Self-Affirmation Attenuates Death-Thought Accessibility After Mortality Salience, But Not Among A High Post-Traumatic Stress Sample

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Objective: According to anxiety buffer disruption theory (ABDT), people function effectively in the world, in part, by relying on anxiety-buffer systems to protect against death awareness; however, traumatic experiences can overwhelm and disrupt those anxiety-buffer systems, leaving people unprotected from death awareness and at increased risk for the major symptom clusters of posttraumatic stress disorder (PTSD). Based on that idea, it was hypothesized that (a) when posttraumatic stress symptoms are low, self-affirmation (a known worldview/self-esteem based anxiety-buffer) should prevent mortality reminders from causing increased death-thought accessibility (DTA); but that (b) when posttraumatic stress symptoms are high (indicating anxiety-buffer disruption), self-affirmation should *fail* to prevent mortality reminders from increasing DTA. *Method:* To test these hypotheses, participants identified in a general population prescreen assessment as "low posttraumatic-stress symptom" ($n = 222$) and "high posttraumatic-stress symptom" ($n = 210$) were reminded of death (vs. control topic), prompted to engage in a self-affirmation (vs. nonself-affirmation) task, and then asked to complete a standard assessment of death-thought accessibility (DTA). *Results:* The hypotheses were confirmed, revealing that posttraumatic stress symptoms were associated with the ineffectiveness of anxiety-buffer system in protecting against increased death awareness. *Conclusion:* The present findings support of a foundational concept of ABDT, and point to new insights about the nature of PTSD and its treatment, because failure to manage death awareness is known to cause anxiety and exacerbate anxiety-related disorders (e.g., PTSD).

Keywords: posttraumatic stress, PTSD, anxiety buffer disruption, mortality salience, self-affirmation

Supplemental materials: http://dx.doi.org/10.1037/tra0000304.supp

My PTSD was triggered by several traumas, including a childhood laced with physical, mental, and sexual abuse, as well as an attack at knifepoint that left me thinking I would die. I would never be the same after that attack. For me there was no safe place in the world, not even my home.

—P. K. Philips (2016, para 2)

In her autobiographical essay, P. K. Philips laughs at the idea that she had what seemed to be a perfect life. Despite being young, talented, and beautiful, her entire view of the world as a meaningfully hopeful place came crashing down after being senselessly victimized by physical, mental, and sexual abuse, catalyzed by a near-deadly knife attack. Indeed, posttraumatic stress disorder (PTSD) sometimes develops in the wake of such extreme fear and helplessness, especially life-threatening situations. And, as with Philips, people with PTSD experience negative changes in beliefs and feelings (e.g., that the world is an utterly dangerous place), increased anxiety/hyper-arousal, as well as reliving the event (e.g., flashbacks) and avoidance of reminders of the traumatic event (American Psychiatric Association [APA], 2013).

Research based on terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986) suggests that people are able to function effectively in the world, in part, by relying on effective anxiety-buffer systems to protect them from the awareness that life is fleeting and fragile. And, according to anxiety buffer disruption theory (ABDT; Pyszczynski & Kesebir, 2011; Pyszczynski & Taylor, 2016), a new extension of TMT designed to address posttraumatic stress, major disruptions to such anxiety-buffer systems (such as Philips's abuse and near-fatal experience) would potentially leave people unprotected from awareness of death, and thus prone to increased anxiety, views of the world as dangerous and chaotic, intrusive thoughts about the event, and avoidance of reminders of it—the major symptom clusters of PTSD.

However, although research testing various implications of ABDT has been growing, no research has directly tested its core assertion: that posttraumatic stress disrupts people's anxiety buffers, rendering them unable to effectively protect against increased death awareness. The present research was therefore designed to test that fundamental idea by presenting death (vs. control) reminders to low and high posttraumatic stress samples, and testing in each sample whether a known anxiety-buffer activation task (i.e., a self-affirmation task) would effectively prevent subsequent increases in death-related cognitions.

Terror Management Theory and Research

TMT (Greenberg, Pyszczynski, & Solomon, 1986; Greenberg, Vail, & Pyszczynski, 2015) suggests that much of human activity is geared toward managing the potentially anxiety-causing aware-

ness of mortality. As a result of the strong evolutionary pressures to survive and reproduce, humans developed sophisticated cognitive abilities to think in self-reflective, symbolic, and temporal ways, allowing them to do adaptive things like organize long-term social plans and anticipate future outcomes. However, these abilities also allowed people to recognize their own inevitable future state: dead. In response, TMT argues, humans developed a dual-component system to help manage the potential anxiety that might otherwise stem from an unbridled awareness of mortality by striving for a psychological sense of permanence. Cultural worldviews, the first component, are socially validated systems of beliefs and attitudes that outline a meaningful set of beliefs, standards, and values, through which adherents can achieve a sense of permanence via secular (e.g., legacy via progeny, teaching students, technological or business innovation, art, government, etc.) or religious means (e.g., permanence via heaven, paradise, reincarnation, etc.). Self-esteem, the second component, then serves to indicate how well one is doing at living up to the tenets of those permanence-promising worldviews. Together, a sense of self-worth (self-esteem) helps manage potential death-anxiety by affirming that one is indeed meeting the standards and values of one's permanence-promising cultural worldview.

