

Mortality salience increases personal optimism among individuals higher in trait self-control

Nicholas J. Kelley¹ · Brandon J. Schmeichel¹

Published online: 18 June 2015

© Springer Science+Business Media New York 2015

Abstract Reminders of personal mortality may tune attention toward positive information. Insofar as attending to positive things in life helps individuals to cope with awareness of death, individuals with higher trait self-control may be particularly adept at positive tuning under mortality salience. To test this hypothesis, the current study had participants complete a measure of trait self-control, contemplate their mortality or a control topic, and then complete a measure of personal optimism. Mortality salience increased personal optimism, but only among participants higher in trait self-control. Taken together with past research the current results suggest that individuals higher in trait self-control draw upon diverse sources of positivity under mortality salience, which may help explain why they enjoy more positive outcomes in life.

Keywords Terror management theory · Mortality salience · Self-control · Optimism

Introduction

All organisms have a drive toward self-preservation. In humans this fundamental drive clashes with knowledge of the inevitability of death. Numerous consequences of this intra-psychic conflict have been investigated from the perspective of terror management theory (TMT; Rosenblatt et al. 1989), which proposes that awareness of mortality poses a potentially crippling threat that exerts a wide

ranging impact on human experience and behavior. One seemingly counterintuitive impact of the psychological threat of death is increased attention toward positive information or events.

Mortality salience, trait self-control, and positivity bias

Initial support for the hypothesis that thoughts of death cause an increase in attention to positive information emerged from a series of studies by DeWall and Baumeister (2007). They found evidence for “positive tuning” under mortality salience. In one study, for example, they asked participants to think and write about their own inevitable death or a control topic before completing a simple word-stem completion task. Word stems could be completed to make a positive (or neutral) word or a negative (or neutral) word. Participants who had thought about death scored higher on an index of positivity (total positive word completions minus total negative word completions) compared to those in the control condition. DeWall and Baumeister interpreted these findings as evidence that thoughts of death trigger an automatic coping response that involves the search for happier thoughts.

Some persons are better than others at coping with psychological threats, so it stands to reason that individual differences in coping skills would moderate positive tuning under mortality salience. More specifically, positive tuning should be more evident in persons with better coping skills. Support for this hypothesis was found in a study that used eye-tracking technology to assess positive tuning (Kelley et al. 2014). Participants in this study completed a measure of trait self-control, contemplated their own mortality or a control topic, and then viewed pairs of images (i.e., two images appearing side by side) while their gaze patterns

✉ Nicholas J. Kelley
nicholasjkelly@gmail.com

¹ Department of Psychology, Texas A&M University, 4235 TAMU, College Station, TX 77843-4235, USA

were recorded. The crucial trials paired positive and negative affective images. Results revealed a bias toward positive affective images after the mortality salience induction, but only among individuals higher in trait self-control. Thus, positive tuning at the level of basic visual attention was most evident among persons with better coping skills (i.e., those higher in trait self-control). The current study sought new evidence for positive tuning under mortality salience in a more internal source of potential positivity—optimism—and tested again the extent to which positive tuning is influenced by trait self-control.

Mortality salience, trait self-control and optimism

Optimism about the future may be considered a form of positive tuning. Optimism is the expectation that positive events are likely to occur whereas negative events are unlikely to occur (Weinstein 1980). Optimism promotes physical and psychological well-being and is robustly related to longevity and recovery from disease (Chapman et al. 2011). We reasoned that optimistic perceptions of one's future may increase in response to mortality salience both because optimism helps to push death into the future through its promotion of subjective well-being, coping skills, and physical health (Carver et al. 2010), and because the subjective positivity of optimism—including the self-enhancement optimism often entails (Regan et al. 1995)—may help to counter the psychological threat of death. Viewed in this light, optimism may be considered an effective coping response to mortality salience.

Some previous research has examined the effects of mortality salience on optimism-related responses. A pair of studies by Dechesne et al. (2000) found that mortality salience increases optimism about the home team's (i.e., Netherlands) upcoming soccer match against a key rival (i.e., Germany). A second study by the same authors conceptually replicated the increase in optimism about the local sports team in an American sample. Mortality salience has also been found to strengthen beliefs in moral and societal progress, which seems to reflect a hopeful, optimistic view of the future (Rutjens et al. 2009). The current study built upon these previous findings by examining the effects of mortality salience on optimism about one's own future.

