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ANXIETY BUFFER DISRUPTION: SELF-EVALUATION, DEATH ANXIETY, AND STRESSOR APPRAISALS AMONG LOW AND HIGH POSTTRAUMATIC STRESS SYMPTOM SAMPLES

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Objective: Research driven by terror management theory suggests sociocultural anxiety-buffer systems typically protect against existential anxiety, whereas anxiety buffer disruption theory suggests traumatic experiences may disrupt that process. **Method**: Following posttraumatic stress (PTS) symptom screening (n = 4097), individuals with low (n = 149) and high (n = 120) PTS engaged in either negative or positive self-evaluations, then reported death anxiety and appraised life's stressors as negative/threatening or positive/challenging. **Results**: When low PTS participants contemplated their worst (vs. best) selves, they experienced moderately heightened death anxiety yet appraised life's stressors as more positive/challenging than harmful/threatening, reflecting effective existential anxiety buffers. However, high PTS participants reported high death anxiety in both the best-self and worst-self conditions—indicating anxiety buffer disruption—and the worst-self (vs. best self) prompt increased their appraisal of

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life's stresses as a harmful threat and decreased appraisal as positive/challenging opportunities for growth and well-being. **Discussion**: Theoretical and clinical implications are discussed.

Keywords: PTSD, anxiety buffer disruption, death anxiety, self-esteem, stress appraisals

Prior work suggests that self-esteem functions as an existential anxiety buffer (Becker, 1971), akin to the way an ocean levee functions to prevent water from flooding inland populations. And just as eroding a levee can cause water to leak through, research also suggests that undermining one's self-esteem can cause modest increases in existential concerns, seen in the form of increased death-related thoughts and anxieties. However, if the levee is damaged to the point that it breaks, the waters don't simply leak—they can flood inland and completely overwhelm the coastal population, and a closer awareness of the broken levee would likely only serve to exacerbate one's perception of the situation as a harmful and overwhelming threat rather than a positive/challenging opportunity for growth. Just like the ocean levee being broken, traumatic experiences can lead to persisting negative psychological changes in one's core beliefs (e.g., that the world is a dangerous place), in increased anxiety and arousal, in emotional and cognitive re-experiencing events (i.e., flashbacks), and in avoidance of the reminders of the traumatizing event. Such are the major symptom clusters of posttraumatic stress (American Psychiatric Association [APA], 2013), and may reflect anxiety buffer disruption that creates vulnerabilities to elevated death anxiety and more hopeless stress-related coping appraisals.

Research driven by terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Routledge & Vess, 2019) suggests that people are able to function effectively in the world, at least in part, by participating in a system of sociocultural anxiety buffers which help shield against the awareness that life is impermanent and easily extinguished. From that perspective, death anxiety is a threat to mental health, and the self-esteem that comes from successful participation in one's sociocultural system serves to help mitigate that threat. However, not all people are able to effectively keep death anxiety low. Anxiety

buffer disruption theory (ABDT; Pyszczynski & Kesebir, 2011; Yetzer & Pyszczynski, 2019) argues that posttraumatic stress (PTS) reflects traumatic disruptions to those anxiety buffer systems, and thereby leaves people both vulnerable to chronically elevated death anxiety and more likely to appraise life's stressors as threatening or harmful rather than positive/challenging opportunities for personal growth and well-being. Yet little to no research has directly investigated those ideas. The present research therefore recruited participants with low and high PTS, and examined whether an experimental boost or decrease in self-esteem would impact both death anxiety and primary appraisals of life's stressors as threats and/or challenges.

TMT AND THE DEATH-ANXIETY BUFFERING FUNCTION OF SELF-ESTEEM

According to TMT (Greenberg et al., 1986; Greenberg, Vail, & Pyszczynski, 2014), people develop, maintain, and participate in sociocultural systems to help manage the potential anxiety that would otherwise follow from an unbridled awareness of death (Routledge & Vess, 2019 for review). From this perspective, cultural worldviews serve as socially-validated systems that offer a set of beliefs, standards, and values according to which people can pursue a sense of permanence via secular means (e.g., legacies via family, science, education) or religious means (e.g., afterlife). Self-esteem, then, functions as an indicator of how well one is living up to those values, and helps manage death anxiety by affirming that one is indeed meeting the standards of one's permanence-promising sociocultural system. Indeed, early research (Greenberg et al., 1992) found that self-esteem serves as an anxiety-buffer.

One hypothesis that has guided much of the TMT literature is the Mortality Salience Hypothesis (Greenberg et al., 1990; Routledge & Vess, 2019), which holds that if one's sociocultural worldviews and self-esteem serve to shield against existential concerns, then increasing mortality salience should motivate people to uphold those worldviews and seek self-esteem. For example, research has found that MS motivates self-esteem strivings; MS increased self-serving biases (Mikulincer & Florian, 2002), and among those who based their self-esteem partly on

their driving skill, scuba diving, basketball, or physical strength, MS increased risky driving (Ben-Ari, Florian, & Mikulincer, 1999), intentions to undertake risky scuba activities (Miller & Ben-Ari, 2004), improved basketball performance (Zestcott, Lifshin, Helm, & Greenberg, 2016), and increased physical strength output (Peters, Greenberg, Williams, & Schneider, 2005). Another useful approach has been testing the Anxiety Buffer Hypothesis, which posits that if one's worldview and self-esteem function to buffer against death awareness, then affirming those structures will buffer against increased death-related concerns and mitigate the need for further defensive responses. Research has, for example, found that MS elicited increased death-related thought, but not when participants first engaged in self-affirmation of their self-worth (Schmeichel & Martens, 2005; Vail, Morgan, & Kahle, 2018) or had high global self-esteem (Harmon-Jones et al., 1997). Likewise, MS led to subsequent defense of one's nation against a critic, but not when participants had high self-esteem (Harmon-Jones et al., 1997).

Critically, TMT argues that death awareness represents a psychological threat, potentially increasing death-related anxiety. One early study found that viewing a video depicting death did increase anxiety, but not among those who received an experimental boost to self-worth (Greenberg et al., 1992). On a similar note, other research (Ogilvie, Cohen, & Solomon, 2008, Study 2) has found that experimentally boosting positive self-evaluation (by prompting participants to imagine themselves at their best) helped keep death-related thoughts low, whereas boosting negative self-evaluation (by prompting participants to imagine themselves at their worst) increased death-related thoughts to the same amount as participants who were directly prompted to think about death. More recent research has further investigated the downstream implications for death-related anxiety, also finding that effective terror management buffers can mitigate that anxiety (Juhl & Routledge, 2016; Yetzer & Pyszczynski, 2019). Indeed, a growing body of research has found that MS can increase death anxiety, but that it is mitigated among people with effective buffers in place—such as feeling that life is meaningful (Routledge & Juhl, 2010) and having a heightened sense of self-esteem (Abeyta, Juhl, & Routledge, 2014; Routledge et al., 2010). Therefore, following these previous research findings the

first hypothesis of the present research was that, at least under normal conditions (when anxiety buffer systems are not disrupted), bolstering a positive self-evaluation should help keep death anxiety low whereas focusing on negative self-evaluation should increase death anxiety.

POSTTRAUMATIC STRESS: ANXIETY BUFFER DISRUPTION

Whereas buffering against death anxiety may be a normative and adaptive response, there are likely important deviations from that otherwise-typical pattern—particularly among individuals with heightened PTS. According to ABDT (Pyszczynski & Kesebir, 2011; Yetzer & Pyszczynski, 2019), certain traumatic events—natural disasters, assaults, life-threatening illness, and so on—have the potential to overwhelm one's anxiety-buffering system by vividly demonstrating that abiding by one's sociocultural standards and values is an ineffective means of averting the harsh realities of the world (also Janoff-Bulman, 1992). Thus, heightened PTS may reflect anxiety buffer disruption—an impaired ability to effectively buffer against death-related thoughts and anxieties. Research has found that a failure to effectively manage death anxiety is a transdiagnostic risk-factor that can lead to a variety of disorders (Iverach, Menzies, & Menzies, 2014; Yetzer & Pyszczynski, 2019), from anxiety-related symptoms (Juhl & Routledge, 2016) to compulsive behaviors (Menzies & Dar-Nimrod, 2017; Strachan et al., 2007) and social phobia (Finch, Iverach, Menzies, & Jones, 2016).

