resource specifically help people cope with the realization that death is certain? According to TMT, to have feelings of self-esteem is to have a sense that one is not merely an animal destined to die and be forgotten but someone who has lived a life of purpose and significance, someone who has made an important and lasting contribution to a meaningful and enduring world. Whereas cultural worldviews, as previously discussed, define what constitutes the symbolic self, self-esteem provides a sense that the self is significant and worthy of all of the benefits afforded by the worldview. Further, cultural worldviews provide the prescriptions to achieve a positive image of the self through different contingencies of self-esteem (Crocker & Wolf, 2001). And one need only peruse the pop psychology section of any major bookstore to see the demand for assistance with finding personal value and purpose as a means to maintain psychological adjustment. Although this particular example of self-esteem seeking may be specific to market-driven industrialized societies, all cultures offer prescriptions of personal value via religious or secular channels. Whether one is striving to be a beauty queen, star pupil, professional athlete, responsible spouse, good American, dutiful Christian, or productive researcher, maintaining the sense of self-esteem is central to being more than the sum of one's biological parts.

Empirical evidence is consistent with this notion that self-esteem serves an existential function. In addition to the strategies previously described that serve to elevate human existence above other forms of biological life, mortality salience increases efforts specifically targeted toward bolstering a sense that one is a significant and worthy member of a broader meaningful world. For example, mortality salience increases the desire for positive self information (e.g., encouraging horoscope reading; Dechesne et al., 2003) and the implementation of self-serving attributions (Mikulincer & Florian, 2002). Mortality salience also elevates attempts to live up to cultural standards of value (i.e., self-esteem striving), even if, perhaps ironically, such attempts ultimately compromise physical health (Goldenberg & Arndt, 2008). For example, participants who derive self-esteem from their driving ability manifest

riskier driving in a driving simulator following mortality salience inductions (Ben-Ari, Florian, & Mikulincer, 1999). Similarly, mortality salience strengthens the desire to suntan, but only among those who derive self-esteem from having tanned skin or in conditions in which tanned skin is promoted as a cultural standard of value (Routledge, Arndt, & Goldenberg, 2004). Converging evidence has also been provided by research on other domains of human behavior (e.g., smoking, exercise): When considering the mortal limitations of the body, people go to great lengths to ensure that they have lived up to culturally derived personal standards of value (Arndt et al., 2009). Also, people may be willing to physically die to live up to cultural standards of value that call for self-sacrifice (e.g., martyrdom). For example, mortality salience increases British participants' self-reported willingness to die for England unless an alternative means to affirm a transcendent self is offered (Routledge & Arndt, 2008; see also Pyszczynski et al., 2006).

In addition, high self-esteem (measured or manipulated) decreases the need to engage in additional self-defenses after mortality is rendered salient (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). For example, individuals with dispositionally high or temporarily bolstered self-esteem do not display the heightened worldview defense typically observed following mortality salience (Harmon-Jones et al., 1997), unless the failure to defend the worldview had negative implications for self-esteem (Arndt & Greenberg, 1999). More recently, similar findings were observed when implicit measures of self-esteem were used (Schmeichel et al., 2009). Specifically, these researchers found that high implicit self-esteem (measured and manipulated) reduced worldview defense after mortality salience. There are, however, studies that suggest that individuals with high self-esteem may display heightened worldview-related defenses after mortality salience as a form of motivated promotion focus (I. McGregor, Gailliot, Vasquez, & Nash, 2007). This issue is further considered in the General Discussion section.

In sum, when death is salient, people deploy a variety of self-enhancement tactics and go to great lengths to live up to cultural contingencies of self-worth. Further, having a positive view of one's self typically reduces the need to rely on other psychological defenses that bolster the symbolic self. Therefore, if death awareness has the potential to compromise psychological adjustment, self-esteem may play a critical mitigating role.

Self-Esteem, Death, and Psychological Adjustment

Although it has been argued by TMT researchers that humans' awareness of mortality has the potential to compromise psychological adjustment, direct empirical examinations of this idea are lacking. Certainly, highly arousing experiences with death-related content (e.g., watching brutal car accident footage) can lead to distress, as can highly arousing experiences that have no death-related content (e.g., awaiting a painful electric shock; Greenberg et al., 1992). Further, self-esteem buffers the effects of such anxiety-provoking experiences (Greenberg et al., 1992). However, much of the relevant research has relied on subtle death primes that are not arousing (Greenberg et al., 2003). The claim is that these types of subtle mortality reminders ultimately have the potential to cause distress but that people preempt this distress by engaging in defenses that bolster symbolic conceptions of the self and thus

prevent death thoughts from compromising psychological adjustment. In support of this claim, if individuals are given a placebo purported to eliminate the ability to experience anxiety, they do not respond to a mortality salience induction with increased cultural worldview defense (Greenberg et al., 2003). This finding is consistent with the possibility that subtle death primes (i.e., heightened death cognition without high arousal) can have consequences for psychological adjustment, but it does not directly test it. In fact, to date, research examining the consequence of mortality salience has provided people with an opportunity to engage symbolic self-defenses as opposed to considering the effects of thoughts of death on psychological adjustment. In other words, research has not measured adjustment (e.g., outcomes related to well-being) at the time in which individuals would normally be initiating the psychological defenses offered to them by experimental situation (e.g., worldview defense, self-enhancement tactics)—the defenses that theoretically would function to preserve optimal psychological functioning.

The literature, then, has yet to fully consider the relationships among self-esteem, death cognition, and psychological adjustment. That said, in recent years, an expanded version of TMT suggests that the relationships among these variables depend on the extent to which death thoughts are inside or outside of focal attention. We turn to this issue next.

Proximal and Distal Terror Management: Implications of a Dual Defense System

As previously discussed, mortality salience inductions increase worldview and symbolic self-defenses. However, the exact nature of these effects is more complex than it appears. Specifically, in a traditional mortality salience study in which participants write for several minutes about their own mortality, worldview and symbolic self-defenses are most pronounced or often only observed if the mortality salience induction is followed with some type of distraction task (e.g., a puzzle, a reading passage, other scales) that serves to remove death thoughts from focal attention (see Arndt, Cook, & Routledge, 2004). Immediately after a death writing task, when death thoughts are still in focal attention, people suppress (Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997), dismiss (e.g., denial of physical vulnerability; Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000), or proactively confront (e.g., increased health intentions; Arndt, Schimel, & Goldenberg, 2003) the threat of physical demise. These immediate responses to a mortality salience induction have been termed *proximal defenses* and serve to remove death thoughts from focal attention. However, once people successfully remove death thoughts from focal attention or the experiment does so via a distraction or cognitive load task, the accessibility of death thoughts increases; it is at this point (i.e., when death is not in focal attention but death thought accessibility [DTA] is high) that symbolic *distal defenses* emerge. Of course, if the death prime is extremely subtle and serves to increase DTA without first bringing death into focal attention, distal defenses are brought online immediately. For example, death-priming experiences that are on the periphery of conscious awareness (e.g., standing in front of a funeral home, being presented with subliminal death themes) immediately increase DTA and symbolic defenses such as worldview defense and self-enhancement strivings (Arndt et al., 2004).

Further, when death thoughts are in focal attention (i.e., when proximal defenses are used), psychological adjustment, as assessed by positive and negative affect scales and physiological arousal measures (e.g., skin conductance), is not compromised (Greenberg et al., 1990; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). In other words, death thoughts in focal attention are not problematic for psychological adjustment. In addition to proximal defenses, positive affect tuning (i.e., seeking positive feelings), which is automatically triggered by mortality salience inductions, also keeps these potentially distressing cognitions from inducing anxiety or negative affect (DeWall & Baumeister, 2007). Thus, both proximal defenses and positive affect tuning keep death thoughts that are in focal attention from adversely affecting psychological adjustment.

However, as noted before, research focused on distal symbolic defenses has yet to consider the impact of death-related cognition outside of focal attention on adjustment. One recent study by Routledge and Juhl (2010) is the exception. In this study, the authors examined the potential for death thoughts to cause distress. Perceptions of life as meaningful (an indicator of a well-established symbolic defense system) were assessed, mortality salience was manipulated, and death anxiety was measured at the time at which typical terror management studies provide participants with an opportunity to self-enhance or engage in worldview defense (i.e., after a distraction task that serves to remove death thoughts from focal attention). The mortality salience induction increased death anxiety, but only for individuals who had previously indicated that they lacked meaning in life. These findings tentatively suggest that thoughts of death may undermine psychological adjustment when measured distally. However, this study did not assess or manipulate self-esteem, and it did not consider more general indices of psychological adjustment. Further, it did not examine both proximal and distal responses to death cognition. In sum, there is a sizeable gap in the literature concerning how self-esteem and death-related cognition interact to impact on psychological adjustment at the time in which distal defenses are deployed to bolster the symbolic self.

The Current Research

In the current research, we examine the relationships among self-esteem, death-related cognition, and psychological adjustment in several distinct ways. To begin with, if the awareness of mortality threatens adjustment and if self-esteem mitigates this effect, then making mortality salient should compromise well-being for individuals with low self-esteem but not those with high self-esteem. We test this hypothesis in Studies 1 and 2 using different measures of well-being (i.e., satisfaction with life in Study 1, subjective vitality in Study 2). Also, TMT and numerous other theoretical perspectives posit that perceptions of meaning in life play a vital role in the provision of psychological security. Therefore, Studies 3–5 focus on the perception of meaning in life as an indicator of psychological adjustment. These studies test the hypothesis that death thoughts will decrease perceptions of meaning, but only for individuals low in self-esteem. Further, Study 5 tests this hypothesis using a Chinese sample to examine the extent to which findings can be generalized beyond American or Western samples. In Study 6, we expand this analysis by focusing on exploration (an indicator of psychological growth) as a distinct

measure of psychological adjustment. Specifically, this study tests the hypothesis that death thoughts will decrease exploration, but only for individuals low in self-esteem.

