Terror Management Theory and Research: How the Desire for Death Transcendence Drives Our Strivings for Meaning and Significance

Jeff Greenberg[*,1] **Kenneth Vail**[§] **and Tom Pyszczynski**[¶]

[*]University of Arizona, Department of Psychology
[§]Cleveland State University, Department of Psychology
[¶]University of Colorado, Colorado Springs, Department of Psychology
[1]Corresponding author: E-mail: jeff@email.arizona.edu

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Abstract

Science tells us that humans are merely animals that evolved to survive long enough to reproduce and care for offspring before dying. Yet, people want to view life as something more and accomplish something more: to have lives that are meaningful and significant. According to terror management theory, these desires spring from the human awareness of our own vulnerability and mortality. This awareness creates a unique ever-present potential for experiencing terror. To manage this potential, cultural worldviews have been constructed to imbue life with meaning and with possibilities for individuals to attain enduring significance (self-esteem). Humans function relatively securely as long as they sustain faith in such a worldview and their value within it because it provides them with the sense that they are not just transient animals fated only to obliteration; rather they will in some way transcend their own death. The theory has been supported by over 500 studies, clarifying how we humans manage this potential terror. We briefly summarize the roots and core of the theory and evidence, and branches of research pertinent to politics, religion, love, family, health, and neuroscience. We conclude by considering how death relates to other threats, and positive forms of terror management.

While working on this chapter, your first author found in his mailbox John Green's (2012) New York Times bestseller, *The Fault in Our Stars*, dropped off by Charlie Champion, an appreciative student from an undergrad seminar. It is about teenagers with various horrific forms of spreading cancer, who live in pain while knowing death is likely coming soon. One loses one eye, then the other, to cancer. A second can barely breathe, even with the help of a mobile oxygen tank. The third loses a leg and much more. The questions the novel poses are why and how we all keep going when even those far more fortunate than the protagonists of this story realize that life is fragile, finite, and can become an absurd horror at any time. Terror management theory (TMT) addresses those same questions.

1. THE ROOTS OF TMT AND RESEARCH

The theory is based on the interdisciplinary writings of cultural anthropologist Ernest Becker. Becker built his analysis on the work of many people, but most notably the writings of Soren Kierkegaard, Sigmund Freud, William James, Otto Rank, Gregory Zilboorg, George

Herbert Mead, Erving Goffman, Norman Brown, and Robert Jay Lifton. Becker's fundamental goal was to understand the human striving for self-esteem and the propensity for humans from one culture to wreak havoc on those from other cultures. Greenberg, Pyszczynski, and Solomon (1986) were drawn to Becker's analysis precisely because their own graduate studies had led them to puzzle over those very same human propensities.

Becker began in *The Birth and Death of Meaning* (1971) with some basic observations regarding human nature and development. One key aspect of our species is our unique capacity for learning. But what goes hand in hand with that capacity is immaturity at birth and a lengthy vulnerability and dependence as we learn. We are born helpless creatures and remain vulnerable and in need of protection for many years. But we have great potential for growth and learning. In infancy, we cannot do much, but as we mature, we begin to develop an ego, a central cortical self-regulatory capacity, or executive function. We can step back from the flow of ongoing sensations and perceptions to think about ourselves, and to consider past events and imagine possible future actions and outcomes. These emerging abilities enhance our chances of getting what we need and want from the world around us. But for this ego to function effectively, our emotions and, especially, our fears and anxieties, must be kept under control.

We are full of fear precisely because our growing self-awareness and capacity for temporal thought makes us increasingly aware of our vulnerabilities and helplessness. From birth, the child has innate distress and fear reactions to what endangers its survival, but between 3 to 5 years of age, explicit concerns about death arise. At this point, the fundamental way we control those anxieties is by sustaining the love and protection of our caregivers. We do that by coming to understand the world the way our seemingly omnipotent parents do and by trying to be the loveworthy beings they want us to be. But this is inevitably a struggle that requires learning a vast array of arbitrary symbols, like the days of the week, and distorting ourselves and stifling our impulses to meet arbitrary bases of value, of good and bad. To sustain our parents' love and protection and minimize their disapproval, we learn to carry their worldview, perspective, and judgments within our own minds. Once we have established this generalized other or superego, we feel loved and protected when we meet its standards for being good and valuable. This is the security-providing sense of self-esteem.

From then on, a stable sense of self-worth is our primary basis of psychological security: it is "an effective anxiety-buffer" (Becker, 1971, p. 67). But,

as we mature, we become more and more aware of the diverse threats in the world that could kill us, of the potential finality and inevitability of death, and of our parents' limitations to protect us. Thus, our basis of security, our generalized other, gradually shifts to incorporate the perspective and values of larger entities such as deities, nations, causes, and ideals—a transference process (Becker, 1973). From the very beginning, our self-worth is predicated on an internalized worldview and our sense of value within it, and as our worldviews expand and shift, so do our strivings to sustain our self-esteem.

2. THE CORE OF TMT AND RESEARCH

Greenberg et al. (1986) formalized Becker's analysis into TMT. At its essence, TMT begins with the idea that from early childhood to the end of our lives our sense of psychological security—our ability to manage our potential for terror—depends on coping with awareness of our vulnerability and mortality, an awareness that conflicts with our predispositions to continue living and avert that which could kill us. The theory's core propositions are that we manage our potential for terror by maintaining (1) faith in a culturally derived worldview that provides meaning, structure, and standards of value and goodness and (2) the sense that we are living up to those standards of value. When we have those things in place, we feel valued and protected, even beyond death, thanks to the worldview's offerings of lasting significance through literal and/or symbolic forms of immortality. We live on through some combination of everlasting souls, culturally valued contributions to the world, and identification with large entities that outlast personal death. So TMT's answers to John Green's questions are (1) that the why is because we are animals driven by biological systems, most notably those centered in the limbic system, to continue to survive and (2) the how is by viewing ourselves as more than mere material animals—as special beings with identities and souls who will endure beyond physical death.

These ideas explain much of what is known empirically about human beings from a variety of fields, ranging from archeology and anthropology to history and sociology to developmental, social, and clinical psychology. Some of the earliest traces of human culture, dating to over 50,000 years ago, indicate elaborate burial rituals suggesting preparation for an afterlife. The earliest human architectural wonders, from Göbekli Tepe to the pyramids, seemed to serve the spirit world rather than material one, despite the

massive amount of work and ingenuity they must have required. These structures did not serve practical purposes, but rather seemed to protect the dead and send them off properly into the afterlife. The first known written story, the ancient Sumerian Epic of Gilgamesh, concerned Gilgamesh's grappling with the problem of death and his quest to transcend it both literally and symbolically.

Entire sophisticated cultures have been centered on afterlife beliefs, ranging from ancient Egypt to Christian and Muslim ones to the Aztecs and beyond. Death and how to cope with and transcend it have been central themes in literature and the arts from Gilgamesh to ancient Greek and Eastern philosophers, to Omar Khayam to Shakespeare, to the great romantic poets and novelists, down to the present day. Importantly, death was not just a prevalent concern of the past; it underlies contemporary concerns about health care, support for the military, terrorism, war, disease, intergroup conflict, economic problems, crime, corruption, drugs, and abortion. Here in the twenty-first century, death is perhaps a more prominent theme than ever in films, television, theater, novels, painting, music, religion, landmarks, and cultural rituals.

Within psychology, early theorists such as James, Freud, Rank, and Allport acknowledged the centrality of death in human belief systems. Within social psychology, TMT seemed able to help account for human propensities to conform to the group, obey authorities, and reject alternative cultural worldviews to the point of aggression. Much of what was known about self-esteem also fits the theory. Low self-esteem had been shown to be associated with anxiety, physical health problems, and poor performance under stress. Further, threats to self-esteem arouse anxiety and a host of defenses such as self-serving attributions, self-handicapping, downward comparisons, and compensation—and the employment of these defenses reduces the impact of such threats (see Greenberg et al., 1986; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

Given the existing evidence, in the mid-1980s, Solomon, Greenberg, and Pyszczynski drafted a paper presenting Becker's ideas and TMT only to find that despite the existing evidence, we had to develop our own a priori testable hypotheses based on the theory in order to introduce these ideas into our chosen field. Once we had built an initial base of evidence, the revised paper was published (Solomon Greenberg, & Pyszczynski, 1991). Since then, over 500 studies have supported hypotheses derived from the theory and refinements of it.

2.1 Mortality Salience and the Worldview

Research began with the hypothesis that if our worldviews protect us from the terror of realizing we are merely fragile creatures fated only to obliteration upon death, then reminders of our mortal state (mortality salience; MS) should intensify efforts to bolster and defend our worldviews (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). The first test used municipal court judges as participants. Judges are charged with upholding the values of their cultural worldview. Thus, if MS intensifies the need to uphold the worldview, it should lead to harsher judicial decisions. The judges were given a packet of personality measures and material typically used to determine the bond to be set for a woman cited for prostitution. In a random half of the packets, before consideration of the bond to set, we inserted a purported projective personality assessment consisting of the following two items: (1) Please briefly describe the emotions that the thought of your own death arouses in you; (2) Jot down, as specifically as you can what you think will happen to you as you physically die and once you are physically dead. This was the first, and has since been the most often used, MS induction. Judges not given the MS induction set an average bond of $50. In support of the hypothesis, judges in the MS condition set an average bond of $455.

After showing this powerful effect of MS on the judgments of the judges, Rosenblatt et al. conducted five follow-up studies using college students. These studies established

1. that the effects of MS are guided by participants' preexisting worldviews, showing that MS effects are never really a main effect; they depend on the individual's belief system;
2. that different ways to increase the accessibility of death-related thoughts produce the same effects;
3. that the effects of MS are different than the effects of heightened self-awareness;
4. that MS does not increase physiological arousal;
5. that the effects of MS are not mediated by self-reported affect or physiological arousal;
6. that MS leads to positive reactions to someone who upholds the values of the individual's worldview, as well as negative reactions to someone who violates them;
7. that the effects of MS are different from that of making general anxieties salient. This last point was made by using a fear of death scale

as the MS induction and a general trait anxiety scale as the control condition.