Research driven by ABDT has explored whether the typical buffers against death-related anxieties might be disrupted among people with heightened PTS or prediagnostic vulnerabilities (a vulnerability prior to or after trauma, but prior to diagnosis of PTSD). Under normal conditions (when posttraumatic stress is presumably low), one's sociocultural systems should be in place as effective buffers against death-related thoughts and anxieties. In contrast, if posttraumatic stress reflects anxiety-buffer disruption, then individuals with heightened PTS should experience heightened death-related thoughts and anxieties, and should be less impacted by affirmations of or threats to their sociocultural worldview systems

as well. Indeed, compared to those with low PTS, individuals with high PTS display increased and chronically high levels of death-related thoughts (Vail, Goncy, & Edmondson, 2019) and death-related anxieties (Vail, Courtney, Goncy, Cornelius, & Edmondson, 2019). Other research has further found that whereas death reminders typically lead to worldview defenses among those with low PTS, those with high PTS fail to respond to death awareness by defending and upholding their legacy-promising sociocultural systems. For example, among female victims of domestic violence in Poland, death reminders motivated worldview defenses among those with low (but not high) PTS symptoms (Kesebir, Luszczynska, Pyszczynski, & Benight, 2011). In another study among survivors of a deadly earthquake in Iran, both earthquake reminders and death reminders motivated worldview defenses among participants with low (but not high) peri-traumatic dissociation (Abdollahi, Pyszczynski, Maxfield, & Luszczynska, 2011).

Further addressing the core of ABDT, several studies have explored whether PTS reflects a disrupted sociocultural buffer system such that existential concerns would not only be chronically heightened but also less impacted by affirmations of or threats to their worldviews. In one study (Vail et al., 2018), participants with low and high PTS were reminded of death (vs. control), then were prompted to either affirm their cultural values (vs. neutral topics), and then completed a measure of death-related cognition. Among the low PTS group, a reminder of death increased death-related cognition when participants were prompted to write about neutral concepts (e.g., jelly beans) but the increase in death thought was eliminated when prompted to affirm their cultural values—replicating prior findings (Schmeichel & Martens, 2005) that affirming one's value systems functions as an effective buffer against increased existential concern. In contrast, among the high PTS group, death reminders increased death-related thoughts in the neutral condition and the value affirmation condition—indicating that affirmation of one's cultural values no longer effectively buffered against death-related cognitions. In a similar study (Vail, Goncy et al., 2019), among participants with low PTS a worldview threat (vs. support) increased death-related cognitions which mediated increased worldview defense; in contrast,

among those with high PTS a worldview threat did not increase death-thoughts and the effect on worldview defense was substantially reduced.

Together, this previous research is consistent with the ABDT idea that heightened PTS may reflect anxiety buffer disruption. However, the extant work on the topic has primarily investigated the relationship between PTS and participants' impaired ability to rely on their sociocultural value systems (e.g., worldview defense) to effectively buffer against death-related thoughts and anxieties. No research has yet explored whether self-esteem may similarly cease to effectively function as a buffer against existential anxiety among those with heightened PTS. Therefore, the second hypothesis tested in the present research was that participants with high PTS will exhibit high levels of death anxiety, which should be neither exacerbated by prompts to focus on a negative self-evaluation nor relieved by prompts to focus on positive self-evaluations—thus reflecting anxiety buffer disruption.

ANXIETY BUFFER DISRUPTION AND STRESSOR APPRAISALS

The present work also investigated the possible connection between anxiety buffer disruption and stress-related coping appraisals. According to multiple perspectives (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 2000; Lazarus, 2007; Roseman, 2013), when people encounter stressors they make primary appraisals to evaluate the qualities of those stressors, and secondary appraisals to evaluate their own coping resources/abilities and develop coping strategies in response. A negative primary appraisal means the individual perceives the stressor to be a potentially harmful threat that could impair one's social functioning, self-esteem, health, or other aspects of one's well-being. A positive primary appraisal means the individual perceives the stressor as a challenge—a likely beneficial opportunity to build mastery, growth, and well-being. Secondary appraisals evaluate one's coping resources, and often lead to a diversity of problem-focused (mitigating the stressful conditions themselves) and emotion-focused (regulating emotional reactions) strategies.

The present research focused on how anxiety buffer disruption, as reflected in PTS, might be associated with primary appraisals of life's ups and downs as threats and/or as challenges.

Research on primary stressor appraisals (Ferguson, Matthews, & Cox, 1999; O'Connor & Ferguson, 2016 for review) has typically examined the relationship between appraisals of stressors as threats/challenges and various aspects of ill-being and well-being. For example, a growing body of research finds that conditions that produce anxiety, depression, social dysfunction, and physical symptoms are positively associated with threat appraisals and negatively associated with challenge (Ferguson et al., 1999; Gourounti, Anagnostopoulos, & Vaslamatzis, 2010; Maltby & Day, 2003; Searle & Auton, 2015). Similarly, among active duty military, anxiety and physical symptoms were associated with threat appraisals, rather than challenge appraisals (Schaubroeck, Riolli, Peng, & Spain, 2011). Additionally, whereas threat appraisals are associated with anxiety and ill-being, challenge appraisals are uniquely associated with posttraumatic growth (Goldberg, McDonald, & Perrin, 2019).

Further, and particularly relevant to the present work, emerging research has begun exploring some of the connections between primary appraisals of stressors and existential concerns. For example, among medical students doing their first human cadaver dissection, those who reported continued adverse stress experiences after 4 months tended to appraise the dissection as a threatening stressor and also reported higher death anxiety (Dempster, Black, McCorry, & Wilson, 2006). Other emerging ABDT research (Vail, Courtney et al., 2019) recruited participants with low and high PTS, randomly assigned them to either recall romantic relationship problems or another negative topic, and then measured death anxiety and perceived ability to cope with life's ups and downs. Compared to the low PTS group, those with high PTS reported chronically high death anxiety and impaired coping ability. But further, whereas imagining relationship problems had no impact on perceived coping ability among the low PTS group (reflecting effective anxiety buffer functioning), it led those with high PTS to report even worse ability to cope with life's stressors. Together, these data patterns suggest that PTS is associated with anxiety buffer disruption, leading to heightened death anxiety and impaired perceived ability to cope with life's ups and downs. Yet, no research has yet investigated,

as a function of PTS, the impact of negative self-evaluations on threat- and challenge-oriented primary appraisals of life's stressors.

However, building on these prior findings, the present ABDT analysis suggests several connections between anxiety buffer functioning and primary (stress-focused) coping appraisals.[1] First, among those with low PTS, the sociocultural system should be in place as an effectively functioning anxiety buffer. So, even when people with low PTS encounter stressors, they may tend to feel fairly secure and may not typically feel that life's stressors are especially threatening or challenging. This logic led to the third hypothesis of the present research: among those with low PTS, threat appraisals should be low and challenge appraisals should be at modest/middling levels—and those appraisals should be neither exacerbated by a prompt to focus on negative self-evaluations nor improved by prompts to focus on positive self-evaluations, thus reflecting secure anxiety buffer functioning. In contrast, if high PTS reflects anxiety buffer disruption, then people with high PTS may tend to feel that life's stressors are potentially threatening and harmful rather than positive and challenging opportunities for personal growth and well-being. Thus, the fourth hypothesis of the present research was that: among those with high PTS, threat appraisals should be heightened and challenge appraisals should be lowered—and threat appraisals should be exacerbated, and challenge appraisals further harmed, by prompts to focus on negative self-evaluations (e.g., when you were at your worst).

1. To be clear, secondary appraisals of one's "coping resources" means (a) evaluating one's problem-focused skills or strategies, such as situation modification or seeking out helpful people or information to resolve the problem (e.g., mitigating one's romantic partnership stress by taking steps to improve communication, seek third-party suggestions from close friends, and/or seek research-based tips to building healthy relationships); and/or (b) evaluating one's emotion-focused skills or strategies, such as cognitive change (e.g., lowering expectations about one's romantic partnership). Theory and measurement in the present study did not focus on such appraisals. Instead, the present work focused on primary appraisals of stress itself, and the dependent measure was similarly focused on primary appraisals ("When I think about life's ups and downs, they seem . . . " threatening, fearful, stimulating, exhilarating, etc.). Thus, the focus of the present theoretical analysis and the dependent measure was on the potential for stress itself (primary appraisals) rather than on one's coping skills and strategies (secondary appraisals).