As described above, we assumed that increased optimism under mortality salience reflects an effective coping response to the psychological threat of death. Presumably the tendency to tune toward more positive information under mortality salience helps individuals to cope with the threat inherent in thought of death. One accepted method for elucidating processes underlying an experimental effect is to examine the role of individual difference variables

that influence the tendency to engage a proposed process (e.g., Gohm and Clore 2000; see also Underwood 1975). At issue in the current investigation is the effect of mortality salience on optimism, and the process presumed to underlie this effect is a coping or self-regulatory response. Evidence that trait self-control moderates the effect of mortality salience on optimism would thus lend support to the idea that increased optimism represents a coping response to mortality salience, given the established link between trait self-control and successful coping (e.g., Tangney et al. 2004).

The current study

Participants completed a measure of trait self-control before thinking and writing about their own mortality or an aversive control topic (i.e., dental pain). Then participants considered the likelihood of 42 possible future life events happening to them relative to a peer of the same age and sex. We predicted that mortality salience would increase personal optimism, consistent with the work of DeWall and Baumeister (2007), and especially so for individuals higher in trait self-control, consistent with Kelley et al. (2014).

Method

Participants and design

One-hundred seventy-five undergraduate students (88 female, 85 male, 2 not reporting) reported individually to a laboratory study described as an investigation of the relationship between personality traits and attitudes. Participants' ages ranged from 18 to 25 ($M = 18.95$, $SD = 1.05$). They received credit toward a course requirement for their participation. Participants were randomly assigned between the mortality salience ($n = 91$) and dental pain salience ($n = 84$) conditions.

Statistical power and sample size selection

A recent meta- revealed that the average mortality salience effect is medium to large in size ($r = 0.35$; Burke et al. 2010). However, other meta-analytic work has suggested that the effect size may not be as large as Burke and colleagues suggested (Yen and Cheng 2013). Furthermore, Burke and colleagues' meta-analysis revealed that the prototypical mortality salience experiment includes approximately 87 participants ($M = 87.3$, $SD = 50.8$). We elected to collect a larger sample of participants than the average mortality salience study due to disagreements about the true size of mortality salience effects. Specifically, we sought to double the sample size of the average

mortality salience experiment by sampling 175 participants, which affords us .92 power to detect a medium-sized ($r = 0.25$) main effect of mortality salience on personal optimism.

Trait self-control

The experimenter first introduced the purpose of the study and then had participants complete the brief (13-item) version of the Self-Control Scale (SCS; Tangney et al. 2004). Sample items include “I have a hard time breaking bad habits,” (reverse scored) and “People would say that I have iron self-discipline.” Participants responded to each item using a 5-point Likert scale from 1 = *not at all* to 5 = *very much*. In the current study the observed range of scores on the SCS was 26–60, and the average total score was 43.42 ($SD = 7.13$).

Mortality salience manipulation

Following previous research (e.g., Rosenblatt et al. 1989), participants were randomly assigned to respond to two open-ended prompts related to either death or dental pain. In the *mortality salience condition* the prompts were “Please briefly describe the emotions that the thought of your own death arouse in you,” and “Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.” In the *control condition* participants responded to prompts about a painful dental procedure: “Please briefly describe the emotions that the thought of a painful dental procedure arouses in you,” and “Jot down, as specifically as you can, what you think will happen to you as you have a painful dental procedure.”

Delay

After writing about death or dental pain participants read an affectively neutral passage from “The Growing Stone,” a short story from the collection *Exile and the Kingdom* (Camus 1957), and they answered questions about the story’s content and the author’s gender. As in several previous studies, this task functioned as a delay and distraction task and was intended to remove thoughts of death from focal awareness (e.g., Greenberg et al. 1994; Kelley et al. 2014).

