Mortal Cognition: Viewing Self and the World from the Precipice

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Abstract

This chapter examines cognitive underpinnings of terror management theory (TMT) and research, and considers the implications of this work for understanding social cognition. The authors describe an associative network model of TMT and review evidence regarding spreading activation from death thought to worldview constructs and from stimuli associated with violence and health to death thought. The TMT dual defense model and evidence are summarized, with a focus on health-relevant behavior. Proximal defenses involve suppression of conscious death thought and rationalizations to minimize perceived vulnerability to death. Distal defenses are triggered by the heightened unconscious accessibility of death thought and bolster life's meaning and the self's value, thereby making death thought less likely to become conscious. The authors describe research on implications of TMT for understanding why and how people maintain well-structured conceptions of themselves, other people, and social situations, and consider the moderating role of need for structure. Finally, the authors consider remaining questions regarding how thoughts of mortality affect social cognition.

Key Words: terror management, associative network, death, meaning, self, health, structure, worldview, accessibility

Integral parts of the human whole: the necessity of destruction to procure alimentary sustenance: the painful character of the ultimate functions of separate existence, the agonies of birth and death: the monotonous menstruation of simian and (particularly) human females extending from the age of puberty to the menopause: inevitable accidents at sea, in mines and factories: certain very painful maladies and their resultant surgical operations, innate lunacy and congenital criminality, decimating epidemics: catastrophic cataclysms which make terror the basis of human mentality...

James Joyce, *Ulysses*, 1966; p. 697

Terror management theory (TMT) builds on two basic facts of human cognition. The first is that the individual's perceptions and conceptions of the world are filtered through the lens of the cultural milieu in which that individual was raised. One doesn't have to be a strict Whorfian to recognize that language is a cultural product that contributes to the way each of us forms the concepts through which we perceive and think about the stimuli we process as we move about the world. This is true of basic aspects of the physical world like plants, rocks, and animals, but even more so of symbolic human products and concepts, such as flags, buildings, democracy, personal growth, and so forth. In short, we each think largely from within an internalized version of the prevailing cultural worldview inculcated from birth.

The second fact is that, with cognitive development, each of us comes to the realization that we will die someday. Once this cognition is available, it has the potential to arouse anxiety at any moment because it runs counter to the biological predispositions to continue living and avoid threats to our

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continued existence. To manage this potential for anxiety, when thoughts of mortality are brought into consciousness, or even more so when they are highly accessible but outside of focal attention, people defensively alter how they think about themselves, others, and their social world. Specifically, thoughts of mortality motivate people to view the social world and their own experiences as structured rather than chaotic and pointless, and to view themselves and their cultural ideologies in a favorable light.

In this chapter, we will first briefly summarize TMT and the basic evidence supporting it. Then we will lay out the sequence of cognitive processes that produce the varied effects of making mortality salient. We will then summarize research examining the implications of TMT for understanding the motivations underlying people's tendencies to seek out well-structured conceptions of themselves, other people, and social situations. Finally, we will consider remaining questions regarding how thoughts of mortality alter aspects of social cognition.

TMT: The Basics

TMT is based on a long tradition of existential psychoanalytic thought summarized most cogently by Ernest Becker (1962/71, 1973, 1975). This school of thought emphasized the dilemma that humans face given that, like all species, they have built-in drives and fears that facilitate their continued survival but, unlike any other species, have the cognitive capacity to understand that, as physical animals, this goal will ultimately be thwarted. This awareness of our ultimate mortality poses an ever-present threat to our psychological equanimity; as John Cassavetes put it in the film *Shadows* (1960), "Man in contrast to other animals is aware of his own existence, therefore conscious of the possibility of nonexistence. Ergo, he has anxiety."

People manage this potential for anxiety, or terror, by viewing themselves as enduring, significant beings in a meaningful world rather than as mere animals in a pointless universe. Presumably, as our ancestors became aware of the inevitability of death and the possibility that it ends one's existence, cultural conceptions of reality that most effectively denied this view of death were constructed and selected for (see, e.g., Solomon, Greenberg, Schimel, Arndt, & Pyszczynski, 2004). These worldviews provided those who subscribed to them with psychological comfort and the courage to take risks and endure suffering. Both the concern with being mortal and the desire to transcend this state are prominent in the oldest known self-referential

text, the Sumerian Epic of Gilgamesh, as well as in virtually all known worldviews over the course of history. Berger and Luckmann (1967) summarize this view in *The Social Construction of Reality*:

A strategic legitimating function of symbolic universes for individual biography is the location of death... the most terrifying threat to the taken-for-granted realities of everyday life. The integration of death within the paramount reality of social existence is, therefore, of the greatest importance for any institutional order. This legitimation of death is, consequently, one of the most important fruits of symbolic universes. All legitimations of death must carry out the same essential task—they must enable the individual to go on living in society after the death of significant others and to anticipate his own death with, at the very least, terror sufficiently mitigated so as not to paralyze the continued performance of the routines of everyday life.... It is in the legitimation of death that the transcending potency of symbolic universes manifests itself most clearly, and the fundamental terror assuaging character of the ultimate legitimations of the paramount reality of everyday life is revealed. (p. 101)

The simple formula for effective terror management is to maintain faith in two broad psychological constructs. The first is a *cultural worldview*. This is an internalized, personal, but largely culturally derived view of the world that imbues reality with structure, meaning, permanence, and the possibility of lasting significance, or death transcendence, to those who subscribe to that worldview and fulfill its requirements for being valuable cultural members. The second psychological construct is the belief that the self is living up to the culture's standards of value and therefore qualifies for the lasting significance promised by the worldview; from the TMT perspective, this is *self-esteem*. In essence, the cultural worldview allows the individual to view oneself as an enduring, significant being in a world of meaning, rather than as just a material organism who exists for a while in an indifferent universe only to no longer exist in any form upon one's inevitable death. Our psychological embedding in this worldview is generally sustained from cradle to grave and consists of everything from our conception of time to our personal and social identities, values, and goals and our spiritual and science-based conceptions of the value and purpose of life.

Empirical Support for TMT

Three general hypotheses derived from TMT have been examined in a body of more than 500

published studies. The first hypothesis states that, if a meaningful cultural worldview and self-esteem serve to ameliorate or keep from actualization the potential terror engendered by the awareness of mortality, then reminders of mortality should motivate people to bolster the sense that they are significant beings in a meaningful world. A wide array of studies have supported this hypothesis (see Greenberg, Solomon, & Arndt, 2008). Rosenblatt et al. (1989) was the first to induce mortality salience by asking participants to respond to two items disguised as a projective measure of personality and imbedded among filler questionnaires: "Please describe the emotions that the thought of your own death arouses in you," and "Please jot down, as specifically as you can, what you think happens to you physically as you die and once you are dead."

The initial versions of the broad hypothesis posited that mortality salience should increase positive reactions to others who uphold or validate aspects of one's worldview and increase negative reactions to others who violate or dispute aspects of that worldview. In a representative study by Greenberg et al. (1990, Study 3), American college students primed with mortality or a control topic evaluated essays supposedly written by an American author who either praised or condemned the American way of life. Participants rated the author of the pro-U.S. essay more favorably than the author of the anti-U.S. essay in the control condition; however, in response to mortality salience, this tendency was exaggerated in both directions (i.e., more positive and negative reactions to pro- and anti-U.S. authors, respectively). This version of the broad hypothesis has been supported by many other studies, using reactions to a wide range of people, symbols, and other social stimuli that support and challenge participants' worldviews. For example, in one recent demonstration supporting the role of mortality concerns in prejudice, medical students were reminded of their mortality or the prospect of uncertainty and then given emergency room admittance forms for a hypothetical patient complaining of chest discomfort and presenting various symptoms. When asked to make estimates of the patient's risk for myocardial infarction and coronary artery diseases, Christian medical students ascribed high risk to a Christian patient (thus suggesting the need for attentive care) and lower risks to a Muslim patient, even though the patients presented identical complaints and symptomology (Arndt, Vess, Cox, Goldenberg, & Lagle, 2009).