THE PRESENT RESEARCH

In prior research, Ogilvie and colleagues (2008, Study 2) manipulated positive and negative self-evaluations by randomly assigning participants to imagine themselves either at their best (affirming self-worth) or at their worst (undermining it); then, participants' completed a measure designed to detect existential concern in the form of implicit death-related cognitions. Results indicated that death-related thoughts remained low when participants imagined themselves at their best, but increased when imagining themselves at their worst (to similar levels as among participants who were explicitly instructed to think about death). That prior work suggested that self-evaluations impact existential anxiety buffer functioning, and that focusing on one's worst-self can cause modest existential concerns in the form of increased death-related thoughts.

The present work extends beyond that prior work in three key ways. First, whereas the Ogilvie et al. (2008) study focused on cognitive aspects of existential concerns, the present work focused directly on the affective experience of death anxiety-allowing a more direct connection to clinically-relevant issues of mental ill/well-being (Iverach et al., 2014; Yetzer & Pyszczynski, 2019). Second, in the absence of any information to the contrary, it seems likely the Ogilvie study was conducted among a sample with, presumably, low levels of PTS; generalizability of the TMT idea that self-esteem functions as an effective existential anxiety buffer may therefore be limited to low PTS populations. In contrast, ABDT suggests that high PTS reflects anxiety buffer disruption, such that among high PTS samples self-esteem is no longer an effectively functioning buffer against death anxiety. To test that possibility, the present research sought to compare and contrast anxiety buffer functioning among both low and high PTS samples. Third, the present research also extends beyond measuring death anxiety to also explore the impact of PTS and anxiety buffer functioning on primary appraisals of life's stressors.

In the present research we first prescreened participants into low and high PTS symptom groups. Then, following Ogilvie et al. (2008), we manipulated positive and negative self-evaluative

experiences by randomly assigning participants to imagine themselves either at their best (affirming self-worth) or at their worst (undermining it) —resulting in a 2 (group: low vs. high PTS) × 2 (prompt: best-self vs. worst-self) between subjects quasi-experimental design. Following the experimental manipulation, participants reported death anxiety as well as threat- and challenge-oriented primary appraisals of life's stresses. The target hypotheses were as follows:

1. Among participants with low PTS, death anxiety should be low in the best-self prompt condition, and elevated in the worst-self condition—consistent with the idea that self-evaluation impacts existential anxiety buffer functioning.

2. Among those with high PTS, death anxiety will be chronically high and should be neither exacerbated by negative self-evaluation (worst-self prompt) nor relieved by positive self-evaluation (best-self prompt)—thus reflecting anxiety buffer disruption.

3. Among participants with low PTS, threat appraisals should be low and challenge appraisals should be at modest levels—and each should be relatively unaffected by being prompted to imagine being at one's best or worst, reflecting the psychological security that comes with effective anxiety buffer functioning.

4. Among those with high PTS, threat appraisals should be heightened and challenge appraisals should be lowered—and threat appraisals should be exacerbated, and challenge appraisals further harmed, by prompts to focus on one's worst (vs. best) self—again reflecting anxiety buffer disruption.

METHOD

PARTICIPANTS AND PROCEDURE

Sample Size Planning. The present research adopted the strategy of selecting a minimally important effect size threshold to determine sample size. Using an a-priori power analysis for F-family tests for ANOVA (G*Power; Faul, Erdfelder, Buchner, & Lang, 2009), we set power to .80 for detecting medium effects of $f = .25$ at $p = .05$, with 1 numerator *df* and 4 groups. This analysis recommended a target sample size of 128 participants.

General Procedure. For roughly one week, the Posttraumatic-stress Check List — Civilian version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) was administered via online survey (Qualtrics, Provo, UT) to build a panel of possible participants. In the following month, primary study materials were administered to two groups of panel members: one group scoring above the PCL-C diagnostic threshold, and one group with sub-threshold PCL-C scores. The study was conducted with IRB approval. Study materials (see supplement), anonymized data, and code, are available at OSF here: osf.io/4mbqy.

Post-Traumatic Stress Assessment and Participant Selection. The PCL-C is a 17-item self-report measure adapted from the three DSM-IV PTSD symptom clusters listed in the DSM-IV (American Psychiatric Association, 2000). Participants rated 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 (range = 17, 85). The PCL-C has good internal consistency, test-retest reliability, and diagnostic efficiency using a cutoff/threshold score of 44 for PTSD caseness (e.g., Blanchard, 1996; Norris & Hamblen, 2004, for review).

In the present study, the PCL-C was distributed to 4097 respondents in exchange for U.S. $0.20. Of those providing data (4,014), 3,877 accurately responded to an attentiveness-check item and were retained as valid panel members. The PCL-C demonstrated good internal consistency (η_p^2 = .94), with a typical positively skewed distribution of scores, skew (*SE*) = .68 (.04); kurtosis (*SE*) = −.26 (.08); Median = 34; *M* = 36.10, *SD* = 13.72.

Panel members with PCL-C scores of 44 or above were designated as eligible for the high PTS group. This caseness score was approximately equal to the upper quartile score of 45. The lower quartile, PCL-C scores of 25 or below, was used to designate the eligible low PTS group. Eligible low PTS (*n* = 1047) and high PTS (*n* = 1101) respondents were invited to participate in the primary study for an additional U.S. $1.40. Of the 418 respondents who accepted the invitation, 409 completed the initial filler items, 362 completed the manipulation prompts, 292 completed the dependent measures and demographics. Of those, 269 provided accurate responses to an attentiveness-check and were thus retained for analysis, with similar numbers of participants in each group: low PTS (*n* = 149; PCL-C:

Median = 21; $M = 21.05$, $SD = 2.53$) and high PTS ($n = 120$; PCL-C: Median = 53; $M = 55.07$, $SD = 8.50$).

MEASURES

The study link used a neutral title and description (Social attitudes survey) and participants first completed informed consent and a brief set of filler items, followed by the target materials in the following order:

Self-Evaluation Manipulation. Following previous research (Ogilvie et al., 2008), participants were randomly assigned to either a best-self or a worst-self prompt condition. In these conditions, three prompts asked participants: "At what age were you, are you, or do you think you will be at your best/worst," and "Describe what it was, what it is, or what it will be like when you are at your best/worst," and "Write down, as specifically as you can, what has happened, what is happening, or what will happen to you when you were, are, or will be at your best/worst." Content analyses of written responses confirmed the manipulation worked.[2]

2. Given that prior research has found that self-evaluations are linked to time-orientation in a systematic way (e.g., people often consider their past self as worse than their current or future self; (Wilson & Ross, 2001), we anticipated that prompting participants to focus on their worst-self (vs. best-self) would lead them to focus on negative evaluations of a past self. We compared the age designated in the written response to the first prompt against participants' actual age indicated in the demographics, and used LIWC software to analyze their time-oriented word usage in response to the second and third prompts, and found that participants in the worst-self (vs. best-self) condition did indeed write about a past self in response to prompt #1 and used more past-focused and fewer present- and future-focused words in response to prompts #2 and #3. Also consistent with expected effects of the manipulation, participants in the worst-self (vs. best-self) condition used more negative affect and less positive affect words (via LIWC word counts). Thus, participants in the worst-self (vs. best-self) condition wrote more negatively about a past self. Two human judges also coded thematic content in the written responses, to examine the possibilities that participants written responses were either focused on (a) positive or negative evaluations of themselves in the situations they described in their responses, or (b) the potentially positive or negative implications for their current selves by comparison. Results indicated the manipulation did indeed focus participants on (a) positive/negative evaluations of themselves in the situations they described in their responses and not (b) the positive or negative implications for their current selves by comparison. In sum, the manipulation had the intended effect: participants in the worst-self (vs. best-self) condition wrote about a past self more negatively and were indeed focused

Death Anxiety. Death anxiety was measured using the 14-item Death of Self subscale from the Revised Collett-Lester Fear of Death Scale (Lester, 1994). Participants indicated how anxious they felt about death and dying (e.g., ". . . the shortness of life," ". . . the thought of never thinking or experiencing anything again," "the thought of the pain of dying," on a 6-point Likert-type scale ranging from1 (Strongly disagree) to 6 (Strongly agree). Overall mean scores were computed,η_p^2 = .96; *M* = 3.65, *SD* = 1.26; skew (*SE*) = −.21 (.15); kurtosis (*SE*) = −.62 (.30); higher scores indicated greater death anxiety.

