

Terror Management Theory

ALISABETH AYARS, URI LIFSHIN, and JEFF GREENBERG

Abstract

Terror management theory (TMT), based on the works of Ernest Becker, asserts that the fear of death contributes to many aspects of human thought and behavior. According to TMT, people use self-esteem and cultural worldviews to buffer awareness of death. In this short review paper we review fundamental research in TMT, including the findings that after being reminded of death people bolster their cultural worldviews and strive for self-esteem. Cutting-edge research in TMT, including research on intergroup conflict, psychological disorders, religious beliefs, and brain imaging, is discussed. Finally, we review key issues in TMT research going forward.

INTRODUCTION

Terror management theory (TMT) is based on the writings of Ernest Becker (1971, 1973), a cultural anthropologist whose works on human nature transcended any single discipline. According to Becker, humans are truly extraordinary animals; they have the intellectual capacity and self-consciousness to imagine the far reaches of the cosmos, ponder the mysteries of existence, and simulate events far off into the future or past. However, the unique human capacity for self-awareness and temporal thinking comes at a price, for humans are also able to recognize their own vulnerability, including the fact that they will one day die.

Becker theorized that humans deal with the problem of death by constructing elaborate meaning systems, or cultural worldviews to provide avenues for people to feel significant. For one, nearly all cultures offer religious worldviews that not only stipulate a literal afterlife but also bestow humans with grand significance in a larger cosmic plot. Aside from religion, all cultures offer ideals of success, beauty, or goodness that, if attained, indicate that one has achieved importance and value and is worthy of a death-transcending legacy. The feeling of value—produced by living up to cultural ideals—is self-esteem.

TMT, developed by Jeff Greenberg, Tom Pyszczynski, and Sheldon Solomon (1986), is an empirically supported derivation of Becker's ideas. TMT asserts that awareness of mortality has the potential to cause overwhelming terror for humans because it conflicts with a host of biological systems geared toward averting death and continuing existence. To cope with death awareness, humans develop and maintain cultural worldviews that provide benign conceptions of reality as well as standards of value. By living up to these standards (and thereby attaining self-esteem), humans feel they are significant contributors to a meaningful universe; important players in an enduring cosmic plot, rather than transient mortal animals. The achievement of a place of significance and permanence represents a symbolic transcendence of death, which is also referred to as symbolic immortality (e.g., Lifton, 1979).

FOUNDATIONAL RESEARCH

Foundational research in TMT focused on two intertwining hypotheses: the anxiety buffer hypothesis and the mortality salience (MS) hypothesis (for a recent review, see Greenberg & Arndt, 2012). "The anxiety buffer hypothesis asserts that if a psychological structure [self-esteem and cultural worldviews] provides protection against anxiety, then augmenting that structure should reduce anxiety in response to subsequent threat. The MS hypothesis states that if a psychological structure provides protection against the potential for terror engendered by knowledge of mortality, reminding people of their mortality should increase their need for protection provided by that structure" (Greenberg, Pyszczynski, & Solomon, 1997, p. 72). Building off these hypothesis, terror management theorists reasoned that if cultural worldviews and self-esteem serve to reduce anxiety about death, then reminding people of death should produce increased need to defend their cultural worldviews, and achieve self-esteem.

In the first test of this hypothesis, Rosenblatt, Greenberg, Solomon, Pyszczynski, and Lyon (1989) found that thinking about mortality motivates people to punish those who threaten their worldviews, and reward those who uphold them. The participants in the first study were municipal judges, who agreed to participate in a study on personality and bond assessment. The judges randomly received a questionnaire packet that either included a MS manipulation or not. In the MS condition, the participants described (i) what will happen to them as they physically die, and (ii) the emotions that the thought of their own death arouses in them. The questionnaire packet also included a case description of an arrested prostitute (who violates cultural standards) and a form for a bond assessment recommendation. In accordance with the study's prediction, judges who were reminded of

their mortality recommended a much higher bond assessment ($M = \$455$) compared to those who were not reminded of death ($M = \$50$).

These results have been further supported by hundreds of studies, which have found that MS inductions compared to control inductions cause participants to give harsher punishments to those who violate the cultural moral codes, to give more negative evaluations of those who oppose their cultural worldviews (e.g., Greenberg *et al.*, 1990), or to support violent actions toward people who criticize their cultural beliefs compared to control inductions. In one provocative study by McGregor and colleagues (1998), participants were allowed to allot painful hot sauce to an individual who disparaged their political views (they were informed that the target did not like spicy food). Participants who had been reminded of death allocated more hot sauce to the worldview-threatening confederate.