Furthermore, the current research addresses lingering issues about the proximal and distal effects of self-esteem and death cognition on positive and negative mood, anxiety, and perceptions of meaning in life. In Studies 1 and 5, affect is assessed proximally, that is, immediately after death thoughts are made salient. In Study 4, affect is assessed distally, that is, while DTA is high but death is not in focal attention. In addition, in Study 3, perceptions of meaning in life are measured both proximally and distally to find out how death thoughts that are inside or outside of focal attention impact well-being. Moreover, on the basis of the core TMT proposition that death cognition instigates anxiety in individuals who lack self-esteem, Study 7 examines the proximal and distal effects of self-esteem and mortality salience on state anxiety. This study tests the hypothesis that mortality salience induces anxiety, but only when measured distally and only among individuals low in self-esteem.

Finally, to further this analysis and broaden the conceptual and methodological scope of TMT, in Study 8, we considered the long-term effects of self-esteem and heightened death awareness on behavior linked to anxiety-based psychological dysfunction (i.e., social avoidance). A newly constructed mortality salience task assessed long-term effects of death-related ideation. Socially anxious participants wrote about death for several weeks and, after a month, returned to the laboratory. The study examines whether previous mortality contemplations contribute to social avoidance and, critically, whether self-esteem plays a moderating role.

Study 1

According to TMT, awareness of physical transience can compromise psychological adjustment in the absence of necessary psychological buffers. One important aspect of psychological adjustment is judgments of the quality of one's life (i.e., subjective well-being; Diener, 1984), and a critical component of subjective well-being is satisfaction with life (Diener, Emmons, Larson, & Griffin, 1985). Most people report being happy with their lives (Diener & Diener, 1996; Pew Research Center, 2006), and to the extent that people have psychological buffers (e.g., self-esteem) in place to insulate them from the threat of death awareness, their life satisfaction will not be compromised by reflections on physical transience.

To date, however, no research has examined the effect of heightened death awareness on satisfaction with life and whether this effect is moderated by self-esteem. The current study fills this gap. We assessed self-esteem, manipulated mortality salience, measured affect proximally (i.e., immediately after the mortality salience induction), and measured satisfaction with life distally (i.e., after a distraction task). We hypothesized that mortality salience would decrease satisfaction with life for individuals with low self-esteem, but not for those with high self-esteem. Furthermore, informed by past research, we anticipated no effects of self-esteem and mortality salience on proximally measured affect.

Method

Participants and procedure. Sixty-two undergraduate Introductory Psychology students (37 women, 23 men, two unidenti-

fied) participated for course credit in a study ostensibly concerned with relationships among personality characteristics. All measures and conditions were administered in the laboratory, which consisted of partitioned cubicles to allow for privacy. Debriefing concluded the experimental session.

Materials. Participants rated their agreement (1 = *strongly agree*, 4 = *strongly disagree*) with the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965). An example item is "I take a positive attitude toward myself." The self-esteem variable was computed such that higher scores reflected higher levels of self-esteem ($\alpha = .81$, $M = 2.79$, $SD = 0.44$).

Participants were then randomly assigned to a mortality salience or control condition (Rosenblatt et al., 1989). They responded to two open-ended items: "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." The control condition consisted of parallel questions regarding the experience of failing an important exam to ensure that the effect of mortality salience is above and beyond the effect of a general self-threat.

To examine the immediate effects of self-esteem and mortality salience on mood, directly after the experimental induction, participants completed the 20-item Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Specifically, they indicated the extent to which each of 10 positive affect items ($\alpha = .83$) and 10 negative affect items ($\alpha = .85$) reflected how they felt right at that moment (1 = *very slightly or not at all*, 5 = *extremely*). We derived average positive affect ($M = 2.95$, $SD = 0.77$) and negative affect ($M = 1.72$, $SD = 0.64$) scores.

Next, participants completed a puzzle distraction task. In particular, they searched for neutral words embedded in a letter matrix (Greenberg et al., 2000). This task serves to remove death thoughts from focal attention, thus allowing for subsequent distal or symbolic defenses to emerge.

Finally, participants completed the Satisfaction With Life Scale (SWLS; Diener et al., 1985), which served as the distal dependent measure. In particular, they rated their agreement (1 = *strongly disagree*, 7 = *strongly agree*) with five items reflecting satisfaction and contentment with life (e.g., "I am satisfied with life"; "If I could live my life over, I would change almost nothing"). The scale had good reliability ($\alpha = .84$, $M = 4.84$, $SD = 1.11$). The SWLS is an established indicator of psychological well-being. Scores on the SWLS are positively correlated with other indices (e.g., interviewer or informant ratings) of life satisfaction (Pavot & Diener, 1993) and with the subjective vitality scale (Ryan & Frederick, 1997). Also, scores on the SWLS are negatively correlated with depression (Blais, Vallerand, Pelletier, & Briere, 1989), anxiety (Arrindell & Ettema, 1986), and negative affect (Larsen, Diener, & Emmons, 1985).

Results and Discussion

To test the hypothesis that mortality salience undermines satisfaction with life, but only among individuals low in self-esteem, we carried out a regression analysis in which we entered the main effects for the experimental manipulation (dummy coded) and self-esteem (centered) in the first step and the interaction term in the second step (Aiken & West, 1991). In the first step, a self-esteem main effect emerged such that higher levels of self-esteem

were associated with increased satisfaction with life, $b = 1.20$, $SE = 0.29$, $t = 4.19$, $p < .001$, squared partial correlation (PRE) = .23. However, this effect was qualified by a significant interaction in the second step, $b = 1.31$, $SE = 0.56$, $t = 2.34$, $p < .02$, $PRE = .09$ (see Figure 1). To test the hypothesis that mortality salience undermines satisfaction with life at low, but not high, levels of self-esteem, we conducted predicted mean comparisons at one standard deviation above and below the centered self-esteem mean. Consistent with this hypothesis, mortality salience, relative to exam failure salience, decreased satisfaction with life at low levels of self-esteem ($-1 SD$), $b = -0.82$, $SE = 0.35$, $t = -2.33$, $p < .02$, $PRE = .09$, but not at high levels of self-esteem ($1 SD$), $b = 0.34$, $SE = 0.34$, $t = 0.99$, $p < .33$, $PRE = .02$.

We proceeded to examine potential effects of self-esteem and mortality salience on positive and negative affect. On the basis of previous research, we anticipated no effects involving mortality salience or the interaction between mortality salience and self-esteem on positive or negative affect given that these variables were measured immediately after the mortality salience induction (proximally). There was a main effect of self-esteem on positive affect such that higher self-esteem was associated with increased positive affect, $b = 0.50$, $SE = 0.22$, $t = 2.26$, $p < .05$, $PRE = .08$; however, there was no main effect of mortality salience ($p > .70$), nor was there a significant interaction ($p > .50$). Similarly, there was a main effect for self-esteem on negative affect such that higher self-esteem was associated with decreased negative affect, $b = -0.47$, $SE = 0.18$, $t = -2.56$, $p < .01$, $PRE = .10$; however, there was no main effect of mortality salience ($p > .90$), nor was there a significant interaction ($p > .25$). Finally, in this and all subsequent studies, no gender effects were observed (all t s < 1).

Study 1 provides initial support for the idea that death-related cognition can threaten psychological well-being and that self-esteem buffers this threat. Whereas thinking about death did not immediately influence mood, it did compromise satisfaction with life following the distraction task, when symbolic self-defenses are typically brought online. This suggests, consistent with previous research (Arndt et al., 2004), that individuals are capable of regulating death thoughts that are in focal attention and that doing so prevents these thoughts from causing immediate distress. How-

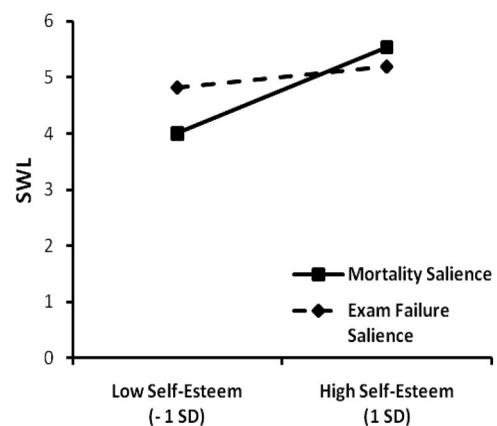


Figure 1. The effects of self-esteem and mortality salience on satisfaction with life (SWL) in Study 1. Plotted values reflect predicted SWL values at one standard deviation below and above the self-esteem mean.

ever, considering that effects on satisfaction with life were observed after a distraction task, mortality salience may have affective consequences (for people with low self-esteem), if affect is assessed after a distraction task. Studies 4 and 7 addressed this issue. First, however, we considered it important to replicate the effects of mortality salience and self-esteem on different indicators of well-being. This was our objective in Study 2.

Study 2

Eudemonic well-being constitutes an essential component of well-being (Ryan & Deci, 2001; Ryff, 1989; Waterman, 1993). Rather than focusing on hedonic well-being (i.e., pleasure and pain), eudemonic well-being is concerned with meaning and becoming a fully functional person. It reflects, in part, a level of heightened energy for living (i.e., feeling alive and vital). Given that eudemonic well-being is relevant to a meaningful and energized existence, it is a dimension of well-being that may be particularly vulnerable to existential threat. That is, contemplating the reality of eventual death may diminish perceptions of aliveness and vitality. Thus, in the current study, we used a measure of subjective vitality (Ryan & Frederick, 1997) that Ryan and Deci (2001) considered an indicator of eudemonic well-being. We measured self-esteem, manipulated mortality salience, and assessed subjective vitality distally. We hypothesized that mortality salience would decrease subjective vitality for individuals with low self-esteem but not for those with high self-esteem.

Method

Participants and procedure. Forty-six undergraduate Introductory Psychology students (26 women, 17 men, three unidentified) participated in exchange for course credit. They were informed that the study examined the relationship among personality characteristics. We measured self-esteem in a mass pretest at least one week prior to the experimental session. We administered all other measures and conditions (including debriefing) in the laboratory.