Stress Coping Appraisals. Coping appraisals were measured using the 6-item threat and 6-item challenge subscales of the Appraisal of Life Events measure (Ferguson et al., 1999). The six threat subscale items were: "When I think about life's ups and downs, they [seem threatening; seem fearful; worry me; seem hostile; seem frightening; seem terrifying]." The six challenge subscale items were: "When I think about life's ups and downs, they [seem enjoyable; seem challenging (reversed); are stimulating; seem exhilarating; seem informative; seem exciting]." Threat and challenge items appeared in alternating order, and were rated on 6-point Likert-scales ranging from 1 (Strongly disagree) to 6 (Strongly agree). Mean scores were computed for the threat subscale, η_p^2 = .95; *M* = 3.39, *SD* = 1.21; skew (*SE*) = .07 (.15); kurtosis (*SE)* = −.70 (.30), and the challenge subscale, η_p^2 = .79; *M* = 3.18, *SD* = .85; skew (*SE*) = −.30 (.15); kurtosis (*SE*) = .21 (.30), which were negatively correlated, *r*[269] = −.25, *p* < .001.

DEMOGRAPHICS

Participants reported their age, sex, ethnicity, race, education level, religion, and political orientation (see supplemental materials Table S1). Low and high PTS groups did not differ in: sex, η_p^2 [1] = 2.74, *p* = .10); race, η_p^2 [3] = 3.28, *p* = .35; ethnicity, η_p^2 [1] = .51, *p* = .47); education, *t*(267) = −1.43, *p* = .15; or religious belief, η_p^2 [7] = 3.21, *p* = .87. High PTS participants were about

on the negative self-evaluation of that past self (not on positive implications for their current self). See the online supplement for full details about data preparation and statistical analysis.

4 years younger, $t(265) = -2.57$, $p = .01$, and were more politically liberal, $t(267) = 2.30$, $p = .02$.

DATA ANALYSES

SPSS was used to conduct the various ANOVAs, pairwise comparisons, and ancillary analyses described below (Table 1, Figure 1). Participants who provided partial data or discontinued the study were excluded list-wise, as described in detail above.

RESULTS

DEATH ANXIETY

A 2 (group: low vs. high PTS) × 2 (prompt: worst-self vs best-self) ANOVA found no interaction, $F(1, 265) = .54$, $\eta_p^2 = .002$, $p = .46$. However, there was a main effect of PTS group, $F[1, 265] = 35.40$, $\eta_p^2 = .12$, $p < .001$, such that death anxiety was higher among the high PTS group ($M = 4.10$, $SD = 1.19$) than among the low PTS group ($M = 3.27$, $SD = 1.19$). There was also a main effect of prompt, $F[1, 265] = 26.00$, $\eta_p^2 = .07$, $p < .001$, such that death anxiety was higher in the worst-self condition ($M = 3.94$, $SD = 1.20$) than in the best-self condition ($M = 3.31$, $SD = 1.24$). This additive pattern is depicted in Figure 1, Panel A, and was further explored with pairwise comparisons. Among the low PTS group, death anxiety was higher in the worst-self than the best-self condition, $t[147] = 3.88$, $d = .64$ [95%CI: .31, .97], $p < .001$. Likewise, among

TABLE 1. Death Anxiety, Threat Appraisals, and Challenge Appraisals Scores Per Condition Among the Low and High PTS Groups.

	Death anxiety				Threat appraisals				Challenge appraisals			
	Low PTS		High PTS		Low PTS		High PTS		Low PTS		High PTS	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Worst-self	3.62	1.16	4.35	1.13	2.89	1.03	4.44	.96	3.24	.80	2.74	.89
Best-self	2.89	1.10	3.83	1.21	2.71	1.00	3.75	1.02	3.38	.81	3.34	.77

Notes. Response scales were 1 = Disagree to 6 = Agree. PTS = posttraumatic stress.

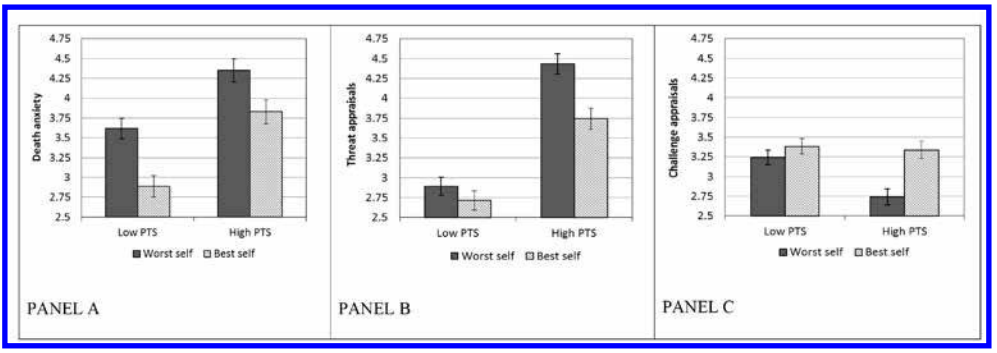

FIGURE 1. The effect of self threat manipulation on death anxiety (Panel A), threat appraisals (Panel B), and challenge appraisals (Panel C) among samples of individuals with low and high posttraumatic stress (PTS). *Note*. Response scales were 1 = Disagree to 6 = Agree.

the high PTS group, death anxiety was elevated, and was higher in the worst-self than the best-self condition, t[118] = 2.49, d = .45 [95%CI: .08, .81], p = .01.

THREAT APPRAISALS

A 2 (group: low vs. high PTS) × 2 (prompt: worst-self vs best-self) ANOVA revealed an unqualified main effect of PTS group, F[1, 265] = 109.11, η_p^2 = .29, p < .001, such that threat appraisal was higher among the high PTS group (M = 4.11, SD = 1.05) than among the low PTS group (M = 2.81, SD = 1.02). There was also a main effect of prompt, F[1, 265] = 12.36, η_p^2 = .05, p = .001, such that threat appraisal was higher in the worst-self condition, though this was qualified by the expected interaction, F(1, 265) = 4.25, η_p^2 = .02, p = .04 (see Figure 1, Panel B). Among the low PTS group, threat appraisal was low and not statistically different between the worst-self and best-self condition, t[147] = 1.08, d = .18 [95%CI: −.15, .50], p = .28. In contrast, among the high PTS group, threat appraisal was elevated, and was higher in the worst-self than the best-self condition, t[118] = 3.74, d = .69 [95%CI: .32, 1.06], p < .001.

CHALLENGE APPRAISALS

A 2 (group: low vs. high PTS) × 2 (prompt: worst-self vs best-self) ANOVA found a main effect of PTS group, $F[1, 265] = 7.50$, $\eta_p^2 = .03$, $p = .007$, such that challenge appraisal was lower among the high PTS group, and a main effect of prompt, $F[1, 265] = 13.57$, $\eta_p^2 = .05$, $p < .001$, such that challenge appraisal was higher in the best-self condition. However, these were qualified by the interaction, $F(1, 265) = 5.12$, $\eta_p^2 = .02$, $p = .03$ (see Figure 1, Panel C). Among the low PTS group, challenge appraisal was moderate and not statistically different between the worst-self and best-self condition, $t[147] = -1.06$, $d = -.18$ [95%CI: −.50, .15], $p = .29$. In contrast, among the high PTS group, challenge appraisal was lower in the worst-self than the best-self condition, $t[118] = 3.99$, $d = -.72$ [95%CI: −1.08, −.34], $p < .001$.

ANCILLARY ANALYSES: DEMOGRAPHIC CHARACTERISTICS

Ancillary analyses were conducted to explore the possibility that the moderating effect of posttraumatic stress group in the interactions were due to the observed differences in the age and political orientation of each group (described above). However, Age*Prompt and PoliticalOrientation*Prompt interactions were either not significant or did not parallel the target PTS*Prompt patterns, indicating that although these demographic characteristics were associated with posttraumatic stress, neither of them produced similar moderating effects and were thus not viable as possible underlying/explanatory factors. Furthermore, the reported interaction patterns on death anxiety and threat and challenge appraisals were unaltered when controlling for these demographic variables (see supplemental materials for details).

DISCUSSION

The present set of hypotheses were largely supported, though there were some notable deviations from two of the expected

data patterns. Hypothesis 1 predicted that in the low PTS group, death anxiety would be low in the best-self prompt condition and elevated in the worst-self condition. The obtained evidence was consistent with that hypothesis, suggesting that self-evaluation impacts effective existential anxiety buffering. Hypothesis 2 predicted that in the high PTS group, death anxiety should have been high and should be neither exacerbated by negative self-evaluation (worst-self prompt) nor relieved by positive self-evaluation (best-self prompt). This hypothesis was partially supported. A main effect found that death anxiety was indeed elevated in the high, compared to the low, PTS group. But, contrary to the hypothesis, the 2 (group: low vs. high PTS) × 2 (prompt: worst-self vs. best-self) interaction was not significant, and pairwise comparisons found that the worst-self (vs. best-self) prompt increased death anxiety among both the low and high PTS groups.