Importantly, these responses occur after people are reminded of death, but not other control topics, such as intense pain, meaninglessness, an upcoming examination, failure, general anxieties, feelings of uncertainty, temporal discontinuity, unexpected events, public speaking, expectancy violations, social exclusion, and more. Furthermore, TMT researchers have used a variety of different ways to induce mortality related thoughts including writing one sentence about death, subliminal priming of death-related words, footage of death or of destruction, proximity to a funeral home, death words search puzzles, health or risk warnings, and images or reminders of terrorism.

Along with cultural worldviews, self-esteem also acts as a buffer against death anxiety. Self-esteem occurs when one lives up to her or his cultural worldview and therefore gains a sense that she or he has secured the symbolic or literal immortality the worldview offers. In a series of studies, Greenberg and colleagues (1992) demonstrated that elevated self-esteem reduces both self-report anxiety in response to graphic, death-related images (study 1) and physiological arousal while anticipating painful shocks (studies 2–3). In a subsequent study by Harmon-Jones and colleagues (1997), American participants were randomly assigned to receive either bogus positive feedback or bogus neutral feedback on a personality assessment. Then, they either wrote about their own death or a neutral topic, and given the opportunity to evaluate people who praised or criticized the United States. Elevated self-esteem decreased pro-US bias in the MS condition, indicating that the increase in self-esteem assuages the need to validate one's worldview when death is salient. Similarly, individuals with dispositionally high self-esteem do not exhibit worldview defensiveness after being reminded of death (for a review of TMT and self-esteem see Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Subsequent research showed that when mortality is made salient, individuals strive for self-esteem; for example, by donating money to charity (e.g., Jonas, Schimel, Greenberg, &

Pyszczynski, 2002). These studies and others provide converging evidence that self-esteem buffers anxiety about death.

These foundational findings have been greatly expanded and refined. One crucial advancement was the discovery of the death-thought accessibility (DTA) concept and the dual-process model of defense (Pyszczynski, Greenberg, & Solomon, 1999). TMT theorists were puzzled that although MS produces defensiveness toward worldview-threatening others presumably out of concern about death, participants do not self-report anxiety after being reminded of death. Furthermore, subliminal reminders of death often produce stronger defensive responses than supraliminal reminders (e.g., Arndt, Greenberg, Pyszczynski, & Solomon, 1997). If unconscious reminders of death produce more defense than conscious reminders, something other than conscious anxiety must be at work. A major breakthrough occurred when TMT theorists found that worldview defense, rather than being driven by conscious anxiety, is caused by elevated death-thought accessibility DTA. DTA refers to the likelihood at a given time that thoughts of death will appear in consciousness, usually measured by a word stem completion task (Hayes, Schimel, Arndt, & Faucher, 2010). TM researchers have found that worldview defense occurs when death thoughts are highly accessible, but beneath conscious awareness, and that worldview defense reduces DTA back to normal levels. Furthermore, when individuals' worldviews or sense of self-worth is threatened, death thoughts become more accessible.

DTA is initially low after an MS prime, because participants deliberately suppress death thoughts. However, after a delay in which participants become distracted from thoughts of death, DTA rises, producing worldview defense. To distinguish deliberate, rational defenses that occur immediately after MS (like death-thought suppression) from unconscious, nonrational defenses (such as worldview defense), TM researchers labeled the former proximal defenses and the latter distal defenses. This formulation of a dual-process model of existential defense marked an important point of progress in the refinement of TMT.

The anxiety buffer hypothesis and the MS hypothesis, along with the dual-process model of defense, provide the foundation around which most TMT hypothesis are situated. However, it is important to note two other foundational lines of research. One of these lines of research has elucidated the effect of mortality concerns on humans' relationship with their own bodies. Building on Becker's analysis, TM theorists hypothesized that because the human bodily existence reminds people of their own vulnerability and mortality (because it is the body that dies and decays), thoughts about death and thoughts about "creatureliness" (e.g., similarity to animals), should drive people to disassociate themselves with their body and with nature (Goldenberg, 2012). This hypothesis was supported by

studies demonstrating that MS manipulations cause participants to be more disgusted by bodily products or by animals and to show greater preference for essays that describe people as distinctively different from animals and to avoid pleasant physical sensations.

Finally, TMT has produced well-supported findings regarding the effect of mortality concerns on health behaviors (see Goldenberg & Arndt, 2008, for a review). When death thoughts are in focal attention, people engage in healthy behaviors such as intending to get fit and using sunscreen; this is a form of proximal defense. However, when death thoughts are highly accessible but unconscious, people's desire to enhance self-esteem often leads them to engage in health-*negative* behaviors. For example, participants who are lead to believe that tanned skin is attractive exhibit an increase interest in tanning when death thoughts are accessible but not conscious.