Materials. Participants filled out the Rosenberg Self-Esteem Scale ($\alpha = .91$; $M = 3.14$, $SD = 0.62$) in a pretest conducted in their Introductory Psychology classes. At the start of the experimental session, participants completed filler measures to avoid suspicion. They were then randomly assigned to a mortality salience or control condition. The mortality salience induction was identical to that of Study 1. The control condition consisted of parallel questions regarding the experience of dental pain, to ensure that the effects of mortality salience were above and beyond the effects of contemplating aversive life experiences. Next, all participants worked on the same word-search distraction task as in Study 1, given that this study assessed only distal effects.

Finally, participants completed a state vitality scale (Ryan & Frederick, 1997), which served as the dependent measure. The scale asks participants to rate their agreement (1 = *not true*, 9 = *very true*) with seven items reflecting aliveness and energy about living (e.g., “At this moment, I feel alive and vital” and “I am looking forward to each new day”). The scale had good reliability ($\alpha = .89$, $M = 6.08$, $SD = 1.65$). Vitality is a marker of eudemonic well-being (Ryan & Deci, 2001), and Ryan and Frederick (1997) reported that vitality scores are positively correlated with the

SWLS and the RAND mental health subscale for well-being (Brook et al., 1979) and are negatively correlated with the Taylor Manifest Anxiety scale (J. Taylor, 1953) and the RAND mental health subscales for anxiety and depression (Brook et al., 1979).

Results and Discussion

To test the hypothesis that mortality salience undermines subjective vitality, but only among individuals low in self-esteem, we carried out a regression analysis in which we entered the main effects for the experimental manipulation (dummy coded) and self-esteem (centered) in the first step and the interaction term in the second step. In the first step, the self-esteem main effect was significant: Higher levels of self-esteem were associated with increased state vitality, $b = 1.19$, $SE = 0.36$, $t = 3.30$, $p < .01$, $PRE = .20$. This effect, however, was qualified by a significant interaction in the second step, $b = 1.57$, $SE = 0.69$, $t = 2.30$, $p < .05$, $PRE = .11$ (see Figure 2). We proceeded to test the hypothesis that mortality salience undermines vitality at low, but not high, levels of self-esteem. Specifically, we recentered self-esteem at one standard deviation below and above the mean, and we conducted predicted mean comparisons. As hypothesized, mortality salience, relative to dental pain salience, decreased vitality at low levels of self-esteem ($-1 SD$), $b = -1.31$, $SE = 0.61$, $t = -2.17$, $p < .03$, $PRE = .10$, but not at high levels of self-esteem ($1 SD$), $b = 0.64$, $SE = 0.60$, $t = 1.01$, $p < .29$, $PRE = .03$.

In the current study, we implemented several methodological alterations compared with Study 1. In particular, in the current study, we (a) examined a different psychological well-being construct (subjective vitality); (b) reduced the potential for self-esteem to be primed, as self-esteem was measured well in advance of the experimental procedures; and (c) used a different control condition (dental pain). These findings converged with those of Study 1. The activation of death thoughts compromised well-being, but only for individuals with deficits in self-esteem. Across Studies 1 and 2, self-esteem aided in the preservation of life satisfaction and vitality when these psychological well-being indices were challenged by thoughts of physical transience.

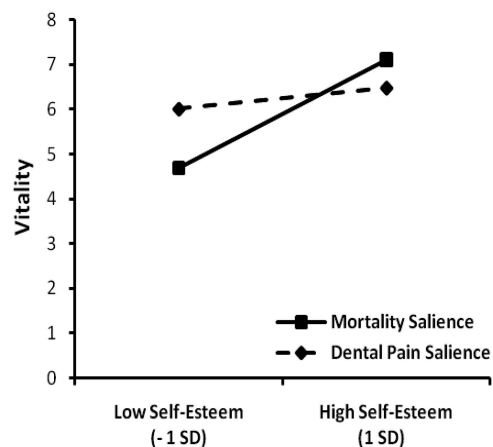


Figure 2. The effects of self-esteem and mortality salience on subjective vitality in Study 2. Plotted values reflect predicted vitality values at one standard deviation below and above the self-esteem mean.

Study 3

The research reported so far provides the first direct examination of the effects of self-esteem and death-related ideation on psychological well-being. One other critical component of adaptive psychological functioning is the sense of meaning in life (King & Napa, 1998; Ryff & Singer, 1998; Wong & Fry, 1998; Zika & Chamberlain, 1992). Reflecting on the implications of mortality can jeopardize perceptions of meaning (Routledge, Arndt, Sedikides, & Wildschut, 2008). Indeed, as existential scholars and philosophers have opined, wondering whether one was born simply to die does not exactly do wonders in providing meaning to one's existence (Becker, 1973; Tolstoy, 1882/1987).

Few studies have directly considered the effects of mortality salience on perceptions of meaning. Recently, Vess, Routledge, Landau, and Arndt (2009) reported that mortality salience can undermine perceptions of meaning in life. However, this research did not consider the potential moderating role of self-esteem. Routledge et al. (2008) also reported that death thoughts decreased perceptions of life as meaningful, but only among individuals disinclined to reflect nostalgically on their past. In other words, affirming the self via nostalgia mitigated the effects of mortality salience on perceptions of meaning in life. Finally, Wildschut, Sedikides, Arndt, and Routledge (2006) showed that nostalgia increases state self-esteem. Therefore, on the basis of the Routledge et al. and Wildschut et al. findings, as well as the results of current Studies 1–2, we hypothesized that death-related cognition would compromise perceptions of meaning in life, but only for those who lack self-esteem.

Although people differ chronically in self-esteem, life events can, of course, produce variation in state self-esteem. Just as previous research has explored the social and psychological ramifications of threatened and bolstered self-esteem (Fein & Spencer, 1997; Greenberg et al., 1992; Sedikides, 1993; Sedikides, Campbell, Reeder, & Elliot, 1998), the current research examines the extent to which situations that challenge or promote positive self-views interact with death thoughts to influence perceptions of meaning in life. Specifically, we manipulated self-esteem by having participants reflect on an important personal failure or success (Green, Sedikides, & Gregg, 2008), made mortality salient (compared with a control stimulus), and measured perceptions of meaning in life.

In addition, although the findings of Study 1 along with previous research indicate that death thoughts in focal attention do not impact affect, no research to date has examined proximal and distal effects of mortality salience on perceptions of meaning. Building from the dual defense model of terror management, we expect that meaning will not be compromised immediately after death is made salient, but it will be vulnerable after a distraction task, when death thoughts are outside of focal attention (Arndt et al., 2004). Therefore, in the current study, we included a proximal–distal factor. That is, half of the participants completed the meaning measure immediately after the mortality salience induction, and half completed a distraction task prior to the meaning measure. We hypothesized that mortality salience would decrease meaning for participants low in self-esteem (i.e., pondering a personal failure) but not for participants high in self-esteem (i.e., pondering a personal success); this pattern, however, would be observed only in the

distal condition, where participants would be distracted from death thoughts.

Method

Participants and procedure. One hundred nineteen undergraduate Introductory Psychology students (67 women, 52 men) took part for course credit in a study allegedly focusing on the relationships among personality characteristics. We administered all measures and conditions in the laboratory and debriefed participants at the end of the experimental session.

Materials. After responding to several filler scales designed to boost the cover story, participants completed a questionnaire called Life Events Assessment under the pretext that life events shape personality. This task constituted the self-esteem manipulation (Green et al., 2008, Experiment 2). In the self-esteem threat condition, participants received the following instructions: "Please briefly think about and describe a time in which you failed to live up to one of your most important values. That is, describe one of your greatest personal failures." In the self-esteem bolster condition, participants received the following instructions: "Please briefly think about and describe a time in which you successfully lived up to one of your most important values. That is, describe one of your greatest personal successes."

Participants were then randomly assigned to the mortality salience condition used in Studies 1 and 2 or a parallel condition concerning their thoughts and feelings about extreme pain. Next, participants were randomly assigned to the proximal or distal condition. Half of them moved on directly to the dependent measure (proximal condition), whereas the other half completed the word-search distraction task used in Studies 1 and 2 (distal condition) before moving on to the dependent measure.

We assessed perceptions of meaning in life with the five-item Presence of Meaning in Life subscale of Steger, Frazier, Oishi, and Kaler's (2006) Meaning in Life Questionnaire. This measure asks participants to indicate how true statements like "My life has a clear sense of purpose" and "I have a good sense of what makes my life meaningful" are on a scale of 1 (*absolutely untrue*) to 7 (*absolutely true*). The scale had good reliability ($\alpha = .93$, $M = 4.92$, $SD = 1.17$). Previous research has demonstrated that this scale is correlated with other measures of meaning as well as general measures of well-being such as the SWLS used in Study 1 (Steger et al., 2006).

Results and Discussion

To test the hypothesis that mortality salience undermines perceptions of meaning for individuals in the self-esteem threat but not the self-esteem bolster condition and that this effect occurs only when death thoughts are outside of focal attention, we conducted a 2 (self-esteem: threat vs. bolster) \times 2 (salience: mortality vs. control) \times 2 (dependent measure presentation: proximal vs. distal) analysis of variance. There was a main effect for salience such that mortality salience decreased meaning ($M = 4.66$, $SD = 1.25$) relative to the control condition ($M = 5.19$, $SD = 1.02$), $F(1, 111) = 6.63$, $p < .01$, $PRE = .06$. There was also a main effect for the dependent measure presentation such that perceptions of meaning decreased in the distal condition ($M = 4.64$, $SD = 1.08$) relative to the proximal condition ($M = 5.15$, $SD = 1.20$), $F(1, 111) = 5.30$, $p < .05$, $PRE = .05$.