In addition to motivating worldview defense, mortality salience intensifies efforts to bolster one's personal value. For example, it leads people to (1) distance themselves from reminders of their animal material nature; (2) follow salient norms consistent with the worldview to which they subscribe; (3) strive more vigorously to demonstrate their competencies in domains upon which they base their self-esteem; and (4) become more self-serving in their causal attributions and identifications and dis-identifications with groups (for a review of TMT research on self-esteem striving and defense, see Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

Importantly, studies show that mortality salience has similar effects on worldview defense and self-esteem biases in more than 20 countries, including the United States, Canada, Japan, Germany, China, Israel, Ivory Coast, and aboriginal Australia. Although most of these studies have utilized the standard two-item mortality salience induction, a substantial number of studies have found converging evidence utilizing diverse methods to increase the accessibility of death-related thought, including subliminal death primes, word search puzzles, writing a single sentence about death, proximity to funeral parlors and cemeteries, death anxiety scales, and gory accident footage. Many studies have shown the effects of mortality salience to differ from the salience of a variety of other potentially threatening topics, including pain, paralysis, public speaking, exams, failure, general anxieties, worries after college, social exclusion, meaninglessness, expectancy violation, and uncertainty. TMT posits that thoughts of death pose a unique psychological threat because death is the only certain undeniable future event, it can occur at anytime, and it threatens to eliminate the possibility of meeting virtually all human desires or goals, whether for pleasure, control, power, belonging, competence, or love (e.g., Pyszczynski, Greenberg, Solomon, & Maxfield, 2006).

A second general hypothesis derived from TMT is that threats to the meaning and value-conferring constructs that protect people from mortality concerns will increase the accessibility of death-related thought. This means that such threats make death-related thoughts more likely to enter consciousness. Various studies have supported this hypothesis as well. Threats to viewing humans as different from other animals, belief that the world is just, the righteousness of one's national identity, the validity of one's religious beliefs, the integrity of

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one's romantic relationship, and perceptions of personal competence all increase death-thought accessibility (e.g., Hayes et al., 2008; Landau et al., 2004a; Mikulincer, Florian, Birnbaum, & Malishkevich, 2002; Schimel et al., 2007). Notably, Schimel et al. (2007) showed that this increase is not accompanied by an increase in the accessibility of negative thoughts not related to death.

The third hypothesis is that bolstering faith in one's worldview or self-worth will reduce anxiety, defensive responses, and death-thought accessibility following reminders of mortality. This hypothesis has also been amply supported. Bolstering self-esteem reduces anxiety in response to gory images of death and threat of shock (Greenberg et al., 1992). Reminding intrinsically religious people of their religiosity, allowing people to denigrate an essay criticizing their country, providing positive personality feedback, and having people think of valued close relationships all reduce mortality salience-induced defensiveness and heightened death-thought accessibility (e.g., Arndt, Greenberg, Pyszczynski, & Solomon, 1997b; Harmon-Jones et al., 1997; Jonas & Fischer, 2006). Recently, research has begun examining the nuances of how implicit and explicit beliefs about the self operate in this context, showing that the buffering effects of self-esteem depend on implicit rather than explicit self-esteem (Schmeichel et al., 2009).

Sequence of Cognitive Processes Activated by Death-Related Thought

Beginning with a 1994 paper by Greenberg and colleagues on the role of consciousness in mortality salience effects, research has been directed toward articulating the cognitive processes triggered by reminders of death, and thus the mental architecture underlying efforts to manage existential fear (see Arndt, Cook, & Routledge, 2004; Pyszczynski, Greenberg, & Solomon, 1999, for reviews). To measure, rather than just manipulate, the accessibility of death-related cognition, Greenberg and colleagues adapted methods from research on construct accessibility (e.g., Bassili & Smith, 1986; Gilbert & Hixon, 1991; Tulving, Schacter, & Stark, 1982). They had participants complete a series of word fragments, some of which could be completed to form a death-related word or a non-death-related word (e.g., GRA _ _ [grave or grape]). The more fragments a participant completes with death-related words, the more accessible thoughts of death are inferred to be. In subsequent years, other measures have been developed to assess death-thought accessibility (e.g.,

lexical decision tasks; see Hayes, Schimel, Arndt, & Faucher, 2010, for a review).

Insights into the cognitive processes by which awareness of death affects social judgment and behavior have since been accumulating. For example, Hayes et al. (2010) note there have now been more than 80 published empirical studies measuring death-thought accessibility, and more than half of these have been published in the past three years. In this section, we will cover some of these insights, including research implicating a cognitive network surrounding thoughts of death, dual defenses elicited by conscious and nonconscious death-related thought, and dispositional differences in death-thought accessibility.

Cognitive Network of Terror Management

A basic principle of cognitive perspectives on memory is that knowledge structures may be organized around interconnected elements (Collins & Loftus, 1975). Although typically linked in terms of semantic associations, TMT focuses on experiential associations. Because of the motivational importance of death, ideation about mortality occupies a central position within a cognitive network of knowledge structures. Although some of these structures involve constructs associated with literally forestalling death (or distracting the individual from its inevitability so as to facilitate other goal-directed activity), others involve association of death with security-providing symbolic bases of meaning and significance.

As noted earlier, when such symbolic buffers (e.g., conceptions of self-value, romantic relationships, just world beliefs, religious beliefs) that hold death concerns at bay are threatened, we see associated increases in the accessibility of death-related thought. Although these findings are not typically viewed in the context of associative network models of semantic priming and spreading activation, they are consistent with these frameworks, leading to a potentially generative integration of terror management and social cognitive perspectives. The general gist of these accounts is that with repeated pairings over time, activation of one construct in memory spreads to activate associated constructs (e.g., Anderson & Bower, 1973; McNamara, 1992). Merging such frameworks with the developmental analysis of TMT, we can gain an understanding of how a cognitive network surrounding death may unfold. Indeed, Becker (1973) describes how peoples' burgeoning and subsequently ever-present awareness of death is managed by immersion in the

cultural blueprint by which they are socialized. In this way, individuals are afforded existential security from death awareness as they come to believe in the meaningful and enduring qualities of their cultural beliefs and sense of self-esteem. Thus, over the course of cognitive development, cognitions about culture, the self, meaningful relationships, and so forth become existential security blankets with which death comes to be associated by virtue of the repeated engagement of these structures for psychological equanimity.

This analysis explicates why threats to elements of the worldview increase death-thought accessibility, and furthermore suggests that increasing death-thought accessibility will increase the accessibility of elements of the worldview. This hypothesis was investigated by Arndt, Greenberg, and Cook (2002), who found that when participants were reminded of their mortality, and such cognition was given a chance to recede from focal awareness, they exhibited increased accessibility of worldview-relevant beliefs. Interestingly, the initial studies demonstrated that mortality salience increased the accessibility of nationalistic constructs for men, but relationship constructs for women, suggesting that spontaneous activation may spread to those worldview domains that are dispositionally important to the individual.

However, situational factors can also influence which elements of the worldview will be important at the moment and thus increase in accessibility. Arndt et al. (2002) found that when women were first primed with the value of the national identity, mortality salience increased the accessibility of nationalistic constructs. This set of studies not only illustrates a death–worldview associative link but also provides insight into the nature of spontaneous construct activation and the potential malleability of the elements of the belief system that people may turn to when needing to manage existential fear. From among the many values and beliefs that are part of their security-providing worldview, when reminded of death, people seem to turn to whichever beliefs are currently accessible. Further support for this idea has been provided by Jonas et al. (2008) and Gailliot et al. (2008), who have shown in a number of studies that reminders of mortality heighten adherence to those worldview-consistent values that are made particularly accessible at the moment. For example, Jonas et al. (2008) had participants first search for neutral words in a matrix of letters that included imbedded words associated with either prosocial (help, tolerance) or proself

(power, indulgence) values. Mortality salience led those primed with prosocial values to be more supportive of a charity to serve underprivileged children's education, but led those primed with proself values to become less supportive of this charity.

Integrating terror management theorizing with an associative network perspective also suggests that if people's cultural beliefs function in part to keep thoughts of death at bay, and if these buffers are bolstered or if individuals have a strong dispositional buffer against anxiety, then death reminders should be less likely to increase the accessibility of death-related thought. As alluded to earlier in this chapter, a variety of findings fit this analysis. High levels of self-esteem (either dispositionally or experimentally induced), a secure attachment style, and especially strong faith in elements of the worldview like belief in progressive hope or a nostalgic connection to the past, have all been found to eliminate or reduce the elevated cognitive accessibility of death that is otherwise observed following reminders of death (e.g., Harmon-Jones et al., 1997; Jonas & Fischer 2006; Mikulincer & Florian, 2000; Routledge et al. 2008; Rutjens, van der Pligt, & van Harreveld, 2009; Schmeichel & Martens 2005). Thus, research converges on three central facets of the connection between worldview beliefs and thoughts of death: Thoughts of death activate elements of the worldview, bolstering the worldview reduces death-thought accessibility, and threatening the worldview increases death-thought accessibility.