To summarize, the earliest research in TMT focused on (i) the importance of cultural worldviews in managing concern about death and (ii) the anxiety buffering function of self-esteem. TMT researchers also discovered that people keep awareness of death at bay using both proximal and distal defenses. Having found support for these major tenets, the theory went on to illuminate how the physical body can induce concerns about death and how mortality concerns influence health-related behaviors.

CUTTING-EDGE RESEARCH

In the next section we succinctly highlight some of the cutting edge TMT research in the domains of intergroup conflict, psychological disorders, religious belief, and brain imaging.

INTERGROUP CONFLICT

Early TMT studies revealed that MS can lead to aggression against worldview-threatening others (McGregor *et al.*, 1998). Recent TMT research has applied this finding to modern intergroup conflicts. In a recent set of studies, Cohen, Soenke, Solomon, and Greenberg (2013) found that death-related thoughts contribute to American participants' negative responses to Islamic symbols. In the first study, participants were randomly assigned to an MS or a control condition and then read a paragraph about the 2010 debate over the controversy surrounding the building of the new Cordoba House or the so-called "Ground Zero Mosque" (the controversy concerns its proximity to the world trade center memorial site in New York). Thinking about mortality caused participants to show less support for the mosque being built, and to want the mosque built farther away from ground zero. In addition, these studies found that asking people to think about a

mosque, but not a church or a synagogue, being built in their neighborhood, increased the accessibility of death-related thoughts (studies 2–3); this effect was eliminated when participants read a newspaper account of the desecration of the Quran (study 4). Greenberg and colleagues (1992) found that when the value of tolerance was primed, MS did not cause derogation of a target who criticized the United States (study 2). Because MS motivates adherence to cultural standards and values, it makes sense that MS drives adherence to peaceful cultural values if those values are salient.

Cutting-edge research has expanded the list of variables that moderate defensive responding (for a thorough review, see Jonas & Fritzsche, 2013). Pyszczynski *et al.* (2012) examined the effect of a subordinate goal—solving global climate change—on desire for peace-making among groups in conflict. They found that when students were focused on a global threat (climate change) as opposed to a local threat (an earthquake), MS actually *increased* support for international peace making (study 1). Furthermore, thinking of a global climate change as opposed to a local catastrophe caused Muslim Palestinian Israelis to respond with increases support for peace making with Israeli Jews, provided they scored high on a measure of perceived common humanity (which measures the extent to which one perceives all humanity to be interconnected and espouse the same fundamental hopes and fears).

PSYCHOLOGICAL DISORDERS

Another line of research has used TMT to understand psychological disorders. For example, TMT has been applied to anxiety disorders such as post-traumatic stress disorder (PTSD). Pyszczynski and Kesebir (2011) theorized that traumatic experiences disrupt the anxiety buffer that normally functions to reduce concerns about death. For example, experiencing a threat to one's existence may dismantle one's perception that the world is a benevolent, meaningful place that supports human life. Essentially, one's "fundamental relationship with existence" is shattered (Pyszczynski & Kesebir, 2011). In order to explore the hypothesis that PTSD is characterized by the disruption of anxiety buffers, Pyszczynski and Kesebir subjected survivors of the 2005 Zarand earthquake in Iran to reminders of mortality as well as reminders of the earthquake four weeks after the event. They found that survivors who had a high level of dissociation—a major predictor of PTSD, characterized by altered time and space perception and the sense that the traumatic experience was dream-like or unreal—did not respond to MS or earthquake with worldview defense, as those with low levels of dissociation did. Similarly, those who had full-blown PTSD 2 years after the earthquake did not exhibit normal worldview defense, suggesting that the cultural worldview anxiety buffer is absent in individuals with PTSD.

Further support for the connection between terror management processes and anxiety disorders comes from Kosloff *et al.* (2006), who showed that MS led to increased dissociation in response to a short film about the attacks of 9/11/2001 and that this dissociation tends to increase anxiety sensitivity, which is a measure of concern over anxious symptoms, assessed with questions such as, "When I notice that my heart is beating rapidly, I worry that I might have a heart attack."

Death concerns are implicated in phobias as well. Strachan and colleagues (2007) found that MS, compared to aversive control manipulations, increased a variety of phobic responses among those who already possessed the phobias, including compulsive hand washing, arachnophobia, and social phobia. The authors suggest that such phobias may in fact be a response to death anxiety, misdirected toward more circumscribed concerns (Strachan *et al.*, 2007).