However, these effects were qualified by the anticipated three-way interaction, $F(1, 111) = 4.14, p < .05, PRE = .04$ (see Figure 3). To further probe this interaction, we looked for two-way interactions within the proximal and distal conditions. For participants who immediately completed the meaning measure after mortality salience (i.e., proximal condition), there was no significant interaction between mortality salience and self-esteem threat ($p > .30$). However, for participants who completed the word search prior to the meaning measure (i.e., distal condition), the predicted two-way interaction was significant, $F(1, 50) = 3.98, p < .05, PRE = .07$. We conducted pairwise tests to further probe this two-way interaction within the distal condition. Within the self-esteem threat condition, mortality salience decreased meaning, $F(1, 50) = 9.46, p < .01, PRE = .16$. However, within the self-esteem bolster condition, mortality salience and control participants did not differ on meaning, $F(1, 50) = 0.07, p < .79, PRE = .001$. Looked at differently, within the mortality salience condition, participants in the self-esteem threat condition evidenced decreased perceptions of meaning relative to participants in the self-esteem bolster condition, $F(1, 50) = 4.79, p < .05, PRE = .09$. However, within the control condition, the self-esteem threat and bolster conditions did not differ on meaning, $F(1, 50) = 0.44, p < .55, PRE = .009$.

Study 3 expanded on the findings of the previous two studies. No significant effects were observed within the proximal condition. However, within the distal condition, mortality salience decreased perceptions of meaning, and manipulated self-esteem moderated this effect. These findings also contribute to our broader research objectives by demonstrating that experimentally manipulated self-esteem produces effects similar to those produced by measured self-esteem when considering the relationship among self-esteem, death cognition, and psychological adjustment. In addition, these effects are obtained not only with a physically aversive control condition (i.e., dental pain; Study 2) but also with a more abstract physical threat (i.e., extreme pain). Finally, by assessing meaning both proximally and distally, the current study demonstrates that when death thoughts are in focal attention, perceptions of meaning are not compromised. This study makes a critical contribution to research on the dual defense model of terror

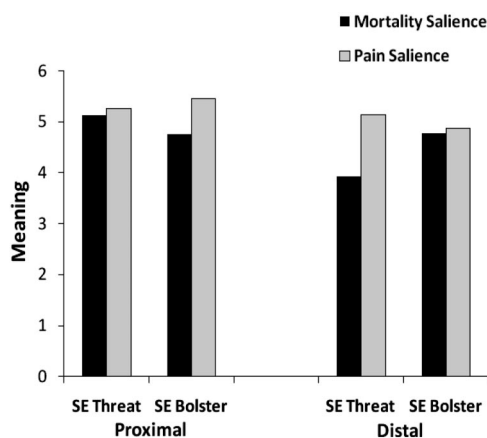


Figure 3. The proximal and distal effects of manipulated self-esteem and mortality salience on meaning in Study 3. SE = self-esteem.

management because it is the first examination of proximal and distal effects of mortality salience on perceptions of meaning and complements previous findings to indicate that the existential consequences of death awareness are most pronounced when death thoughts are outside of focal attention.

Study 4

Study 4 addressed two distinct issues. First, it built on the findings of Study 3 to examine further the relationships among self-esteem, death cognition, and meaning in life. However, unlike Study 3, Study 4 measured self-esteem and DTA rather than manipulating them. Thus, with Study 4, we sought converging evidence that self-esteem and death-related cognition interact to predict perceptions of meaning in life.

Second, in Study 4, we tested whether self-esteem and death cognition can influence mood (i.e., a psychological adjustment index; Alicke & Sedikides, 2009; Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004; S. E. Taylor et al., 2003b) when death thoughts are not in focal attention but DTA is high. As previously discussed, research indicates that symbolic self defenses (i.e., distal defenses) occur when DTA is elevated but death thoughts are not in conscious attention, as is the case immediately after a mortality salience writing task such as those used in Studies 1–3. Borrowing methods validated in previous research, we used a distraction task in Studies 1–3 to remove death thoughts from focal attention. In the current study, instead of using this procedure, we simply measured DTA with a word stem completion task. Thus, by directly measuring DTA, Study 4, in addition to examining effects on meaning, explored potential distal effects on mood in a manner methodologically distinct from the previous three studies. We hypothesized that self-esteem and death cognition would interact such that heightened DTA would be associated with decreased perceptions of meaning, decreased positive affect, and increased negative affect at low, but not high, levels of self-esteem.

Method

Participants and procedure. Fifty-eight undergraduate Introductory Psychology students (27 women, 26 men, five unidentified) took part in exchange for course credit. Participants were under the impression that the study involved the relationships among personality characteristics. As in previous studies, we administered all measures (including debriefing) in the laboratory.

Materials. As in Studies 1–2, participants filled out the Rosenberg Self-Esteem Scale ($\alpha = .85, M = 2.85, SD = 0.47$). Then, to assess varying levels of death-related cognition, we had participants complete a measure of DTA recently used in this way by Vess et al. (2009). The measure is a word completion task consisting of 28 word fragments, six of which can be completed with either a neutral or a death-related word (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Mikulincer & Florian, 2000; Routledge et al., 2008). For example, the fragment COFF_ _ can be completed as COFFEE (a neutral word) or COFFIN (a death-related word). The possible death-related words were *buried*, *murder*, *grave*, *skull*, *stiff*, and *coffin*. We computed DTA scores by summing the number of death words created by each participant ($M = 1.98, SD = 0.82$). Higher scores indicate greater accessibility of death-related thoughts. Previous research demon-

strates that immediately after mortality is experimentally rendered salient with a traditional writing task, DTA is low because of proximal defensive efforts to suppress such thoughts. As previously discussed, however, DTA subsequently increases, and it is when DTA is high that distal symbolic self-defenses occur (Arndt et al., 2004; Vess et al., 2009). Thus, directly measuring levels of DTA would allow for a test of the effects of self-esteem and death cognition on psychological well-being, when symbolic self-defenses would normally be deployed (when DTA is high).

After measuring DTA, we collected the dependent measures. As in Study 3, we assessed perceptions of meaning in life with the Presence of Meaning in Life subscale of the Meaning in Life Questionnaire. The subscale exhibited good reliability ($\alpha = .89$, $M = 4.75$, $SD = 1.11$). Finally, we measured affect. As in Study 1, participants completed the PANAS, consisting of 10 positive affect items ($\alpha = .85$) and 10 negative affect items ($\alpha = .86$). We proceeded to derive average positive affect ($M = 2.98$, $SD = 0.77$) and average negative affect ($M = 1.80$, $SD = 0.72$) scores.

Results and Discussion

Self-esteem and DTA were not correlated ($r = .09$, $p > .50$). To test the hypothesis that heightened DTA would be associated with decreased perceptions of meaning at low but not high levels of self-esteem, we conducted regression analyses in which we entered independently self-esteem (centered) and DTA (centered) in the first step and the interaction term in the second step. There was a significant main effect for self-esteem such that higher self-esteem was associated with increased meaning, $b = 1.60$, $SE = 0.24$, $t = 6.62$, $p < .001$, $PRE = .45$. However, this main effect was qualified by an interaction that approached significance, $b = 0.62$, $SE = 0.33$, $t = 1.88$, $p < .07$, $PRE = .06$ (see Figure 4). At low levels of self-esteem ($-1 SD$), increased DTA tended to be associated with decreased meaning, $b = -0.41$, $SE = 0.22$, $t = -1.87$, $p < .07$, $PRE = .06$. This effect was not found at high levels of self-esteem ($1 SD$), $b = 0.18$, $SE = 0.19$, $t = 0.91$, $p < .37$, $PRE = .02$.

We conducted the same analyses with positive and negative affect as the outcome variables. Concerning positive affect, only

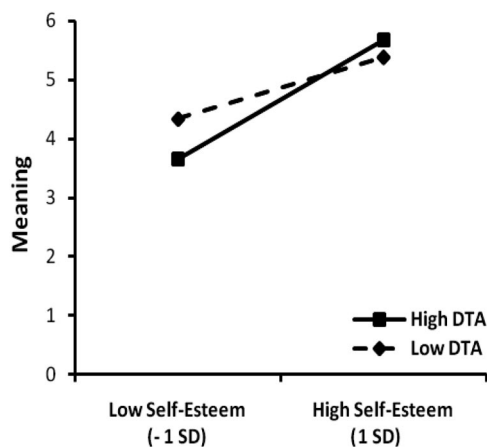


Figure 4. The effects of self-esteem and death thought accessibility (DTA) on meaning in Study 4. Plotted values reflect predicted meaning values at one standard deviation below and above the self-esteem mean.

the self-esteem main effect was significant: Higher self-esteem was associated with increased positive affect, $b = 0.63$, $SE = 0.21$, $t = 3.03$, $p < .01$, $PRE = .15$. Concerning negative affect, the self-esteem main effect was also significant: Higher self-esteem was associated with decreased negative affect, $b = -0.56$, $SE = 0.19$, $t = -3.00$, $p < .01$, $PRE = .15$. However, a significant interaction also emerged between DTA and self-esteem, $b = -0.61$, $SE = 0.26$, $t = -2.31$, $p < .05$, $PRE = .09$ (see Figure 5). Paralleling the findings on meaning in life, increased DTA was associated with increased negative affect at low levels of self-esteem, $b = 0.46$, $SE = 0.18$, $t = 2.49$, $p < .05$, $PRE = .11$. No such effect was found at high levels of self-esteem, $b = -0.12$, $SE = 0.14$, $t = -0.82$, $p < .42$, $PRE = .01$.

Study 4 expanded the findings of the prior three studies in several ways. First, Study 4 deviated from the use of an open-ended mortality salience writing induction and instead used a measure of DTA. By simply assessing levels of DTA, Study 4 suggests that the effects of mortality salience are not the result of something specific to the way that death thoughts are induced via the more standard open-ended induction. More important, by using this technique, Study 4 allowed for a further examination of the effects of self-esteem and death cognition on meaning in life (as in Study 3). Among those with deficits in self-esteem, the greater the accessibility of death thoughts, the less individuals perceived their life to be meaningful. This relationship between death cognition and meaning was not obtained when participants had high levels of self-esteem. In all, these findings suggest that death-related thoughts pose a threat to psychological adjustment (i.e., lack of meaning) and that self-esteem provides protection from this threat.

Finally, this technique also allowed for a further examination of how DTA relates to affective states. In Study 1, when participants consciously wrote about death, mood was not immediately affected, a finding consistent with past research. However, in the current study, when death cognition was assessed outside of focal attention, negative mood covaried with DTA at low, but not at high, levels of self-esteem. This finding further suggests that adjustment—as measured by SWLS, vitality, meaning, and negative mood—is compromised when distal defenses are needed (i.e., when DTA is high but not in focal attention), but only for those who lack self-esteem. It is interesting that corresponding findings were not obtained for positive mood. We return to this issue in the General Discussion section.