Death-Thought Accessibility, Anxiety-Buffer Effectiveness, and Mental Health

From the TMT perspective, death-related cognition is a potential source of anxiety, threat to mental health, and key motivator for various defensive reactions. This set of ideas has been tested and supported in over 600 empirical research studies, in over 20 countries, on at least 5 continents around the globe (Routledge & Vess, forthcoming for comprehensive review; Hayes, Schimel, Arndt, & Faucher, 2010 for meta-analysis).

Some of that research has tested the *mortality salience hypothesis* (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), which posits that if cultural beliefs and self-esteem do help manage death concerns, then making mortality salient should motivate people to more strongly defend or uphold their cultural values and strive for self-esteem. Indeed, hundreds of studies show that, compared to control topics (e.g., dental pain, uncertainty, failure, public speaking), priming mortality salience (MS; e.g., prompts to write about death, in situ inductions such as passing a funeral home, or death-related imagery or word primes) can motivate a variety of efforts to bolster one's cultural worldview, protect it from threat, and strive for a sense of self-esteem within that cultural system (e.g., Florian & Mikulincer, 1997; McGregor et al., 1998; Peters, Greenberg, Williams, & Schneider, 2005).

Other research has tested the *buffer hypothesis*, which holds that if something functions to buffer against death-related cognition then, when people are reminded of death, situationally activating the buffer or chronically relying on it will protect the individual against increases in death-related cognitions—thus also preventing the need for other psychological defenses. Death-related cognition is often assessed using one of various death-thought accessibility (DTA) tasks, designed to measure the cognitive accessibility of death-related thought (e.g., Hayes et al., 2010 for review); for example, in a series of partially completed words, some (e.g., COFF_ _) might be completed as either death-related (COFFIN) or neutral (COFFEE) words, and higher numbers of death-related

word-stem completions indicates that death-related concepts are more cognitively accessible (e.g., Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Consistent with TMT, buffer hypothesis research shows that MS increases DTA and worldview defenses among people with low—but not high—self-esteem (Harmon-Jones et al., 1997; Schmeichel et al., 2009), and that affirming relational attachments, self-esteem, and/or one's worldview belief (e.g., religious) systems can similarly mitigate the effects of MS on both DTA and worldview defenses (e.g., Jonas & Fischer, 2006; Mikulincer, Florian, & Hirschberger, 2003; Schmeichel & Martens, 2005).

Together, experiments testing these hypotheses have found that (a) the same conditions that lead to increased DTA also elicit greater worldview defense (e.g., Simon et al., 1997), (b) increased DTA mediated the causal impact of death-related stimuli on worldview defense (Fransen, Fennis, Pruyn, & Das, 2008; Vail, Arndt, Motyl, & Pyszczynski, 2012), and (c) engaging defensive buffers (e.g., via self-affirmation tasks) alleviates DTA after death reminders (e.g., Greenberg, Arndt, Schimel, Pyszczynski, & Solomon, 2001; Schmeichel & Martens, 2005).

Importantly, TMT holds that effectively buffering death awareness is functional, and key for psychological well-being, because failure to effectively manage DTA can potentially cause anxiety and exacerbate anxiety-related symptoms (Juhl & Routledge, 2016). Indeed, when people lack effective anxiety-buffers, death reminders can cause manifest anxiety and deficits in psychological well-being (Edmondson, Park, Chaudoir, & Wortmann, 2008; Routledge et al., 2010). Additionally, a lack of effective anxiety-buffers can exacerbate anxiety-related disorders and depression, and can impair self-regulation (e.g., Gailliot, Schmeichel, & Baumeister, 2006; Routledge & Juhl, 2010; Simon, Arndt, Greenberg, Pyszczynski, & Solomon, 1998; Strachan et al., 2007). Thus, the essential function of terror management buffers appears to be keeping DTA low, thus maintaining psychological well-being.