Hypothesis 3 predicted that the low PTS group should benefit from the psychological security that comes with effective anxiety buffer functioning, such that threat appraisals should be low and challenge appraisals should be at least at modest levels—and each should be relatively unaffected by being prompted to imagine being at one's best or worst. The obtained evidence was consistent with that hypothesis, reflecting effective anxiety buffer functioning. Hypothesis 4 predicted that among the high PTS group, threat appraisals should be heightened and challenge appraisals should be lowered—and threat appraisals should be exacerbated, and challenge appraisals further harmed, by prompts to focus on negative self-evaluations. The evidence was consistent with this hypothesis. There were main effects such that threat appraisals were higher and challenge appraisals were lower in the high PTS group than the low PTS group. Additionally, interaction patterns on both threat and challenge appraisals revealed that among the high PTS group threat appraisals were exacerbated and challenge appraisals were reduced in the worst-self (vs. best-self) prompt condition.

IMPLICATIONS FOR TMT AND HEALTHY ANXIETY BUFFER FUNCTIONING

The present findings among the low PTS group converge with the TMT perspective that much of human sociocultural activity

is oriented toward managing death anxiety (Greenberg et al., 2014) and that self-esteem helps serve that function (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Previous work has found that mortality awareness can motivate self-esteem striving (Mikulincer & Florian, 2002), that heightened self-esteem can help keep death awareness low (Harmon-Jones et al., 1997), and that negative self-evaluation can increase the accessibility of death-related thoughts (Ogilvie et al., 2008, Study 2). The present research extended beyond prior research focused on cognitive aspects of existential concern by investigating the impact on the affective aspect—death anxiety. Similar to prior findings examining effects on death-related thoughts (Ogilvie et al., 2008), the present findings among the low PTS group found that experimentally bolstering positive self-evaluation helped keep death anxiety low, whereas negative self-evaluation increased it.

Further, the present work interfaced with various perspectives on stress-related coping (Folkman et al., 2000; Lazarus, 2007; Roseman, 2013). Prior research (Vail, Courtney et al., 2019) has found that, among those with low PTS, imagining relationship problems had no impact on perceived coping ability—reflecting effective anxiety buffer functioning. The present evidence converged with those prior findings as well, finding here that among the low PTS group prompts to imagine being at one's best or worst had no effect on primary appraisals of life's stresses as either harmful threats or growth-oriented challenges, reflecting the psychological security that comes with effective anxiety buffer functioning. Together, these findings suggest that effectively functioning buffers allow people to at least temporarily endure modest threats to self-worth and increases in death anxiety without thinking that life's stresses are harmful and hopeless (i.e., without boosting appraisals as harmful threat and reducing appraisals as growth-oriented challenge).

IMPLICATIONS FOR EXISTENTIAL ANXIETY BUFFER DYSFUNCTION

The present work also contributes to the growing body of research testing ABDT (Pyszczynski & Kesebir, 2011; Yetzer & Pyszczynski, 2019), suggesting that heightened PTS may reflect anxiety buffer disruption—that the typical buffers against death-related

anxieties might be disrupted among people with heightened PTS or prediagnostic vulnerabilities. That research has found that, compared to those with low PTS, those with high PTS display chronically high levels of death-related thoughts (Vail, Goncy et al., 2019) and death-related anxieties (Vail, Courtney et al., 2019). The present data converged with those prior findings, revealing a main effect in which high (vs. low) PTS was associated with heightened death anxiety. This finding, in particular, has important and direct clinical implications, because prior work has found that failure to effectively manage death anxiety is a transdiagnostic risk-factor that can lead to a variety of disorders (Iverach et al., 2014; Yetzer & Pyszczynski, 2019).

Additionally, several prior studies suggest that PTS reflects a disrupted sociocultural buffer system, such that death anxiety was not only chronically heightened among those with high PTS but also that it was not relieved by affirmations of their sociocultural worldviews (Vail et al., 2018). Other research has found that, among those with low PTS, a worldview threat (vs. support) increased death-related cognitions which mediated increased worldview defense (Vail, Goncy et al., 2019), and a reminder of romantic relationship problems (vs. another negative problem) increased death anxiety (Vail, Courtney et al., 2019). In both prior studies, however, individuals with high PTS had heightened death-related thoughts and anxieties, and were not further influenced by experimental manipulations of worldview threats and romantic relationship problems, consistent with the idea that heightened PTS may reflect anxiety buffer disruption.

Yet, no prior research had tested whether experimental manipulations of self-esteem would be similarly affected. Thus, based on ABDT, we had hypothesized that among those with high PTS death anxiety should have been chronically high and should not have been exacerbated by a threat to self-esteem (worst-self prompt). However, although the data did show a main effect of PTS consistent with the former portion of that hypothesis, there was no interaction and pairwise comparisons found that the worst-self (vs. best-self) prompt increased death anxiety in both the low and high PTS groups. That is, although death anxiety was heightened among the high (vs. low) PTS group, and although we had hypothesized that the worst-self (vs. best-self) prompt would cease to have an influence among the high PTS group, the worst-self prompt nevertheless continued to further

increase death anxiety among the high PTS group. This finding represents a meaningful deviation from what was hypothesized, and reveals an ambiguity in ABDT. Specifically, it is not clear whether ABDT would suggest: (a) that high PTS reflects a completely broken/non-functioning buffer system such that existential concerns are at maximum levels and additional sociocultural threats pose no further existential shock; or (b) that PTS reflects a more modest (or range of gradations of) anxiety buffer disruption such that although the system may be generally overwhelmed it may still be able to be further assailed by additional threats. Based on initial theorizing (Pyszczynski & Kesebir, 2011; Yetzer & Pyszczynski, 2019) and research (Vail, Courtney et al., 2019; Vail, Goncy et al., 2019), we had originally assumed the former; but the present findings were unexpectedly consistent with the latter interpretation. We can point to at least two possible future directions to resolve the ambiguity.

First, it may be that ABDT should be refined to refer more specifically to the sociocultural platforms (i.e., social relationships and worldview systems) upon which self-esteem may be based. That is, it is possible that PTS may not necessarily reflect damaged self-esteem (e.g., negative self-evaluations) in the same way that it may reflect disruptions to one's sociocultural belief systems and interpersonal relationships (e.g., traumatic events may be interpreted as vivid demonstrations that the world and the people in it do not operate as one previously thought they did). In fact, a potential disconnect between one's self-evaluation and the occurrence of a traumatic experience itself may be a core component of anxiety buffer disruption. It may be comprehensible if one has a negative self-evaluation and suffers a trauma; but most people think of themselves as good people, doing the best with what they have, living according to the standards and values prescribed by their worldviews, and yet a traumatic event may happen anyway. Thus it may not necessarily be that PTS reflects damage to the value of self-evaluation, per se, but rather that it may reflect damage to the value of the underlying sociocultural systems that were supposed to offer useful beliefs about the world. If so, then death anxiety might be generally elevated among high PTS samples as a result of disruption to one's sociocultural systems of beliefs, standards, and values—and an experimental threat to ones' sociocultural systems (such as a worldview threat or a reminder of relationship problems) might

not have any additional impact (e.g., Vail, Courtney et al., 2019; Vail, Goncy et al., 2019). In contrast, self-evaluations of one's best-self and worst-self may continue to be meaningful regardless of whether worldview disruption has contributed to the emergence of PTS. This perspective could help explain why, in the present research, death anxiety may be generally heightened due to PTS-related worldview disruption and yet was further exacerbated by a worst-self (vs. best-self) prompt.

Second, it is possible that one or multiples of the previous (Vail, Courtney et al., 2019; Vail, Goncy et al., 2019) or present findings among the high PTS groups suffered a Type I or Type II error. Perhaps the prior studies failed to detect that worldview-threats or relationship-problems do indeed also cause increased existential concerns among high PTS samples (Type II); or perhaps the present study incorrectly rejected a true null among the high PTS group (Type I). Future research could further interrogate these patterns and ideas.