Although an increasing number of studies are showing how breakdowns in individuals' faith in their worldview increase death-thought accessibility, most TMT research has used either direct (e.g., open-ended questions about death) or indirect (e.g., proximity to funeral parlors, subliminal primes) methods to activate thoughts of death. Yet recent research has shown that there are a variety of other stimuli that are also associated with death, consistent with the idea that death-related cognition plays a significant role in everyday functioning.

Certain events have such impact that their psychological reverberations echo with both immediate and enduring force. The terrorist attacks in the United States on September 11th are obviously such an event. With its wake of destruction to both human life and to the cultural icons of the United States, these attacks stood out as an especially potent reminder to Americans of the fragility of life and the vulnerability of cultural symbols (Pyszczynski, Solomon, & Greenberg, 2003).

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For one or both of these reasons, even subliminal presentations of "9/11" and "WTC" (World Trade Center) months after the attacks were sufficient to increase the accessibility of death-related thought (Landau et al., 2004b). Landau et al. further demonstrated that explicit reminders of either 9/11 or mortality increased support for then President George W. Bush just prior to the 2004 Presidential election. Das and colleagues (2009) extended these findings to media stimuli, showing that exposing participants to a news story about Islamic terrorism increased both death-thought accessibility and distal worldview defense in the form of prejudice toward Arabs. Showcasing the breadth of associations tethered to death, Vail, Arndt, Motyl, and Pyszczynski (2012) examined how the destruction of buildings—the architectural imprint of cultural humanity—may constitute what Lifton (1979) referred to as "imagery of extinction." In these studies, exposure to images of buildings reduced to rubble similarly increased both the accessibility of death-related thought and various forms of worldview defense. These studies furthermore showed that increased death-thought accessibility provoked by destruction stimuli statistically mediated the effect of these stimuli on worldview defenses. Such findings suggest that newsworthy events may trigger death-related echoes, which in turn strengthen efforts to affirm one's culturally derived meaning system.

Another domain in which we see frequent elicitation of death-related thought is in matters pertaining to physical health. As articulated by the terror management health model (Goldenberg & Arndt, 2008), a variety of health contexts and stimuli have the potential to activate thoughts of mortality. Health communications about risky sexual activity (Taubman Ben-Ari, 2004), binge drinking (Jessop & Wade, 2008), drinking and driving (Shehryar & Hunt, 2005), and risky driving more generally (Jessop, Albery, Rutter, & Garrod, 2008) all have been shown to increase death-thought accessibility.

This connection is especially evident in the context of stimuli related to cancer because more than 60% of the American public perceives cancer as a death sentence (Moser et al., in press). Indeed, the sensitivity is such that conscious primes of cancer induce vigorous efforts to suppress the activation of death-related thought, and even subliminal presentations of the word "cancer" increase the accessibility of such thought (Arndt, Cook, Goldenberg, & Cox, 2007). Given this, it is perhaps not surprising that various health behaviors that raise the possibility of a

cancer diagnosis—such as breast self-exams or mammograms for women—can increase death-thought accessibility (Cooper, Goldenberg, & Arndt, 2011; Goldenberg et al., 2008).

There are, of course, important implications that stem from such activation. As we reviewed previously, accessible death-related cognition increases self-esteem striving and other such efforts to maintain and defend one's view of self and world. Thus, to the extent that an individual derives self-esteem from risky health behavior, health communications that activate thoughts of death may, ironically, increase the very behavior they are designed to warn against (Goldenberg & Arndt, 2008). A clear example of this is found in the recent work of Hansen and colleagues (2010), who demonstrated that graphic cigarette pack warnings—the likes of which the Food and Drug Administration has recently been granted the unprecedented authority to regulate in the United States—increase death-thought accessibility and thereby increase smoking intentions among those who derive some self-worth from their smoking.

Although the arenas of war and health are perhaps the most obvious domains in which death-related thoughts are elicited, there is a broader landscape of stimuli that also do so. In fact, the accessibility of death-related thought has been shown to be increased by thoughts of physical sex (Goldenberg et al., 1999); disgusting imagery (Cox, Goldenberg, Pyszczynski, & Weis, 2007); stimuli that elevate self-awareness (Silvia, 2001); photos of uncultivated nature (Koole & Van den Berg, 2005); reminders of the value of life (King, Hicks, & Abdelkhalik, 2009); and perhaps our favorite, exposure to robots that come uncannily close to looking human (MacDorman, 2005). Taken together, a growing body of research demonstrates that many stimuli we encounter on a daily basis (e.g., just open any newspaper for the latest news of war and destruction or current health scare) may trigger thoughts of death.

Conscious and Nonconscious Thoughts of Death: The Dual Defenses of Terror Management

Yet all thoughts of death are not created equal. The consequences of mortality reminders that we have thus far discussed stem from the unconscious activation of death-related thought. It is the existential rumbling beneath the surface that motivates investment in the symbolic pillars of meaning and significance. But the full story is more complex because explicit awareness of death (or mortality

salience as it is commonly induced in laboratory studies) actually sets in motion a specific cognitive sequence that is described by the dual defense model of terror management (Pyszczynski et al., 1999). These processes are important not only for understanding the complexities of managing existential fear but also for what they teach us about motivated cognitive dynamics. Whereas most social cognitive theories are content free—positing, for example, general processes by which explicit and implicit ideation influence social judgment, the dual defense model posits different defenses activated by conscious and nonconscious thoughts specifically about death. Proximal defenses address conscious thoughts of death, whereas the bolstering of symbolic bases of meaning and value that are typically the focus of terror management research represent distal defenses to quell the potential for anxiety engendered by highly accessible thoughts of death outside of focal attention.

Imagine that you are standing in the shower, and in the process of lathering up, you find a lump on your body where a lump just should not be. We are guessing that upon doing so, your routine mental forecast and planning of the day's schedule will be suspended as you now—with a baseball-sized knot of angst in your stomach—ponder the implications of this bodily protuberance. We raise this hypothetical to illustrate the potent impact of conscious thoughts of death on one's self-regulation. Obviously, in many circumstances, thoughts of impending death can have adaptive ramifications (e.g., getting yourself off the tracks when the train is coming). Yet in many others, they are likely to interfere with the goal-directed activity that otherwise consumes the business of living. As such, the initial response to conscious thoughts of death is posited to be the removal of those thoughts from focal awareness.

This is the front-line reaction and involves a set of proximal defenses that serve to remove death from conscious awareness. The first indication of proximal defense was found in a seminal series of studies by Greenberg and colleagues (1994). They found that death-thought accessibility was low immediately after participants contemplated mortality, but became elevated after a delay. This suggested that thoughts of death are initially suppressed, a notion that was then directly tested in a series of studies by Arndt et al. (1997a). Building on evidence that mental load interferes with thought suppression (e.g., Wegner, 1994), Arndt et al. found that when participants were under high cognitive load (i.e.,

by mentally rehearsing a number), death-thought accessibility (and worldview defense) was high immediately after reminders of death, suggesting that participants were indeed actively suppressing such cognition. In further support of this conclusion, if participants are exposed to death-related words without their awareness, as is done with subliminal priming, death-thought accessibility (and worldview defense) increases immediately (Arndt et al., 1997b). Only when people are consciously focused on death do they subsequently suppress further death-related thought.

Whereas an active suppression of death-related thought may be one common means of reducing focal awareness of mortality, it is not the only way in which people may respond, especially if they are given other means to do so. When explicitly reminded of mortality, people will also take advantage of opportunities to escape self-awareness (Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998), deny vulnerability to those factors associated with a short life expectancy (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000), bolster their intentions to exercise (presumably under the expectation that better health extends life expectancy; Arndt, Schimel, & Goldenberg, 2003), and reduce their intentions to sun-tan (Routledge, Arndt, & Goldenberg, 2004).

What these examples hopefully convey is that there are both adaptive and maladaptive means by which people try to reduce focal concerns with mortality. According to the terror management health model (Goldenberg & Arndt, 2008), the adaptiveness of these (health-relevant) proximal defenses is moderated by factors that facilitate vulnerability reduction and thereby remove death-related thought from focal attention (e.g., coping style, health optimism, response efficacy; Arndt, Routledge, & Goldenberg, 2006). Thus, for example, individuals who perceive screening exams for early detection of skin cancer to be efficacious increase their screening intentions when confronted with conscious thoughts of death, whereas those who perceive low response efficacy for such exams are more likely to take an avoidance stance toward such screening (Cooper, Goldenberg, & Arndt, 2010).