Anxiety-Buffer Disruption and Posttraumatic Stress

Building on TMT, ABDT (Pyszczynski & Kesebir, 2011) asserts that traumatic experiences can disrupt normally functioning terror management anxiety-buffers. From the ABDT perspective, individuals may experience extreme events—natural disasters, physical/mental/sexual abuse, war or political violence, among others—that overwhelm the psychological protection of their existing worldview beliefs. Such traumatic events can disrupt one's anxiety-buffering cultural worldviews by demonstrating that, even if one adheres to one's cultural standards and values, the world is still a dangerous and chaotic place in which the flame of life might be snuffed in the slightest breeze (Janoff-Bulman, 1992). As a result, ABDT argues that one's cultural worldviews and self-esteem cease to function as effective anxiety-buffers, which undermines mental health (e.g., PTSD) and the impression of meaning in life.

Some research has tested the implications of ABDT by investigating how traumatic events might disrupt efforts to immediately reduce death-awareness via cognitive suppression. This research builds from the dual process model of terror management (Goldenberg & Arndt, 2008; Pyszczynksi, Greenberg, & Solomon, 1999), which is based on research showing that when made consciously aware of death, people first initiate efforts to remove

death thoughts from consciousness by suppressing them or directly managing mortality awareness (e.g., wearing seatbelts, quitting smoking); but then, when outside of focal awareness (e.g., subliminal primes, or an explicit MS prime followed by delay/distracter tasks), suppression ceases and DTA increases again, motivating reliance on worldview defense and self-esteem anxiety-buffers (e.g., defense of national values/beliefs, Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997; Greenberg, Pyszczynski, Solomon, Simon, & Brews, 1994). Some emerging ABDT research has focused on that initial suppression stage and found, however, that MS led to immediate spikes in DTA among those with moderate and high, but not low levels of PTSD symptoms (Chatard et al., 2012; Edmondson et al., 2011), suggesting that traumatic symptoms reflect disruption to (among other things) the typical immediate suppression of DTA.

Other research has been guided by the mortality salience hypothesis, investigating whether or not people with PTSD symptoms or prediagnostic vulnerabilities (e.g., peri-traumatic dissociation, Ozer, Best, Lipsey, & Weiss, 2003) respond to MS by engaging in typical worldview defense. According to ABDT, if PTSD involves anxiety-buffer disruption, then MS will not lead to worldview defense among people with high traumatic stress. Indeed, in a study conducted in Iran a month after a 2005 earthquake there killed 1,500 people, both MS and earthquake reminders (vs. control prime) followed by a delay/distraction caused participants with low ($n = 90$), but not high ($n = 90$), peri-traumatic dissociation (based on prescreen assessment) to increase worldview defense (Abdollahi, Pyszczynski, Maxfield, & Luszczynska, 2011). A follow-up study conducted 2 years later replicated the earlier finding, with MS failing to produce worldview defense among survivors with higher PTSD symptom severity (Abdollahi et al., 2011). Similar research conducted among 89 female victims of domestic violence in Poland found that MS motivated typical worldview defense among women with low, but not high, levels of PTSD symptoms (Kesebir, Lyzczynska, Pyszczynski, & Benight, 2011).

Still other research, conducted among survivors of the civil war in Cote d'Ivoire, has studied the impact of death awareness on PTSD symptoms among survivors with high versus low exposure to the war. In line with ABDTs idea that traumatic events disrupt people's anxiety-buffers, death reminders (vs. control topic) exacerbated PTSD symptoms among survivors living in regions characterized by violence, but MS did not increase PTSD symptoms among those living farther away from the violence (Chatard et al., 2012). Together, these findings are consistent with the idea that traumatic experiences can disrupt the normal reactions to death awareness, where effective anxiety-buffering (e.g., worldview defense) helps maintain psychological health.

The above research findings are consistent with ABDT, but that research has thus far only investigated whether traumatic experience disrupts the immediate cognitive suppression of DTA, and whether it disrupts MS effects on downstream worldview defense and mental health outcomes. However, no research yet has directly tested the core claim of ABDT: that traumatic stress renders the anxiety-buffer system (worldview, self-esteem) ineffective in protecting against increased death awareness. That is, ABDT predicts the buffer hypothesis will *fail* among populations with heightened posttraumatic stress symptoms; but no research has yet tested the buffer hypothesis among populations dealing with heightened

posttraumatic stress symptoms. To fill that gap in knowledge, the present research tested that fundamental ABDT idea, directly, by building upon prior mainstream TMT research demonstrating effective anxiety-buffering activity among presumably nontraumatized populations, and extending beyond that prior work to test the effectiveness of the same activity among populations with heightened posttraumatic stress.