Hundreds of studies have replicated and expanded these points since then.

Beginning with Study 6 of Rosenblatt et al. (1989), many studies have compared MS with making salient other potential future threats, including failure, dental pain, intense and uncertain pain, social exclusion, paralysis, public speaking, worries after college, general anxieties, meaninglessness, uncertainty, and unexpected events. The vast majority of these studies (hundreds) have found MS to cause different effects than these other threats (see, e.g., Cohen Sullivan, Solomon, Greenberg, & Ogilvie, 2011; Cox and Arndt, 2012; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Landau et al., 2004; Shepherd, Kay, Landau, & Keefer, 2011). Furthermore, a variety of methods have been developed to bring death in or close to consciousness, and all have been shown to lead to similar effects. Besides the classic MS induction, researchers have used gory accident footage, death anxiety scales, generating a sentence about death, proximity to funeral homes and cemeteries, death words imbedded in a word search puzzle, and subliminal primes of the words "death" or "dead."

2.2 TMT and Prejudice

Many of the MS findings, from Rosenblatt et al. (1989) onward, can be conceptualized as showing that MS increases defense and bolstering of people's internalized, culturally derived worldview, which is generally labeled worldview defense. After MS, people defend and support their nation, uphold their values, are reluctant to use cultural icons inappropriately, prefer out-group members who conform to stereotypes, and derogate and punish those who violate or criticize aspects of their own worldview (for a review, see, e.g., Pyszczynski, Solomon, & Greenberg, 2003). Because of this propensity for worldview defense, perhaps the clearest implication of the entire TMT empirical literature is one that was a central insight of Becker's last book, *Escape from Evil* (1975): That concerns with mortality contribute to prejudice and intergroup conflict (for a review focused on prejudice, see Greenberg, Landau, Kosloff, Soenke, & Solomon, in press). For example, MS increases (1) Germans' preferences for German products and places over foreign ones (Jonas Fritsche, & Greenberg, 2005), (2) Italians' dislike for Germans (Castano Yzerbyt, Paladino, & Sacchi, 2002), (3) Americans' negativity toward Jews and Israel (Cohen, Jussim, Harker, & Bhasin, 2009), (4) young adults dislike for elderly people (Martens Greenberg, &

Schimel, 2004), (5) heterosexual males' dislike for gay men (Webster & Saucier, 2011), and (6) American Christian medical students' inattentiveness to the medical needs of a Muslim patient (Arndt, Vess, Cox, Goldenberg, & Lagle, 2009).

2.3 TMT and Self-Esteem

Research on the role of self-esteem in terror management began with the core idea that self-esteem is an anxiety-buffer. Although it seemed to fit most of what was already known about self-esteem, Greenberg, Simon, et al. (1992) generated an additional hypothesis—boosting self-esteem would buffer people from otherwise anxiety-inducing threats. Across three studies, images of death and threat of electric shock increased self-report and physiological indicators of anxiety in a control condition, but did not do so after a boost to self-esteem. Subsequent studies showed that both dispositionally high and temporarily elevated self-esteem reduces defensive responses to reminders of death (e.g., Harmon-Jones, Simon, Greenberg, Pyszczynski, & Solomon, 1997). Schmeichel et al. (2009) showed that high-implicit self-esteem has greater terror management value than explicitly reported self-esteem.

If self-esteem serves a critical terror management function, not only should it protect people from death-related fear, it should also be the case that MS motivates people to strive for self-worth. This was first demonstrated in a remarkable set of studies by Taubman-Ben-Ari Florian, and Mikulincer (1999). This work found that Israeli soldiers who based their self-worth partly on their driving skill reacted to MS by claiming they would take more risks driving and by driving more boldly on a driving simulator. Further, if self-esteem was boosted in another way after MS, showing off by driving recklessly became unnecessary. As an aside, this is one of a number of sets of studies to show that, after MS, using one way of bolstering one's worldview or self-worth reduces the need to do so in a different way. Similarly, MS led scuba enthusiasts to claim they would take more risks (Miller & Taubman-Ben-Ari, 2004) and males to claim more interest in "macho" risky activities (Hirschberger Florian, Mikulincer, Goldenberg, & Pyszczynski, 2002). Peters, Greenberg, Williams, and Schneider (2005) showed that after MS, people whose self-worth was based in part on their physical strength increased their handgrip strength as measured by a hand dynamometer. And Arndt et al. (2002) demonstrated that MS leads to disidentification with one's own in-group when identifying with the in-group could damage self-esteem.

2.4 Threats to Terror Management Structures and Death Thought Accessibility

If worldview defense and self-esteem serve to stem concerns about mortality, then threats to those protective structures should make death-related thought more accessible to consciousness; using either a word-stem completion measure (e.g., coff _ _) or a lexical decision task (which assesses how quickly death-related words are recognized), a large body of research has shown that they do. Criticisms of one's nation, one's religion, one's self-worth, and one's belief in a just world all increase death thought accessibility (DTA) (for a review, see Hayes Schimel, Arndt, & Faucher, 2010). In subsequent sections, we will show how various specific threats to terror management resources increase DTA in the context of such domains as politics, close relationships, and health.

2.5 Death and Animality

The core idea of TMT can be boiled down to the point that we cope with knowing we will die by living out our lives within a symbolic world of meaning in which we become enduringly significant beings rather than mere animals fated only to obliteration upon death. Unfortunately, our physical bodies are a continual threat to belief in our special status, and so we have to, as Becker (1973) put it, deny our creatureliness as best we can. An important line of work spearheaded by Jamie Goldenberg (for a review, see Goldenberg, 2012) has demonstrated many ways people engage in this process. MS increases both the desire to deny that humans are animals and distancing from animals and animalistic activities.

As examples, MS leads to more negativity toward an essay arguing for similarities between humans and animals, physical aspects of sex, bodily products, physical sensations (both positive and negative ones), overtly sexual women, pregnant women, and breast-feeding women. In addition, DTA is increased by thinking about the physical aspects of sex and bodily products. These propensities are particularly strong for people high in neuroticism or when people are reminded of their similarity to other animals. MS also increases dislike of nonhuman animals (Beatson & Holloran, 2007) and even increases support for killing them (Lifshin Greenberg, & Sullivan, 2014). The evidence so far suggests that this support for killing other animals is part of how we try to feel superior to them.

2.6 The Role of Affect in MS Effects

In every calm and reasonable person there is hidden a second person scared witless about death.

Phillip Roth, The Dying Animal *(2001, p. 153)*

From the very first MS study, researchers have assessed self-reported affect after the manipulation, and some have examined physiological indicators of affect as well. Surely the imminent threat of death from acts of terrorism, combat, airplane turbulence, etc., can very quickly generate feelings of terror and accompanying physiological arousal. This shows that the potential for terror is indeed with us at all times. Even when objectively free of imminent threat, people with panic attacks report thinking they are going to die. People diagnosed with cancer and other life-threatening illnesses or undergoing diagnostic tests for such maladies commonly experience bouts of fear of death; some people experience these fears whenever they visit their doctors. Even healthy people sometimes wake up at night worried about their one inevitable fate.

But when we designed the first MS study, we had no idea whether young healthy adults writing about their mortality in the safety of our labs would consciously experience fear. On the one hand, fear of death is at the core of the theory. On the other hand, as Becker stressed, this fear is largely unconscious, and people have presumably spent their lives investing in worldviews and bases of self-worth to minimize their experience of that fear. Furthermore, the theory is really about the motivation to manage the ever-present potential for terror rather than the motivating properties of consciously experienced terror (indeed, the latter quickly arouses fight, flight, or freezing). What we found in the first six MS studies was no hint of either elevated self-reported fear or anxiety, and no increase in cardiovascular indicators of arousal. Hundreds of studies have similarly failed to find an impact of MS on self-reported affect or physiological arousal. One study examined facial electromyography during presentation of subliminal death primes (Arndt, Allen, & Greenberg, 2001). They found only a small increase in corrugator activity during presentation of the primes, but it did not last beyond the primes and the level of activation did not mediate (or correlate with) the increased worldview defense caused by the death primes.

Greenberg et al. (2003) designed a study to test the idea that MS, by increasing DTA, evokes a potential for anxiety, and it is that perceived potential that motivates worldview defense. Prior to an MS manipulation, they told half their participants that they were drinking a tea containing a

drug that blocks the experience of anxiety for the following hour. Participants not told this showed the typical MS-induced increase in worldview defense. Participants who thought they were immune from anxiety did not. Note also that if MS had caused anxiety, there would likely have been an augmentation misattribution in which those who took the anxiety-blocker would think they must be *extra*-aroused, as found in previous misattribution of arousal studies (e.g., Storms & Nisbett, 1970). If MS effects were mediated by arousal, the prediction then would have been even higher worldview defense in the anxiety-blocker condition. Quite the opposite occurred. These ideas fit the general view that a lot of behaviors, including psychological defenses, are motivated not by the experience of the feared affect, but rather by the anticipation of that affect (e.g., Baumeister Vohs, DeWall, & Zhang, 2007; Erdelyi & Goldberg, 1979; Greenwald, 1989).

Lambert et al. (2014) recently reported four studies that did detect increased affect in response to an MS induction using what they considered a more refined measure of fear. It is not clear what to make of these findings in light of the hundreds of studies that did not find an effect. But even in these studies, the increased fear did not mediate worldview defense, much as a small increase in corrugator activity in response to subliminal death primes did not mediate worldview defense in Arndt et al. (2001).

2.7 The Dual Defense Model

Research has also explored other processes possibly activated by MS. After the first two empirical articles reporting nine MS studies had been published, Randolph Ochsmann, a German psychologist informed us that he was unable to replicate our basic MS effect. This turned out to be a very fortuitous event because it spurred the development of the dual defense model of coping with reminders of death. The details regarding Randolph's attempt to replicate our finding revealed that he used a much more elaborate method to make people think about their own death, one involving guided imagery regarding one's own funeral. This led us to the idea that perhaps the kinds of defense we had been studying were triggered when death thoughts were *close* to consciousness, i.e., highly accessible, but not when they were in focal attention. In all nine of our initial studies, there was a delay between the MS induction and assessment of the dependent measures. These delays invariably involved some combination of a script conveying the cover story for the "second study," measures of mood, and information to set up the primary dependent variable.