IMPLICATIONS FOR STRESS-RELATED COPING APPRAISALS AND MENTAL HEALTH

This work also investigated the effects of anxiety buffer disruption on stress-related coping appraisals. According to various perspectives (e.g., Folkman et al., 2000; Lazarus, 2007; Roseman, 2013), when people encounter stressors they make primary appraisals of the qualities of those stressors. Negative threat appraisals mean the individual perceives the stressor to be potentially harmful and overwhelming, whereas more positive challenge appraisals mean one perceives stressors to be a beneficial opportunity to build mastery, growth, and well-being. In terms of the relationship between existential concerns and primary appraisals of life stress, initial research found that medical students reporting adverse stress experiences 4 months after their first human cadaver dissection reported both increased threat appraisals and higher death anxiety (Dempster et al., 2006), and other work found that those with high (vs. low) PTS reported chronically high death anxiety and reduced perceived ability to cope with life's stresses (Vail, Courtney et al., 2019).

The present work extended beyond that prior work to explore the effects of anxiety buffer disruption on primary stressor

appraisals, predicting that the high (vs. low) PTS group would feel that life's stressors are more threatening/harmful and less likely to be positive/challenging opportunities for personal growth and well-being. Converging with prior findings, and Hypothesis 4, threat appraisals were higher and challenge appraisals were lower in the high PTS group than the low PTS group. Thus, these patterns were consistent with the idea that PTS reflects anxiety buffer disruption, and creates an inclination to appraise life stressors as more threatening risks than growth-oriented challenges. Additionally, the present work further extended beyond the prior research to predict that, among those with high PTS, threat appraisals should be exacerbated and challenge appraisals further harmed by undermining self-esteem with prompts for participants to recall when they were at their worst. The present data patterns were consistent with that hypothesis. Recall that the primary appraisals in the low PTS sample were not affected by the worst-self (vs. best-self) manipulation; in contrast, among the high PTS group, the worst-self (vs. best-self) prompt led to higher threat appraisals and lower challenge appraisals, suggesting that anxiety buffer disruption leaves individuals feeling less secure and more vulnerable to being overwhelmed by what might otherwise be manageable life stressors.

Again, these findings have important and direct clinical implications, because prior work on primary stressor appraisals finds that appraisals of stressors as threats/challenges are associated with various clinically-relevant aspects of mental ill/well-being (Ferguson et al., 1999; O'Connor & Ferguson, 2016). Conditions that produce anxiety, depression, social dysfunction, and physical symptoms are positively associated with threat appraisals and negatively associated with challenge (Ferguson et al., 1999; Gourounti et al., 2010; Maltby & Day, 2003; Searle & Auton, 2015); and whereas threat appraisals are associated with anxiety and ill-being, challenge appraisals are uniquely associated with posttraumatic growth (Goldberg et al., 2019). Because the current research found that the conditions associated with chronically high levels of death anxiety (the high PTS group) were the same conditions under which an experimental manipulation of self-evaluation negatively impacted both threat and challenge appraisals, an important avenue for future research would be to investigate the potential presence and causal direction of the relationship between death anxiety and negative primary

appraisals of life stressors. One causal path could be that anxiety buffer disruption increases existential concern, which then causes individuals with high PTS to perceive increased vulnerability to life stressors. The other causal path could be that anxiety buffer disruption increases vulnerability to life stressors, which causes an increased experience of death anxiety. Learning the operant causal path would be critical for developing an appropriate therapeutic strategy. If the former is true, then clinicians might seek to directly restore the existential buffer (e.g., faith in a sociocultural system), to have the direct effect of reduced death anxiety and the indirect effect of restored resilience in the face of daily life stressors. However, if the latter is true, then clinicians might seek to adjust the client's cognitive appraisals of life stressors to view them in more challenge-oriented rather than threat-oriented terms, which could have the direct effect of restoring resilience and the indirect effect of reducing death anxiety. Indeed, meta-analyses suggest that therapies focused on existential concerns can produce significant improvements (Vos, Craig, & Cooper, 2015). Other ABDT work (Maxfield, John, & Pyszczynski, 2014) also suggests effective treatment might seek to restore effective anxiety buffer functioning (Lewis, 2014; Major, Whelton, & Duff, 2016) by helping clients rebuild effective sociocultural buffer systems, identifying and committing to meaningful cultural belief systems, reestablishing close social relationships, providing a renewed platform upon which to bolster positive self-evaluations and restore existential well-being.

LIMITATIONS AND FUTURE DIRECTIONS

Several limitations should of course be acknowledged. First, the PCL-C measure corresponds to the DSM-IV; a PCL-5 now exists and corresponds to the updated DSM-5 diagnostic criteria. Future work should adopt the appropriately contemporary measures. Second, the PCL-C measures symptoms only, and is a prediagnostic tool only; it cannot on its own be used to determine whether participants have PTSD, and it does not measure the quantity, quality, or diversity of traumatic experience or comorbid conditions. Future research could more directly address the role of specific traumatic experiences, resilience factors, and coping strategies in anxiety buffer disruption processes, as well as

the role of stress-related coping appraisals in determining when traumatic events lead to anxiety buffer disruption, PTS, and other disorders and mental or physical health outcomes. Because stress is known to have physiological effects (Boyce & Ellis, 2005), future directions may further investigate whether elevated death anxiety and stress-related coping strategies might be related to psychophysiological health risks (e.g., in cardiovascular functioning, sleep).

And lastly, future clinical work should further investigate the ABDT perspective about how people with high PTS might best recover. For example, if one's sociocultural anxiety buffer system is disrupted, the person may become less defensive and more open-minded about alternative ideologies, social groups, and ways of living in and understanding the world. That might be consistent with the idea that a lack of meaning is associated with harmed mental health, yet spurs a meaning making process in which people search for alternate/replacement systems of meaning, and that when they find a suitable replacement they can effectively function again (Park, 2010; Park & Folkman, 1997). Future research could explore whether and how existential concern may motivate open-minded growth orientation, rather than defensiveness, and therapies might similarly do well to appreciate the difference (Ryan & Deci, 2017).

CONCLUSION

The present research offers novel theory-based and data-driven insights about whether PTS reflects disruptions to otherwise-effective sociocultural anxiety buffer functioning, and has direct clinical implications. When individuals with low PTS contemplated their worst (vs. best) selves, they experienced moderately heightened death anxiety, and yet maintained an appraisal of life's stressors as more of a positive challenge than a harmful threat, reflecting the psychological health and security that may likely come with effective existential anxiety buffers. In contrast, those with high PTS reported high death anxiety in both the best-self and worst-self conditions, and the worst-self (vs. best self) prompt increased their appraisal of life's stresses as a harmful threat and decreased their appraisal of life's stresses as positive/challenging opportunities for growth and well-being. This

latter set of findings highlight the vulnerability to coping failure under conditions associated with anxiety buffer disruption, such as when individuals experience heightened PTS. These findings are relevant to the current understanding of PTSD and its treatment, because failure to effectively manage death anxiety and to develop optimistic primary appraisals of life stressors are each known to impact physical and mental health, and may potentially represent key risk factors in the development of PTSD symptoms, outcomes, and therapeutic strategies.

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Supplemental materials

[Post-traumatic stress Check Listð Civilian (PCL-C)]

Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, and select the response that most accurately indicates how much you have been bothered by that problem *in the last month*:

1	2	3	4	5
Not at all	A little bit	Moderately	Quite a bit	Extremely

_____ 1. Repeated, disturbing memories, thoughts, or images of a stressful experience from the past?

_____ 2. Repeated, disturbing dreams of a stressful experience from the past?

_____ 3. Suddenly acting or feeling as if a stressful experience were happening again (as if you were reliving it)?

_____ 4. Feeling very upset when something reminded you of a stressful experience from the past?

_____ 5. Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful experience?

_____ 6. Avoid thinking about or talking about a stressful experience from the past or avoid having feelings related to it?

_____ 7. Avoid activities or situations because they remind you of a stressful experience from the past?

_____ 8. Trouble remembering important parts of a stressful experience from the past?

_____ 9. Loss of interest in things that you used to enjoy?

_____ 9a. For this item, please mark ñQuite a bitò.

_____ 10. Feeling distant or cut off from other people?

_____ 11. Feeling emotionally numb or being unable to have loving feelings for those close to you?

_____ 12. Feeling as if your future will somehow be cut short?

_____ 13. Trouble falling or staying asleep?

_____ 14. Feeling irritable or having angry outbursts?

_____ 15. Having difficulty concentrating?

_____ 16. Being ñsuper alertò or watchful or on guard?

_____ 17. Feeling jumpy or easily startled?

[FILLER ITEMS]

Please read each of the following statements and decide how much you agree with each according to your experience. It is important for you to know that there are no "right" or "wrong" answers to these questions. People are different, and we are interested in your experience.