RELIGIOUS BELIEFS

Another cutting-edge research program has focused on the psychological functions of religious beliefs (for reviews see Soenke, Landau, & Greenberg, 2013; Vail *et al.*, 2010). According to TMT, religions serve a fundamental function in managing death-related concerns, by granting followers a clear sense of meaning, purpose, and a way of achieving literal immortality. Although initial TM research focused on the role that religious beliefs play for people who define themselves as religious (e.g., Soenke *et al.*, 2013) a recent study by Heflick and Goldenberg (2012) suggests that supernatural beliefs could also help atheists manage death-related concerns. In this provocative study, atheist, agnostic, and religious Americans read an article that either confirmed or disconfirmed the existence of an afterlife, and then were randomly assigned to either a MS or a control manipulation. Afterwards, the participants rated worldview-threatening and worldview-affirming essays. Evidence for the existence of an afterlife reduced defensive MS responses regardless of the participants' beliefs, suggesting that even atheists are capable of using (at least some forms of) afterlife belief to buffer death anxiety. However, a study by Vail, Arndt, and Abdollahi (2012) found no effect of MS on atheists' explicit endorsement of afterlife beliefs.

BRAIN IMAGING

Very recent research has explored the effects of MS primes on neural functioning. Han, Qin, and Ma (2010) used functional magnetic resonance imaging (fMRI) to investigate the brain regions associated with perceptions of death-related words in a Stroop-like task, finding that death-related words were associated with decreased activity in the insula. Quirin and colleagues

(2011) found that answering questions about death, as opposed to pain, was associated with activation of brain areas associated with the experience of or potential for anxiety.

Henry, Bartholow, and Arndt (2009) examined event-related potentials (ERPs) as white participants viewed pictures of black or white faces after being reminded of death (vs control). The results indicated that MS increased amplitude of the N2 and latency of the P3 components of the ERP to pictures of angry in-group (white) faces. This finding might be indicative of people's greater desire for affiliative interactions with the in-group after MS.

Klackl, Jonas, and Kronbichler (2013) examined the neural correlates of proximal defenses to MS. They found that participants' responses to death-related words were associated with a larger late positive potential (LPP) (400–800 ms after stimuli), compared to their responses to words that were either neutral or negative in valence. Considering previous studies on the LPP ERPs (e.g., Schupp *et al.*, 2000), this suggests that individuals were particularly motivated to attend to and process death words. In a second study, a similar effect was found for positive words. The authors suggest that increased attention to positive words may be indicative of proximal defense (i.e., a means of distracting oneself from death words also present in the task).

Because research on the neural correlates of TM processes is young, at this point it is too early to interpret these findings confidently. However, brain studies prove a promising area of research that may shed light on underlying TM processes.

ADDITIONAL MODERATORS

TMT research has also focused on additional moderators of MS-related responses and death thought accessibility. For example, mindfulness—the tendency to focus on the present moment—has been shown to moderate responses to death reminders. In a series of studies, Neimiec and colleagues (2010) found that individuals high in trait mindfulness (measured as low mindlessness) exhibit decreased responses to MS on a variety of measures. Further investigation of this effect (studies 6 and 7) revealed that mindful individuals suppressed death thoughts less after MS and responded to MS prompts with longer than average responses, suggesting that mindful individuals inhibit proximal defenses (thus allowing death thoughts to remain conscious), obviating the need for distal defense (which occurs when death thoughts are active but unconscious). Another recently explored moderator of MS is nostalgia (Routledge, Arndt, Sedikides, & Wildschut, 2008); this work suggests that thinking about one's past as significant can serve a terror management function.

KEY ISSUES IN FUTURE RESEARCH

In the following section, we summarize key issues that have emerged in TMT research and will likely be the subject of further exploration.

DEEP VERSUS SHALLOW DEATH CONSTRUALS

When people think about death deeply (i.e., via writing about it for a long period time), defensiveness is mitigated or does not emerge (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). It is possible that deeper death construals simply prevent distal defenses, such as worldview bolstering, from occurring, because death thoughts are not suppressed after deep construal (either because the motivation to do so is eliminated, or time or other constraints prevent suppression in the experiments). However, Cozzolino (2006) has proposed a “dual-defense” system of terror management defense. Cozzolino asserts that reminders of mortality may be dealt with by an abstract or concrete existential system. According to Cozzolino, TMT experiments usually activate the abstract existential system, because reminders of mortality are subtle and impersonal; processing death abstractly leads to defensive responding. When individuals reflect deeply on death, processing of death thoughts occurs in a concrete personal system, leading to growth-oriented rather than defensive responses. Cozzolino notes that individuals diagnosed with a terminal illness probably process death in the concrete system, explaining why these individuals often experience personal growth in light of their illness. Indeed, it remains to be settled how growth-oriented and accepting responses to death may be incorporated into the TMT framework.