Greenberg et al. (1994) conducted a set of four studies to provide an initial test of this idea. First they showed that a stronger MS induction led to weaker effects. Then they demonstrated that keeping death in mind by having participants complete a word search puzzle involving death-related words after an MS induction and right before the dependent measure eliminated its effects. A third study found that if a neutral word puzzle followed the death–related word search, the typical MS effect did occur. This showed that the key to observing the effects was for people to be distracted from consciously thinking about death before completing the dependent measure. In a final study (the first to use the previously described word completion DTA measure), we showed that immediately after an MS induction, DTA is low, but after a delay it increases.

This set of studies led to additional research culminating in the dual defense model, first fully presented by Pyszczynski Greenberg, & Solomon (1999) and subsequently elaborated by Arndt, Cook, and Routledge (2004). Figure 1 depicts this model, each component of which has been empirically supported in numerous ways. When people are consciously reminded of death, they first engage proximal defenses to minimize the conscious threat ("not me, not now"; Chapin, 2000), thereby enabling them to stop thinking about death. These defenses involve some combination of active suppression of death–related thoughts, rationalizations about one's health and safety, and intentions directed toward reducing vulnerability to death. Once these defenses have been engaged, death is out of focal attention, but remains high in accessibility. It is when death is high in accessibility but not in focal attention, a state Wegner and Smart (1997) labeled deep activation, that distal terror management defense is engaged. Indeed, level of DTA mediates the effects of death reminders on worldview defense and self-esteem striving (e.g., Cohen et al., 2011; Das, Bushman, Bezemer, Kerkhof, & Vermeulen, 2009; Vail, Arndt, & Abdollahi, 2012).

Which particular distal defenses, i.e., ways to bolster the worldview or self-esteem striving, are chosen depends on the individual's worldview and self-esteem investments, as well as the salience or accessibility of particular aspects of that person's worldview or sources of self-worth. Defense of the worldview and increased striving for self-worth then reduce DTA back to baseline levels (for a recent review, see Greenberg Landau, & Arndt, 2013). This dual defense model has been most fruitfully applied as the foundation of the terror management health model (TMHM), to be described in our section on TMT and health.
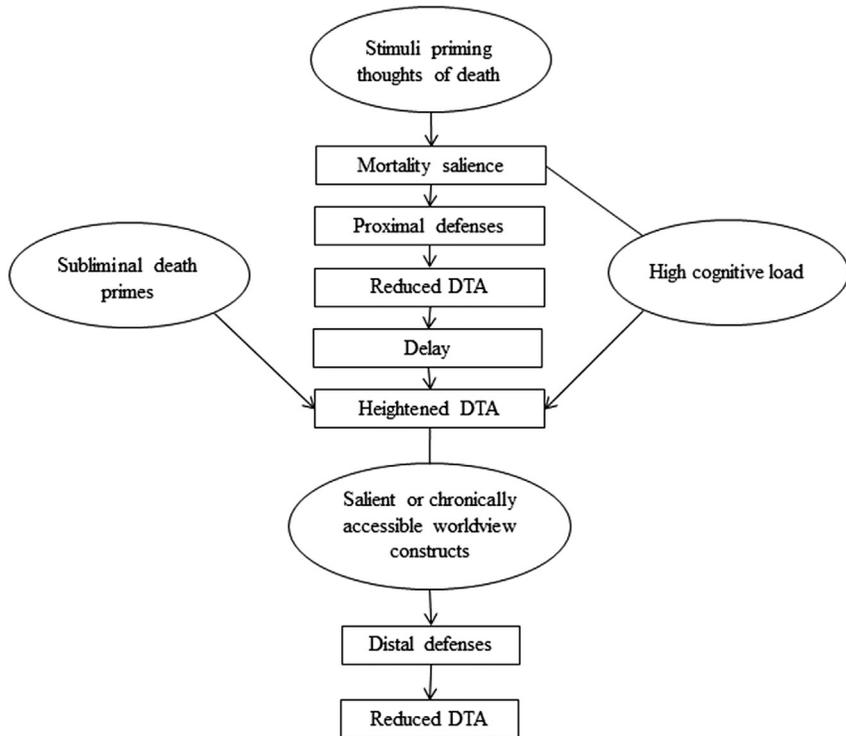
Figure 1 The Dual Defense Model of Responses to Reminders of Death (DTA = Death thought accessibility).

3. THE MANY BRANCHES OF TMT AND RESEARCH

Perhaps because of the range of behavior to which TMT has been applied, TMT sometimes has been mistakenly interpreted as arguing that coping with mortality is the underlying motive behind all human action. This is not the case. Indeed, TMT does not propose or imply that any actions are solely motivated by terror management concerns, but rather that terror management concerns influence human behavior in most, if not all, domains of social life. Indeed, research has shown that concerns with mortality affect what we eat, whom we vote for, the products we prefer, our mental health, legal decision-making, health-related choices, how we structure social perception, how we view nature, dissonance reduction, aggression, intergroup conflict, stereotyping, greed, consumerism, generosity, philanthropy, fashion, art preferences, creativity, use of nostalgia, sexual

attitudes and behavior, fame-seeking, celebrity worshipping, how we conceive of the self over time, parent—child relationships, romantic relationships, and even human—android relations (for reviews, see Greenberg, 2012; Greenberg & Arndt, 2012; Greenberg Solomon, & Arndt, 2008). TMT is thus demonstrably pertinent to marketing, consumer science, economics, aesthetics, film study, criminology, the law, theology, political science, philosophy, family studies, anthropology, and robotics. Covering all of the topics TMT research has explored is impossible within our allotted word limit, so here we will focus in on brief summaries of findings pertinent to how TMT and research contribute to six central topics of likely interest to a broad swath of readers: politics, religion, love, parent—child relationships, health, and neuroscience. Following those sections, we will more fully consider how defense against death relates to other defenses. We will then conclude with a focus on positive influences of death-related thought.

3.1 TMT and Politics

Taking TMT into the political realm was motivated primarily by a chapter in Becker's *The Denial of Death* (1973) called the "The Spell Cast by Persons: The Nexus of Unfreedom." Becker essentially argued that when death concerns are looming, people are drawn to "charismatic" political leaders, i.e., individuals who confidently espouse a simple worldview in which the in-group is great and destined to heroically triumph over evil. Becker's analysis fits what we know about the rise of many historical leaders, but also seemed to foretell the effects of the terrorist attacks of 9/11, 28 years later. Before the attacks, both President Bush and New York Mayor Rudy Giuliani were doing poorly in political polls. A few days after the attacks, they both had reached unprecedented levels of approval (Pyszczynski, Solomon, & Greenberg, 2003).

To put the TMT analysis of such phenomena to the test, Cohen et al. (2004) hypothesized that MS would increase the appeal of leaders who fit this charismatic leadership style. They manipulated MS and had student participants read about three hypothetical gubernatorial candidates: one with a charismatic style emphasizing the greatness of the state and its people, one with a task-oriented style who emphasized getting the job done, and one with a relationship-oriented style who emphasized participatory governance. MS increased the appeal of the charismatic candidate greatly. Then, prior to the 2004 U.S. presidential election, Landau et al. (2004) manipulated MS and assessed its effects on the appeal of incumbent President George W. Bush and, in some studies, Democratic challenger John Kerry.

Bush, with his calm, confident demeanor and "the greatness of America will defeat the evil-doers" message fit the charismatic formula much better than Kerry, who seemed uncomfortable as a speaker and who was portrayed by Republican advertising as a flip-flopper. Over six studies, MS, relative to a variety of aversive control topics, increased the appeal of Bush, and in two studies also reduced the appeal of Kerry. Subsequent studies have provided additional support for this effect and have shown that MS increases the appeal of charismatic candidates only if they espouse a worldview compatible with one's own (Kosloff, Greenberg, Weise, and Solomon, 2010).

Other evidence shows that MS shifts people toward supporting more extreme measures in dealing with political opponents and nations portrayed by political figures as evil. First, McGregor et al. (1998) developed an innovative hot sauce measure of aggression and showed that after MS, American liberals and conservatives allocate more painfully hot salsa to another individual who criticized their preferred political party. In two studies, Pyszczynski, Abdollahi, et al., (2006) examined support for aggression against "enemy" nations. In the first, they found that in a pain control condition, Iranian college students preferred peaceful strategies to address issues with the U.S. But, following MS, they became much more supportive of terrorist attacks against America and more interested in joining the cause. In the second study, after MS, politically conservative Americans became more supportive of using extreme measures against potentially threatening nations, including nuclear weapons. Interestingly, liberals, who tend to be more valuing of tolerance and cooperation, were not drawn toward more extreme reactions to other nations. In more recent research, Weise Arciszewski, Verlhiac, Pyszczynski, and Greenberg (2012) similarly showed in a pair of studies that although people high in authoritarianism became more negative toward immigrants after MS, people low in authoritarianism showed the opposite reaction.

Largely paralleling the Pyszczynski, Abdollahi, et al., (2006) findings, Hirschberger Pyszczynski, and Ein-Dor (2009) found that MS led Israelis to be more supportive of a preemptive nuclear attack on Iran and also of military sorties in Gaza (Hirschberger Pyszczynski, & Ein-Dor, 2010). Further, mortality-salient conservative Israelis, similar to conservative Americans, became more favorable toward violent measures to resist withdrawal from the Gaza Strip in 2005 (Hirschberger & Ein-Dor, 2006).