Whether proceeding along health productive or unproductive avenues, the operative goal is to reduce conscious concern with death. This, however, is just the tip of the defensive iceberg. Once death-related ideation leaves focal awareness, more abstract distal defenses are employed. Indeed, recent work indicates that reminders of death increase more abstract thinking (Landau, Kosloff, & Schmeichel, 2011),

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tracted from mortality thoughts and not when mea-
sured immediately after the induction (Vail, Vess,
& Arndt, 2012). Distal defenses are more abstract
in the sense that they bear little to no logical con-
nection to the problem of death (except perhaps in
the interesting case of religious beliefs), but rather
serve the need to maintain a sense of oneself as a sig-
nificant contributor to a meaningful cultural drama
(Becker, 1971). These distal defenses are the many
forms of worldview bolstering and self-esteem striv-
ing that constituted the initial empirical support for
TMT.

The temporal sequence of defenses follow-
ing explicit mortality reminders was most clearly
demonstrated by Greenberg et al. (2000). In this
study, immediately after thinking about mortality,
participants showed an increased tendency to deny
possessing those characteristics they were previ-
ously told were associated with a short life expec-
tancy. However, this same reaction did not occur
when participants were first distracted from their
thoughts of mortality. In contrast, a typical world-
view defense of increased favoritism toward those
who support one's country manifested when partici-
pants were distracted from death-related thought,
but not immediately after a mortality salience
induction when death-related thought was still in
focal awareness.

Further evidence for the distinction in these
forms of defense comes from considering the unique
factors that moderate them. Those factors that mod-
erate proximal responses to death-related cognition
(e.g., response efficacy) have no predictive power
over esteem-based distal responses (e.g., Cooper
et al., 2010). At the same time, the factors that mod-
erate distal responses have little influence over proxi-
mal reactions. A few examples should help to clarify.
Arndt et al. (2003) found that if you remind people
of mortality and then immediately thereafter assess
their exercise intentions, regardless of the relevance
of fitness to their self-esteem, people increase exer-
cise intentions, presumably because exercising regu-
larly can lower perceived (and actual) risk for health
problems. But when death concerns fade from con-
scious attention, only participants for whom fitness
is relevant to their self-esteem increase exercise inten-
tions, presumably reflecting an orientation not to
health per se, but to self-esteem bolstering.

As another illustration, in Routledge et al.
(2004), when thoughts of death were conscious,
people decreased their tanning intentions. Yet
when thoughts of death were active but outside

consciousness, people increased their intentions,
and especially so if they based their self-esteem on
their level of attractiveness (see also Arndt et al.,
2009; Cox et al., 2009). Thus, what we see here
is the same stimulus (a mortality salience prime)
having opposite effects depending on the explicit
or implicit goals that it activates. Although many
basic semantic priming–goal activation processes
may function similarly when the prime is conscious
or nonconscious (cf. Bargh & Chartrand, 1999), in
the case of cognitions about death, markedly differ-
ent processes can unfold.

One punch line for the broader picture of
symbolical efforts to maintain enduring value on
which TMT research most often focuses is that
such reactions stem from the increased accessibil-
ity of death-related thought. A number of findings
that we have already presented support this idea.
Further convergent evidence is obtained from stud-
ies showing that the same conditions that attenu-
ate death-thought accessibility, such as boosting
self-esteem, or placing participants in a rational
(vs. experiential; cf. Epstein, 1994) frame of mind,
attenuate worldview defense and other such reac-
tions (e.g., Harmon-Jones et al., 1997; Simon et
al., 1997). Further, the dual defense model of ter-
ror management highlights the functional utility of
these distal defenses in showing that when given the
opportunity to engage in them following a reminder
of mortality, the accessibility of death-related
thought is reduced back to baseline levels (e.g.,
Arndt et al., 1997a; Greenberg, Arndt, Schimel,
Pyszczynski, & Solomon, 2001; Mikulincer &
Florian, 2002). Recent work has also shown that the
effects of stimuli that prime thoughts of death on
distal defense are in fact mediated by death-thought
accessibility (Vail, Arndt et al., 2012), and variables
that mitigate mortality salience effects on such
defenses do so by reducing the accessibility of such
thoughts (Cohen et al., 2011).

A New Wave of Terror Management Research: Insights from Dispositional Levels of Death Thought Accessibility

A large body of research has demonstrated that
cues which elevate the accessibility of death-related
thought trigger efforts to maintain a meaningful
view of self and one's world. But do individual differ-
ences in chronic levels of death-thought accessibility
matter too? For example, could, at least under some
conditions, such dispositional variations predict an
individual's psychological security and well-being?
And does the chronic strength of an individual's

cultural anxiety buffer predict an individual's dispositional tendency to have death-related thought highly accessible? Research has begun to address these questions.

Consider first the ideas that having a secure investment in a belief system should be associated with lower levels of death-thought accessibility and lacking such investment should dispose one to greater death-related concerns. Indirect support for these ideas comes from clinical analyses of psychopathology. Depression and neuroticism both feature more tenuous faith in a meaningful view of the world, and both are associated with increased concerns about death (e.g., Abdel-Khalek, 1998; Loo, 1984). More recently, studies show that investment in religious beliefs and viewing the self as enmeshed in social relationships help to keep thoughts of death at bay. Friedman and Rholes (2009) found that those individuals who are high in religious fundamentalism and those with an interdependent self-construal tend to have lower levels of dispositional death-thought accessibility.

Further, as we saw with the suppression studies discussed earlier, the control of death-related thought can be an effortful task that requires and consumes ego resources. Gailliot and colleagues have developed this idea to suggest that, if awareness of mortality is indeed what James (1910/1978) referred to as the "skull beneath the skin," measures of self-regulatory control might then predict people's sensitivity to death-related thought. And indeed, people who are higher in self-regulatory control show lower accessibility of death-related thought, suggesting that they are better able to keep thoughts of death from the fringes of consciousness (Gailliot, Schmeichel, & Baumeister, 2006). And conversely, when people's ego resources are depleted, they are also susceptible to increased death-thought accessibility (Gailliot et al., 2006; Gailliot, Schmeichel, & Maner, 2007).

What, then, are the consequences of having death-related thought close to consciousness for psychological well-being? Recall that a basic idea of TMT is that thoughts of death that threaten to become conscious disrupt our psychological equanimity. Some work is now suggesting that certain conditions may reveal this connection. For example, Cox, Reid-Arndt, Arndt, and Moser (2012) found that women who had recently received surgery for a cancerous breast mass reported lower levels of well-being than women who had surgery for a noncancerous mass. This is a well-documented effect in the cancer survivorship literature. However, whereas cancer-diagnosed women did not differ from nondiagnosed controls in explicit worries about death, they did show higher death-thought accessibility, which, in turn, was negatively associated with well-being and mediated the effect of diagnosis on well-being.

Yet some individuals appear to possess the psychological resources to manage these cognitions in ways that buffer their deleterious impact on well-being. TMT suggests that self-esteem, as a fundamental terror management structure (Greenberg, Pyszczynski, & Solomon, 1986), should operate in this fashion. And indeed, Routledge and colleagues (2010) found that dispositional death-thought accessibility interacted with self-esteem to predict perceived meaning in life. High levels were only associated with lower meaning in life if individuals also had low self-esteem. In another line of work, Vess, Routledge, Landau, and Arndt (2009) found that dispositional level of death-thought accessibility was negatively associated with perceived meaning in life only among participants with low levels of personal need for structure who are by disposition more open to experience and appreciative of novelty. We will discuss this and related work on personal need for structure more fully later, but for now the point is that among individuals lacking preexisting meaning-providing resources, highly accessible death-related thought may predispose people to view life as less meaningful.

There are certainly a number of issues to be considered when trying to understand the meaning of high death-thought accessibility in the absence of a mortality salience induction or when elevated by other stimuli. However, it appears that research exploring such phenomena has considerable potential and opens the door to studying terror management in a broader playing field of contexts that may otherwise not render themselves conducive to mortality salience inductions for ethical, practical, or other conceptual reasons.

Terror Management and the Cognitive Infrastructure of Meaning

TMT illuminates the psychological motivations underlying people's basic efforts to meaningfully construe the social world. Social cognition is essentially the scientific study of how people create meaning in the social world. Because the field was partly inspired by gestalt psychologists' investigations into the organization of visual perception, it approaches meaning making by characterizing the cognitive processes that people use to impose

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structure on the welter of information in their social environment. This empirical approach has stimulated a massive body of research showing that social information processing is shaped by a veritable arsenal of cognitive processes that simplify and disambiguate information. For example, people rely on stereotypes to simplify information about social groups, and they selectively attend to certain pieces of information about other people in order to form clear impressions.