Optimistic perception task

The optimistic perception task (Weinstein 1980) asked participants to consider the likelihood of 42 possible future life events happening to them relative to a peer of the same age and sex. Eighteen of the events were positive (e.g.,

statewide recognition in your profession) and 24 were negative (e.g., heart attack before age 40). Responses could range from -4 (*very much less likely to occur*) to $+4$ (*very much more likely to occur*). Events were presented in a randomized order. Responses to negative events were reverse scored, and a composite score was created with larger values indicating more optimism about the future ($M = 47.34$, $SD = 31.48$, $\alpha = .78$).

Results

We conducted a hierarchical regression to test the effects of mortality salience and trait self-control on personal optimism. In the first model we regressed optimism onto mortality salience condition and trait self-control (centered). The first model was significant, indicating that the mortality salience manipulation and trait self-control account for a significant amount of the observed variance in optimism, $R^2 = .04$, $F(2, 172) = 3.66$, $p = .028$. Specifically, the main effect of mortality salience condition was non-significant, $b = 5.82$, $t(171) = 1.24$, $p = .22$, semi-partial $r^2 = .01$, 95 % CI = $[-3.01, 14.93]$,¹ whereas the main effect of trait self-control was significant, $b = 0.79$, $t(171) = 2.40$, $p = .02$, semi-partial $r^2 = 0.03$, 95 % CI = $[0.09, 1.47]$. In the second model we entered the mortality salience condition \times trait self-control interaction term. This model predicted optimism scores significantly over and above the single level predictors, R^2 change = .04, $F(1, 171) = 6.92$, $p = .009$, and the mortality salience \times trait self-control interaction was statistically significant, $b = 1.71$, $t(171) = 2.63$, $p = .009$, semi-partial $r^2 = .04$, 95 % CI = $[0.44, 2.96]$.

We calculated within-cell correlations to probe the nature of the significant interaction. Figure 1 depicts the scatterplot and least-squares regression lines for the two conditions. Trait self-control was a positive predictor of optimistic perceptions of their future in the mortality salience condition, $r(89) = 0.34$, $p < .001$, but not in the dental pain salience condition, $r(82) = -0.02$, $p = .83$.

We also examined the effects of mortality salience on optimism at $\pm 1 SD$ from the mean trait self-control score. Predicted-values t tests indicated that mortality salience increased optimism relative to dental pain salience among participants higher ($+1 SD$) in trait self-control, $t(173) = 2.75$, $p = .007$. Among participants lower ($-1 SD$) in trait self-control, however, the mortality salience manipulation did not influence optimism, $t(173) = -0.97$, $p = .33$.

¹ 95 % Confidence intervals are based on 5000 bootstrap samples.

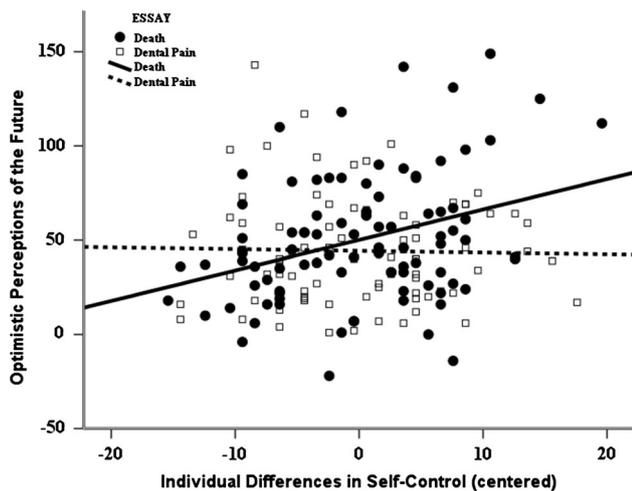


Fig. 1 Trait self-control was positively associated with optimism in the mortality salience condition but not in the dental pain salience condition

Discussion

Does thinking about death influence optimism about the future? The current study revealed that shifts in optimistic perceptions of the future following mortality salience depend on individual differences in trait self-control. After thinking about death participants higher in trait self-control became more optimistic about the future, whereas optimism did not change among those lower in trait self-control.