TMT AND AGING

In a similar vein, many aging individuals, who are closest to death, often do not respond to MS with worldview defense. The effect of MS on worldview defense for aging individuals is moderated by executive function, with adults high in executive function exhibiting *increased* tolerance after MS and adults low in executive functioning exhibiting normal defensive responding (Maxfield, Pyszczynski, Greenberg, Pepm, & Davis, 2011). Currently, TMT researchers are investigating the role that executive function might have on reducing defensive responding in older adults. One potential explanation for this finding is that individuals with high executive functioning construe death more concretely, thus fostering more connections between death and the self, leading to more acceptance of death.

ALTERNATIVE FRAMEWORKS

TMT has been the subject of much controversy over the years. Alternative theories have been proposed to explain the effects of MS, and perhaps supplant TMT, such as uncertainty management theory (van den Bos, Poortvliet, Maas, Miedema, & van den Ham, 2005), the Meaning Maintenance Model (Proulx & Heine, 2006), Coalitional Psychology (Navarrete & Fessler, 2005), and most recently, an unconscious vigilance model proposed by Holbrook, Sousa, and Hahn-Holbrook (2011). The general tenor of these models is that MS may be one of a number of general threats, such as threats to certainty, control, or meaning that arouse vigilance or increased reliance on one's cultural worldview. Cultural worldviews may indeed serve to address other threats besides mortality. However, terror management theorists (e.g., Greenberg & Arndt, 2012; Landau, Solomon, Pyszczynski, & Greenberg, 2007) have argued that death is a unique threat because it is the only inevitable future event, it runs counter to many biological systems oriented toward continued survival, and it threatens to eliminate all human desires, whether for belonging, control, competence, or meaning. They have also argued that the alternative theories cannot account for substantial lines of evidence supporting TMT. Among these are evidence that MS has been shown: in many studies to have different effects than other threats; to sometimes reverse rather than simply amplify control condition preferences; to often have very different effects immediately than it does after a delay; to activate a different time course of defense than other threats (Martens, Burke, Schimel, & Faucher, 2011); and to have very specific influences on how people respond to their body, to animals, and to health choices. In addition, well over 80 studies have specifically linked MS effects to the accessibility of death-related thought (Hayes *et al.*, 2010). A challenge for future research is to clarify the interrelations among threat of mortality and other sources of psychological insecurity.

SUMMARY

TMT has been, and will continue to be, a fruitful area of study. It has helped inspire a new subfield known as experimental existential psychology. Foundational work on TMT supported the anxiety buffer and MS hypotheses as well as the dual defense model. Foundational TMT research also includes the interplay between death concerns, bodily awareness, and health behaviors. Cutting-edge research has explored intergroup conflict, psychological disorders, religious belief, neural correlates of TM processes, mindfulness, and more. Key issues for TMT include puzzling moderators of MS including deep death construals and old age, as well how death relates to other existential concerns. TMT will continue to shed light on how awareness of mortality

effects human behavior as it moves into the future with innovative research designs and addresses increasingly deep and provocative questions.