Recent studies using non-Muslim Americans examined the role of death concerns in support for American anti-Muslim policies. An initial study showed that MS pushed Americans toward supporting harsh interrogation techniques for a terrorism suspect from Saudi Arabia (Kugler & Cooper,

2010). A subsequent set of four studies was inspired specifically by the controversy over the proposed building of a mosque at Ground Zero, the site of the attacks on the World Trade Center (Cohen Soenke, Solomon, & Greenberg, 2013). In the first study, MS increased negative reactions to the proposal. In the second and third studies, thinking of a mosque, but not a church or synagogue, increased DTA. In the final study, after MS, reading about incidents in which a copy of the Quran was either burned or dropped in a toilet reduced DTA. So, after MS, learning of the destruction of a central symbol of Islam served a terror management function. This latter finding was similar to the even more chilling finding by Hayes Schimel, and Williams (2008) that among non-Muslim Canadians who learned that Muslims were becoming the dominant religious group in Nazareth, reading about Muslims dying in a plane crash reduced DTA.

Taken together, the political TMT research shows that death-related thought plays a role in preference for particular politicians and policies regarding treatment of immigrants, minority group members, and other nations. The general tenor of this work is that terror management is often served by heightened nationalism and negativity toward different others. However, in a later section reviewing positive reactions to MS, we will describe recent research on moderators that can direct terror management in more constructive directions in the political realm.

3.2 Terror Management and Religious Faith

Religious beliefs play a prominent role in human social behavior, but why have they been so persistently appealing? In contrast to evolutionary psychological perspectives that portray religion as a by-product of fitness-enhancing cognitive adaptations (e.g., Sosis, 2009), research suggests that religious beliefs are not epiphenomenal, but instead serve the terror management function of helping protect adherents from potential death-related anxiety. With religious belief, people can psychologically transcend the limits of mortality. From the *Jannat Al-Na'im* (Islamic gardens of delight) to *Moksha* (Hindu salvation) to heaven (Christian paradise), and to *Ching* (the pure land for some Buddhists), this longing for eternal life continues today. In fact, polls show major portions of the world's population believe in an afterlife (Ipsos/Reuters, 2011).

Whatever the religion's name, each typically offers the notion that a supernatural realm exists and can be reached by following its teachings. In our aching need to believe, religious promises of literal immortality lay ever at our fingertips. Thus, people may find it easier to cope with mortality

when sacred books tell them there is life after death. Previous research, for example, presented participants with ostensible scientific evidence from near-death experiences either confirming or disconfirming life after death (Dechesne, Pyszczynski, Arndt, Ransom, Sheldon, van Knippenberg, & Janssen, 2003). MS increased self-esteem striving when afterlife was disconfirmed, but not when it was confirmed as scientifically valid. More recent research (Kastenmuller Greitemeyer, Ai, Winter, & Fischer, 2011; Piwowarski Christopher, & Walter, 2011) has similarly found that MS increases worldview-defensive reactions against out-groups, except when afterlife is affirmed. Relatedly, having intrinsically religious people think about their religiosity also eliminated worldview defense after MS (Jonas & Fischer, 2006).

In addition to afterlife beliefs, religious creation stories help people cope with the problem of nonexistence by bathing oneself, and one's cultural world, in a spiritual cosmogony. From drops of milk landing on tortoise shells, to divine lovemaking, to God's telekinetic fiat (Leeming & Leeming, 1994), creation myths convey that one is a featured participant in a spiritual drama that stretches indefinitely backward and forward in time. Consistent with the idea that such religious beliefs help serve terror management, Schimel Hayes, Williams, and Jahrig, (2007) found that DTA among creationists increased after they read an article presenting evolutionary evidence against creationism. Recent work has also shown that MS can heighten rejection of evolution and acceptance of intelligent design (Tracey Hart, & Martens, 2011).

If belief in an unbounded spiritual realm inhabited by supernatural agents can provide psychological equanimity in the face of death, then bolstering faith in supernatural agents should help serve that existentially protective function. Indeed, Norenzayan and Hansen (2006) found that MS increased peoples' general religiosity and intensified belief in various supernatural agents (e.g., Buddhist prayer, shamans, and ancestral spirits). Such explicit professions of faith also appear to depend on individuals' preexisting religious orientations. For instance, MS only increased belief in afterlife among those with preexisting afterlife beliefs (Osarchuk & Tatz, 1973; Schoenrade, 1989). More recent research by Vail Arndt, and Abdollahi (2012) found that MS did not increase supernatural belief among atheists, but it increased American Christians' and Iranian Muslims' faith in their own religions' gods (God/Jesus and Allah, respectively) and reduced their faith in alternative religions' deities.

At first blush, that atheists maintained their rejection of religion and su-pernatural agents after MS would seem to be inconsistent with the idea that death concerns are most powerfully resolved through literal immortality, as in religious belief. However, research on social cognition has highlighted the important difference between automatic (implicit) and controlled (explicit) processes (e.g., Bargh & Chartrand, 1999; Chaiken & Trope, 1999). In the religious context, even people who explicitly deny religious beliefs behave like "implicit theists" (e.g., Uhlmann Poehlman, & Bargh, 2008; Haidt Bjorklund, & Murphy, 2000; Bering, 2002, 2010), and when reminded of death, they indicate a general *desire* for a literal afterlife, even though they do not explicitly accept it as possible (Heflick Goldenberg, Hart, & Kamp, 2014).

Thus, it seems likely that MS would lead all people—regardless of prior belief—to implicitly (automatically) turn toward literal immortality, such as that offered by religions, for comfort, whereas more consciously deliberate (explicit) responses would be modified according to one's explicit world-view beliefs. In recent work exploring that possibility (Jong Halberstadt, & Bleumke, 2012), religious and nonreligious participants were reminded of death (vs control) and then completed a single-target implicit association test in which supernatural concepts (e.g., god, heaven, miracles) were categorized as "real" or "imaginary." MS shortened response latencies when categorizing supernatural concepts as real, regardless of participants' self-reported religiosity. To compare that effect against explicit responses, Jong et al. conducted a similar study, but measured explicit religious beliefs; MS led religious participants to explicitly profess stronger faith, but led nonreligious participants to explicitly reject it, echoing other findings on explicit religious worldview defense (e.g., Vail, Arndt, et al., 2012). Together, these findings point to the power of literal immortality such as religious notions of the supernatural and afterlife. Even the nonreligious participants appeared to cope with the death awareness by at least initially *implicitly* accepting the supernatural, whereas their self-reported (explicit) re-sponses were informed by their *explicit* worldview beliefs. Furthermore, recent studies in our labs suggest that even nonreligious people move toward more explicit afterlife belief when they read an article arguing that efforts to extend the life span indefinitely are fruitless.

The general thrust of these findings is that religion serves an important terror management function as a basis for literal immortality. Becker (1971) argued that this is in some ways a better solution to the problem of death than symbolic (secular) immortality. One particular problem with

symbolic immortality is that the inevitable end of our species undermines it; if our ancestral line and groups are going to end, then our cultural contributions will be forgotten. People lacking faith in literal immortality should therefore be especially resistant to the idea of our world ending. Indeed, Lifshin, Weise, Soenke, and Greenberg (2014) found that people who believe in an immortal soul are more accepting of the possibility that the world may end (through either global warming or solar activity). However, if soul-believers are reminded of their investments in symbolic immortality, they become just as resistant to end-of-world scenarios as nonbelievers.

3.3 Love and Death

Rank (1941/1958) argued that the decline of the centrality of religion in twentieth-century Western cultures led to increased focus on romantic love as a basis of meaning and self-worth. Becker (1973) expanded on this idea and posited love as the romantic solution to terror management. The theme that love can transcend death is common in modern literature and movies and, indeed, is clearly conveyed in the novel and film version of *The Fault in Our Stars*.

Mikulincer and colleagues (for a review, see Mikulincer, Florian, & Hirschberger, 2003) developed a line of research that supports the idea that people do in fact use their romantic relationships to manage their concerns about death, especially those with a secure attachment style. MS increases interest in forming close relationships and increases the valuing of, and desire for, greater intimacy with romantic partners. In addition, thinking of one's committed romantic partner reduces the need for worldview defense after MS. Furthermore, securely attached people, compared to those insecurely attached, are less prone after MS to worldview defense and more prone to seek romantic intimacy. Furthermore, thinking of threats to one's romantic relationship, such as relationship problems or an extended period of separation, increases DTA, especially for people high in attachment anxiety. Complementing this research, recent studies have found that after MS, interpersonal touch can alleviate the need for symbolic defense for low self-esteem people (Koole, Sin, & Schneider, 2014).

Supplementing this work, Goldenberg et al. (1999) showed that reminders of love reduce the link between physical sex and thoughts of death, and Kosloff, Greenberg, Sullivan, and Weise (2010) showed that MS leads people to seek long-term partners who validate their worldviews. And

finally, Cox and Arndt (2012) reported seven studies demonstrating the terror management function of the positive regard provided by romantic relationship partners. Four of those studies showed in various ways that, after MS, people exaggerate how favorably their romantic partners view them and become more committed to their partners to the extent that they serve as a source of self-worth. An additional study showed that, after MS, thinking about being valued by a romantic partner reduced DTA. A final study found that, after MS, although securely attached individuals inflate how positively their romantic partners see them, anxiously attached people exaggerate how positively their parents see them.

3.4 The Roles of Parents and Children in Terror Management

Although in adulthood a committed romantic partner probably is more central to terror management than one's parents, Cox et al. (2008) proposed that the original base of psychological security still plays some role, and six studies supported this idea. In the first three, after MS, thoughts of one's parents reduced worldview defense and DTA and increased feelings of self-worth. In a fourth study, MS led to rosier thoughts about one's mother. A fifth study showed that MS increased liking for a stranger who seemed to be similar to one's same-sex parent. A final study showed that reliance on parents for terror management is especially likely for insecurely attached individuals. Specifically, Cox et al. found that, after MS, securely attached people apportioned more of their allotted cell phone minutes to their romantic partner, whereas insecurely attached individuals increased minutes allotted to their parents instead.

So adults do get some terror management value from their parents, but it is even more likely that they get a sense of death transcendence from being parents, a point emphasized by Lifton (1979). Children provide a literal continuation of some of one's biological material, but as Lifton notes, they also may carry forward one's ancestral line; one's name; one's values and one's worldview, including one's religious, regional, and national identifications; and one's valued possessions and activities (a house, a business, etc.). The importance of carrying these things forward is clear in many cases where parents want their children to marry within their group and carry on their values; they even sometimes disown children who do not do so. Besides carrying aspects of oneself into a future beyond one's death, children provide self-worth through their love, admiration, and needing of the parent and through their achievements, and typically also validate the parent's worldview.