The Present Research

Specifically, the present work builds on research by Schmeichel and Martens (2005), showing that a self-affirmation task—affirming one's self-worth within one's cultural value/belief system—normally functions as an effective terror management anxiety-buffer. In that research, participants were reminded of death (followed by delay/distraction task) and then randomly assigned to either a self-affirmation or a control condition. DTA was then measured using a common word-stem completion task (e.g., Greenberg et al., 1994; for review Hayes et al., 2010), in which a series of word-stems were presented, some of which (e.g., GRA_ _) could have been completed in either neutral (GRANT) or death-related ways (GRAVE). Schmeichel and Martens found that MS led to more death-word completions (increased DTA), unless participants engaged in self-affirmation, indicating that self-affirmation was an effective anxiety-buffering activity.

But where Schmeichel and Martens (2005) found that self-affirmation functioned as an effective anxiety-buffer, no research has yet tested whether posttraumatic stress symptoms are associated with the effectiveness of self-affirmation as a buffer against increased DTA. The present research therefore sought to build on this prior work *and extend it into novel territory* by also investigating whether posttraumatic stress symptoms are associated with the effectiveness of self-affirmation in protecting against increased DTA. Thus, this research is the first to Test ABDT using the buffer hypothesis. To do so, we first recruited participants with low and high posttraumatic stress symptoms. Then, following Schmeichel and Martens's (2005) study, participants in each group were reminded of death (vs. control topic), randomly assigned to either an anxiety-buffer (self-affirmation) or a no-anxiety-buffer (no-self-affirmation) condition, and asked to complete a DTA word-stem completion task. Thus, a 2 (low vs. high traumatic-stress) × 2 (mortality salience [MS] vs. pain salience) × 2 (self-affirmation vs. no-self-affirmation) experimental design was used, with DTA as the outcome. Based on the present analysis, we expected self-affirmation would function as an effective anxiety-buffer among those with low, but not high, posttraumatic stress symptoms. Specifically, we hypothesized the following:

(a) among the low posttraumatic stress symptom group, MS would lead to more death-word completions (DTA) in the no-self-affirmation but not in the self-affirmation condition—demonstrating effective anxiety-buffer functioning;

(b) among the high posttraumatic stress symptom group, MS would lead to higher DTA in *both* the no-self-affirmation *and* the self-affirmation condition—demonstrating disrupted anxiety-buffer functioning.

Method

General Design and Procedure

A 2 (group: low vs. high posttraumatic stress symptom) × 2 (MS vs. pain) × 2 (self-affirmation vs. control) between-subjects design was used, with DTA as the dependent variable.

Meta-analyses of mortality salience effect sizes were consulted to anticipate the sample sizes necessary to achieve a sufficient level of power (.80) to detect MS effects within each category, should such effects be present. Burke, Martens, and Faucher (2010) found an overall MS effect size of $r = .35$ ($d = .75$) on a broad range of studies using various worldview-defense outcomes (defense of national identity, sports team affiliations, physical aggression, etc.). However, another meta-analysis (Steinman & Updegraff, 2015) focused specifically on studies that measured DTA as the outcome, and found a slightly lower overall MS effect size of $g = .57$ (interpreted similar to Cohen's d). This effect size ($g = .57$) was most appropriate to use for an a priori power analysis because the present research also measured DTA as the outcome. The a priori power analysis (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009), assuming $g = .57$, prescribed a minimum of 50 participants per each of the eight conditions, for a minimum total sample size of 400 participants.

Due to the difficulty of locating and recruiting sufficient numbers of local patients who meet or exceed the PTSD threshold, a research panel company was hired to reach participants throughout the U.S.A. Prior research has found that this panel company, and their primary source of recruitment, produces high quality data (Litman, Robinson, & Rosenzweig, 2015) and samples that are more representative of the general US population than local convenience samples (Berinsky, Huber, & Lenz, 2012). From January 27 to February 12, 2016, the company first administered the Posttraumatic Stress Check List—Civilian version (PCL-C), via an online survey medium (Qualtrics, Provo, UT), building a panel of possible participants.

Then, the next week, on February 16, the primary study materials (detailed below) were administered to a panel members with PCL-C scores either below or above the PCL-C prediagnostic threshold (see next section for details). Institutional Review Board approval was obtained and all relevant materials are accessible via the online supplement.