REFERENCES

- Arndt, J., Greenberg, J., Pyszczynski, T., & Solomon, S. (1997). Subliminal exposure to death-related stimuli increases defense of the cultural worldview. *Psychological Science*, 8(5), 379–385. doi:10.1111/j.1467-9280.1997.tb00429.x
- Becker, E. (1971). *The birth and death of meaning* (2nd ed.). New York, NY: Free Press.
- Becker, E. (1973). *The denial of death*. New York, NY: Free Press.
- Cohen, F., Soenke, M., Solomon, S., & Greenberg, J. (2013). Evidence for a role of death thought in American attitudes toward symbols of Islam (Vol. 49, pp. 189–194). *Journal of Experimental Social Psychology*.
- Cozzolino, P. J. (2006). Death contemplation, growth, and defense: Converging evidence of dual-existential systems? *Psychological Inquiry*, 17(4), 278–287.
- Goldenberg, J. L. (2012). A body of terror: Denial of death and the creaturely body. In P. R. Shaver & M. Mikulincer (Eds.), *Meaning, mortality, and choice: The social psychology of existential concerns* (pp. 17–35). Washington, DC: American Psychological Association 10.1037/13748-005
- Goldenberg, J. L., & Arndt, J. (2008). The implications of death for health: a terror management health model for behavioral health promotion. *Psychological Review*, 115(4), 1032.
- Greenberg, J., & Arndt, J. (2012). Terror management theory. In P. Van Lange, A. Kruglanski & E. Higgins (Eds.), *Handbook of theories of social psychology* (Vol. 1, pp. 398–416). London, England: SAGE Publications Ltd. 10.4135/9781446249215.n20
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1986). The causes and consequences of a need for self-esteem: A terror management theory. In R. F. Baumeister (Ed.), *Public self and private self* (pp. 189–212). New York, NY: Springer-Verlag.
- Greenberg, J., Pyszczynski, T., & Solomon, S. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. In P. M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 61–141). San Diego, CA: Academic Press.
- Greenberg, J., Pyszczynski, T., Solomon, S., Rosenblatt, A., Veeder, M., Kirkland, S., & Lyon, D. (1990). Evidence for terror management theory II: The effects of mortality salience on reactions to those who threaten or bolster the cultural worldview. *Journal of Personality and Social Psychology*, 58(2), 308–318.
- Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, 67(4), 627–637.
- Greenberg, J., Simon, L., Pyszczynski, T., Solomon, S., & Chatel, D. (1992). Terror management and tolerance: Does mortality salience always intensify negative reactions to others who threaten one's worldview? *Journal of Personality and Social Psychology*, 63, 212–220.
- Greenberg, J., Solomon, S., Pyszczynski, T., Rosenblatt, A., Burling, J., Lyon, D., & Pinel, E. (1992). Why do people need self-esteem? converging evidence that

- self-esteem serves an anxiety-buffering function. *Journal of Personality and Social Psychology*, 63(6), 913–922.
- Han, S., Qin, J., & Ma, Y. (2010). Neurocognitive processes of linguistic cues related to death. *Neuropsychologia*, 48(12), 3436–42.
- Harmon-Jones, E., Simon, L., Greenberg, J., Pyszczynski, T., Solomon, S., & McGregor, H. (1997). Terror management theory and self-esteem: Evidence that increased self-esteem reduced mortality salience effects. *Journal of Personality and Social Psychology*, 72(1), 24–36.
- Hayes, J., Schimel, J., Arndt, J., & Faucher, E. H. (2010). A theoretical and empirical review of the death-thought accessibility concept in terror management research. *Psychological Bulletin*, 136, 699–739.
- Heflick, N. A., & Goldenberg, J. L. (2012). No atheists in foxholes: Arguments for (but not against) afterlife belief buffers mortality salience effects for atheists. *British Journal of Social Psychology*, 51(2), 385–392. doi:10.1111/j.2044-8309.2011.02058.x
- Henry, E. A., Bartholow, B. D., & Arndt, J. (2009). Death on the brain: effects of mortality salience on the neural correlates of ingroup and outgroup categorization. *Social cognitive and affective neuroscience*, 5(1), 77–87. doi:10.1093/scan/nsp041
- Holbrook, C., Sousa, P., & Hahn-Holbrook, J. (2011). Unconscious vigilance: World-view defense without adaptations for terror, coalition, or uncertainty management. *Journal of Personality and Social Psychology*, 101(3), 451–466. doi:10.1037/a0024033
- Jonas, E., & Fritsche, I. (2013). *Destined to die but not to wage war: How existential threat can contribute to escalation or de-escalation of violent intergroup conflict* (pp. 543–558). *American Psychologist*.
- Jonas, E., Schimel, J., Greenberg, J., & Pyszczynski, T. (2002). The Scrooge effect: Evidence that mortality salience increases prosocial attitudes and behavior. *Personality and Social Psychology Bulletin*, 28, 1342–1353.
- Klackl, J., Jonas, E., & Kronbichler, M. (2013). Existential neuroscience: Neurophysiological correlates of proximal defenses against death-related thoughts. *Social Cognitive and Affective Neuroscience*, 8(3), 333–340.
- Kosloff, S., Solomon, S., Greenberg, J., Cohen, F., Gershuny, B., Routledge, C., & Pyszczynski, T. (2006). Fatal distraction: The impact of mortality salience on dissociative responses to 9/11 and subsequent anxiety sensitivity. *Basic & Applied Social Psychology*, 28(4), 349–356. doi:10.1207/s15324834basp2804_8
- Landau, M. J., Solomon, S., Pyszczynski, T., & Greenberg, J. (2007). On the compatibility of terror management theory and perspectives on human evolution. *Evolutionary Psychology*, 5(3), 476–519.
- Lifton, R. J. (1979). *The broken connection: On death and the continuity of life*. New York, NY: Basic Books.
- Martens, A., Burke, B. L., Schimel, J., & Faucher, E. H. (2011). Same but different: meta-analytically examining the uniqueness of mortality salience effects. *European Journal of Social Psychology*, 41(1), 6–10.
- Maxfield, M., Pyszczynski, T., Greenberg, J., Pepm, R., & Davis, H. P. (2011). The moderating role of executive functioning in older adults' responses to