Study 5

In the current study, we sought to replicate the effects of self-esteem and mortality salience on meaning in a non-Western sample. Studies examining and documenting terror management processes have been conducted in several countries that represent diverse regions of the world (e.g., Australia, England, China, Iran, Israel, Japan, the Netherlands, the United States; see Pyszczynski et al., 2004). However, given that the present research is the first systematic examination of the effects of mortality salience and self-esteem on psychological adjustment, it is important to demonstrate that the observed pattern of findings is obtained in a culturally distinct sample. In addition, although there is now a sizable literature in support of the assertion that self-esteem is a universal need (Brown, in press; Cai, Brown, Deng, & Oakes, 2007; Cai, Wu, & Brown, 2009; Sedikides, Gaertner, & Toguchi,

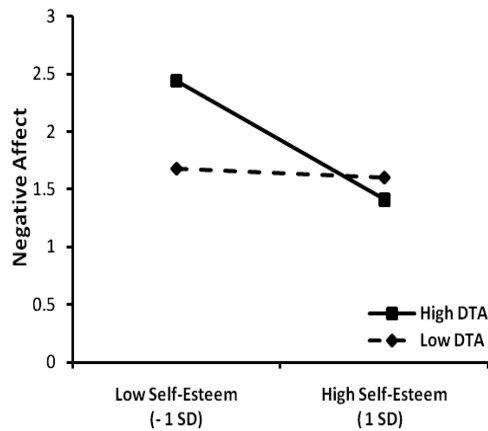


Figure 5. The effects of self-esteem and death thought accessibility (DTA) on negative affect in Study 4. Plotted values reflect predicted negative affect values at one standard deviation below and above the self-esteem mean.

2003; Sedikides, Gaertner, & Vevea, 2005, 2007; Yamaguchi et al., 2007), replicating the effects observed in the first four studies in a non-Western sample would provide convergent evidence for the universality of the self-esteem motive by demonstrating that self-esteem buffers the effects of death-related cognition on psychological adjustment similarly in distinct cultural samples. Therefore, in Study 5, we examined the effects of mortality salience and self-esteem on meaning using a sample of Chinese college students. We measured self-esteem, manipulated mortality salience, and assessed affect (proximally) and meaning (distally). We hypothesized that mortality salience would undermine meaning, but only for participants low in self-esteem. Consistent with previous findings, we anticipated no effects on proximally measured affect.

Method

Participants and procedure. Fifty-three Chinese undergraduate students (27 women, 26 men) enrolled in freshman-level core courses participated in exchange for payment in the form of two small gifts (i.e., participants could choose from a pen, a highlighter, and a sticky note and pen bag). Participants were informed that the study concerned the relationship between personality and attitudes. All measures and conditions were translated into Mandarin Chinese (and back-translated for quality assurance purposes) and administered in the classroom in Mandarin by a Chinese experimenter. On completion of the study, participants were fully debriefed and thanked.

Materials. Participants completed the Rosenberg Self-Esteem Scale ($\alpha = .77$, $M = 2.72$, $SD = 0.21$). Then, participants were randomly assigned to the mortality salience or pain control condition used in Study 3.

We used the PANAS as the sole distraction task. We did this for several reasons. First, previous research has shown that the PANAS alone constitutes a sufficient distraction (Routledge & Arndt, 2008). Second, we wanted to ensure that the distal effects observed thus far were not due specifically to using the puzzle as a distraction task, and a critic could argue that the puzzle may deplete regulatory resources (although this assertion would not

explain the findings of Study 4 in which we merely measured DTA). Finally, assessing mood immediately after the experimental conditions allowed us to further rule out affective proximal effects within a distinct sample. Both the Positive ($\alpha = .77$, $M = 2.95$, $SD = 0.65$) and Negative ($\alpha = .83$, $M = 2.57$, $SD = 0.74$) Affect subscales formed reliable measures.

As in the previous two studies, we assessed perceptions of meaning in life with the Presence of Meaning in Life subscale of the Meaning in Life Questionnaire. The subscale exhibited good reliability ($\alpha = .88$, $M = 4.49$, $SD = 1.41$).

Results and Discussion

To test our hypotheses that mortality salience undermines perceptions of meaning for individuals low in self-esteem but not for those high in self-esteem, we conducted regression analyses in which we entered self-esteem (centered) and mortality salience (dummy coded) independently in the first step and the interaction term in the second. The only effect to emerge was the predicted interaction, $b = 3.75$, $SE = 1.80$, $t = 2.09$, $p < .05$, $PRE = .08$ (see Figure 6). We recentered self-esteem at one standard deviation below and above the mean and conducted predicted mean comparisons. As hypothesized, mortality salience, relative to pain salience, decreased meaning at low levels of self-esteem ($-1 SD$), $b = -1.14$, $SE = 0.55$, $t = -2.08$, $p < .05$, $PRE = .08$, but not at high levels of self-esteem ($1 SD$), $b = 0.44$, $SE = 0.53$, $t = 0.83$, $p < .45$, $PRE = .01$. We conducted the same analyses with positive affect and negative affect as the outcome variables. There were no main or interaction effects on positive or negative mood ($ps > .20$).

Study 5 replicated, in a sample of Chinese participants, the pattern of results observed in the previous studies. Mortality salience compromised meaning, but only for those with self-esteem deficits. Further, when affect was assessed immediately after the experimental induction, no effects were observed. In addition, as found in previous research (Routledge & Arndt, 2008), the mood assessment provided a sufficient distraction to allow for distal

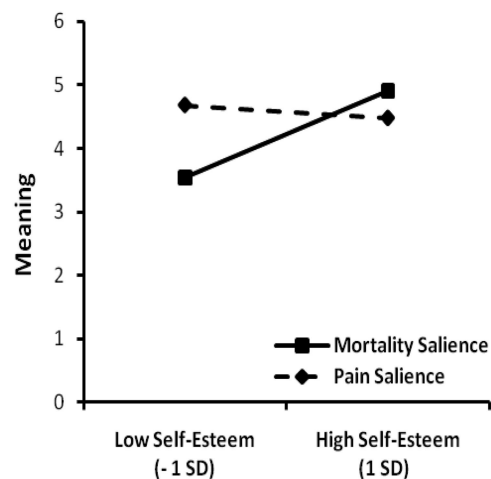


Figure 6. The effects of self-esteem and mortality salience on meaning in Study 5. Plotted values reflect predicted meaning values at one standard deviation below and above the self-esteem mean.

effects to emerge, further indicating that there is not something inherent in the puzzle distraction task that facilitates distal effects. Indeed, several studies have now demonstrated that distal effects can be produced using a variety of distraction tasks (e.g., puzzle, reading passage, completion of other scales) or using no distraction task at all if (a) experimental procedures (e.g., a cognitive load task) prevent the deployment of proximal defenses or (b) mortality salience is induced outside of focal attention or in an extremely subtle manner (Arndt et al., 2004).

In sum, the capacity for self-esteem to preserve psychological adjustment when death cognition is primed is not specific to American samples. Regardless of cultural background, death cognition is problematic for psychological functioning for those who lack sufficient self-esteem. The results add to the sizeable literature showing robust TMT effects across cultures (e.g., American, Australian, East Asian, European, Middle Eastern; Pyszczynski et al., 2004). The results also add to the growing literature documenting the panculturality of self-esteem in particular (Brown, in press; Cai et al., 2007, 2009) and self-enhancement in general (Gaertner, Sedikides, & Chang, 2008; Sedikides et al., 2003, 2005; Sedikides, Gaertner, & Vevea, 2007; Yamaguchi et al., 2007).

Study 6

The research reported thus far provides strong evidence that death-related cognition can be problematic for psychological adjustment and that self-esteem plays a critical buffering role. Several theoretical perspectives propose that healthy psychological adjustment goes beyond well-being—perhaps beyond even perceptions of meaning—to include behaviors such as exploration (Bowlby, 1969; Deci & Ryan, 2000; Fredrickson, 2001; Maslow, 1970; Piaget, 1955; Pyszczynski, Greenberg, & Goldenberg, 2003; Silvia & Kashdan, 2009). Such growth-oriented perspectives suggest that part of adaptive functioning is seeking out new experiences, entertaining different ideas and perspectives, and desiring to evolve as a person. Therefore, in the current study, we expand on analysis of the effects of death cognition on psychological adjustment to consider exploration as a measure of personal growth. Specifically, we measured self-esteem, manipulated mortality salience, and measured intellectual exploration (Green & Campbell, 2000). We hypothesized that mortality salience would undermine intellectual exploration, but only for individuals with low self-esteem.

Method

Participants and procedure. Fifty-five undergraduate Introductory Psychology students (30 women, 24 men, one unidentified) took part in exchange for course credit. They were informed that the study concerned the relationship between different personality characteristics. All measures and conditions were administered in the laboratory. On completing the study, participants were fully debriefed and thanked.

Materials. Participants completed the Rosenberg Self-Esteem Scale ($\alpha = .88$, $M = 2.75$, $SD = 0.50$). They were then randomly assigned to the mortality salience or exam failure control condition (as in Study 1) and were presented with the word-search distraction task.

The dependent measure was a six-item subscale assessing exploration ($\alpha = .75$, $M = 5.55$, $SD = 1.19$). An example item is “If

given the chance, I would enjoy exploring unusual ideas or theories.” The subscale was taken from a larger general exploration scale (Green & Campbell, 2000). Green and Campbell used this scale to measure both trait and state differences in general exploration tendencies; for the current study, we used the instructions designed to assess state changes (in this case, as a function of experimental condition). Specifically, participants indicated to what extent each statement represented them at that moment (1 = *not at all*, 8 = *very much*). Green and Campbell (2000) reported that exploration was negatively correlated with both the anxiety and the avoidance attachment subscales (Simpson, Rholes, & Nelligan, 1992).