Participant Selection and Characteristics

The PCL-C (Weathers, Litz, Herman, Huska, & Keane, 1994) is a 17-item self-report measure adapted from the 17 PTSD symptoms listed in the *DSM–IV* (American Psychiatric Association, 2013). Each item assessed the presence and severity of symptoms corresponding to one of the three *DSM–IV* PTSD symptom clusters: reexperiencing, avoidance, and arousal. Participants were asked to rate on a scale of 1 (not at all) to 5 (extremely) the degree to which they were bothered in the past month by each symptom (e.g., "Repeated, disturbing memories, thoughts, or images of a stressful experience from the past."). PCL-C item responses are summed, with scores ranging from 17 to 85. The PCL-C has strong psychometric properties, including good internal consistency and test–retest reliability, and good diagnostic efficiency using a cut-off/threshold score of 44 for PTSD "caseness" (e.g., Blanchard,

Jones-Alexander, Buckley, & Forneris, 1996; Norris & Hamblen, 2004, for review).

In the present study, the PCL-C was administered to 1526 respondents, in exchange for US$0.20, establishing the initial panel of possible participants. An attentiveness-check item ("For this item, please select the 'Quite a Bit' response.") was inserted in the middle of the PCL-C to ensure respondents were attending to the item content; 1504 respondents provided accurate responses and were retained as valid panel members. The PCL-C demonstrated good internal consistency ($\alpha = .93$), with a positively skewed distribution of scores (skewness = .75, skewness SE = .06; kurtosis = −.01, kurtosis SE = .13) such that respondents most often reported lower PCL-C severity with score frequency gradually tapering off at the higher end of the scale (Median = 33; $M = 35.50$, $SD = 13.38$), with scores ranging up to 83.

The upper quartile score was 44, exactly matching the PTSD "caseness" threshold score; thus, panel members with PCL-C scores of 44 or above were designated as eligible for the "high posttraumatic stress" group. The lower quartile score was 25; thus, panel members with PCL-C scores of 25 or below were designated as eligible for the "low posttraumatic stress" group. Eligible "low posttraumatic stress" and "high posttraumatic stress" panel members were then contacted and invited to participate in the primary study with an additional US$1.20 incentive.

Participant characteristics. An initial 587 participants accepted the invitation (and the incentive); however, 65 accepted the incentive and did not complete the study, and a further 90 did not accurately complete an attentiveness-check item embedded in the primary study (indicating they were not attending to item content; item described below) and so were excluded.

Thus, the final sample consisted of 432 participants. Of those, 222 were recruited from the "low posttraumatic stress" group (PCL-C: Median = 22; $M = 21.40$, $SD = 2.57$) and 210 were recruited from the "high posttraumatic stress" group (PCL-C: Median = 52; $M = 53.77$, $SD = 8.43$). Demographic statistics are presented in the online supplement.

Primary Materials

In all cases, the study link was distributed using a neutral title and description (e.g., "Social Attitudes Survey") to conceal its true purpose and associated hypotheses. Upon obtaining informed consent, participants completed a brief set of filler items (e.g., a personality measure) and then the target materials were presented in the following order, and upon completion all participants were thanked and debriefed.

Mortality salience. Following previous research (Rosenblatt et al., 1989), participants were randomly assigned (using Qualtrics' randomization feature) to respond to either MS or a negative event topic prompt. In the MS condition, two prompts asked participants to, "Please briefly describe the emotions that the thought of your own death arouses in you," and "Jot down, as specifically as you can, what you think happens to you as you physically die." The negative event topic prompt asked participants to, "Please briefly describe the emotions that the thought of dental pain arouses in you," and "Jot down, as specifically as you can, what you think happens to you as you physically experience dental pain." This comparison topic was chosen because dental pain similarly represents a negative/anxiety-

provoking event; thus, both the MS and dental pain condition were affectively negative, allowing a test of whether MS causes effects on DTA beyond simply being reminded of a negative/anxiety-provoking event.

Delay and distraction. Next, the 20-item positive ($\alpha = .89$) and negative ($\alpha = .93$) affect schedule (PANAS-X, Watson & Clark, 1992) was administered, as well as a brief 3–5 min reading task (an excerpt taken from Albert Camus' *The Growing Stone*), followed by the self-affirmation manipulation. These materials provided the delay and task-switching distraction needed to move death-awareness out of focal attention to observe distal terror management effects (see Pyszczynski, Greenberg, & Solomon, 1999).

Self-affirmation. Following previous research (Sherman, Nelson, & Steele, 2000), participants were randomly assigned to either a self-affirmation or a control condition. The self-affirmation condition involved the two-stage personal worldview-values affirmation task. Participants were first instructed to rank 13 possible worldview-values (artistic skill/aesthetic appreciation, sense of humor, relationship with friends/family, spontaneity/living life in the moment, social skills, athletics, musical ability/appreciation, physical attractiveness, creativity, academic skills, romance, religion, other [custom reply]) according to their importance to the individual. Then, they were prompted to think of the value they ranked as most important, and write a brief response describing (a) why it is important to them, (b) a particular time when that value had been particularly important or meaningful, and (c) how that value had made them feel good about themselves. In the control condition, participants were instead asked to rank 13 jelly bean flavors (blueberry/vanilla swirl, buttered popcorn, peppermint tea, Caribbean punch, pink lemonade, peanut butter and jelly, watermelon, caramel apple, saltine cracker, tartar sauce, strawberry, mango, pumpkin bread) according to tastiness. Then, they were prompted to think of the flavor they ranked the tastiest and write a brief response describing a) why they think it is tasty, b) a particular time when that flavor had been/would be particularly tasty to eat.