According to TMT, these structuring processes are not simply built-in features of our cognitive system. Rather, people's tendencies to seek well-structured conceptions of the social world are motivated by the need to view the self as a significant being who can transcend the biological confines of a finite existence. Below we elaborate on this functional account of cognitive structuring tendencies and then summarize emerging lines of research showing that mortality salience increases people's reliance on a range of structuring processes, particularly among those individuals who are predisposed to prefer structured knowledge.

Within mainstream social cognitive theory, functional accounts of structure-seeking (e.g., Fiske, 1992) tend to follow pragmatist philosophers (e.g., James, 1907/1979; Peirce, 1877) in positing that well-structured interpretations of the social environment enable people to effectively navigate that environment in the pursuit of specific purposes, such as making a favorable impression or finding a job. TMT provides a complementary account by positing that to maintain psychological equanimity, the person strives to meet cultural standards of value by which her life can be perceived as significant and enduring beyond death. The individual's confidence that she can attain this enduring value—whether that means upholding religious dictates or achieving fame and fortune—is rooted in more fundamental conceptions of the world as a structured place in which one can reliably act in pursuit of value. If the world appears to lack structure—if, for example, other people's behavior seems contradictory, or if events take place haphazardly—then the person lacks the basic infrastructure necessary to confidently establish a sense of lasting personal significance, and they are therefore vulnerable to the threatening prospect of perishing entirely.

This existential account shares in common with the pragmatist view the principle that well-structured conceptions of the social environment facilitate goal-directed action, but it goes further to emphasize the fundamental role that these conceptions

play in supporting the individual's distal psychological goal to achieve death-transcending value. This account also significantly broadens TMT's empirical scope. The TMT studies reviewed earlier show that reminders of mortality heighten people's adherence to specific aspects of their cultural worldview, such as cultural norms and religious beliefs, suggesting that these aspects provide psychological security. If, as we have just proposed, faith in specific cultural ideologies is predicated on more basic or nonspecific conceptions of the world as a predictable, orderly place, then we would expect mortality salience to increase people's preference for well-structured interpretations of other people, events, and their own lives.

But will thoughts of mortality increase efforts to seek structure equally for all individuals? A large body of personality research shows that people vary widely in the strength of their dispositional preference for well-structured knowledge of the social world (e.g., Rokeach, 1960). People with a high (versus low) dispositional preference for structured knowledge—as measured with scales like *need for closure* (NFC; Kruglanski, Webster, & Klem, 1993) and *personal need for structure* (PNS; Neuberg & Newsom, 1993; Thompson et al. 2001)—are particularly inclined to seek simple and clear interpretations of social information, and to respond aversely to complexity and ambiguity.

As noted earlier, TMT posits that each person clings to an individualized worldview for psychological security. This claim is supported, for example, by Arndt et al.'s (2002) finding that mortality salience increased the spontaneous accessibility of different constructs among male and female participants. According to Solomon, Greenberg, and Pyszczynski (1991), individual differences in personality traits can also reflect the different sources of meaning that people characteristically cling to for security. Thus, although our account suggests that people have a universal need to perceive at least some structure in their social environment, individuals with a stronger preference for certain knowledge may be especially likely to invest in well-structured conceptions of the world as a preferred means of managing terror, whereas low structure-seeking individuals may be more comfortable with epistemic openness and novelty (we revisit this latter possibility below). This suggests that individual difference constructs like NFC and PNS can be useful for predicting the types of people who are especially likely to respond to reminders of mortality with increased preference for well-structured interpretations of social information.

Processes Serving Simple Conceptions of Others and the Self

Social psychologists have for many years pointed out that stereotypes serve to simplify information processing by allowing people to interpret and evaluate individual members of outgroups based on overgeneralized beliefs about their group rather than individuating features. A TMT perspective suggests that stereotypes are not only cognitive energy savers, they are also part of a well-structured understanding of the social environment that forms the cognitive foundation for the person's strivings for death-transcending value.

Consistent with this perspective, Schimel et al. (1999) found that mortality salience increased people's tendency to perceive individual members of various outgroups in stereotypic ways. For example, mortality salience led participants to ascribe more stereotypic traits to Germans. Interestingly, this effect was not qualified by whether the stereotypic traits were positive (e.g., disciplined) or negative (e.g., unemotional), suggesting that reminders of mortality not only increase disliking for outgroups that threaten specific aspects of the cultural worldview (e.g., Greenberg et al., 1990) but also increase a more basic, nonspecific tendency to simplify information about other people. Landau et al. (2004a) reported complementary evidence (Study 2) that mortality salience increases the use of the representativeness heuristic, whereby people judge a person's group membership based on that person's superficial resemblance to the group stereotype.

Schimel et al. also reported evidence that mortality salience increases preference for outgroup members who conform to stereotypes by displaying stereotypic traits (e.g., a young black man who likes basketball and clubbing) over individuals who disconfirm stereotypes (e.g., a young black man who likes chess and engineering). Furthermore, this effect is especially prominent among participants predisposed to interpret others in simple ways. Specifically, mortality salience led participants high, but not low, in NFC to prefer a stereotype-confirming feminine gay man over a counter-stereotypic masculine gay man. Taken together, these findings show that thoughts of mortality increase reliance on and preferences for stereotypes, particularly among individuals high in need for closure.

Reminders of mortality encourage stereotyping of others, but can terror management motivation also drive people to conform to *self*-relevant group stereotypes? Landau, Greenberg, and Rothschild (2009a) addressed this question by examining the effect that death reminders may have on people's tendency to underperform on a task when a negative stereotype for their group's ability is made salient (i.e., *stereotype threat*; Steele, Spencer, & Aronson, 2002). Imagine that a person is poised to excel on a task when she becomes cognizant that, as a member of a certain group, she is stereotyped to perform poorly. Excelling may have its own psychological rewards, but even the implicit realization that one is acting contrary to stereotypic expectancies may undermine meaningful conceptions of oneself conferred in part by simple stereotypes for the groups to which one belongs. Insofar as those simple conceptions serve a terror management function, mortality salience should introduce a motivation to exemplify self-relevant stereotypic expectancies (even negative ones) and thus a reluctance to excel beyond them.

Based on this reasoning, Landau et al. (2009a, Study 2) had female participants think about death or a control topic and then take part in an assessment of mental spatial rotation. Participants in the stereotype threat condition were told that, compared with men, women are generally worse at mentally rotating objects, whereas the other participants received no information about gender differences. All participants then completed both an easy and a difficult spatial rotation test. For participants stereotyped to perform poorly, the easy test poses a dilemma: they have the opportunity to excel, but excelling would mean disconfirming a self-relevant stereotype; the difficult test, however, offers less of an opportunity to excel, and thus poses less of a dilemma. Consistent with this reasoning, women primed with mortality and subsequently negatively stereotyped performed poorly on the easy test even though (or, as Landau et al. theorized, *because*) they had the opportunity to excel. Performance on the difficult test was negatively affected by stereotype threat, replicating prior research (Steele et al., 2002), but was unaffected by the mortality prime. These findings suggest that concerns about mortality motivate people to cling to stereotypic conceptions of themselves, as well as others, even if it means falling short of realizing their full potential.

Another cognitive process that people employ to simplify self-relevant information is captured by Linville's (1985) notion of self-concept complexity. A person's self-concept usually contains a cornucopia of individual traits ranging from ardent to zany, and people tend to group subsets of those traits into clusters that describe the different "selves" they associate with different social contexts. For example, a person may view "me-with-friends" as spontaneous

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and irreverent, whereas "me-at-church" as quiet and contemplative. For Linville (1985), a complex self-concept encompasses a multiplicity of selves characterized by distinctive trait clusters, whereas a simple self-concept contains fewer and more similar selves.

Although a complex self-concept has psychological advantages for coping with specific stressors (Linville, 1985; Showers, 1992), TMT suggests that a simpler self-concept may provide a more stable foundation for understanding the meaning and significance of one's own life, particularly if the individual tends to invest in simple knowledge as a source of meaning. Landau, Greenberg, Sullivan, Routledge, and Arndt (2009d) tested these hypotheses using a common card-sort method for assessing self-complexity (Linville, 1985) and found that participants who were high, but not low, in PNS responded to mortality salience by organizing self-defining traits in a simpler fashion.

