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Article in *Journal of Personality and Social Psychology* · January 1997

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Terror Management Theory and Self-Esteem: Evidence That Increased Self-Esteem Reduces Mortality Salience Effects

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On the basis of the terror management theory proposition that self-esteem provides protection against concerns about mortality, it was hypothesized that self-esteem would reduce the worldview defense produced by mortality salience (MS). The results of Experiments 1 and 2 confirmed this hypothesis by showing that individuals with high self-esteem (manipulated in Experiment 1; dispositional in Experiment 2) did not respond to MS with increased worldview defense, whereas individuals with moderate self-esteem did. The results of Experiment 3 suggested that the effects of the first 2 experiments may have occurred because high self-esteem facilitates the suppression of death constructs following MS.

The questions of why individuals need self-esteem and how they cope with their awareness of death are challenging ones that have fascinated and puzzled philosophers and social theorists (e.g., Plato, Kierkegaard, Norman Brown, William James) for centuries. Terror management theory, based primarily on the writings of Ernest Becker (1962, 1971, 1973, 1975) and Otto Rank (1936, 1941), posits that self-esteem is sought because it provides protection against the fear of death (Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg, & Pyszczynski, 1991a). From this perspective, the fear of death is rooted in an instinct for self-preservation that humans share with other species. Although we share this instinct with other species, only we are aware that death is inevitable—that is, that our self-preservation instinct will inevitably be thwarted. This combination of an instinctive drive for self-preservation with an awareness of the inevitability of death creates the potential for paralyzing terror.

This potential for terror is managed by a cultural anxiety buffer, consisting of the cultural worldview and self-esteem. The *cultural worldview* is defined as a set of beliefs about the nature

of reality shared by groups of individuals that provides meaning, order, permanence, stability, and the promise of literal and/or symbolic immortality to those who live up to the standards of value set by the worldview. *Self-esteem* is defined as one's belief regarding how well one is living up to the standards of value prescribed by the worldview. Because the cultural anxiety buffer is a social creation (humanly created, transmitted, and maintained), individuals are highly dependent on others for its validation and maintenance. Consequently, the theory posits that a great deal of individual and social behavior is directed toward preserving faith in a cultural worldview and self-esteem. Thus far, research on terror management theory has independently tested two distinct hypotheses derived from the theory.

Anxiety-Buffer Research

The *anxiety-buffer hypothesis* states that if a psychological structure (worldview faith or self-esteem) provides protection against anxiety, then strengthening that structure should make one less prone to exhibit anxiety or anxiety-related behavior in response to threats, and weakening that structure should make one more prone to exhibit anxiety or anxiety-related behavior in response to threats. Support for this hypothesis is provided by correlational studies that have shown that self-esteem is negatively correlated with general anxiety, death anxiety, and physical and mental health problems associated with anxiety (e.g., French, 1968; Solomon, Greenberg, & Pyszczynski, 1991b; Templer, 1971). Further support for the anxiety-buffer hypothesis is provided by experiments that have demonstrated that self-esteem threats cause anxiety (e.g., Bennett & Holmes, 1975), that defensive responses to self-esteem threats are mediated by anxiety (e.g., Gollwitzer, Earle, & Stephan, 1982), and that the use of self-esteem defenses reduces anxiety (e.g., Mehlman & Snyder, 1985).

More recent support for this hypothesis has been provided by experiments that have shown that experimentally increasing

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This research was partially supported by Grant SBR 9312456 from the National Science Foundation. Thanks are extended to Cindy Harmon-Jones, who provided much assistance throughout the process of conducting the research and writing the article.

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self-esteem by means of bogus personality feedback or success on a supposed intelligence test reduces self-reported anxiety in response to a graphic death-related video and reduces skin conductance (a measure of sympathetic nervous system activity) in response to the anticipation of painful electric shock (Greenberg, Solomon et al., 1992). Other experiments have shown that when individuals' faith in aspects of their cultural worldviews is bolstered by encouraging them to write arguments supporting their attitudes about the U.S. involvement in the Gulf War, they are less prone to exhibit increased skin conductance and self-reported anxiety in response to death-related questions (Pyszczynski, Becker, Vandeputte, Greenberg, & Solomon, 1994). Experiments have also shown that when participants are led to believe that emotionality is related to either a long or short life expectancy, those with high self-esteem (both dispositional and experimentally enhanced) are less likely to bias self-reported emotionality in a manner that denies vulnerability to a short life expectancy (Greenberg et al., 1993).