- a reminder of mortality. *Psychology and Aging*. Advance online publication. doi:10.1037/a0023902
- McGregor, H. A., Lieberman, J. D., Greenberg, J., Solomon, S., Arndt, J., Simon, L., & Pyszczynski, T. (1998). Terror management and aggression: Evidence that mortality salience motivates aggression against worldview-threatening others. *Journal of Personality and Social Psychology, 74*(3), 590–605.
- Navarrete, C., & Fessler, D. T. (2005). Normative bias and adaptive challenges: A relational approach to coalitional psychology and a critique of terror management theory. *Evolutionary Psychology, 3*, 297–325.
- Niemiec, C. P., Brown, K. W., Kashdan, T. B., Cozzolino, P. J., Breen, W. E., Levesque-Bristol, C., & Ryan, R. M. (2010). Being present in the face of existential threat: The role of trait mindfulness in reducing defensive responses to mortality salience. *Journal of Personality and Social Psychology, 99*(2), 344–365.
- Proulx, T., & Heine, S. J. (2006). Death and black diamonds: Meaning, mortality, and the meaning maintenance model. *Psychological Inquiry, 17*(4), 309–318. doi:10.1080/10478400701366985
- Pyszczynski, T., Greenberg, J., & Solomon, S. (1999). A dual-process mode of defense against conscious and unconscious death-related thoughts: An extension of terror management theory. *Psychological Review, 106*, 835–845.
- Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological Bulletin, 130*(3), 435–468. doi:10.1037/0033-2909.130.3.435
- Pyszczynski, T., & Kesebir, P. (2011). Anxiety buffer disruption theory: A terror management account of posttraumatic stress disorder. *Anxiety, Stress & Coping: An International Journal, 24*(1), 3–26.
- Pyszczynski, T., Motyl, M., Vail, K., Hirschberger, G., Arndt, J., & Kesebir, P. (2012). Drawing attention to global climate change decreases support for war. *Peace and Conflict: Journal of Peace Psychology, 18*(4), 354–368. doi:10.1037/a0030328
- Quirin, M., Loktyushin, A., Arndt, J., Kustermann, E., Lo, Y., Kuhl, J., & Eggert, L. (2011). Existential neuroscience: a functional magnetic resonance imaging investigation of neural responses to reminders of one's mortality. *Social Cognitive and Affective Neuroscience, 7*(2), 193–8.
- Rosenblatt, A., Greenberg, J., Solomon, S., Pyszczynski, T., & Lyon, D. (1989). Evidence for terror management theory I: The effects of mortality salience on reactions to those who violate or uphold cultural values. *Journal of Personality and Social Psychology, 57*, 681–690.
- Routledge, C., Arndt, J., Sedikides, C., & Wildschut, T. (2008). A blast from the past: The terror management function of nostalgia. *Journal of Experimental Social Psychology, 44*(1), 132–140.
- Schupp, H. T., Cuthbert, B. N., Bradley, M. M., Cacioppo, J. T., Ito, T., & Lang, P. J. (2000). Affective picture processing: the late positive potential is modulated by motivational relevance. *Psychophysiology, 37*(2), 257–261.
- Soenke, M., Landau, M., & Greenberg, J. (2013). Sacred armor: Religion's role as a buffer against the anxieties of life and the fear of death. In K. I. Pargament, J. J. Exline & J. W. James (Eds.), *APA handbook of psychology, religion, and spirituality*

- (Vol 1): *Context, theory, and research* (pp. 105–122). *APA Handbooks in Psychology*. Washington, DC, US: American Psychological Association. doi:10.1037/14045-005
- Strachan, E., Schimel, J., Arndt, J., Williams, T., Solomon, S., Pyszczynski, T., & Greenberg, J. (2007). Terror mismanagement: Evidence that mortality salience exacerbates phobic and compulsive behaviors. *Personality and Social Psychology Bulletin*, 33, 1137–1151.
- van den Bos, K., Poortvliet, P., Maas, M., Miedema, J., & van den Ham, E. (2005). An enquiry concerning the principles of cultural norms and values: The impact of uncertainty and mortality salience on reactions to violations and bolstering of cultural worldviews. *Journal of Experimental Social Psychology*, 41(2), 91–113. doi:10.1016/j.jesp.2004.06.001
- Vail, K., Arndt, J., & Abdollahi, A. (2012). Exploring the existential function of religion and supernatural agent beliefs among christians, muslims, atheists, and agnostics. *Personality and Social Psychology Bulletin*, 38(10), 1288–1300. doi:10.1177/0146167212449361
- Vail, K. E., Rothschild, Z. K., Weise, D. R., Solomon, S., Pyszczynski, T., & Greenberg, J. (2010). A terror management analysis of the psychological functions of religion. *Personality and Social Psychology Review*, 14, 84–94.