Death thought accessibility. As in previous research (e.g., Greenberg et al., 1994; Schmeichel & Martens, 2005), the accessibility of death-related cognition was assessed using a word-stem completion task. This task presented 36 incomplete word-stems, of which 12 could be completed with either a neutral or a death-related word (*killed, murder, skull, death, corpse, dead, coffin, grave, buried, lethal, fatal, mortal*). For example, GRA_ _ could be completed as GRANT or GRAVE. Word fragments were presented 12 per page; participants used the keyboard to type the letters necessary to complete the word. Non-death-related word completions were scored as 0; death-related completions were scored as 1 and summed.

Attention check. An attentiveness-check item ("For this item, please select the 'Strongly disagree' response.") was inserted at the end of the DTA task to ensure respondents were attending to items' content.

Demographics. At the end of the survey, participants completed a demographic questionnaire collecting age, sex, ethnicity, race, and education level.

Results

Death Thought Accessibility

A 2 (group: low vs. high posttraumatic stress) $\times$ 2 (MS vs. pain) $\times$ 2 (self-affirmation vs. control) ANOVA revealed a main effect of MS, $F(1, 424) = 8.27$, $d = .28$, $p < .01$, such that DTA was higher in the MS condition ($M = 3.27$, $SE = .08$) than in the pain condition ($M = 2.92$, $SE = .09$). There was no main effect of posttraumatic stress group ($F[1, 424] = .30$, $\eta_p^2 < .01$, $p = .59$) nor of self-affirmation ($F[1, 424] = 8.27$, $\eta_p^2 < .01$, $p = .41$). There was a marginal MS*self-affirmation interaction ($F[1, 424] = 2.89$, $\eta_p^2 < .01$, $p = .09$), and no stress*MS interaction ($F[1, 424] = 1.62$, $\eta_p^2 < .01$, $p = .20$) or stress*self-affirmation interaction ($F[1, 424] = .99$, $\eta_p^2 < .01$, $p = .32$). However, the preceding results were qualified by the expected three-way interaction, $F(1, 424) = 4.43$, $\eta_p^2 = .01$, $p = .04$ (Figure 1), explored below using pairwise comparisons.

Hypothesis 1 predicted that, among the low posttraumatic stress symptom group, MS would lead to more death-word completions (DTA) in the no-self-affirmation but not in the self-affirmation condition. Indeed, when the low posttraumatic stress symptom
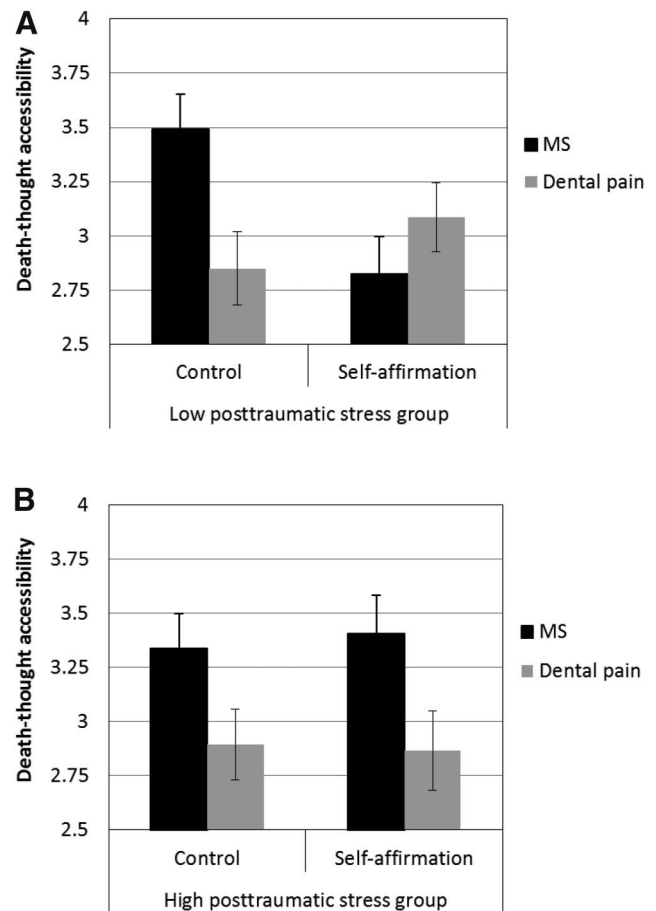