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree

1. ____ It upsets me to go into a situation without knowing what I can expect from it.

2. ____ I enjoy having a clear and structured mode of life.

3. ____ I like to have a place for everything and everything in its place.

4. ____ I don't like situations that are uncertain.

5.____ I find that a consistent routine enables me to enjoy life more.

6. ____ I become uncomfortable when the rules in a situation are not clear.

[MANIPULATION: WORST-SELF CONDITION]

The Projective Life Attitudes Assessment

This assessment is a recently developed, innovative personality assessment. Recent research suggests that feelings and attitudes about significant aspects of life tell us a considerable amount about the individualôs personality. Your responses to this survey will be content-analyzed in order to assess certain dimensions of your personality. Your honest responses to the following questions will be appreciated.

1. At what age were you, are you, or do you think you will be, AT YOUR WORST?

_____

_____

2. Describe what it was, what it is, or what it will be like when you are AT YOUR WORST.

_____

_____

_____

_____

_____

_____

3. Write down, as specifically as you can, what has happened, what is happening, or what will happen to you when you were, are, or will be AT YOUR WORST.

_____

_____

_____

_____

_____

_____

[MANIPULATION: BEST-SELF CONDITION]

The Projective Life Attitudes Assessment

This assessment is part of a recently developed, innovative personality assessment. Recent research suggests that feelings and attitudes about significant aspects of life tell us a considerable amount about the individualôs personality. Your responses to this survey will be content-analyzed in order to assess certain dimensions of your personality. Your honest responses to the following questions will be appreciated.

1. At what age were you, are you, or do you think you will be, AT YOUR BEST?

_____

_____

2. Describe what it was, what it is, or what it will be like when you are AT YOUR BEST.

_____

_____

_____

_____

_____

_____

3. Write down, as specifically as you can, what has happened, what is happening, or what will happen to you when you were, are, or will be AT YOUR BEST.

_____

_____

_____

_____

_____

_____

[DEATH ANXIETY MEASURE]

Please read each item and rate how strongly you would agree/disagree with each:

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree

_____ 1. I feel disturbed or anxious by the social isolation of death

_____ 2. I feel disturbed or anxious by the shortness of life

_____ 3. I feel disturbed or anxious by the thought of missing out on so much after you die

_____ 4. I feel disturbed or anxious by the thought of dying young

_____ 5. I feel disturbed or anxious by the how it might feel to be dead

_____ 6. I feel disturbed or anxious by the thought of never thinking or experiencing anything again

_____ 7. I feel disturbed or anxious by the disintegration of your body after you die

_____ 7a. For this item, we ask that you please select the strongly disagree response.

_____ 8. I feel disturbed or anxious by the physical degeneration involved

_____ 9. I feel disturbed or anxious by the thought of the pain of dying

_____ 10. I feel disturbed or anxious by the intellectual degeneration of old age

_____ 11. I feel disturbed or anxious by the thought that my abilities will be limited as I lay dying

_____ 12. I feel disturbed or anxious by the uncertainty as to how bravely I will face the process of dying

_____ 13. I feel disturbed or anxious by my lack of control over the process of dying

_____ 14. I feel disturbed or anxious by the possibility of dying in a hospital away from friends and family

[STRESS COPING APPRAISALS MEASURE]

Please rate yourself on the following statements:

1	2	3	4	5	6
Strongly disagree	Disagree	Somewhat disagree	Somewhat agree	Agree	Strongly agree

_____ 1. When I think about lifeôs ups and downs, they seem threatening.

_____ 2. When I think about lifeôs ups and downs, they seem enjoyable.

_____ 3. When I think about lifeôs ups and downs, they seem fearful.

_____ 4. When I think about lifeôs ups and downs, they seem challenging.

_____ 5. When I think about lifeôs ups and downs, they worry me.

_____ 6. When I think about lifeôs ups and downs, they are stimulating.

_____ 7. When I think about lifeôs ups and downs, they seem hostile.

_____ 8. When I think about lifeôs ups and downs, they seem exhilarating.

_____ 9. When I think about lifeôs ups and downs, they seem frightening.

_____ 10. When I think about lifeôs ups and downs, they seem informative.

_____ 11. When I think about lifeôs ups and downs, they seem terrifying.

_____ 12. When I think about lifeôs ups and downs, they seem exciting.

[DEMOGRAPHICS]

Demographics

1.) What is your sex? _____Male _____Female 2.) Age? _____

3.) What is your ethnicity? _____Hispanic or Latino _____Not Hispanic or Latino

4.) What is your race? (check only one)

_____1. Caucasian/White
_____2. African American/Black
_____3. American Indian/Native Alaskan
_____4. Asian
_____5. Native Hawaiian/Pacific Islander
_____6. Other (specify): _____

5.) Please indicate the total number of years of education you have completed: _____
(for example: high school graduation is 12yrs., so two years of college is 14yrs.)

6.) Please indicate your religious affiliation, if any (please circle one):

1. Christian
2. Muslim
3. Jewish
4. Buddhist
5. Hindu
6. Atheist (I do not believe supernatural beings exist)
7. Spiritual (I believe supernatural beings exist, but I do not follow a specific religion)
8. Agnostic (Iôm not sure whether, or it is impossible to know whether, supernatural beings do or do not exist)
9. Other: _____

7.) Please rate your political orientation:

1	2	3	4	5
Progressive		Moderate		Conservative

What do you think this study is about? _____

_____

What thoughts/feelings do you have about this study? _____

_____

Table 1. Participant descriptive and frequency statistics.

Demographic	Low PTS	High PTS	Total sample
Age	37.69 (12.62)	33.91 (11.06)	36.02 (12.08)
Did not report	0	2	2
Sex			
Male	64	40	104
Female	84	80	164
Did not report	1	0	1
Ethnicity			
Hispanic or Latino	7	8	15
Non-Hispanic or Latino	142	111	253
Did not report	0	1	1
Race			
Caucasian	124	98	222
African American	16	9	25
Native American/Native Alaskan	0	0	0
Asian/Pacific Islander	4	8	12
Other	5	3	8
Did not report	0	2	2
Religion			
Christian	79	53	132
Muslim	2	1	3
Jewish	4	3	7
Buddhist	1	1	2
Hindu	0	0	0
Atheist	17	14	31
Spiritual	13	12	25
Agnostic	27	31	58
Other	6	5	11
Political orientation (1 = progressive, 5 = conservative)	2.78 (1.06)	2.48 (1.03)	2.65 (1.06)
Years of education	15.32 (2.53)	14.91 (1.92)	15.13 (2.33)

Note. Means are presented with standard deviations in parentheses; all others are sums.

Preliminary analyses: Manipulation checks

Preliminary analyses examined participantsô written responses for time orientation and focus on positive/negative evaluations of themselves in the described situation (vs. focusing on the written responses implications for their current self).

Time orientation. For time orientation, two indicators were analyzed. The first question of the manipulation prompts asked ñAt what age were you, are you, or do you think you will be, at your worst/best?ò and then later in the study participants indicated their actual current age. Thus, for the first indicator, we subtracted their current age (demographics item) from the age they indicated in the manipulation prompt (all in years), such that negative values mean participants wrote about a past self and positive values mean they wrote about a future self. For the second indicator, we used Linguistic Inquiry Word Count (LIWC) software (Pennebaker, Booth, Boyd, & Francis, 2015). LIWC is capable of quantitatively content-coding text responses by comparing selected written text to validated, standardized, conceptually-meaningful dictionaries and phrase categories, and computes the percentage of each writing sample found in a given dictionary category. We selected the three default ñtime orientationò categories, computing the proportion of words focused on past, present, and/or future in each participants written responses.

Affect and self-evaluations. For affect, we again used LIWC to analyze positive and negative affect words in written responses to the manipulation prompts. For self-evaluation, two second-year social psychology masters students[1] served as judges and conducted thematic content coding on each participantôs response to the manipulation prompts. Each judge was blind to hypotheses and condition, and only viewed the written responses. Each first independently read the responses in their entirety, then met to discuss and score each participantsô response using two content theme items. The first was ñEvaluate how positively or negatively the author

[1] Special thanks to Madhwa Galgali and Alexis Goad for their attentive thematic content coding.

seems to be viewing themselves in the event they described (regardless of past, present, or future tense)ò and the second was ñEvaluate how positively or negatively the author seems to be viewing their current self, in light of the event they described.ò Each item used a Likert-type scale (-5 = Very negative, 0 = neutral or could not determine, +5 = Very positive).