The results of the current study are consistent with prior research on positivity biases under mortality salience. For example, mortality salience has been found to shift attention toward more positive or emotionally pleasing words and meanings on simple verbal tasks (DeWall and Baumeister 2007). The current study found similar evidence in the form of more positive thinking about one's future. However, the observed increase in personal optimism was evident only among persons higher in trait self-control. The studies by DeWall and Baumeister (2007) found main effects of mortality salience on positive tuning and did not assess for possible moderation by trait self-control. Like the current study, some prior studies have found moderating effects of trait self-control under mortality salience. For example, trait self-control has been found to moderate the effects of mortality salience on worldview defense (Gailliot et al. 2006, 2007). Most relevant to the present study, higher trait self-control has also been found to predict biases toward positive (versus negative) affective stimuli under mortality salience (Kelley et al. 2014). Taken together the current findings and the past results suggest that higher trait self-control individuals may be particularly likely to embrace optimism and

positivity in response to potentially troubling reminders of death, whereas lower trait self-control individuals do not embrace such positivity.

TMT was conceived as a theory of self-esteem, and the basic idea was that self-esteem helps persons cope with the potential for existential anxiety associated with awareness of death (Greenberg et al. 1986). The current results suggest that self-control also helps persons to cope with mortality salience. Given that trait self-control is positively associated with trait self-esteem (Tangney et al. 2004), it seems reasonable to consider the possibility that moderation of mortality salience effects by trait self-control is explained at least in part by the overlap with trait self-esteem. We did not address this possibility in the current study, but previous studies have found that trait self-control contributes unique predictive power to mortality salience effects above and beyond the contributions of trait self-esteem (Gailliot et al. 2007). It may be the case that the positive coping responses associated with trait self-control contribute to the development and maintenance of high self-esteem. Additional research is needed to address this possibility.

Implications for terror management theory

Mortality salience interacted with trait self-control to influence personal optimism in the current study, but mortality salience did not exert a main effect on personal optimism. A lack of main effects is not an uncommon occurrence in the TMT literature (Yen and Cheng 2013). Furthermore, it has not been uncommon in the terror management literature to observe moderated effects in the absence of main effects of mortality salience manipulations. For example, Arndt and Solomon (2003) found a moderating effect of neuroticism in the absence of a mortality salience main effect on self-reported desire for control across two studies, and Vess et al. (2009) found a moderating role of personal need for structure in the absence of mortality salience main effects across six studies using multiple measures of meaning in life and interest in novelty. Regarding the current study, if mortality salience had exerted a main effect on personal optimism, then the current study was sufficiently powered to detect it. Studies that are adequately powered but do not find predicted effects are important for establishing the true size of a given effect. In this way the results of the current study further clarify the true size of mortality salience effects. The current study also provides further evidence that trait self-control moderates the effects of mortality salience.

It is not controversial to consider death an aversive topic. Not surprisingly the majority of research inspired by TMT has focused on the dark side of mortality awareness. Vail et al. (2012) astutely pointed out that at its core TMT

is simply about reducing awareness of death, and that attempts to reduce death awareness can have negative consequences (e.g., outgroup derogation). But attempts to manage mortality concerns can also have positive consequences, such as promoting physical health (e.g., Goldenberg and Arndt 2008), reinforcing goal-directed behavior (e.g., Kosloff and Greenberg 2009), and increasing relationship functioning (e.g., Taubman-Ben-Ari et al. 2002). Moreover, thinking about death has been found to promote tolerance and egalitarianism (e.g., Vail et al. 2011), empathy (e.g., Schimel et al. 2006), helping behavior (e.g., Gailliot et al. 2008), and compassion (e.g., Vail et al. 2009; Jonas et al. 2008). The results of the current study found evidence of increased optimism about the future, adding yet another potentially positive consequence to the list of mortality salience effects.

Implications for optimism and health

The current findings appear to be consistent with research on optimism and adjustment to cancer, which has found that optimism facilitates adjustment to cancer. For example, research by Miller et al. (1996) found that optimism predicts greater subjective well-being in advanced stage cancer. A cancer diagnosis or the diagnosis of any potential terminal illness may be considered a potent reminder of one's mortality. The current findings suggest that trait self-control may be another key individual difference variable facilitating adjustment and subjective well-being in the face of terminal illness. As self-control and optimism are not redundant constructs (Carver 2014), self-control may have a unique relationship with adjustment to cancer that is not encompassed by optimism.