Mortality Salience Research

The *mortality salience hypothesis* states that to the extent that a psychological structure (worldview faith or self-esteem) provides protection against death concerns, reminding individuals of death should increase their need for that structure. Thus, reminders of mortality should increase the need for the protection provided by faith in the cultural worldview and therefore affect evaluations of people whose behavior, beliefs, or mere existence impinges on that worldview, because an enhanced positive evaluation of those who support the worldview and an enhanced negative evaluation of those who deviate from the worldview maintain or increase one's faith in the worldview. Therefore, mortality salience (MS) should amplify preferences for worldview-supporting others over worldview-challenging others; we have termed these preferences *worldview defense*.

In support of this hypothesis, experiments have shown that after participants briefly ponder their own mortality, by responding to open-ended questions about their thoughts and feelings about death or by expressing their level of agreement with statements concerning their beliefs about death, they evaluate people who uphold the worldview more positively and those who challenge it more negatively (for a recent review, see Greenberg, Pyszczynski, & Solomon, 1995). For example, MS has led to harsher recommended punishments for moral transgressors (Burris & Harmon-Jones, 1996; Ochsman & Reichelt, 1994; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989), increased preference for people who praise their country over those who criticize it (Greenberg et al., 1990), increased preference for in-group members over out-group members in a minimal group paradigm (Harmon-Jones, Greenberg, Solomon, & Simon, 1996), and physical distancing from foreigners (Ochsman & Mathay, 1994). Recent research has also shown that merely passing by a funeral parlor on a city street leads to increased perceptions of social consensus for one's attitudes (Pyszczynski et al., in press). These effects have emerged in experiments in which a variety of target individuals and issues have been used, and the effects have been replicated in several different countries (United States, Canada, Germany, and Israel).

Research also suggests that the MS effect is specific to the problem of death and does not occur in response to thoughts of

other aversive events. Although increased worldview defense in response to MS has been replicated in many experiments with varying operationalizations of both MS and worldview defense, parallel effects have not emerged when college students were induced to think about other aversive events, such as giving a speech in public, their next important test, the worries of life after college, or experiencing intense physical pain (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Greenberg, Simon, et al., 1995). Moreover, individuals have responded to MS with increased worldview defense and not increased negative affect, whereas individuals have responded to thoughts of other aversive events with increased negative affect but not increased worldview defense (Greenberg, Simon et al., 1995).

Regarding the processes by which the MS effect emerges, recent research indicates that immediately after MS, exaggerated worldview defense does not occur, but that mortality concerns are removed from consciousness by cognitive strategies (Greenberg et al., 1994). As these cognitive strategies are relaxed and death becomes more accessible to consciousness, worldview defense increases (Greenberg et al., 1994). Support for this analysis comes from four sets of experiments that have shown that the conditions under which death-construct accessibility is high are the same conditions under which worldview defense also is high (Arndt, Greenberg, Pyszczynski, & Solomon, 1996; Arndt, Greenberg, Pyszczynski, Solomon, & Simon, in press; Greenberg et al., 1994; Simon, Greenberg, Harmon-Jones, Solomon, & Pyszczynski, in press). Additional support for this analysis comes from an experiment that demonstrated that whereas participants who had not been given the opportunity to defend their worldview exhibited high death-construct accessibility following MS, participants who were given the opportunity to defend their worldview exhibited low death-construct accessibility (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, in press). Thus, the evidence to date seems to suggest that following MS, high death-construct accessibility activates worldview defense and that worldview defense reduces death-construct accessibility.