The research reviewed in this subsection suggests that people's tendency to interpret other people and themselves in simple ways stems not only from cognitive "miserliness" or limited processing capacity but also from the desire for simple conceptions that help the person to maintain a well-structured view of who she is and who other people are, such provides the means to confidently establish a sense of lasting personal significance. Of course, simplifying is only one broad epistemic structuring tendency, and our analysis suggests that terror management motivation plays a role in other structuring tendencies as well. Next, we consider cognitive processes through which people maintain *clear* conceptions of the social world.

Processes Serving Clear Conceptions of the Self, Others, and Cultural Artifacts

The everyday task of making sense of other people and ourselves often involves coping with ambiguity and apparent contradiction (Heider, 1958). The same individual may appear to behave in different ways from one situation to the next, and we may even find ourselves acting in ways that contradict our beliefs and standards. Social cognitive theory and research identify a number of processes that people use to reduce ambiguity, resolve mental conflict, and generally maintain clear conceptions of the social world. According to TMT, people seek clarity partly to mitigate mortality concerns. A world in which people and the self act in consistent ways is a world that can be reliably negotiated in an effort to make one's lasting mark, whereas an ambiguous

world of conflicting information affords few reliable opportunities for establishing the significance of one's life.

This general line of reasoning led researchers to test whether reminders of mortality motivate people to maintain perhaps the most basic kind of consistency—that which exists between one's own cognitions and behaviors (Friedman & Arndt, 2005; Jonas, Greenberg, & Frey, 2003). For example, Friedman and Arndt (2005) had participants write a counterattitudinal statement—claiming that a boring passage was in fact quite interesting—under conditions of either high choice or low choice. Replicating previous demonstrations of dissonance reduction under conditions of induced compliance, Friedman and Arndt found that participants who freely chose to write the counterattitudinal statement later reported more positive attitudes toward the boring passage compared with participants who were forced to write the statement, presumably bringing their attitudes in line with their behavior. More importantly, participants who had been previously primed with mortality (vs. feelings of personal uncertainty) reported even stronger liking for the passage, suggesting that they were especially motivated to reduce dissonance. These findings support our broader claim that terror management motivation drives people to maintain consistency in even nonspecific ways because stating that a boring passage is interesting does not pose an explicit threat to any specific aspect of the participants' cultural worldview.

In addition to resolving more micro-level inconsistencies between particular cognitions, seeking clarity in the self-concept at a more macro-level also facilitates terror management. Consistent with the notion that self-clarity facilitates terror management, Landau et al. (2009d, Study 2) found that mortality primes led participants high, but not low, in PNS to define personal traits more clearly (cf. Campbell, 1990). Furthermore, this effect was attenuated if, following the mortality salience manipulation, participants were led to affirm a clear personal quality, suggesting that, at least for high-PNS individuals, clear self-conceptions help to defend against mortality fears.

The mortality salience induced preference for clarity extends to perceptions of other people as well. Landau et al. (2004a, Study 1) found that mortality salience exaggerated the primacy effect, leading participants to seize on a clear impression of a target individual as introverted or extroverted, depending on which information they learned about

first, and to ignore contradictory information that might complicate that impression (cf., Asch, 1946). The notion that clear conceptions of others serve a terror management function suggests that people primed to think of their mortality should dislike a person whose behaviors defy clear interpretation, particularly if they have a strong personal need for clear knowledge. Landau et al. (2004a, Study 4) tested this by having high- and low-PNS participants primed with mortality or uncertainty read a transcript of a conversation in which three people shared their observations of a mutual acquaintance. In two control conditions, this acquaintance comes across as acting in either a clearly introverted or extroverted manner, whereas in the ambiguous condition, he appears to vacillate between introverted and extroverted behaviors. Supporting predictions, high-PNS participants primed with mortality expressed especially strong disliking for the behaviorally ambiguous target.

Our foregoing analysis suggests that high-PNS individuals will respond aversely to ambiguity not only in themselves and in others but also in cultural artifacts that seem (superficially) to have no clear meaning or purpose at all, such as abstract art. Although modern artworks are often intelligible and enjoyable for those with some background in the history of their respective media, most people find them highly aversive (Cupchik & Gebotys, 1988). Although this distaste may stem in part from a layperson's dismissal of the works as snobbishly eccentric (Bourdieu, 1984), TMT suggests that such artworks appear to lack clear interpretation, and thereby fail to reinforce an orderly, meaningful conception of reality, and may even imply the opposite—a random, meaningless, or absurd universe. This suggests that people should respond to mortality salience with increased aversion to artworks that seem to eschew or even undermine clear meaning and order, especially among high-PNS people.

Landau et al. (2006) found support for these hypotheses. In one experiment (Study 3), mortality salience led high-PNS individuals to report greater aversion to a visually chaotic painting by Jackson Pollack when the piece was presented with the unrevealing title of #12 (in contrast, individuals low in PNS showed no such effect). Interestingly, however, the negative effect of mortality salience on high-PNS participants' evaluations of the painting was eliminated when the painting was presented with its actual title—Guardians of the Secret—which renders the painting interpretable by giving the viewer a clear idea of how to assign meaningful roles to the objects in the frame (two figures suddenly become "guardians," and a distorted shape between them is now the "secret" they are protecting). In other words, death reminders caused those predisposed to seek structured knowledge to dislike a renowned artwork when they perceived it as devoid of meaning; but when they were able to attach some clear interpretation to the work by means of an explanatory title, the apparent threat of the painting dissipated. A follow-up study showed that for high-PNS individuals, a mortality prime reduced liking for a visually chaotic Kandinsky painting, but this effect was eliminated if participants were first asked to imagine themselves having a very chaotic experience lost in an unknown city. Presumably, this imagined experience provided high-PNS participants with a personal frame of reference within which to interpret the painting's meaning.

Processes Serving Orderly Conceptions of Social Events

From a TMT perspective, the belief that social events follow a just and benevolent order constitutes a fundamental building block of terror-assuaging meaning. At some level, people realize that randomly occurring hazards—from a falling chunk of masonry to a bite from an infected insect—can instantaneously negate all of their strivings for value. At the same time, people may witness others who don't believe in or conform to the worldview prosper for equally incomprehensible reasons. When the environment seems to allot favorable and unfavorable outcomes to people regardless of their adherence to the worldview, people may have serious difficulty sustaining confidence that following the worldview's prescriptions for value will ensure their death transcendence. This suggests that reminders of mortality will increase people's efforts to construe social events as following a just and benevolent order.

Lerner (1980) observed that when people encounter information implying that the world is not just, they often restore justice by convincing themselves that the victims of misfortune somehow deserved what happened to them. A number of studies show that this victim-blaming tendency is exacerbated by heightened mortality concerns, especially among those who strongly crave structured knowledge. In one study (Landau et al., 2004a, Study 5), participants read about a senseless tragedy in which a college student was disfigured in an unprovoked attack. After a mortality salience manipulation, the participants were given the opportunity to read

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titled bits of information about the victim, with the titles implying either positive or negative information about the person. Negative information would bring the event more in line with the belief in a just world. Supporting predictions, for high-PNS individuals, mortality salience increased preference for negative over positive information about the victim, presumably in an effort to restore just world beliefs.

In a follow-up study, Landau et al. (2004a, Study 6) tested whether presenting just-world threatening information suggesting that victims of tragedy are actually good people would unleash mortality concerns. Participants read an article about an unprovoked attack and then read either negative or positive information about the victim. High-PNS participants who read positive (but not negative) information exhibited heightened death-thought accessibility, whereas low-PNS participants did not.

In complementary research, Hirschberger (2006) found that, among samples of Israeli participants, reminders of mortality increased blaming of innocent victims, and unjust events elicited increased the accessibility of death-related thought, especially when the victims of the unjust events incurred severe injuries and had no responsibility for their misfortune—precisely the conditions under which the threat to a just and benevolent order is greatest (Lerner, 1980). Taken together, these findings suggest that, at least for high-PNS people, the belief that victims of misfortune get what they deserve and deserve what they get is an important part of the meaningful social reality that protects people against mortality concerns.