Results and Discussion

To test the hypothesis that mortality salience undermines intellectual exploration among individuals low in self-esteem but not among those high in self-esteem, we computed a regression equation in which we entered the main effects for the experimental manipulation (dummy coded) and self-esteem (centered) in the first step and the interaction term in the second step. The only effect was a significant interaction, $b = 1.50$, $SE = 0.66$, $t = 2.28$, $p < .05$, $PRE = .09$ (see Figure 7). At low levels of self-esteem ($-1 SD$), mortality salience decreased exploration, $b = -0.92$, $SE = 0.46$, $t = -1.99$, $p = .05$, $PRE = .07$. At high levels of self-esteem, no effect emerged, $b = 0.59$, $SE = 0.47$, $t = 1.25$, $p < .25$, $PRE = .03$.

Study 6 makes a critical contribution to the present research by demonstrating that mortality salience compromises the desire to engage in intellectual explorative pursuits for individuals with self-esteem deficits. To the extent that such exploration is an important component of psychological and intellectual growth (and adaptive functioning), these findings indicate that the negative effects of death awareness for those with low self-esteem are wide ranging. Thus, existential threat not only challenges life satisfaction, vitality, and meaning and triggers negative affect, it also serves as a barrier to personal growth and development.

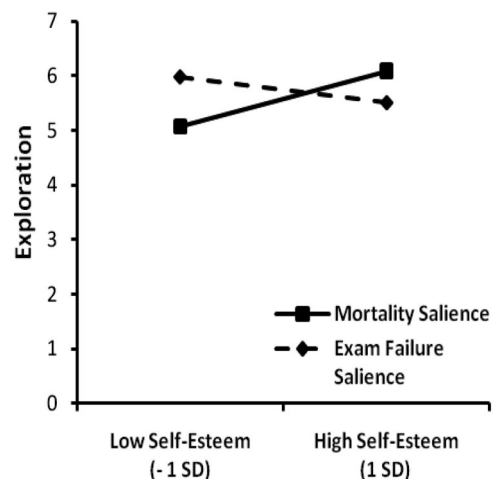


Figure 7. The effects of self-esteem and mortality salience on intellectual exploration in Study 6. Plotted values reflect predicted exploration values at one standard deviation below and above the self-esteem mean.

Study 7

Our prior studies (e.g., Study 4) demonstrated that death-related cognition can have mood-related health consequences (increased negative affect) for those lacking self-esteem. This finding is consistent with the core TMT assertion that the awareness of mortality is anxiety provoking for individuals who are not buffered by self-esteem. In Study 7, we directly tested the potential for mortality salience to increase anxiety and for self-esteem to buffer this effect. In particular, we measured self-esteem, induced mortality salience, and assessed state anxiety proximally and distally. We hypothesized that mortality salience would increase anxiety at low, but not high, levels of self-esteem. We further hypothesized that this effect would only occur when anxiety was measured distally. This study is significant because it is the first to test directly TMT's core assertion that death cognition will lead to anxiety (when measured distally) if people have deficient anxiety buffers.

Method

Participants and procedure. One hundred one undergraduate Introductory Psychology students (60 women, 41 men) participated in exchange for course credit in a study ostensibly about the relationship among personality characteristics. As before, we administered all measures and conditions in the laboratory. Debriefing concluded the experimental session.

Materials. Participants filled out the Rosenberg Self-Esteem Scale ($\alpha = .74$, $M = 2.74$, $SD = 0.40$). Subsequently, they were then randomly assigned to the mortality salience or pain control condition (as in Studies 3 and 5). Next, as in Study 3, participants either moved directly to the dependent measure or worked on a word-search distraction task prior to completing the dependent measure.

Finally, we measured state anxiety with the state version of the State-Trait Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970). Participants rated their agreement with 20 statements (e.g., "I feel anxious," "I feel jittery") on a 4-point scale (1 = *not at all*, 4 = *very much so*). The instructions specifically ask participants to indicate how they feel right now. This measure formed a reliable index ($\alpha = .89$, $M = 1.96$, $SD = 0.45$).

Results and Discussion

To test the hypothesis that mortality salience increases anxiety at low, but not high, levels of self-esteem only when measured distally, we conducted a regression analysis. We entered the main effects of mortality salience (dummy coded), dependent measure presentation (proximal, distal) condition (dummy coded), and self-esteem (centered) in the first step; all two-way interaction terms in the second step; and the three-way interaction term in the third step. In the first step, there was a main effect for self-esteem such that higher levels of self-esteem were associated with decreased anxiety, $b = -0.64$, $SE = 0.09$, $t = -7.03$, $p < .001$, $PRE = .34$, as well as a main effect for mortality salience such that death salience led to higher anxiety than did pain salience, $b = 0.16$, $SE = 0.07$, $t = 2.13$, $p < .05$, $PRE = .04$.

However, these effects were qualified by a significant three-way interaction in the final step, $b = 0.87$, $SE = 0.37$, $t = 2.33$, $p <$

$.05$, $PRE = .06$ (see Figure 8). On the basis of our hypothesis that mortality salience and self-esteem will only interact to impact anxiety distally, we then examined two-way interactions between mortality salience and self-esteem within the proximal and distal conditions. As anticipated, there was no significant interaction between mortality salience and self-esteem within the proximal condition ($p > .35$); however, this interaction was significant within the distal condition, $b = 0.65$, $SE = 0.28$, $t = 2.36$, $p < .05$, $PRE = .06$. We recentered self-esteem at one standard deviation below and above the mean and conducted predicted mean comparisons to unpack this interaction. As hypothesized, mortality salience, relative to pain salience, increased anxiety at low levels of self-esteem ($-1 SD$), $b = 0.45$, $SE = 0.16$, $t = 2.92$, $p < .01$, $PRE = .08$, but not at high levels of self-esteem ($1 SD$), $b = -0.07$, $SE = 0.15$, $t = -0.46$, $p < .65$, $PRE = .003$.

Study 7 complements the prior studies. Mortality salience increased anxiety, but only for individuals with low self-esteem and only when anxiety was measured distally. Across a wide range of psychological adjustment indicators, a similar pattern is observed. When assessed distally, death-related cognition perturbs positive psychological functioning and growth orientation among individuals who lack self-esteem protection.

Study 8

The previous studies demonstrate that mortality salience undermines psychological adjustment in the presence of a deficient self-esteem buffer. In Study 8, we extended this analysis by addressing several theoretical and methodological issues. The first issue pertained to the effects on psychological adjustment of a brief versus enduring mortality salience induction. Our previous studies, along with most mortality salience studies to date, examined transient effects of brief mortality contemplations. A key question is whether repeated mortality-related contemplations would lead to longer term effects. That is, if a brief and single death prime can influence adjustment a few minutes later, would a longer and repeated death thought activation have an impact on adjustment weeks later? Only one published study has examined

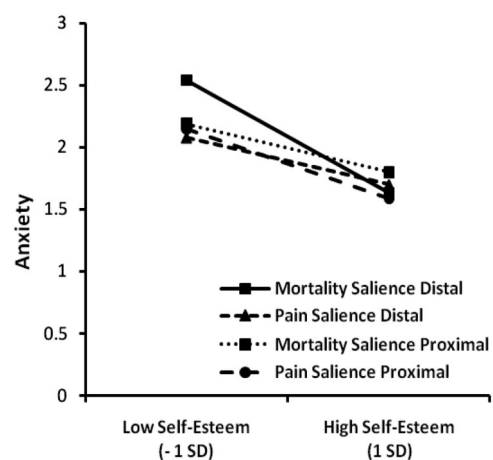


Figure 8. The proximal and distal effects of self-esteem and mortality salience on state anxiety in Study 7. Plotted values reflect predicted anxiety values at one standard deviation below and above the self-esteem mean.

such a question, showing that a mortality salience induction repeated over several days can impact goal orientation a day later (Lykins, Segerstrom, Averill, Evans, & Kemeny, 2007). However, no research has examined whether such a repeated induction has a lingering effect weeks later. Further, no research has considered the moderating role of self-esteem.

In addition, Study 8 adopted a broader conceptual and operational definition of psychological adjustment. The previous studies used self-reported indicators of psychological well-being, meaning, or personal growth. The current study examined whether similar effects would emerge in the case of a behavioral indicator.

Further, Studies 1–7 examined the relation among self-esteem, death cognition, and psychological adjustment in normal samples. If the same buffering function of self-esteem was found in a sample showing clinically relevant anxiety symptoms, this would represent an important extension of the previous findings. Although some research has linked terror management processes with psychopathology (Kosloff et al., 2006; Simon, Arndt, Greenberg, Pyszczynski, & Solomon, 1998; Strachan et al., 2007), no research has considered the interactive effects of self-esteem and mortality salience on psychopathology or on behavior that indexes psychopathology. However, as Study 7 suggests, death awareness can lead to anxiety and thus such awareness may contribute to anxiety-related pathology.

We addressed these issues by testing participants with moderate levels of social anxiety. We measured self-esteem, exposed participants to repeated death primes over a series of weeks, and then brought them back to the laboratory 1 month later to assess avoidance of social interaction. We hypothesized that participants in the death condition, relative to those in a control condition, would demonstrate elevated social avoidance, but only if they had self-esteem deficits.

Method

Participants. Forty-five Introductory Psychology students participated in exchange for course credit in a study ostensibly concerned with the psychological effects of writing about different topics. Participants were recruited if they scored in the upper median of a brief screening measure for social anxiety administered in a mass screening questionnaire. Six participants did not return for the follow-up sessions, and the social avoidance data of two participants were not collected because of a computer malfunction. The final sample consisted of 19 female and 18 male participants. Participants who completed all of the sessions were placed in a drawing to win a monetary prize (i.e., a \$50 gift certificate).