The terror management value of children for parents has been demonstrated in a number of ways. Wisman and Goldenberg (2005) found that after MS, Dutch men wanted more children, and Dutch women did too, as long as they were led to believe that having children would not hinder their career aspirations. Further studies found MS increasing enthusiasm for having kids in Germany, China, and England (Fritsche et al., 2007; Mathews & Sear, 2008; Zhou, Lei, Marley, & Chen, 2009). In addition, MS has led people to be more negative toward strict birth-control policies, and more positive toward younger family members (Zhou, Liu, Chen, & Yu, 2008) and toward naming their kids after themselves (Vicary, 2011).

Yaakobi, Mikulincer, and Shaver (in press) recently added further support for the terror management value of parenthood in a series of six studies. In the first two, MS made parenthood-related cognitions more vivid and accessible. An additional pair of studies demonstrated that parenthood-related thoughts reduce DTA, whereas making salient obstacles to parenthood increased DTA. In their first five studies, the link of death to parenthood was weak among people high in attachment avoidance. However, their last study showed that if parenthood was framed as compatible with career strivings (as in Wisman and Goldenberg, 2005), then even avoidant people reacted to MS with more positive parenthood-related cognitions.

3.5 TMT and Health

The recently developed TMHM (Goldenberg & Arndt, 2008) builds on the dual-process model of terror management to shed light on health-relevant motivations. According to the TMHM, when death thoughts enter focal consciousness, people engage in proximal defenses, becoming motivated to remove them by behaving in health-oriented ways or by denying their vulnerability. Nonconscious terror management kicks in when death thoughts are no longer in focal attention, but are high in accessibility. These distal defenses are not focused on resolving health risks, but instead on bolstering self-esteem and cultural beliefs, which can have an important influence on health-relevant behaviors.

Health consequences of conscious death thought. When death thought is in focal awareness, one way that people can remove it is by engaging in behaviors designed to enhance health such as boosting intentions to purchase higher sun protection factor sunscreen or to exercise (Arndt, Schimel, & Goldenberg, 2003; Routledge, Arndt, & Goldenberg, 2004). This type of response, however, depends on being able to perceive behaviors that would

lead to improved health. For example, immediately after a reminder of mortality, individuals who used more adaptive coping strategies or had greater health optimism (both indicators of the ability to perceive effective behavioral steps toward better health) bolstered their health-related behavioral intentions (e.g., sun protection intentions; Arndt, Routledge, & Goldenberg, 2006; Cooper, Goldenberg, & Arndt, 2010). Thus, in health-relevant situations, increasing one's resolve to engage in health-enhancing behaviors is a common way to cope with conscious concerns about death.

However, given that conscious thoughts of death motivate efforts to remove such cognition from focal awareness, they can also lead to threat avoidance or denial. For example, people often directly suppress thoughts of death associated with cancer (Arndt et al., 2007) or deny their vulnerability by perceiving longer life expectancy (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000). This work suggests that if the perception of a meaningful behavioral path to better health is absent, clouded, or biased, then people instead seek to deny their vulnerability. One such clouding influence is the common psychophysiological craving for a cigarette. Though smokers generally tend to discount health risks (Odum, Madden, & Bickel, 2002), their cravings exert a strong influence on that bias: smokers can more easily see themselves taking steps toward quitting when their cravings are weak (Niaura, Shadel, Britt, & Abrams, 2002), whereas they focus on the positive aspects of smoking when the cravings are strong (Sayette & Hufford, 1997; Sayette, Loewenstein, Kirchner, & Travis, 2005). Accordingly, Arndt et al. (2013) hypothesized that MS should motivate those with stronger cravings to increase smoking vigor, denying vulnerability by focusing on the positive consequences of smoking, whereas MS should motivate those with weak cravings to reduce smoking intensity because they are better able to recognize and address their vulnerability to death by reducing health risks. Smokers were reminded of death (vs control topic) and then smoked a cigarette while their puff topography (volume, velocity, flow rate, etc.) was recorded. Indeed, after MS, smokers with weaker cravings smoked less intensely, whereas those with stronger cravings smoked more intensely. This finding is consistent with the idea that conscious thoughts of death motivate people to take steps to reduce health threats if they can perceive meaningful health-enhancing behavior-outcome contingencies, but deny their vulnerability if that perception is clouded or biased.

Health consequences of nonconscious death thought. Because nonconscious thoughts of death motivate efforts to enhance the self and uphold cultural

beliefs and values, the TMHM also posits that certain standards of self-worth can impact existentially motivated health-related decisions. When people based their self-worth on being tan or fit, nonconscious death thoughts motivated them to boost their intentions to tan or exercise (Arndt et al., 2003; Routledge, Arndt, and Goldenberg, 2004), and smokers who based their self-worth on smoking increased smoking intentions when graphic cigarette warning labels aroused thoughts of death outside of conscious awareness (Hansen, Winzeler, & Topolinski, 2010). Similarly, reflecting the social value commonly placed on tanned skin in North American culture, MS after a delay increased desire to tan among people who more strongly rely on external social standards for personal value (Arndt et al., 2009).

Further, the perceived social value of a health-relevant behavior can potentially alter behavioral intentions among people who invest in external social standards. For example, nonconscious death thoughts increased tanning intentions when extrinsic cues suggested the social value of tanned skin (e.g., a fashion article titled "Bronze is beautiful," photos of attractive tanned women), but decreased intentions to suntan when the societal attractiveness of more healthy untanned skin was primed (e.g., a fashion article titled "Pale is pretty"; Cox et al., 2009; Routledge, Arndt, and Sheldon, 2004). Similarly, when people who smoked for extrinsic reasons were reminded of death, they later increased their intentions to quit only if they were first exposed to antismoking messages that portrayed smoking as uncool or socially isolating (Arndt et al., 2009; Martin & Kamins, 2010). And there may also be instances where being healthy is itself one's basis for self-esteem. When people sensitive to extrinsic social standards were given information describing a positive exercise exemplar (vs a non-exercising exemplar), MS, after a delay, motivated them to more strongly view exercise as important for self-esteem (Arndt et al., 2009). And when women attending a mammogram clinic were presented with a brochure framing breast self-exams (BSEs) as empowering (compared to practical instructions), nonconscious DTA led them to increase their intentions to conduct BSEs (Cooper, Goldenberg, & Arndt, in press).

The TMHM further posits that terror management efforts to uphold one's belief systems can impact health outcomes. Because one's cultural beliefs help mitigate concerns about mortality, the motivation to uphold and protect those belief systems can, unfortunately, sometimes have a negative influence on health. This rigid investment in certain cultural beliefs can negatively impact health-relevant decisions if it leads people to resist modern

scientific medical treatments in favor of antiquated folk treatments or religious beliefs based on one's cultural traditions. For example, Vess, Arndt, Cox, Routledge, and Goldenberg (2009) found that nonconscious thoughts of death (vs a control topic) motivated strongly religious people to prefer prayer as a substitute for medical treatment in treating disease and injury. This finding suggests that MS enhanced strongly religious participant's motivation to rely on their faith as a guide.

Enhancing health by targeting TMHM motivational orientations. Based on this previous TMHM work, emerging research considered the possibility that conscious death thoughts would motivate sensitivity to health-relevant information, whereas nonconscious death thoughts would instead motivate sensitivity to information about self-enhancement and social status (McCabe Vail, Arndt, & Goldenberg, 2013). Across several experiments, American participants were first reminded of either death or a control topic; then, either immediately or after a brief delay, they viewed a persuasive appeal in the form of an endorsement by either a high-status celebrity (Jennifer Aniston, Sandra Bullock) or a medical doctor (with white lab coat and stethoscope) spokesperson. The endorsements supported a water bottle brand (Study 1 and 2), an antismoking campaign (Study 3), a responsible drinking campaign (Study 4), and an influenza vaccination campaign (Study 5). Immediately following MS, participants consumed more of the endorsed products and expressed better health and safety intentions when endorsed by the medical doctor. When there was a delay following MS, however, participants consumed more and expressed better health and safety intentions when endorsed by the celebrity. Together, these findings demonstrate that the dual terror management processes can be systematically targeted, such that one approach can enhance health intentions when death is salient and a very different approach will work when DTA is high but death is not in focal attention.

3.6 The Emerging Neuroscience of Terror Management

As discussed earlier, MS does not typically arouse much measurable fear, but rather appears to trigger terror management processes in an effort to prevent the potential for death-related anxiety. Thus, encountering death-related stimuli should activate neural mechanisms involved in detecting potentially anxiety-provoking stimuli and in avoiding anxiety onset.

Neural activity triggered by death-related stimuli. Functional magnetic resonance imaging (fMRI) research, which tracks hemodynamic activation of specific regions of the brain using blood oxygen level-dependent

contrasts, has recently begun to catalog the specific neural structures activated by explicit death-related primes. Quirin et al. (2012) found increased activity in the rostral anterior cingulate cortex (ACC), the right amygdala, and the tail of the right caudate nucleus during the presentation of death-related (vs pain-related) primes. The amygdala is involved in the detection of threatening stimuli (Phan, Wager, Taylor, Liberzon, 2002), and the ACC is involved in the anticipation of negative events and anxiety (Petrovic et al., 2005; Simpson, Drevets, Snyder, Gusnard, & Raichle, 2001), which is consistent with the idea that death-related stimuli activate structures involved in detecting potential sources of anxiety.