In addition to victim blaming, another means of maintaining the perception of benevolent order in the world is by believing that tragic events "happen for a reason"—they are "trials," "tests," or otherwise set the stage for what will ultimately be positive outcomes. To assess whether such beliefs in benevolent causation contribute to terror management, Landau et al. (2004a, Study 7) had high- and low-PNS participants primed with death or a control topic read two summaries of movie scripts. In one summary, a protagonist witnesses his apartment building burn down, and then, through an unrelated series of events, he falls in love. The other summary described the apartment fire as setting off a chain of events that leads the protagonist to meet the love of his life. Even though the protagonist in both scenarios experiences the same negative and positive outcomes, high-PNS participants after mortality

salience preferred the "bad causes good" scenario over the "bad simply precedes good" scenario. That is, reminders of mortality encouraged preference in high-PNS individuals for the story that reinforced the idea of benevolent causation—that bad events will eventually turn out for the best.

Processes Serving Coherent Conceptions of Personal Experience

Our self-concepts include a vast store of experiences that take place over time. Both classic and contemporary theorists emphasize that people seek to integrate these experiences into coherent, temporally continuous narratives that explain—to themselves and to others—how their current self came to be and how their future will unfold, and they find it aversive when their experience appears temporally fragmented or disordered (Erikson, 1968; Habermas & Bluck, 2000; McAdams, 2001).

At a pragmatic level, perceiving overarching patterns in experiences can facilitate practical goal pursuit. But TMT also suggests, as have a number of influential theorists (e.g., Lifton, 1979; May, 1953), that a coherent autobiography that imbues personal experience with order also helps people to believe that their lives have some enduring significance. This analysis suggests that increasing the salience of personal mortality will increase people's need for the psychological protection provided by a coherent autobiography, and will therefore heighten motivation to piece together the episodes that make up their experience into a temporally coherent and continuous whole.

Several theorists have argued that a coherent autobiography is largely sustained by perceiving clear cause-and-effect relationships between separate events (e.g., Habermas & Bluck, 2000; McAdams, 2001). Our guiding analysis suggests, therefore, that mortality salience will motivate people to seek out these causal connections. However, many of the studies we've reviewed thus far suggest that causal coherence, like other types of epistemic structure, might provide psychological security, particularly among high-PNS individuals. Accordingly, Landau et al. (2009d, Study 4) found that high-PNS (vs. low-PNS) participants responded to mortality salience by using more causal words (e.g., *because*) in spontaneously describing the events that took place over the course of their day.

In addition to causal coherence, maintaining autobiographical coherence depends largely on thematically integrating memories of past events with one's current self (McAdams, 2001). To test

whether this tendency serves terror management goals, Landau et al. (2009d, Study 5) had participants generate separate autobiographical memories from various times in their lives and then, following a mortality salience manipulation, indicate which of those remembered experiences has had a significant influence on how they see themselves today (they did this by drawing lines connecting boxes representing their individual memories to a box representing their current self). As predicted, high-PNS participants primed with death perceived more meaningful connections between past events and their current sense of self. Also, this effect was not qualified by whether the events were positive or negative in valence, suggesting that in this study, the mortality prime did not simply increase efforts to bolster self-esteem by identifying with certain memories; rather, the evidence suggests that mortality salience heightened high-PNS participants' concern with establishing continuity between their personal past and present. Indeed, a related set of studies (Landau, Greenberg, & Sullivan, 2009b) shows that directly threatening mortality-salient participants' sense of autobiographical coherence by leading them to perceive their past experiences as temporally fragmented prompted compensatory bolstering of their life's global significance.

Another means of imposing coherence on personal experiences over time is to perceive substantive connections between one's current actions and one's long-term goals. Landau et al. (2009b) tested whether mortality salience heightens this tendency. Participants listed personal goals they hoped to accomplish within the next 40 years as well as specific activities they planned for the next few days. Following a mortality salience manipulation, participants were then asked to indicate which current activities meaningfully contribute to their long-term goals. As predicted, participants reminded of their mortality were more likely to view their current actions as steps in what they hoped to do and be in the distant future.

Summary

To sum up this section, we proposed on the basis of TMT that well-structured conceptions of the social world function not only to aid practical goal pursuit but also to defend against threatening mortality concerns. We then reviewed a large body of experimental research showing that increasing the salience of personal mortality heightens motivation to simplify, clarify, and integrate information about the people, events, and experiences that constitute

one's social world, particularly among individuals with a high chronic need for clear and confident knowledge.

Although we claim that the effects of mortality reminders on structure seeking are due specifically to concerns about death, one alternative interpretation is that these effects are due to a generalized reaction to reminders of any aversive or uncertain outcome. However, this alternative explanation is challenged by a large body of evidence that mortality salience elicits different responses compared with the salience of a variety of topics that are aversive (e.g., pain, paralysis, meaninglessness, social exclusion) and uncertainty arousing (e.g., upcoming events; see Pyszczynski et al., 2006). In fact, in many studies reviewed in this section, making mortality salient was compared with the salience of personal uncertainty and even worries about the fate of one's career and relationships problems, which simultaneously controls for thinking about aversive, uncertain, and personally important future outcomes. Further, we've also seen the violations of these preferences for structured knowledge lead to increased accessibility of death-related thought.

Another potential alternative explanation is that mortality salience simply engenders a cognitive load that subsequently results in a global tendency to rely on simple knowledge structures and seize on interpretations of social information that reduce ambiguity and confusion. This explanation cannot account for many extant findings. First, cognitive load is highest directly after mortality salience, and yet these structuring effects, like other distal defenses, occur after a delay. Second, direct comparison of classic cognitive load and mortality salience inductions found entirely different effects (Arndt et al., 1997a). Third, studies have found that mortality salience increases efforts to impose structure in ways that seem to take more, rather than less, mental energy. For example, finding meaningful connections between separate past events and the current self would seem to require more cognitive effort than allowing that past events follow a simple linear sequence in time. Finally, Landau et al. (2006) found that having individuals imagine a chaotic experience attenuated rather than amplified the effect of a mortality reminder. Thus, we think it is unlikely that the effects of mortality salience on instigating structuring processes is due to depleting cognitive resources by reminding people of death.

Although more research is certainly necessary, this body of research indicates that seeking and maintaining structured conceptions of the social

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world can serve to protect individuals against the threatening awareness of death's inevitability. These studies contribute to social cognition research by demonstrating how distal psychological motivations—in this case terror management needs—can significantly shape people's efforts to understand the people and events that they encounter in their everyday lives. This work also broadens the empirical scope of TMT by showing that people manage mortality concerns not only by clinging to specific aspects of their cultural worldview but also by using basic cognitive processes to impose structure on their social environment. Thus, it appears that terror management motivation lies behind even very basic ways that we make meaningful sense of the world.

In many studies we saw that thoughts of mortality do not instigate structure seeking equally for all individuals. Participants with high dispositional preference for structured knowledge, as assessed by the NFC and PNS measures, are especially likely to seek and defend well-structured conceptions of the social world in response to mortality reminders. In contrast, individuals who are less dispositionally motivated to seek structured conceptions of the social world are more tolerant of ambiguity and novelty and don't respond to mortality salience with heightened desire for structured knowledge.

This does not mean, however, that low-PNS individuals don't need to cope with the threat of death. Rather, it appears they may do so in different ways. In fact, recent research suggests that, in some situations, low-PNS individuals respond to existential threat by actively *seeking out* novel experiences and open interpretations of the world as a means of lending life meaning. Vess et al. (2009) showed that after mortality salience, low-PNS participants exhibited increased interest in documentaries presenting novel perspectives on culturally relevant topics. Furthermore, after contemplating death, low-PNS individuals who imagined exploring an unfamiliar topic reported higher levels of perceived meaning in life than those who imagined exploring a familiar topic (and than high-PNS individuals considering either topic). In a related vein, Usta, Williams, Haubl, and Schimel (2010) found that although mortality salience led high-PNS individuals to seek familiar consumer choices, it actually led low-PNS participants toward novel consumer choices.

These studies suggest that, for certain individuals or in certain situations, thoughts of mortality will not necessarily trigger a rigid approach to understanding events in one's social world. Indeed, it

may be important to consider both the individual and the situation in concert. Usta and colleagues' (2010) studies also explored the role that the choice environment plays in the preferences of high- and low-PNS people. They found that when the choice environment with which participants are faced when needing to manage thoughts of death is perceived as providing organized structure, low-PNS people assert their penchant for novelty by seeking out unfamiliar consumer choices. For high-PNS individuals, in contrast, being confronted with an unstructured choice environment leads them to assert their desire for structure and seek out familiar consumer choices. These studies also suggest a provocative way to encourage more novelty seeking among those who desire structure in their social experiences. When high-PNS individuals were provided with a structured choice environment after MS, they were less likely to lean toward the familiar. This implies that if peoples' propensity for structured organization of the world can be satiated, they may be more prone to explore novel experiences.