Procedure. Participants were randomly assigned to either a mortality salience condition or a trauma salience control condition. The study consisted of five sessions. The first four sessions were conducted over the course of 2 weeks and the fifth (follow-up) session was conducted 1 month after the fourth session. Participants were run in groups ranging in size from one to five in partitioned cubicals for privacy. In Session 1, participants completed a packet of individual difference measures, including a self-esteem questionnaire. All of the writing sessions were conducted by a clinical psychology graduate student who observed participants for signs of serious distress, in which case the experimenter was prepared to follow a detailed safety plan; however, no

cases of serious distress were reported. To reduce the likelihood that participants would arrive at Session 5 actively thinking about death (i.e., death in focal attention), we informed them at the end of Session 4 that the writing portion of the study had ended and that Session 5 would not contain such a task. Thus, we assumed that the content of the writing conditions from previous weeks were distally (i.e., outside of focal attention) affecting behavior.

Session 5 was conducted by a second experimenter unaware of participant condition. In Session 5, participants were reminded that they would be asked to speak about personally revealing topics with a group of other participants. (This information was included on the consent form.) After completing several filler measures, participants were presented with a free-writing task, in which they could write about the contents of the experimental room to relax before beginning the group discussion. Avoidance behavior was operationalized as the time spent on the task. Next, participants walked to the assigned room across the hall and were debriefed. Participants were given an opportunity to ask questions and discuss the nature of the study and were also provided with contact information for counseling services. After being fully debriefed and given the chance to discuss the study, no participant evidenced signs of distress or reported any concerns regarding their participation.

Materials. We screened for socially anxious participants with the social phobia subscale of the Fear Questionnaire (Marks & Mathews, 1979). We used a 5-point Likert-type scale ranging from 0 (*would not avoid it*) to 4 (*always avoid it*) to assess avoidance of social situations (e.g., speaking to or acting in front of an audience, being watched or stared at) because of fear. Across the full mass screening sample ($N = 788$), participants reported a mean total score of 6.16 ($SD = 3.27$) and a median of 6.0, with a range from 0–20. The measure demonstrated moderate internal consistency ($\alpha = .67$).

We assessed self-esteem in the first session using a response scale that ranged from 1–11. Participants rated themselves on the following four dimensions: (a) *very negative* versus *very positive*, (b) *a failure* versus *a success*, (c) *very bad* versus *very good*, and (d) *very unpleasant* versus *very pleasant*. These items demonstrated good reliability ($\alpha = .91$, $M = 7.80$, $SD = 1.53$).

The four-session repeated writing task constituted the experimental condition. We relied on the guidelines suggested by Pennebaker (1997) to compose the writing instructions for both groups. We instructed participants to write for 20 min about either their deepest thoughts and feelings pertaining to their own death or the most traumatic experience they have had. We chose trauma as a comparison condition to make this writing task as similar to the mortality salience writing task as possible without specifically asking people to contemplate their own death. We instructed participants to continue writing for the entire time and not to worry about grammar or spelling.

We assessed social avoidance behavior with a behavioral avoidance task. Behavioral avoidance tasks are objective measures used to measure unwillingness (e.g., latency) to engage in anxiety-provoking situations (Deacon & Maack, 2008; Tsao & McKay, 2004). In the current study, avoidance was operationalized as the amount of time spent avoiding a group discussion about personally revealing topics (Strachan et al., 2007). Specifically, the behavioral avoidance task consisted of telling participants that they would be asked to speak about personal issues with a group of

other participants but that they would have time to relax beforehand. Participants were instructed to write about the contents of the room on a personal computer and that when they were ready, they should walk across the hall for the group discussion. An examination of the narratives indicated that all participants followed instructions and wrote about the contents of the room. Participants pressed the space bar to begin the task and the escape key to end it. Avoidance was operationalized as time spent on the task, which was recorded by the computer program used in the experiment. Using this method, Strachan et al. found that a traditional mortality salience induction followed by a distraction task increased social avoidance within that experimental session.¹

Results and Discussion

We hypothesized that self-esteem would interact with writing condition (mortality vs. control salience) to predict social anxiety, as measured by avoidance of the group discussion. Specifically, we hypothesized that in socially anxious individuals with low self-esteem, thinking about their own death would lead to more social avoidance than would thinking about a past trauma, but that this difference would not occur in individuals with high self-esteem.

To test this hypothesis, we conducted a regression analysis, in which we entered the main effects of mortality salience writing (dummy coded) and self-esteem (centered) in the first step and the interaction term in the second step. The only effect to emerge was the predicted interaction, $b = 86.21$, $SE = 31.89$, $t = 2.70$, $p = .01$, $PRE = .18$. We conducted predicted mean comparisons at one standard deviation above and below the centered self-esteem mean. Mortality salience, relative to trauma salience, increased social avoidance at low levels of self-esteem ($-1 SD$), $b = -203.71$, $SE = 68.99$, $t = -2.95$, $p < .006$, $PRE = .21$, but not at high levels of self-esteem ($1 SD$), $b = 60.10$, $SE = 68.46$, $t = 0.88$, $p < .39$, $PRE = .02$ (see Figure 9). The slope within the trauma condition appeared as if it could also be driving this results pattern. Thus, we analyzed further this interaction with tests of simple slopes. Self-esteem predicted avoidance behavior in the mortality salience condition, $b = -53.48$, $SE = 22.38$, $t = -2.39$, $p < .02$, $PRE = .14$, but not in the trauma salience condition, $b = 32.74$, $SE = 22.72$, $t = 1.44$, $p < .15$, $PRE = .06$. These results



Figure 9. The effects of self-esteem and repeated death writing on social avoidance in Study 8. Plotted values reflect predicted social avoidance values at one standard deviation below and above the self-esteem mean.

suggest that it is, in fact, thoughts of death that are driving the effect. It is interesting, however, that the reverse relationship occurred in the trauma condition. Given that this effect was not significant, however, we do not discuss it further.

In Studies 1–7, we examined whether self-esteem buffers the influence of death awareness on psychological adjustment. Study 8 complemented these findings by investigating whether self-esteem also buffers the influence of death awareness on socially avoidant behavior. A month after a repeated induction of death awareness, individuals with low self-esteem demonstrated increased social anxiety as measured by social avoidance, but individuals with high self-esteem were buffered from this effect. For low self-esteem individuals, mortality salience not only tarnishes the tint of their rose-colored glasses, but it also contributes to psychological suffering for which these individuals may seek the clinician's office.

General Discussion

The reported findings are of specific importance because they provide the first direct test of the assertion that existential threat in the form of death cognition influences psychological adjustment and that self-esteem plays a crucial moderating role. Heightened death awareness (a) reduced satisfaction with life, subjective vitality, meaning in life, and exploration and also (b) increased negative affect, anxiety, and socially avoidant behavior at low, but not high, levels of self-esteem. The same results pattern emerged using a variety of control conditions and when both death cognition and self-esteem were measured and manipulated. In addition, these results were only found when death thoughts were active but likely outside of focal attention. These effects were also observed in American and Chinese samples. Further, this pattern was observed on actual behavior weeks after a repeated death prime. These findings have implications for TMT and, more generally, theory and research on the antecedents of psychological adjustment and adaptive functioning.

Further Support for the Key Tenets of TMT

The current research paves the way for a more complete understanding of the psychological consequences of death awareness. Specifically, our research makes at least five distinct and important contributions to the theory. First, the research is the first systematic examination of the effects of death-related cognition on psychological adjustment. Whereas recent research by Routledge and Juhl (2010) found that mortality salience increases death anxiety, the current set of studies found that it also impacts psychological adjustment more generally. Thus, by measuring general indicators

¹ We conducted a pilot study to test the assertion that the behavioral avoidance task measures social anxiety. Specifically, we administered self-report items to assess social anxiety and then had participants go through the social interaction component of Study 8 (i.e., describe the experimental room while relaxing before a social interaction task). Consistent with this assertion, we found a positive and significant relation (with a moderate effect size) between the sum of the three items assessing social anxiety (worry about what to say in social situations, feeling tense if alone with one other person, and ease in meeting new people [reverse scored]) and time spent on the avoidance task, $r(19) = .45$, $p = .05$.

of adjustment in place of providing participants with an opportunity to engage psychological defenses (as is typically done in TMT studies), the current research shows that death awareness can be problematic to psychological functioning. Second, the examination of self-esteem as a moderator of these effects further demonstrates that self-esteem is a buffer of existential threat, as has been argued in previous research in which heightened self-esteem eliminated the use of further self-defenses in response to mortality salience. Self-esteem is, as TMT suggests (Greenberg et al., 1992), a psychological resource that can help buffer a variety of threats in addition to existential ones. The current research, however, is the first exploration of how self-esteem can specifically help preserve psychological adjustment when individuals are reminded of personal mortality. Third, by examining a new repeated mortality salience induction and measuring behavior a month later, the current research provides a critical piece of evidence that existential threat (heightened death awareness) can have lingering consequences. Those vulnerable to social anxiety exhibited an increase in socially anxious behavior weeks after writing about death, but only if they were low in self-esteem. Fourth, the findings of Study 5 provided evidence of the universal nature of self-esteem as a buffer of existential threat. Among Chinese participants, mortality salience decreased meaning, but only for those with low self-esteem. This finding adds to the growing body of research demonstrating that terror management processes operate similarly across different cultural settings (e.g., Dechesne, Greenberg, Arndt, & Schimel, 2000; Heine, Harihara, & Niiya, 2002; Kashima, Halloran, Yuki, & Kashima, 2004; Tam, Chiu, & Lau, 2007; Taubman Ben-Ari et al., 1999). The findings also contribute to the burgeoning literature documenting the panculturality of self-esteem (Brown, in press; Cai et al., 2007, in press) and self-enhancement (Gaertner et al., 2008; Sedikides et al., 2003, 2005; Sedikides, Gaertner, & Vevea, 2007; Yamaguchi et al., 2007).

Fifth, the current investigation provides further evidence for the dual defense model of terror management. Mortality salience and self-esteem did not impact positive or negative mood, meaning in life, or anxiety when these variables were measured proximally. However, these variables were affected when measured distally. That is, the effects previously discussed only occurred when participants did not immediately complete the dependent measures or when DTA was directly assessed in a subtle manner (i.e., stem completion task). Although previous research has similarly found that mortality salience does not affect mood and anxiety immediately (i.e., when death thoughts are still in focal attention), the current research is the first to measure several indicators of psychological adjustment, including perceptions of meaning in life, both proximally and distally. Specifically, the current research provides substantial evidence (a) that it is when distal symbolic self-defenses are needed that mortality salience compromises adjustment and (b) that self-esteem buffers this effect.