Additional fMRI studies have revealed increased activity in the posterior cingulate cortex, bilateral middle frontal gyrus, and right frontal eye field during the presentation of death-related (vs neutral/unrelated) primes (Han, Qin, Ma, 2010; Shi & Han, 2013; see Yanagisawa et al., 2013 for similar findings showing activation in the right ventrolateral prefrontal cortex using near-infrared spectroscopy technology), which again suggests death-related stimuli activate a frontoparietal neural network that helps efficiently detect threatening information (Lloyd, Morrison, Roberts, 2006). These studies also found evidence that whereas negative-valence word primes (e.g., idiot, humiliate) increased activity in the insula (see also Johnstone, van Reekum, Oakes, & Davidson, 2006), death-related word primes (e.g., coffin, cemetery) instead led to immediate and sustained *decreased* insula activity. Insula activity facilitates focal awareness of the self (Craig, 2009, 2010), which suggests insula deactivation is perhaps involved in the avoidance of self-focusing situations—such as sitting in front of one's reflection in a mirror—when reminded of death (Arndt, Greenberg, Simon, Pyszczynsk, & Solomon, 1998). Further, participants' ratings of stimulus words as more strongly related to death predicted heightened frontoparietal activity during the presentation of those words (indicating greater attention devoted to such stimuli), and stronger frontoparietal activity in turn predicted a greater sustained decrease in insula activity (Shi & Han, 2013).

Other research has examined the effect of MS on *event-related potentials* (ERPs): phasic changes in rolling electroencephalographic (EEG) activity, which are time-locked in response to a particular event. Using ERPs to map rolling attentional and evaluative processes, studies have found that death-related (vs unrelated) words increased the amplitude of the P3 component at ∼300 to 500 ms (Lui, Shi, Ma, Qin, & Han, 2013) and at ∼400 to 800 ms (Klackl, Jonas, Kronbichler, 2013). Similar to the fMRI

research just reviewed, these later positive deflections point to the activation of neural structures allocating attention to, and perhaps more deeply evaluating, stimuli such as death–relevant primes that are negative or anxiety provoking (Franken, Gootjes, & van Strien, 2009; Lang Sparks, Bradley, Lee, & Wang, 2004; Li Zinbarg, & Paller, 2007).

   Neural implementation of abstract terror management processes. Rather than focusing on the immediate neural activity triggered by death-related primes, other emerging research has instead focused on identifying brain activity involved in implementing distal terror management defenses such as worldview defense. For example, Henry Bartholow, and Arndt (2010) induced MS (vs control) and then tracked ERPs as participants categorized the expression (happy vs angry) of in-group and out-group faces. MS increased the amplitude of the N2 component as participants viewed angry in-group faces. The N2 is a negative deflection sensitive to cues of in-group conflict (Dickter & Bartholow, 2010), suggesting that MS activated brain structures controlling attention to worldview-threatening images. MS also shortened the latency of the P3 component while viewing happy in-group faces and slowed it during angry in-group face presentation. P3 latency reflects the speed that a stimulus is categorized and its evaluative implications understood, and has been implicated in the cognitive activation of stereotypes (Bartholow, Dickter & Sestir, 2006). Thus, MS activated neural structures that made it easier to categorize faces consistent with stereotypically positive views of one's in-group.

   Kosloff, Greenberg, Martens, and Allen (2014) also used EEG to study the effect of MS on subsequent anterior hemispheric asymmetry and reactivity during worldview defense. Greater relative activity in the right (vs left) frontal hemisphere is associated with readiness for withdrawal. After measuring the effect of MS on frontal EEG, Kosloff et al. assessed *eyeblink startle responses* (anxiety-prone reactivity at the orbicularis oculi modulated by the amygdala) during the presentation of worldview-threatening and worldview-irrelevant images. MS (vs control) increased right anterior asymmetric activity and led to greater startle responses during the presentation of worldview-threatening, but not worldview-irrelevant, images. This motivated withdrawal configuration (right frontal asymmetry) may underlie the cultural worldview defense reactions so commonly observed in the broader TMT literature.

   In other research, Kosloff, Greenberg, and Allen (2014) reasoned that because MS motivates self-esteem striving, MS should boost neural sensitivity to failure on self-esteem-relevant tasks. Participants performed a rapid

decision-making task and were told that the task was diagnostic of valued attributes like intelligence and career success. The task was difficult and designed to elicit performance errors, allowing the researchers to observe patterns of error-related negativity (ERN). ERN is an early ERP component time-locked to erroneous responses, known to be generated by the dorsal ACC (dACC) and associated with behavioral adjustments to avoid continued error commission (Gehring, Goss, Coles, Meyer, & Donchin, 1993). MS not only increased ERN amplitude following errors, suggesting increased sensitivity to esteem-relevant failures, but MS-primed participants tended to slow down (post-error slowing) and be more accurate (post-error accuracy) on trials following an error; ERN statistically mediated those behavioral adjustments. Thus, MS-primed participants made efforts to correct esteem-relevant failures, but only to the extent the dACC had recognized the failures in the first place. Though still in its early stages, this research helps inform the neuropsychological processes that put terror management processes into action.
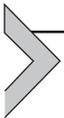
4. HOW DEATH RELATES TO OTHER TYPES OF THREATS

Over the years, critics of TMT have attempted to reduce the problem of death to a specific instance of some other threat claimed to be the "real reason" that thoughts of death produce the effects they do. Candidate reasons have included because many aspects of death are uncertain (e.g., Hohmann & Hogg, 2011; van den Bos & Mideima, 2000), because death threatens people's meaning structures (Heine, Proulx, & Vohs, 2006), because death robs people of control (Fritsche, Frankhanel & Jonas, 2008), or because all threats draw people toward social coalitions (Navarette & Fessler, 2005). There have also been attempts to reduce the diverse responses to thoughts of death to activation of a neurological system that quells aversive emotions induced by threats of all types (Jonas et al., 2014). We certainly agree that uncertainty, meaninglessness, lack of control, and so forth can lead to considerable distress and therefore motivate attempts to counter these threats. However, the argument that the problem of death can be reduced to any alternative underlying threat or that responses to thoughts of death can be reduced to activation of a single system that quells distress independent of the content of the thoughts and behavior involved seems implausible and unable to account for the diverse behaviors that MS has been shown to affect.

Here, we outline the most serious conceptual and empirical problems with these alternative theories, as has been done in previous papers (e.g., Landau, Solomon, Pyszczynski, & Greenberg, 2007; Pyszczynski, Sullivan, & Greenberg, 2014). To our knowledge, these critiques have gone unanswered by proponents of these theories. Although some interesting findings have emerged, we think they are better viewed as complementary to TMT, rather than as alternatives.

4.1 The Role of Uncertainty, Meaning, Control, and Interpersonal Relations in TMT

Each of the psychological constructs purported to be the "real reason" death is threatening has played a central role in the TMT analysis of human motivation since the earliest presentations of the theory. Cultural worldviews are posited to buffer anxiety by providing a conception of reality that imbues existence with *meaning*, the possibility of attaining personal value (self-esteem), and hope of transcending death. To function effectively as buffers against anxiety, people require faith (i.e., *certainty*) in the absolute validity of their worldviews and self-concepts. Because many of the most important aspects of worldviews cannot be directly observed and some run counter to ordinary experience, people require *consensual validation* of their worldviews and self-concepts from other people to maintain the *certainty* that enables these structures to effectively manage their fears; thus, acceptance from others is essential for effective terror management. This is not to say that effective anxiety-buffer functioning is the *only* reason people need meaning, certainty, control, or other people. People need confidence in their understanding of the world to act effectively in it, and they need other people to help them meet their needs, both concrete and abstract. But, these pragmatic functions do not provide adequate explanations for the many ways that awareness of the inevitability of death affects people.

Perhaps the most basic claim of TMT is that our ancestors coped with the emerging awareness of death by using the same intellectual abilities that made this awareness possible—they managed the fear of death by enlisting the ideas, beliefs, and values that they were inventing to act effectively in the world to serve the new function of managing the fear of death. Awareness of death puts a press on these ideas, beliefs, and values such that those that helped manage this fear by imbuing life with ultimate significance and continuance after death were especially appealing, likely to be spread, and eventually institutionalized as cultural knowledge. The fear of death fundamentally changed the way the human motives for meaning, certainty,

control, and relatedness operate. Purely pragmatic motives that function to facilitate effective action would orient people toward the most accurate meanings possible and toward connections with people who are most useful for meeting their pragmatic needs. Although people *sometimes* seek accurate meanings that comport well with observable reality and people who help them meet their concrete needs, they also sometimes go to great lengths to believe things that conflict with observable reality and to please those who do little to meet their needs. Existential death–denial motives help explain such departures from what is pragmatically useful.

4.2 Do Other Threats Sometimes Produce Effects Similar to MS?

Most of the attempts to empirically support the role of these alternative motives entail studies showing that other types of threats sometimes produce effects parallel to those of MS. Critics of TMT point to studies showing that various threats other than reminders of death, such as personal dilemmas (e.g., McGregor, Zanna, Holmes, & Spencer 2001), abstract art and absurdist literature (e.g. Proulx & Heine, 2006), disconfirmation of expectations (Proulx & Heine, 2008), and thoughts of being uncertain (van den Bos & Miedema, 2000) or not having control (Fritsche et al., 2008), sometimes produce effects parallel to those of MS. These are interesting findings, but there are several issues to consider regarding their implications for TMT.

First, it is important to keep in mind that prior to the development of TMT there was already a substantial literature showing that people respond defensively to threats to their self-esteem and meaning systems, in the form of the literature on self-serving biases, cognitive dissonance, just–world beliefs, and other motivated cognitive distortions. Thus, it is not surprising that studies continue to show that threats to these psychological entities produce defensive reactions. TMT was developed, in part, to explain why people need self-esteem and certainty regarding their meaning systems. We developed the MS hypothesis as one approach to testing the TMT proposition that self-esteem and cultural worldviews provide protection from death-related anxiety. Our MS studies consistently showed that reminders of death increase the already well-documented defensive responses to people and ideas that threaten self-esteem or worldviews. It is perfectly consistent with the theory that direct threats to worldview or self-esteem increase defensiveness as well.