Research also suggests that creativity is another factor that may encourage less rigid cognitive orientations in how people respond to awareness of mortality. Although the existential implications of creativity may be complex (see, e.g., Arndt et al., 1999, 2005; Rank, 1932/1989), when creativity primes divergent and open-minded cognition, it can redirect terror management responses away from a dogmatic bias against that which potentially threatens known and existing beliefs. Accordingly, studies indicate that creativity—to the extent that it inspires a more open-minded cognitive style—can reduce worldview defense when people are reminded of mortality (Routledge, Arndt, & Sheldon, 2004), and further, that after mortality salience, creative cognition can actually lead to an openness and exploration of novel cultural viewpoints (Routledge & Arndt, 2009). Such research may offer a foundation for examining how the management of mortal cognition can also play a role in the cognitive processes associated with other facets of growth and enrichment of the self.

Future Directions for Understanding Mortal Cognition

Part of the reason creativity may be able to inspire more open-minded responses to death awareness is that, in this and other cultures, the value of creativity may be an important component of peoples' worldview. This suggests that one direction for further research would be to investigate the particular

dimensions of people's worldviews that are most central to their existential security. Research has shown that people are quite idiosyncratic in the ways they try to bolster their self-esteem in response to elevated death-thought accessibility. This makes sense because worldviews offer a variety of paths to self-worth and, as James (1890) and Becker (1971) noted, and Crocker and colleagues' (e.g., Crocker & Wolfe, 2001) research shows, people invest in some bases of self-esteem more than others. Similarly, every individual internalizes his or her own version of the prevailing cultural worldview and so may be especially prone to bolster his or her faith in science, religion, money, friendship, love, and so forth. And different cultures may emphasize some of these aspects of worldviews more than others. We doubt people have much conscious access to how they are serving their terror management needs, so we hope to use implicit measures to assess the extent to which individuals within and between cultures associate feelings of security with these particular components of cultural worldviews.

In a related point, PNS often seems to be a moderator of mortality salience effects. A question needing further research is: How do the more open and tentative cognitive styles characteristic of low-PNS people serve their terror management needs for a meaning-providing worldview that provides stable bases for enduring personal significance? The findings of Usta et al. (2010) suggest that providing low PNS people with unstructured choice environments may satiate their desires for novelty, leading them to turn to that which is more familiar and predictable. Perhaps, then, this allows for some stability in their worldviews and social experience.

Another issue concerns the relative strength of motivations to affirm one's worldview and bolster one's self-worth. The study described earlier showing that a mortality prime encouraged women under stereotype threat to perform poorly on an easy task suggests that people will often sacrifice their self-esteem striving to preserve faith in the worldview to which they subscribe. This fits TMT in that faith in the worldview is a prerequisite for effective self-esteem striving; one can't be good or valuable without a worldview that clearly defines what it means to be good and valuable. Four studies reported by Landau, Greenberg, and Sullivan (2009c) provide further evidence for this point by showing that after mortality salience, (1) people will accept the validity of a test they did poorly on if credible authorities attest to it validity; (2) people will accept the invalidity of a test they did well on

if authorities criticized the test; (3) people will deny the validity of a leadership test if it suggests they had more leadership skills than an admired canonical leader; and (4) people will not self-enhance on a trait if they first rated a parent whom they admired for the parent's standing on that trait dimension.

So this work suggests that with death-thought accessibility high, faith in the worldview may be the most potent concern. However, a recent set of studies suggests this matter may be more complex than that, and that the context may determine whether mortality salience motivates worldview or self-esteem bolstering. In a set of studies, Kosloff, Greenberg, Sullivan, and Weise (2010) found that when considering short-term dating prospects, a self-esteem enhancing prospect was preferred, whereas when considering a long-term relationship prospect, a worldview validating prospect was more appealing. Thus in some contexts, reminders of mortality may direct the individual toward preferences and behavior that serve self-esteem, whereas in others, they may direct people more toward worldview validation. But research has just scratched the surface regarding the contexts that play such a moderating role.

Another minimally explored aspect of TMT is the role of conscious construals of death in instigating distal defenses. Because research has shown that death-related ideation produces worldview defense primarily when thoughts of death are highly accessible but outside of current focal attention (Pyszczynski et al., 1999), our work has focused on the impact of nonconscious death-related thought and variables that affect the accessibility of such thoughts. However, death is clearly a problem to which people and cultures devote considerable conscious thought, and individuals and cultures vary greatly in how they consciously construe the problem of death. Only a few studies have explored the effects of different ways of consciously construing one's mortality. Initial work suggests that contemplating suicide in the face of terminal illness (Fritsche et al., 2008) and a heroic death (Cozzolino, 2006) may not trigger distal defenses, but there is much more to learn.

A substantial literature on attitudes and anxieties regarding death (e.g., Florian & Mikulincer, 2004) indicates that, at least at a conscious level, death is associated with a multitude of concerns. Prominent among these are concerns about not existing, the pain and unpleasantness of dying, separating from loved ones, and failing to meet one's goals. Perhaps how people consciously

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construe death moderates whether they cling to the defensive coping mechanisms that have been the focus of previous research. For example, contemplating dying painlessly with loved ones after living a long, happy, and productive life may arouse less potential for anxiety and thus less death-thought accessibility and defense than the prospect of dying an agonizing death at young age, alone, after an undistinguished or unsatisfying life. Thus, a potentially fruitful direction for new research would be to alter the classic mortality salience induction to have people contemplate their own death in ways that vary aspects such as the level of pain, the age at which life ends, and the level of isolation at the time of death, and determine whether these different conscious construals affect subsequent death-thought accessibility and defensive responses. Such research would fill an important gap in our understanding of the role of death awareness in human behavior.

A related point is that philosophers, existential psychologists, and researchers focused on reactions to trauma and near-death experiences have suggested that deeper, more elaborate conscious thought about mortality can benefit personal growth and be liberating (see, e.g., Janoff-Bulman & Yopyk, 2004). Some evidence suggests such elaborate processing regarding the problem of mortality motivates a reprioritizing toward more authentic, psychologically beneficial goal pursuit. This, of course, contrasts with the largely defensive responses most typically found in response to mortality salience.

Although some progress on understanding the differences between these two types of death-related thought and their consequences has been made, more research is needed. One issue raised by recent research is whether more elaborate contemplation of death has lasting effects on goal prioritization or whether short-term effects that surrender to standard terror management motivated intensified investment in symbolic bases of meaning and value over time (Kosloff & Greenberg, 2009). Whether a deep contemplation of death can lead to true acceptance of one's own death, and thereby increase appreciation of one's own life and that of others, remains to be determined.

Finally, more research is needed on the effects of highly accessible death-related thought over time. We don't know how long the effects of a single instance of increased death-thought accessibility last, although that is likely to vary based on the intensity of the experience with which this

heightened accessibility is elicited. And we also don't know much about how chronically elevated death-thought accessibility affects people. One study of Indian funerary workers found that they were not affected by mortality salience, but exhibit elevated pro-Indian bias, equivalent to that shown by other Indian workers only after a mortality salience induction (Fernandez, Castano, & Singh, 2010). Other studies have started to show similar effects of mortality salience as are found with resting levels of death-thought accessibility (e.g., Routledge et al., 2010; Vess et al., 2009), although whether this reflects chronically elevated death-thought accessibility or an elevation elicited by unspecified acute sources is at this point unclear. Certainly, more research is need on these and related issues.

A Final Reflection

Our ability, unlike the other animals, to conceptualize our own end creates tremendouspsychic strains within us; whether we like to admit it or not, in each man's chest a tinyferret of fear at this ultimate knowledge gnaws away at his ego and his sense of purpose.
Stanley Kubrick, 1986 (Phillips, 2001, p. 72)

Over thousands of years, philosophers, writers, poets, and artists have commented on how the knowledge of our own mortality affects human mentation and action. For its first 100 years, the young science of psychology virtually ignored (or willfully denied) any role for this knowledge. But over the past 25 years, psychological science has begun to catch up, systematically advancing our understanding of the impact of awareness of death, both confirming and refining our theoretical grasp on how it shapes our conceptions of ourselves and the world. We suggest that this knowledge helps us move toward a more mature, existentially informed social cognition. At the same time, we also suggest there is a great deal more to learn about how human awareness of death, as well as other ineluctable features of existence (see Pyszczynski, Greenberg, Koole, & Solomon, 2010), contribute to the way in which we all think, feel, and act over the course of our life.[25]

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