Figure 1. The effect of MS (vs. pain) on DTA after self-affirmation (vs. control) among samples of individuals with below-threshold (Panel A) and above-threshold (Panel B) PCL-C scores.

group was prompted to affirm jelly bean flavors, DTA was higher in the MS condition ($M = 3.49$, $SD = 1.32$) than in the pain condition ($M = 2.85$, $SD = 1.17$), $t(110) = 2.76$, $d = .51$ (95%CI: .13, .89), $p < .01$. In contrast, when the low posttraumatic stress symptom group was prompted to engage in self-affirmation, there was no statistical difference between DTA scores in the MS ($M = 2.82$, $SD = 1.40$) and dental pain ($M = 3.09$, $SD = 1.13$) conditions, $t(108) = -1.11$, $d = -.21$ (95%CI: $-.58$, .17), $p = .27$.

Hypothesis 2 predicted that, among the high posttraumatic stress symptom group, MS would lead to higher DTA in the no-self-affirmation *and* the self-affirmation condition. When the high posttraumatic stress symptom group was prompted to affirm jelly bean flavors, DTA was higher in the MS condition ($M = 3.34$, $SD = 1.15$) than in the pain condition ($M = 2.90$, $SD = .94$), $t(114) = 1.95$, $d = .42$ (95%CI: .05, .79), $p = .05$. And, indeed, when the high posttraumatic stress symptom group was prompted to engage in self-affirmation, DTA was again higher in the MS condition ($M = 3.41$, $SD = 1.44$) than in the pain condition ($M = 2.87$, $SD = 1.15$), $t(92) = 2.13$, $d = .40$ (95%CI: $-.01$, .80), $p = .03$.

Supplemental Analyses

Secondary analyses were conducted on the PANAS and on written responses to the self-affirmation prompts; see online supplemental materials for details and brief discussion.

Discussion

The present study tested whether posttraumatic stress reflects disruption to one's anxiety-buffers. It was hypothesized that (a) among healthy, nontraumatized individuals, self-affirmation would prevent mortality reminders from causing an increase in death-related cognitions; but (b) among individuals reporting high posttraumatic stress, self-affirmation would *fail* to prevent mortality reminders from causing an increase in DTA. The present results supported those predictions. When reminded of death, the low posttraumatic stress symptom group displayed higher DTA in the no-self-affirmation condition, but not after they engaged in self-affirmation—replicating Schmeichel and Martens (2005) findings and demonstrating again that self-affirmation normally functions as an effective terror management anxiety-buffer. In contrast, however, when reminded of death, the high posttraumatic stress symptom group showed heightened DTA regardless of whether or not they engaged in self-affirmation—indicating that these participants' anxiety-buffer system had been disrupted and no longer effectively functioned to protect them against increased DTA.

First, this research contributes to the broader TMT literature, by offering a replication test of a fundamental mainstream TMT research finding (Schmeichel & Martens, 2005). That prior work had shown that, when reminded of death, activating one's anxiety-buffering worldview/self-esteem system (via self-affirmation) normally effectively functions to prevent increased DTA. The present research borrowed similar methods and obtained similar results. When the low traumatic stress sample was reminded of death, activating one's anxiety-buffering worldview/self-esteem system (via self-affirmation) again effectively functioned to prevent otherwise increased DTA. The present research therefore converges with foundational TMT ideas (e.g., buffer hypothesis) and research

suggesting that, under normal conditions, affirming one's self-worth within one's cultural value/belief system will protect the individual against increases in death-related cognitions (Greenberg et al., 2015).

Second, the present research also contributes to the growing body of research exploring the ABDT idea that traumatic symptoms are associated with the disruption of otherwise normally functioning terror management anxiety buffers. Several prior studies have tested implications of ABDT, exploring downstream consequences that would be logically expected if traumatic stress disrupts the effectiveness of one's worldview anxiety-buffer in keeping DTA low. Studies have shown that when reminded of death, high posttraumatic stress participants fail to immediately suppress DTA (Chatard et al., 2012; Edmondson et al., 2011), they fail to engage typical MS-induced worldview defenses (Abdollahi et al., 2011; Kesebir et al., 2011), and after MS they experience exacerbated PTSD symptoms (Chatard et al., 2012).