Soon after our initial MS studies (Greenberg et al., 1990; Rosenblatt et al., 1989) were published, critics wondered whether these effects were

driven by thoughts of death, per se, or whether thoughts of any aversive event or state of negative affect would yield the same effects. This led us to begin contrasting MS with control conditions in which participants were given parallel inductions about other potential threats such as failure, uncertainty, anxieties, meaninglessness, unexpected events, giving a speech in front of a large audience, social exclusion, paralysis, and physical pain. Hundreds of these studies showed that MS produced effects different from these other psychological threats.

This literature as a whole suggests that other threats sometimes do produce the same effects as MS, but that MS far more often produces effects quite different from these other threats. What should be made of this mixed evidence? First, when the other threats produce similar effects, it sometimes could be a result of terror management and other times might involve a different process. Sometimes these threats may increase DTA; other times there may be other concerns being addressed. Second, these other approaches struggle with accounting for the dramatic difference between proximal and distal defenses triggered by MS. Their explanations of the concerns MS evoke make a little more sense when people are consciously contemplating mortality; yet, that is precisely when symbolic terror management defenses do not occur.

Tests of other TMT hypotheses also undermine these alternative views. Many studies have shown that threats to self-esteem, worldviews, and close relationships increase DTA, and that boosts to each of these anxiety-buffer components reduce both DTA and MS-induced defense. Anxiety-buffer threats increase DTA while not increasing the accessibility of other negative thoughts (Hayes et al., 2010), and evidence for an afterlife reduces worldview defense in response to MS (e.g. Dechesne et al., 2003). The fact that threats to these anxiety-buffer components activate and respond to content specifically focused on death, and that bolstering these components reduces DTA, shows that death is central to these processes. Indeed, studies have shown that DTA mediates the relationship between both MS and worldview defense (e.g., Cohen et al., 2011; Das et al., 2009; Vail, Arndt, Motyl, and Pyszcysnki, 2012).

4.3 Conceptual Problems with Alternatives to TMT

Although a thorough critique of the conceptual and empirical problems faced by the various theories that attempt to reduce the fear of death to some specific aspect of death would be beyond the scope of this chapter

(for such discussions, see Landau et al., 2007; Pyszczynski, Solomon, et al., 2006), here we briefly discuss the most serious issues that make uncertainty- and meaning-based theories, two of the most prominent of these perspectives, implausible as alternatives to TMT.

4.3.1 Uncertainty

Several theorists have argued that either uncertainty about what happens after death (e.g., Hohman & Hogg, 2011) or general personal uncertainty aroused by reminders of death (e.g., McGregor, 2006) is the primary reason that death is upsetting, and that the various responses to MS that have been documented in the literature are all attempts to increase one's sense of certainty. In fact, death is one of the few truly certain things in life. Not knowing what death will be like and what, if anything, happens to us afterward is no doubt one of the many things that are troubling about it. But, clearly people do not always prefer certainty over uncertainty. We ask (Pyszczynski et al., 2010, p. 7550): "Would people rather believe there certainly is not an afterlife or that there *might* be one? Would they rather believe they will certainly be forgotten a few years after they die, or that their memory *might* live on indefinitely? Would it be comforting for people to know that they were absolutely certain to die a painful death a year from today, or would they prefer the possibility that they will live a happy and productive life into their 90s and then die painlessly in their sleep?"

Although certain knowledge is indeed useful for effective action, there is no effective behavior to escape the inevitability of death. Although many people may think they would like to know the truth about what happens after death, we suspect their enthusiasm for such knowledge would be greatly diminished if the answers were not to their liking. Unrealistic optimism regarding one's health and longevity is well documented and this extends to many domains of life (e.g., Weinstein & Klein, 1996). Avoiding diagnostic medical tests, self-handicapping, and gambling are all examples of active avoidance of certainty. Some theorists have argued that it is self-certainty (van den Bos, 2009), or identity certainty (Hohmann & Hogg, 2011), that is at the root of things. But who would prefer to know with certainty they will never succeed in their career or find a loving partner, as opposed to holding out hope that they might? Would people rather be certain they are stupid, unattractive, and untalented or remain uncertain about these possibilities (Pyszczynski, Greenberg, Koole, & Solomon, 2010, p. 750)? The obvious point here is that hope

for a positive future is a powerful motivator that often outweighs the desire for certainty.

4.3.2 Meaning Threat

It has also been argued that death is threatening primarily because it under-mines meaning. In their meaning maintenance model (MMM), Heine et al. (2006, p. 90) define meaning as "what connects things to other things in ex-pected ways — anything and any way that things can be connected." Because human beings are, for reasons not made entirely clear, meaning-making animals, threats to meaning lead to attempts to restore meaning, sometimes extending to sources of meaning unrelated to the original disrup-tion. They argue that thoughts of death produce the effects they do because they undermine meaning frameworks, similar to any disconfirmation of expectancy or perceptual anomaly.

We find the idea that all meanings serve the same function implausible. Indeed, it is ironic that the MMM, which uses meaning as its central concept, is actually meaning free and emphasizes cases where any meaning will apparently do as well as others. However, we believe that a recent refinement of the model (Proulx & Inzlicht, 2012) that describes specific ways in which people respond to meaning threats is a step in the right direction. Indeed, your senior authors' first collaborative research together was a demonstration that disconfirmed expectancies instigate inferential processes aimed at resolving the disrupted meaning that such disconfirma-tions produce (Pyszczynski & Greenberg, 1981). We suspect that many of the findings of MMM studies in which participants make more extreme judgments after disconfirmed expectancies or perceptual anomalies may occur because of the increased epistemic activity and dissonance that such events produce, and the arousal generated by them, but that responses to thoughts of death involve different processes oriented toward managing existential anxiety.

However, if meaning refers to "any way that things can be connected," we fail to see how death fits the MMM's definition of a threat to meaning. Knowing that we must someday die is a fact of life of which all but very young children are aware. Surely no one has ever participated in a TMT study without this knowledge. The belief that life ends at death, never to be regained, and that only a very few people will think about us much after we are gone, and in time all remnants of our existence will be lost, is also a way of making sense of death that fits the MMM's definition of meaning. Although not very pleasant, such a view is easier to accommodate to

observable reality than what most people believe. Yet, clearly people avoid these meanings and exert considerable energy to preserve more palatable, but less likely, meanings.

Although it is true that people sometimes say death robs life of its meaning, others argue that death actually grants life's experiences their meaning. Either way, it is not the MMM's very general "relationships among things" sort of meaning to which they are referring. From our perspective, the MMM has the problem backward: people need meaning to protect themselves from the fear of death, rather than fearing death because it undermines meaning. Importantly, not just any meaning will do when it comes to dealing with death—or most other problems for that matter. People work hard to preserve the culturally transmitted creations of our ancestors that enable them to believe that they will continue to exist in some form after they die.

4.3.3 Death Is Not Living

We agree that uncertainty about death, lack of clear understanding of what it means, the loss of control that it entails, and the severing of social bonds are some of the reasons why people fear death. Research suggests that people vary in which of these and other aspects of death they report to be most troubling (e.g., Florian & Mikulincer, 2004). TMT maintains that death is upsetting and motivating because it undermines perhaps the most basic motive of all—staying alive. More specifically, death is a unique motivator because (1) many biological systems directly function to keep the organism alive, thus averting death; (2) death must be avoided to enhance opportunities for reproduction and care of offspring; (3) death is the only absolutely inevitable future event; and (4) death threatens to undermine virtually all human desires, whether for pleasure, enjoyment, belonging, certainty, meaning, control, competence, self-actualization, or growth.

4.4 Threat-General and Threat-Specific Aspects of Coping

Recently, several models have proposed general mechanisms through which all threats produce their effects (e.g. Jonas et al., 2014; McGregor, 2006; Tritt, Inzlicht, & Harmon-Jones, 2012). These models view all threats as functionally equivalent and explain their effects by positing general coping mechanisms tied to neurological structures and processes. McGregor's (2006) reactive approach motivation (RAM) model was the first of these and seems to be the prototype upon which other models have built. From this perspective, threats of all kinds involve goal conflicts or

discrepancies between actual and expected or desired states that produce a subjective state of anxious uncertainty. This anxiety is produced by the behavioral inhibitory system (BIS; Gray & McNaughton, 2000), which produces an orienting response aimed at resolving the problem at hand. However, if a resolution is not forthcoming, there is a rapid switch to the approach-oriented behavioral activation system (BAS) that refocuses the organism toward approaching other goals. This switch to approach motivation is claimed to relieve the distress activated by the original disruption, and thus either resolves the problem or reduces the distress in a merely palliative manner. The key point is that activation of approach motivation is posited to be the central mechanism that resolves the distress produced by all threats, death included.

Recent refinements of this approach have further specified the neurological underpinnings of this model (e.g. Jonas et al., 2014; Tritt, Harmon-Jones, and Inzlicht, 2012) and linked the initial BIS activation to the proximal defenses specified by TMT and the later BAS activation to the TMT distal defenses. This is clearly implausible because, as the TMT health research shows, both proximal and distal defenses can, depending on salient cues and individual differences, involve either avoidance or approach. To their credit, Tritt et al. argue, quite reasonably, that it is likely that new threats that emerged later in our evolutionary history, and that require higher-order cognitive capacities for symbolic thought and self-awareness (such as awareness of mortality), would be resolved by building onto preexisting regulatory systems that evolved because of other benefits. However, this in no way implies that awareness of death is functionally equivalent to other threats or that coping with this awareness inevitably entails using the same mechanisms used for coping with all other types of threats. From the perspective of TMT, the fear of death is managed by means of specific cultural beliefs and values that our ancestors created to provide literal and symbolic immortality, and thus minimize the potential for death-related fear.

Our impression is that these general threat compensation models are conceptualized at a different, more concrete, level of abstraction than TMT. This is what gives them their apparent general applicability, which of course is a virtue. But what they gain in generality, they lose in specificity and difficulties accounting for the many findings that depend on the specific meanings of both threats and the ideas people use to cope with threats. There are simply too many findings that do not fit these frameworks to make them viable alternatives to TMT.