Limitations

The current study found an overall positive association between trait self-control and optimism, but this relationship was significant only in the mortality salience condition. In the dental pain salience condition we found no significant relationship between self-control and optimism. Carver (2014) observed a positive relationship between self-control and optimism ($r = 0.30$). Why did Carver find a bivariate relationship between the two variables whereas we found a relationship only in the mortality salience condition?

We cannot say for sure why the two studies found somewhat different results. The simplest explanation is that the two studies differed in ways that produced the different results. For example, the two studies employed different measures of optimism: Carver used the revised Life-Orientation Test (LOT-R; Scheier et al. 1994) whereas we used Weinstein's unrealistic optimism measure (Weinstein 1980). Whereas the "realistic" optimism observed by Carver may be associated

with trait self-control under neutral circumstances, "unrealistic" optimism may be associated with self-control only under circumstances of self-threat as observed in the mortality salience condition. This may be due in part to the fact that the Weinstein measure we used incorporates an element of social comparison that is not present in the LOT-R. Making favorable social comparisons may be help to manage existential concerns, particularly among those high in self-control. This could help to explain the apparent differences in the results of the two studies. Further, the control condition in the current study involved thinking about dental pain; thinking about dental pain may not be a psychologically inert control condition, which makes it difficult to presume that our "control" condition is equivalent to the circumstances in which Carver's participants completed the LOT-R. It is possible that thinking about dental pain attenuates the correlation between optimism and trait self-control relative to a neutral, psychologically inert control condition. This is an empirical question for future research to consider.

As noted previously, in the current research we measured optimism with a questionnaire that asks participants to compare themselves to a same sex, same age peer (Weinstein 1980). It may be the case that this measure evokes self-enhancement or social comparison processes and is not a pure reflection of personal optimism. From the perspective of TMT, the possibility that the optimism measure evoked self-enhancement or social comparison tendencies is consistent with the idea that mortality salience motivates a coping response. It may be the case that optimism only functions as a coping response to mortality salience when it is measured in a way that incorporates an element of social comparison. Future research should continue to explore this possibility by using measures of optimism that do not entail social comparisons.

Conclusion

After thinking about their own death individuals higher in self-control endorsed more optimistic perceptions of the future, whereas those lower in self-control became no more or less optimistic. In this way individuals higher in self-control appear to be more effective than those lower in self-control at coping with the psychological threat of death. Indeed, self-control processes may be a key to understanding the effects of mortality salience.

References

- Arndt, J., & Solomon, S. (2003). The control of death and the death of control: The effects of mortality salience, neuroticism, and