However, no research had yet directly tested the fundamental ABDT idea that posttraumatic stress is associated with disrupted effectiveness of one's worldview anxiety-buffer in keeping DTA low. Thus, the present research is the first to directly test that core idea. Indeed, consistent with ABDT, the present research found that when the high posttraumatic stress sample was reminded of death, activating one's anxiety-buffering worldview/self-esteem system (via self-affirmation) failed to prevent mortality reminders from causing an increase in DTA.

Third, the present research bears implications for mental health. Prior TMT research suggests that effectively buffering death awareness is related to psychological well-being, and that failure to effectively manage DTA can potentially cause manifest anxiety, deficits in psychological well-being, and can exacerbate anxiety-related disorders, depression, and impair self-regulation (e.g., Edmondson et al., 2008; Routledge et al., 2010; Strachan et al., 2007). Indeed, the present findings demonstrate that high posttraumatic stress is associated with being *un*protected from awareness of death, which can help explain why people with high posttraumatic stress are prone to increased anxiety, view the world as dangerous and chaotic, have intrusive thoughts about the source of anxiety, and avoid reminders of it (major symptom clusters of PTSD).

The present work also bears implications for therapeutic treatment of posttraumatic stress. Two common approaches to PTSD treatment are cognitive behavior therapy (CBT; e.g., Galovski & Gloth, 2015) and cognitive processing therapy (CPT; e.g., Galovski, Wachen, Chard, Monson, & Resick, 2015), which emphasizes repeated mental "exposure" and asks clients to imagine and write down the most distressing elements of their traumatic experience. Both CBT and CPT have been found to be potentially effective in treating PTSD (e.g., Monson & Shnaider, 2014). If the etiology of PTSD stems from anxiety-buffer disruption, as ABDT suggests, then successful treatment should endeavor to restore effective anxiety-buffer functioning (e.g., Lewis, 2014; Major, Whelton, & Duff, 2016). Such treatment efforts might involve helping clients restore the effectiveness their worldviews, and/or helping them encounter and adopt alternative beliefs, standards, and values as replacements capable of providing the individual a sense of enduring personal value, and/or helping them reconnect with friends and loved ones (Maxfield, John, & Pyszczynski, 2014). A notable challenge for future research is to determine how, or if, this could be accomplished. Nevertheless, common goals in

therapy are to build meaning, self-esteem, and interpersonal connection (Resick, Monson, Gutner, & Maslej, 2015), and ABDT makes the specific suggestion that restoring or replacing clients' anxiety-buffering systems will help them effectively manage death awareness—and thus help to mitigate any resulting anxiety, anxiety sensitivity, as well as any intrusive thoughts or trigger avoidance behaviors.

There are several possible limitations of the present work, primarily involving the selection of low and high posttraumatic stress symptom groups, and the accompanying interpretation of results. First, note that the *DSM–5* has been in use for a few years at the time of this research. However, the PCL-C (Weathers et al., 1994), used routinely to assess PTSD symptoms, corresponds to the *DSM–IV* and has not yet caught up to the *DSM–5*. Future work should attend to advances in this posttraumatic stress symptom assessment tool. We also emphasize that the present research used the PCL-C to assess posttraumatic symptomology, not the occurrence of a traumatic event (e.g., sexual assault, combat, natural disaster), the number or severity of such events, or participants' appraisals of such events. Individuals vary in resilience, and it is not the case that every traumatic event leads to PTSD. In that light, manifest posttraumatic stress symptoms, as measured here, may be a direct reflection of anxiety buffer disruption, whereas traumatic events may not necessarily lead to such disruption. Thus, future ABDT research might seek to explore the influence of traumatic events and how individuals' resilience factors, and experience of traumatic events (e.g., appraisals of those events), might determine whether or not a traumatic event produces anxiety buffer disruption, posttraumatic stress symptoms, and its consequences.

Conclusion

The present study replicates prior TMT research, and offers some new theory-driven and data-based insights about the nature of posttraumatic stress. First, the present research replicated prior work showing that, among nontraumatized individuals, self-affirmation prevented mortality reminders from causing an increase in death-related cognitions. This finding demonstrates again that self-affirmation (affirming one's value within one's cultural worldview context) normally functions as an effective terror management anxiety-buffer. Second, however, the present work found that, among those reporting high posttraumatic stress symptoms, MS increased DTA regardless of whether or not participants engaged in self-affirmation. This finding is consistent with the core assumption of ABDT: that posttraumatic stress renders the anxiety-buffer system (worldview, self-esteem) ineffective in protecting against increased death awareness. The implications of these findings are of critical importance to the current understanding of PTSD and its treatment, because failure to effectively manage death awareness is known to cause anxiety and exacerbate anxiety-related symptoms, and may potentially represent a key ingredient in the emergence of the key PTSD symptom clusters.

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