It is interesting that positive affect was not influenced by mortality salience when measured proximally or distally, even though all other indicators of adjustment were influenced when measured distally. Recent work by DeWall and Baumeister (2007) suggesting that mortality salience increases positive affect tuning might help explain this null finding. Specifically, their results showed that mortality salience increased tuning to positive emotional information but did not influence conscious feelings of positive

mood; this occurred both immediately after reminders of mortality and after a delay. For instance, reminders of mortality increased the likelihood that participants would complete ambiguous word stems with positive emotion words. DeWall and Baumeister proposed that this less conscious behavior reflects automatic coping efforts (i.e., the psychological immune system) initiated after conditions of threat. However, it is unclear how this unconscious response to mortality salience would ultimately impact psychological adjustment, as it does not eliminate the need to engage subsequent symbolic self-defenses that are directed toward ensuring that the individual feels he or she is a person of value contributing to a meaningful world. Further, as found in the current research, it does not mitigate effects of mortality salience on negatively valenced affect (i.e., negative affect and anxiety) or positively valenced indicators of adjustment that are more connected to the self (i.e., meaning in life, satisfaction with life, vitality, exploration). Positive emotional tuning, like previously discussed proximal defenses (e.g., denial, thought suppression), may help temporarily stave off the full psychological impact of death awareness, but ultimately individuals need additional defenses that are better poised to provide perceptions of meaning and symbolic permanence. This is an exciting possibility worth considering in future research.

Self-Esteem, Death, and Psychological Adjustment

The current research also contributes to the broader theoretical and empirical agenda on psychological functioning and adjustment. As previously discussed, self-esteem protects psychological (and physical) health in response to life stressors and threats (Sedikides & Gregg, 2008; Sedikides, Gregg, & Hart, 2007; Swann et al., 2007; S. E. Taylor et al., 2003a, 2003b; Trzesniewski et al., 2006). The current research indicates that this protective nature of self-esteem is applicable to existential threats as well. Contemplating one's transient nature decreased satisfaction with life, perceptions of being fully alive and vital, a sense of meaning, and a desire to explore new ideas, while increasing negative affect, state anxiety, and avoidant behavior for socially anxious individuals. However, these effects were consistently found only in participants with low levels of self-esteem and only when assessed distally. Further, these effects emerged when self-esteem was measured within the experimental session (Studies 1, 4, 5–7) or at least a week prior to the experimental session (Study 2); it was also found when self-esteem was manipulated (Study 3). Feeling good about oneself prevents thoughts of death from compromising psychological adjustment. Considering that in today's interconnected and technologically advanced world, individuals are often bombarded with reminders of mortality (e.g., health risk information, terrorist threats) and these reminders may often be operating outside of focal attention, self-esteem may play a crucial role in preserving adaptive psychological functioning in the face of omnipresent existential threats.

Although these findings indicate that self-esteem serves a protective role when people are facing existential threat, they also provoke important questions for future research. There has been some debate regarding the impact of self-esteem on attitude-related responses to mortality salience. As previously noted, many studies suggest that people low in self-esteem are not adequately insulated from mortality concerns and thus respond to reminders of

death with a heightened defense of worldview-related attitudes. However, some studies have found that it is people with high, not low, self-esteem who respond to mortality salience with the greatest amount of defensiveness. Specifically, I. McGregor et al. (2007) reported that participants high in self-esteem, but not those low in self-esteem, demonstrated increased ideological and personal project zeal in response to a death-related prime. Further complicating this issue, recent research has started to consider the potentially distinct effects of contingencies of self-worth (Routledge et al., 2004), intrinsic versus extrinsic self-esteem (Arndt et al., 2009), and explicit versus implicit self-esteem (Schmeichel et al., 2009) on attitudinal responses to mortality salience. There appears to be general agreement that self-esteem is an anxiety-buffering mechanism (Pyszczynski et al., 2004; Schmeichel et al., 2009), but perhaps there are critical differences in how worldviews are used after existential threat as a function of a variety of dimensions of self-esteem and esteem-related contingencies. For example, people with inflated but unstable positive self-regard may need to be particularly vigilant when navigating existential threat. If so, how might psychological adjustment be influenced by mortality salience for such people, and what role do worldview-related attitudinal defenses play in protecting adjustment for such people? Or, as previously discussed, high self-esteem individuals may show heightened defense of a cultural domain that is a central basis of self-worth (Arndt & Greenberg, 1999). How is psychological adjustment affected when a worldview highly connected to personal self-worth is bolstered or compromised, and do existing levels of self-esteem play a role? Future research is needed to answer these and related questions. Nevertheless, the current work supplies a critical foundation for these future empirical endeavors by providing the first systematic examination of the key TMT proposition that self-esteem helps prevent the awareness of mortality from compromising psychological health and well-being.

Similarly, the current studies also pave the way for future research on how other defenses besides self-esteem may similarly help preserve adaptive functioning when people are confronted with reminders of human transience. In the current studies, participants were not given the opportunity to engage in symbolic self-defenses after the mortality salience induction and prior to the measurement of psychological adjustment. Given that this was the first examination of the effects of mortality salience on psychological adjustment, it was important to follow previous terror management protocols and to measure adjustment precisely at the time in which people engage symbolic self-defenses (i.e., after mortality salience and the distraction task or after the measurement of DTA). Future research could, however, begin to examine the potential interplay between psychological adjustment and psychological defenses after mortality is rendered salient. For example, would providing individuals with the opportunity to affirm or defend an important worldview after mortality salience eliminate the observed effects on indicators of psychological adjustment? Another possibility is that indicators of adjustment mediate the distal effects of mortality salience on worldview defense. Previous research has suggested that affect does not mediate the effects of mortality salience on worldview defense, but affect was always measured proximally (i.e., immediately after the death prime) and not distally when worldview defenses were deployed. Thus, as a result of the current findings, there are several crucial questions to explore that are related to self-esteem, mortality salience, psycho-

logical adjustment, and symbolic self-defenses (e.g., worldview defense). Similarly, future researchers should consider how other individual differences, such as secure attachment style (Mikulincer, Florian, & Hirschberger, 2003), hope (Rutjens, van der Pligt, & van Harreveld, 2009), or nostalgia (Sedikides, Wildschut, Arndt, & Routledge, 2008), may mitigate the effects of mortality salience on indicators of psychological adjustment.

Terror Management and Psychopathology

Existential perspectives on anxiety suggest that individuals who are unable to cope with death anxiety are more likely to develop anxiety disorders such as social phobia (Becker, 1973; May, 1977; Yalom, 1980). That is, unless one has faith in a cultural worldview and the belief that one is meeting the standards of value of that worldview (i.e., self-esteem), the effects of death awareness can lead to increased anxiety across several domains. Recent research has begun to examine the relationship between fear of death and anxiety disorders (Strachan et al., 2007). This research has found that mortality salience leads to increased anxiety behavior, such as behavioral avoidance of social interaction in socially anxious individuals. Strachan et al. (2007) followed other existential thinkers in suggesting that self-esteem buffers the influence of death awareness on anxiety behaviors; however, they did not specifically test this hypothesis. Study 8 addressed this question directly and demonstrated that repeatedly thinking about death increased social avoidance for socially anxious participants with low self-esteem, but it did not increase social avoidance for socially anxious participants with high self-esteem. Thus, the current research builds on the findings of Strachan et al. in two important ways. First, the research tested the moderating role of self-esteem. Second, the research assessed social avoidance, not in the same experimental session in which mortality salience was manipulated but a month after the death-writing induction.

Concerning the role of self-esteem and death-related ideation in psychopathology, there are several exciting possibilities for future research. For example, Simon et al. (1998) reported that providing mildly depressed individuals with an opportunity to engage in symbolic self-bolstering worldview defense after mortality salience increased perceptions of meaning in life. The researchers argued that mildly depressed individuals lack feelings of meaning and personal significance, and thus activating existential concerns and facilitating a means to affirm greater meaning via worldview defense had therapeutic value for these vulnerable individuals. However, this research did not examine whether death-related existential concerns played an active role in depression. Considering that the current research suggests that death cognition can compromise adjustment and self-esteem can help preserve it and that depression is characterized by deficits in self-esteem and hopelessness, future researchers would do well to address the interactive potential of self-esteem and death cognition on predicting depressive symptoms.

An advantage of an existential analysis of psychopathology is that it would provide a functional perspective of psychological symptoms. A problem with the prevalent syndromal perspective of psychopathology is that because it is based on symptoms and signs that can be caused by a number of processes (e.g., a headache can be the result of influenza or vision problems), it does not readily lead to treatment decisions (Hayes, Wilson, Gifford, Follette, &

Strosahl, 1996). In contrast, a functional perspective organizes behaviors by functional processes that produce and maintain them, indicating rather authoritatively effective intervention targets (Chawla & Ostafin, 2007; Hayes et al., 1996). Addressing low self-esteem was a traditional focus of several schools of therapy (Horney, 1950; Rogers, 1961; Sullivan, 1953), but it has been somewhat neglected by cognitive behavior therapy (Fennell, 1998). To the extent that the interaction of death cognition and self-esteem is found to influence psychopathology, it would suggest the importance of addressing both of these factors in treatment development research.

Coda

Death-related existential threat deteriorates adaptive psychological functioning. Self-esteem, however, buffers the deleterious influence of death ideation on adjustment. That is, although individuals with low self-esteem struggle with adjusting to the knowledge of mortality, individuals with high self-esteem remain unscathed and unflappable. The findings shed light on the nature of death cognitions, psychological adjustment, and self-esteem, as well as their interrelationships. More important, the findings enrich psychologists' understanding of terror management processes. We hope that the findings constitute a springboard for future theoretical and empirical advances in this research domain.

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Received December 2, 2009

Revision received May 22, 2010

Accepted May 24, 2010 ■