Analyses. For each of the eight measures (age difference score [1], LIWC measures of past-focus [2], present-focus [3], future-focus [4], positive affect [5], and negative affect [6], and self-evaluation in the event [7] and evaluation of the current self in light of the event [8]), a 2 (group: low vs. high PTS) x 2 (prompt: worst-self vs best-self) ANOVA found no interactions (see Table S2 for model statistics). PTS had a main effect on self-evaluation in the event described such that those with high PTS wrote slightly more negative responses about themselves (M = -.12, SD = 3.70) than those with low PTS (M = .27, SD = 3.53), and a main effect on evaluation of current self in light of the event described such that those with high PTS wrote slightly more negative responses about themselves (M = -.09, SD = 2.04) than those in the best-self condition (M = .70, SD = 1.84); there were no other main effects of PTS. Manipulation prompt had main effects such that those in the worst-self (vs. best-self) condition: wrote about a past self (M = -6.76, SD = 19.16; vs. M = -.50, SD = 14.66); used more past-focused (M = 8.69, SD = 6.01; vs. M = 4.23, SD = 5.32), fewer present-focused (M = 7.22, SD = 6.23; vs. M = 11.54, SD = 5.80) and future-focused words (M = 1.89, SD = 2.93; vs. M = 4.55, SD = 3.74), and fewer positive affect (M = 2.05, SD = 2.01; vs. M = 7.38, SD = 4.89) and more negative affect words (M = 6.40, SD = 5.88; vs. M = .93, SD = 1.60); and evaluated themselves more negatively in the situations described in the prompts (M = -3.13, SD = 1.27; vs. M = 3.69, SD = 1.02); and had no main effect on evaluation of current self in light of the event described.

Table S2. Model statistics for the preliminary analyses of written responses to the manipulation prompts.

	Age (difference)			Past-focus (LIWC)			Present-focus (LIWC)			Future-focus (LIWC)		
	F (1, 228)	η_p^2	*p*	F (1, 265)	η_p^2	*p*	F (1, 265)	η_p^2	*p*	F (1, 265)	η_p^2	*p*
PTS	2.35	.01	.13	.45	.002	.50	1.48	.006	.22	.34	.001	.56
Prompt	7.43	.03	.007	43.07	.14	< .001	35.44	.12	< .001	44.90	.15	< .001
Interaction	.13	.001	.72	2.67	.01	.10	1.30	.005	.26	2.83	.01	.09
	Positive affect (LIWC)			Negative affect (LIWC)			Self-evaluation (in event described)			Self-evaluation (current self in light of event)		
	F (1, 265)	η_p^2	*p*	F (1, 265)	η_p^2	*p*	F (1, 265)	η_p^2	*p*	F (1, 265)	η_p^2	*p*
PTS	.44	.002	.51	.09	< .001	.76	8.91	.03	.003	11.68	.04	.001
Prompt	139.05	.34	< .001	100.09	.27	< .001	2394.49	.90	< .001	.13	< .001	.72
Interaction	.04	< .001	.85	.42	.002	.52	2.27	.008	.13	2.53	.009	.11

Note. PTS = post-traumatic stress groups. LIWC = Linguistic Inquiry Word Count 2015

Ancillary analyses: Age and political orientation as competing moderators

Ancillary analyses were conducted to explore the possibility that the effects of posttraumatic stress group in the interactions were due to the observed differences in age and political orientation of each group. Each potential competing variable was either centered or dummy-coded, as appropriate, and Variable*Prompt interaction terms computed; multiple regression methods were used, in which main effects were entered in step 1 and interactions in step 2.

When regressing death anxiety there were no significant interactions with age (ΔF[1, 263] = .39, ΔR^2 = .001, p = .53) nor political orientation (ΔF[1, 265] = 3.20, ΔR^2 = .01, p = .08), which is similar to the lack of interactions reported in the main text. However, whereas a main effect found that PTS group was related to death anxiety (see main text), death anxiety was correlated with neither age (r[266] = -.06, p = .34) nor political orientation (r[268] = .07, p = .25). When regressing threat appraisal there were no significant interactions with age (ΔF[1, 263] = .53, ΔR^2 = .002, p = .47) nor political orientation (ΔF[1, 265] = 2.03, ΔR^2 = .007, p = .16). When regressing challenge appraisal there was no significant interaction with political orientation (ΔF[1, 265] = 1.02, ΔR^2 = .004, p = .32), but there was with age (ΔF[1, 263] = 4.39, ΔR^2 = .02, p = .04). High PTS participants tended to be younger than low PTS participants who were older, so an interaction parallel to the target PTS*Prompt interaction would be such that challenge appraisal were lower in the worst-self than the best-self condition among the younger (-1SD mean age) but not older (+1SD mean age) participants. However, this was not the case. Instead, challenge appraisals were lower in the worst-self (vs. best-self) condition among older (t = -3.85, β = -.33, p < .001) but not younger (t = -.88, β = -.08, p = .38) participants. Together, these results indicate that although these demographic characteristics were associated with PTS

groups, none of them produced similar effects on death anxiety nor threat nor challenge appraisals and were thus not viable as possible underlying/explanatory factors.

Ancillary analyses: Age and political orientation as covariates

Additionally, we checked whether the reported interaction patterns on death anxiety and threat and challenge appraisals were altered when controlling for age and political orientation.

Death anxiety. A 2 (group: low vs. high PTS) x 2 (prompt: worst-self vs best-self) ANCOVA, controlling for age and political orientation, again found no interaction ($F(1, 261) = .26$, $\eta_p^2 = .001$, $p = .61$). However, there was again a main effect of PTS group ($F[1, 261] = 38.15$, $\eta_p^2 = .13$, $p < .001$) such that death anxiety was higher among the high PTS group than among the low PTS group. There was also a main effect of prompt ($F[1, 265] = 19.52$, $\eta_p^2 = .07$, $p < .001$) such that death anxiety was higher in the worst-self condition than in the best-self condition. This additive pattern was further explored with pairwise comparisons. Among the low PTS group, death anxiety was higher in the worst self than the best-self condition ($t[147] = 3.69$, $d = .64$ [95%CI: .31, .97], $p < .001$). Likewise, among the high PTS group, death anxiety was elevated, and was higher in the worst self than the best-self condition ($t[116] = 2.63$, $d = .47$ [95%CI: .10, .83], $p = .01$).

Threat appraisals. A 2 (group: low vs. high PTS) x 2 (prompt: worst-self vs best-self) ANCOVA, controlling for age and political orientation, revealed an unqualified main effect of PTS group ($F[1, 261] = 107.33$, $\eta_p^2 = .29$, $p < .001$) such that threat appraisal was higher among the high PTS group than among the low PTS group. There was also a main effect of prompt ($F[1, 261] = 13.28$, $\eta_p^2 = .05$, $p < .001$), such that threat appraisal was higher in the worst-self condition, though this was again qualified by the expected interaction, $F(1, 261) = 5.61$, $\eta_p^2 = .02$, $p = .02$. Among the low PTS group, threat appraisal was low and not statistically different

between the worst self and best-self condition (t[147] = .96, d = .18 [95%CI: -.15, .50], p = .34). In contrast, among the high PTS group, threat appraisal was elevated, and was higher in the worst self than the best-self condition (t[116] = 4.03, d = .76 [95%CI: .39, 1.13], p < .001).

Challenge appraisals. A 2 (group: low vs. high PTS) x 2 (prompt: worst-self vs best-self) ANOVA found a main effect of PTS group (F[1, 261] = 7.10, η_p^2 = .03, p = .008) such that challenge appraisal was lower among the high PTS group, and a main effect of prompt (F[1, 261] = 14.46, η_p^2 = .05, p < .001) such that challenge appraisal was higher in the best-self condition. However, these were qualified by the interaction, F(1, 261) = 4.69, η_p^2 = .02, p = .03. Among the low PTS group, challenge appraisal was moderate and not statistically different between the worst-self and best-self condition (t[147] = -1.23, d = -.18 [95%CI: -.50, .15], p = .22). In contrast, among the high PTS group, challenge appraisal was lower in the worst-self than the best-self condition (t[118] = 4.01, d = -.72 [95%CI: -1.08, -.34], p < .001).

Thus, the interaction patterns reported in-text were unaltered when controlling for the age and political orientation variables.

This article has been cited by:

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