- worldview threat on the desire for control. *Journal of Research in Personality*, 37, 1–22.
- Burke, B. L., Martens, A., & Faucher, E. H. (2010). Two decades of terror management theory: A meta-analysis of mortality salience research. *Personality and Social Psychology Review*, 14, 155–195.
- Camus, A. (1957). *Exile and the kingdom*. New York: Vintage Books.
- Carver, C. S. (2014). Self-control and optimism are distinct and complementary strengths. *Personality and Individual Differences*, 66, 24–26.
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review*, 30, 879–889.
- Chapman, B. P., Roberts, B., & Duberstein, P. (2011). Personality and longevity: Knowns, unknowns, and implications for public health and personalized medicine. *Journal of Aging Research*, 2011, 1–24.
- Dechesne, M., Greenberg, J., Arndt, J., & Schimel, J. (2000). Terror management and the vicissitudes of sports fan affiliation: The effects of mortality salience on optimism and fan identification. *European Journal of Social Psychology*, 30, 813–835.
- DeWall, C. N., & Baumeister, R. F. (2007). From terror to joy: Automatic tuning to positive affective information following mortality salience. *Psychological Science*, 18, 984–990.
- Gailliot, M. T., Schmeichel, B. J., & Baumeister, R. F. (2006). Self-regulatory processes defend against the threat of death: Effects of self-control depletion and trait self-control on thoughts and fears of dying. *Journal of Personality and Social Psychology*, 91, 49–62.
- Gailliot, M. T., Schmeichel, B. J., & Maner, J. K. (2007). Differentiating the effects of self-control and self-esteem on reactions to mortality salience. *Journal of Experimental Social Psychology*, 43, 894–901.
- Gailliot, M. T., Stillman, T., Schmeichel, B. J., Plant, E. A., & Maner, J. K. (2008). Mortality salience increases adherence to cultural norms. *Personality and Social Psychology Bulletin*, 34, 993–1003.
- Gohm, C. L., & Clore, G. L. (2000). Individual differences in emotional experience: Mapping available scales to processes. *Personality and Social Psychology Bulletin*, 26, 679–697.
- Goldenberg, J. L., & Arndt, J. (2008). The implications of death for health: A terror management health model for behavioral health promotion. *Psychological Review*, 115, 1032–1053.
- 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: Springer.
- 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, 627–637.
- Jonas, E., Martens, A., Niesta Kayser, D., Fritsche, I., Sullivan, D., & Greenberg, J. (2008). Focus theory of normative conduct and terror-management theory: The interactive impact of mortality salience and norm salience on social judgment. *Journal of Personality and Social Psychology*, 95, 1239–1251.
- Kelley, N. J., Tang, D., & Schmeichel, B. J. (2014). Mortality salience biases attention to positive versus negative images among individuals higher in trait self-control. *Cognition and Emotion*, 28, 550–559.
- Kosloff, S., & Greenberg, J. (2009). Pearls in the desert: Death reminders provoke immediate derogation of extrinsic goals, but delayed inflation. *Journal of Experimental Social Psychology*, 45, 197–203.
- Miller, D. L., Manne, S. L., Taylor, K., Keates, J., & Dougherty, J. (1996). Psychological distress and well-being in advanced cancer: The effects of optimism and coping. *Journal of Clinical Psychology in Medical Settings*, 3, 115–130.
- Regan, P. C., Snyder, M., & Kassin, S. M. (1995). Unrealistic optimism: Self-enhancement or person positivity? *Personality and Social Psychology Bulletin*, 21, 1073–1082.
- 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.
- Rutjens, B. T., van der Pligt, J., & van Harreveld, F. (2009). Things will get better: The anxiety-buffering qualities of progressive hope. *Personality and Social Psychology Bulletin*, 35, 535–543.
- Scheier, M. F., Carver, C. S., & Bridges, M. W. (1994). Distinguishing optimism from neuroticism (and trait anxiety, self-mastery, and self-esteem): A re-evaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67, 1063–1078.
- Schimel, J., Wohl, M. J. A., & Williams, T. J. (2006). Terror management and trait empathy: Evidence that mortality salience promotes reactions of forgiveness among people with empathic (vs. non-empathic) worldviews. *Motivation and Emotion*, 30, 217–227.
- Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, 72, 271–324.
- Taubman-Ben-Ari, O., Findler, L., & Mikulincer, M. (2002). The effects of mortality salience on relationship strivings and beliefs: The moderating role of attachment style. *British Journal of Social Psychology*, 41, 419–441.
- Underwood, B. J. (1975). Individual differences as a crucible in theory construction. *American Psychologist*, 30, 128–134.
- Vail, K. E., Arndt, J., Motyl, M., & Pyszczynski, T. (2009). Compassionate values and presidential politics: Mortality salience, compassionate values, and support for Barack Obama and John McCain in the 2008 Presidential election. *Analysis of Social Issues and Public Policy*, 9, 255–268.
- Vail, K. E., Juhl, J., Arndt, J., Vess, M. K., Routledge, C., & Rutjens, B. T. (2012). When death is good for life: Considering the positive trajectories of terror management. *Personality and Social Psychology Review*, 16, 303–329.
- Vail, K. E., Rampo, N., Arndt, J., Pope, J. B., & Pinel, E. (2011). *Intolerance of intolerance: Mortality salience, tolerant values, and attitudes toward an anti-Muslim leader*. Unpublished manuscript, University of Missouri-Columbia.
- Vess, M., Routledge, C., Landau, M. J., & Arndt, J. (2009). The dynamics of death and meaning: The effects of death-relevant cognitions and personal need for structure on perceptions of meaning in life. *Journal of Personality and Social Psychology*, 97, 728–744.
- Weinstein, N. D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, 39, 806–820.
- Yen, C. L., & Cheng, C. P. (2013). Researcher effects on mortality salience research: A meta-analytic moderator analysis. *Death Studies*, 37, 636–652.