ALISABETH AYARS SHORT BIOGAPHY

Alisabeth Ayars is a PhD candidate at the University of Arizona, studying under the guidance of Dr. Jeff Greenberg. She attended undergraduate at New College of Florida. Her research interests are existential psychology and moral psychology, as well as experimental philosophy.

URI LIFSHIN SHORT BIOGRAPHY

Uri Lifshin was born and raised in Tel Aviv, Israel, and finished his BA degree in psychology at the Inter Disciplinary Center Herzliya. He also is a PhD candidate at the University of Arizona, studying under Dr. Greenberg's guidance. His research is primarily focused on terror management theory.

JEFF GREENBERG SHORT BIOGRAHY

Jeff Greenberg is Professor of Psychology at the University of Arizona. He has published many papers on self-esteem, prejudice, and intergroup conflict. He developed terror management theory in collaboration with Sheldon Solomon and Tom Pyszczynski.

RELATED ESSAYS

What Is Neuroticism, and Can We Treat It? (*Psychology*), Amantia Ametaj *et al.*

- Genetics and the Life Course (*Sociology*), Evan Charney
Peers and Adolescent Risk Taking (*Psychology*), Jason Chein
Delusions (*Psychology*), Max Coltheart
Misinformation and How to Correct It (*Psychology*), John Cook *et al.*
Problems Attract Problems: A Network Perspective on Mental Disorders (*Psychology*), Angélique Cramer and Denny Borsboom
Expertise (*Sociology*), Gil Eyal
Controlling the Influence of Stereotypes on One's Thoughts (*Psychology*), Patrick S. Forscher and Patricia G. Devine
Emerging Evidence of Addiction in Problematic Eating Behavior (*Psychology*), Ashley Gearhardt *et al.*
Depression (*Psychology*), Ian H. Gotlib and Daniella J. Furman
Positive Emotion Disturbance (*Psychology*), June Gruber and John Purcell
Family Relationships and Development (*Psychology*), Joan E. Grusec
Insomnia and Sleep Disorders (*Psychology*), Elizabeth C. Mason and Allison G. Harvey
Mental Imagery in Psychological Disorders (*Psychology*), Emily A. Holmes *et al.*
Normal Negative Emotions and Mental Disorders (*Sociology*), Allan V. Horwitz
Dissociation and Dissociative Identity Disorder (DID) (*Psychology*), Rafaële J. C. Huntjens and Martin J. Dorahy
Computer Technology and Children's Mental Health (*Psychology*), Philip C. Kendall *et al.*
Cultural Neuroscience: Connecting Culture, Brain, and Genes (*Psychology*), Shinobu Kitayama and Sarah Huff
Understanding Risk-Taking Behavior: Insights from Evolutionary Psychology (*Psychology*), Karin Machluf and David F. Bjorklund
Evolutionary Perspectives on Animal and Human Personality (*Anthropology*), Joseph H. Manson and Lynn A. Fairbanks
Disorders of Consciousness (*Psychology*), Martin M. Monti
Social Classification (*Sociology*), Elizabeth G. Pontikes
Cognitive Remediation in Schizophrenia (*Psychology*), Clare Reeder and Til Wykes
Cognitive Bias Modification in Mental (*Psychology*), Meg M. Reuland *et al.*
Born This Way: Thinking Sociologically about Essentialism (*Sociology*), Kristen Schilt
Clarifying the Nature and Structure of Personality Disorder (*Psychology*), Takakuni Suzuki and Douglas B. Samuel
Taking Personality to the Next Level: What Does It Mean to Know a Person? (*Psychology*), Simine Vazire and Robert Wilson

A Gene-Environment Approach to Understanding Youth Antisocial Behavior (*Psychology*), Rebecca Waller *et al.*

Crime and the Life Course (*Sociology*), Mark Warr and Carmen Gutierrez

Rumination (*Psychology*), Edward R. Watkins

Emotion Regulation (*Psychology*), Páree Zarolia *et al.*