One of the most basic problems with these approaches is that many of the well-documented defenses against thoughts of death are difficult to construe as approach oriented. The large literature documenting the tendency of people to move away from reminders of their physical animal nature provides many TMT findings that cannot be easily construed as approach focused: finding the physical aspects of sex less appealing, avoiding both pleasant and unpleasant physical sensations, distancing from a breast-feeding mother, and avoiding BSEs (for a review, see Goldenberg, 2012). Similarly, many responses to MS involve negative evaluations, derogation, or distancing from a person who is different from oneself or who violates cultural values (e.g., Greenberg et al., 1990). Although threat-general theorists argue that aggression is an approach-oriented behavior, citing Harmon-Jones and Peterson (2008), and this might fit findings in which MS increases actual aggression (McGregor et al., 1998), not all negative evaluations are primarily approach oriented. Are feeling distress when handling a flag or crucifix disrespectfully (Greenberg, Simon, Porteus, Pyszczynski, & Solomon, 1995), distancing from one's own ethnic group (Arndt et al., 2002), disliking abstract art (Landau, Greenberg, Solomon, Pyszczynski, & Martens, 2006), opposing immigration (Weise et al., 2012), derogating a sexually provocative woman (Landau, Goldenberg, et al., 2006), or giving a harsher punishment to a moral transgressor (Florian & Mikulincer, 1997), all things that have been found to be increased by MS, good examples of approach-motivated behavior?

Taken literally, the RAM model would lead us to predict the opposite of what was found in all these studies. Perhaps proponents would argue that these overt cases of avoidance involve upholding values or standards of some sort, and that the apparent avoidant nature of these attitudes and actions is ultimately serving this approach motivation. But this sort of argument would largely obscure any meaning or utility of the distinction between approach and avoidance, and illustrates the looseness and inability to generate a priori predictions of this reductionist view regarding much of what has been documented in the TMT literature. It is hard to imagine how a theory that views activation of approach motivation as the proximal source of relief from threat could generate any of the predictions made by TMT or any a priori predictions regarding specific responses to particular threats (cf. Shepherd et al., 2011). Indeed, given the looseness and flexibility of this conceptualization, it is also hard to envision any response that could not be interpreted *post hoc* as being consistent with the theory.

It is also important to realize that most, if not all, behaviors involve simultaneous activation of both approach and avoidance systems. For example, theory and research suggests that suppressing unpleasant thoughts (avoidance motivation) typically requires the generation of distractions (approach). Similarly, pursuing most goals requires simultaneous avoidance of appealing impediments to one's goal pursuits—as when avoiding partying in order to study to pass a test. Although one can assess the relative activation of brain regions more associated with approach or avoidance, it is important to realize that most, if not all, behaviors involve a blend of both approach and avoidance, and presumably activation of brain regions involved with both.
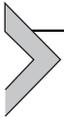
5. THE POSITIVE POTENTIAL OF TERROR MANAGEMENT

TMT research initially followed the general tenor of Becker's work in focusing primarily on the effects of MS on harmful forms of worldview defense. Nevertheless, a steadily mounting body of evidence suggests terror management processes are also capable of driving "positive" attitudes and/or behaviors that minimize harm to oneself and others, and promote physical, social, and psychological well-being (Vail, Juhl, et al., 2012).

5.1 Constructive Consequences of Proximal Terror Management

Conscious thoughts of mortality prompt pseudo-rational efforts to distract oneself from death thoughts (Pyszczynski et al., 1999). As we have seen, in the health context, proximal terror management processes can motivate healthy behaviors when people perceive that they can preserve or improve their health (Arndt et al., 2013; Cooper et al., 2010). But beyond personal health strivings, conscious thoughts of death may also serve as a "reality check" on one's life goals (Heidegger, 1926; Martin, Campbell, & Henry, 2004; Yalom, 1980), leading people to reevaluate popular status-oriented goals and instead consider more inherently supportive and meaningful goal pursuits.

One approach to this issue has focused on differentiating extrinsically dictated, status-oriented goals—typically for wealth, fame, and physical attractiveness—from more intrinsically supportive or meaningful goals—such as for personal growth and insight, positive interpersonal relationships, and supporting one's community (Kasser & Ryan, 1993, 1996). Whereas the

distal terror management processes can motivate self-esteem striving and worldview investment via increased extrinsic goal pursuit (Heine, Harihara, & Niiya, 2002; Sheldon & Kasser, 2008), conscious thoughts of death motivate people to trivialize extrinsic goals and more highly prioritize intrinsically oriented goals (Kosloff & Greenberg, 2009). Longitudinal research has similarly found that conscious thoughts about death predict increases in the relative importance placed on intrinsic over extrinsic goals (Heflick et al., 2014; Lykins et al., 2007). Thus, given that intrinsic goals are associated with enhanced psychological well-being, better social cohesion, and feelings of personal growth and expansion (Deci and Ryan, 2000), these findings highlight the positive potential of proximal terror management processes.

5.2 Constructive Consequences of Distal Terror Management

Distal strategies involve more symbolic efforts to live up to one's cultural norms and standards of value. When the dominant or accessible standards of self-worth are personally or socially constructive, mortality awareness can promote more positive attitudes and behaviors. If people base their self-worth on being environmentally sustainable, for example, MS can motivate pro-environmental attitudes and behaviors (Fritsche et al., 2010; Vess and Arndt, 2008). Similarly, when the salient or dominant norms and values dictated by one's cultural worldview promote prosocial behavior, MS can lead to increased tolerance or equality (Galliot et al., 2008; Greenberg, Simon, et al., 1992; Vail, Rampy, Arndt, Pope, and Pinel, 2014), helpfulness (Jonas et al., 2008), compassion and peacefulness (Rothschild et al., 2009), or empathy (Schimel et al., 2006).

Distal defenses can also promote constructive community involvement and investment in quality relationships with close others. Indeed, MS increases identification with communities offering positive self-reflections (Arndt et al., 2002; Dechesne et al., 2000) and can increase charitable donations to improve one's community (Hirschberger et al., 2008; Jonas et al., 2002), which can help explain why people get involved in groups providing community services to youth, the sick, or the homeless, or why people become involved in beneficial communal institutions such as local governments, education systems, and charities. Other emerging work suggests that expanding one's groups' boundaries to include members of other communities can foster more inclusive, cooperative, and peaceful interactions during distal terror management (Motyl et al., 2011; Pyszczynski et al., 2012).

Further, as attachments to early caregivers become a proxy for existential safety during adulthood (Becker, 1962; Bowlby, 1969), close relationships with others begin to help protect against existential anxieties (Cox et al., 2008). As described earlier, MS can also motivate the development of, and commitment to, romantic relationships (e.g., Blankmeyer et al., 2011; Florian et al., 2002) and greater strivings for romantic intimacy (Hirschberger et al., 2003), especially when relationship partners are a source of positive regard (Cox and Arndt, 2012).

A growing body of research suggests that terror management processes are also capable of motivating creativity and innovation, and an interest in novel, enriching experiences. Greenberg, Pyszczynski, and Solomon, 1995; (see also Pyszczynski, Greenberg, & Goldenberg, 2003) initially proposed the possible interplay of terror management motivation and positive growth, self-expansion, and promotion-oriented motivation (Deci and Ryan, 2000; Higgins, E. T., 1998), arguing that although controlling anxiety and feeling secure are typically more urgent, growth motivation is also an inherent driving force for human behavior. From early childhood on, a dialectic inter-play between two motivational systems emerges: when terror management needs are met, people are most able to grow and be creative.

Emerging work has integrated this analysis with self-determination theory (Deci and Ryan, 2000), which posits that optimal social functioning and personal well-being depend on the satisfaction of three "basic needs": to effectively (competently) act on one's internalized (autonomous) values while maintaining positive social relationships with others (relatedness). Thus, stronger need-satisfaction could signal existential safety, and thus be another catalyst for growth-oriented, rather than defense-oriented, responses to mortality awareness. Instead of reacting to death awareness as an existential threat, experiencing the "dread" of one's impending demise, need-satisfied individuals reminded of death might instead more strongly appreciate and explore the precious beauty of the world around them.

Indeed, recent work found that MS increased worldview defensiveness and DTA among individuals with low, but not high, need-satisfaction; MS also increased motivation to experience need-satisfaction, develop need-satisfying environments, and engage in need-satisfying activities (Vail, Arndt, & Pope, 2014). Further, after MS, people with high need-satisfaction reported feeling more meaning in life, interest in personal growth, and openness to novel experiences (Vail, Arndt, & Breshears, 2014). Future work could investigate whether need-satisfied people respond to MS in growth-oriented ways because they perceive death reminders in

terms of promotion rather than prevention appraisals (Higgins, 1998; Quested et al., 2011).

At times, however, terror management may stifle efforts at growth because pleasure seeking, self-expansion, and creativity can conflict with it. For example, though creativity is often regarded as a constructive force for social and technological improvement and personal growth (Hennessy and Amabile, 2010; also, Deci and Ryan, 1987), it involves departing from familiar cultural norms and precedents in ways that can make a person reminded of mortality feel guilty for having strayed (Arndt et al., 1999). Yet, although MS can undermine individual-oriented creativity, recent work shows it does not undermine creativity oriented toward one's community (Routledge et al., 2008). Other research has also investigated the possibility that certain growth-oriented activities may at least temporarily lessen focus on bolstering psychological security (e.g., Park et al., 2009). Similarly, when primed with creative mind-sets, MS enhances personal growth orientations (e.g., interest in social, intellectual, and environmental exploration) and can motivate exploration of alternative secular and religious worldviews (Routledge and Arndt, 2009; Routledge, Arndt, and Sheldon, 2004).

6. ALL LEAVES MUST FALL

In Green's *The Fault in Our Stars*, the characters oscillate between belief and disbelief that there is something more than this life. They also oscillate between recognizing the ultimate futility of strivings for symbolic immortality and the damage in this life they can do, and recognizing the irresistibility of the urge to make a permanent mark on the world. The thoughtful among us do likewise, and to use Green's metaphor, try to make the scar we leave a beautifying one. It is what Green is trying to do with his novels, what the editor and contributors are trying to do in this volume, and what we suspect you, the reader, are trying to do in your own ways as well.

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