Self-Esteem, MS, and Worldview Defense

According to terror management theory, increased self-esteem should enhance the functioning of the cultural anxiety buffer and thereby provide protection against death concerns. In effect, high self-esteem should reduce the effects of MS on worldview defense. Unfortunately, no prior research has tested this hypothesis. Although previous research has supported the anxiety-buffering function of self-esteem by showing that increased self-esteem reduces anxiety in response to threats, this research does not imply that self-esteem will also reduce worldview defense after MS. This prior research has shown that increased self-esteem reduces anxiety in response to extremely graphic images of death and threats of electric shock (Greenberg, Solomon, et al., 1992). Whereas these threats evoked considerable anxiety, MS has been found to evoke none. In addition, worldview defense is a delayed reaction to MS, whereas the reactions to the threats used in the anxiety-buffer studies have occurred during or immediately after the threat. Moreover, recent research has found that when individuals ponder mortality deeply, MS does not evoke increased worldview defense (Greenberg et al., 1994), suggesting that the strong threats used in previous anxiety-buffer

research would not necessarily evoke increased worldview defense. Other results concur and suggest that the process by which MS exerts its effects on worldview defense is not simply through increased anxiety (Greenberg et al., 1994; Greenberg, Simon et al., 1995). Finally, the previous anxiety-buffer research has found effects on individuals' own reactions to threats (self-reported anxiety, psychophysiology, and emotionality bias), whereas the MS paradigm is used to observe effects on individuals' reactions to other individuals. That is, increasing self-esteem prior to threat may have effects on individuals' direct responses to the threat, but whether it will also affect their reactions to others is a separate and unanswered question and a matter of particular importance to understanding the social consequences of different levels of self-esteem.

Thus, we tested the hypothesis that higher levels of self-esteem would reduce the effects that MS has on worldview defense. If self-esteem provides protection against mortality concerns, and if increased defense of the worldview after reminders of mortality is a response to mortality concerns, then high levels of self-esteem should reduce or eliminate the worldview defense that occurs in response to MS. We tested this hypothesis by assessing the interactive effects of self-esteem and MS on worldview defense. In Experiment 1 the self-esteem variable was created through a manipulation, whereas in Experiment 2 it was determined by level of dispositional self-esteem.

Experiment 1

We manipulated participants' self-esteem by means of positive or neutral feedback on a bogus personality test. Participants then wrote about either their own mortality or a neutral topic and evaluated a person who supported an aspect of their worldview (United States) and a person who threatened an aspect of their worldview.

Method

Participants. Forty-nine introductory psychology students (34 women and 15 men) from the University of Arizona participated to partially fulfill a course requirement. Participants were randomly assigned to conditions in the 2 (personality feedback manipulation: neutral vs. positive) \times 2 (MS treatment: MS vs. control) factorial design.

Procedure. Three to 5 students participated in each session. The experimenter informed the students that they would be participating in two short studies. The "first study" was described as being concerned with the relationship among various personality characteristics and would involve participants completing several personality measures. The experimenter further explained that he had put together personality profiles for each participant from the questionnaires they had completed at a previous mass testing session. Before ushering participants into separate cubicles, the experimenter informed participants that they could look at these profiles before completing the new questionnaires.

These personality profiles constituted the self-esteem manipulation. After reading their personality profiles, participants completed a packet of questionnaires, which included a check on the self-esteem manipulation, a filler questionnaire, the MS manipulation, and the Positive and Negative Affect Scales—Expanded Form (PANAS-X; Watson & Clark, 1991).

After completing the packet of questionnaires, participants returned to the main room. The experimenter explained that the "second study" was concerned with foreigners' views of the U.S. and Americans' reactions to these views. Several essays written about the U.S. by foreign

students had been collected, and the participants' task was to read and evaluate two of these essays. Participants then returned to their cubicles to read and evaluate the essays. When participants completed the evaluations, they were thoroughly debriefed. No participants reported that they thought the "two studies" were related to each other.

Materials. The personality feedback was patterned after that used to manipulate self-esteem in previous experiments (e.g., Greenberg, Solomon, et al., 1992; Studies 1 & 3) and was based on research on the Barnum effect (e.g., Forer, 1949). The participant's name was printed at the top of the page, and a summary description of his or her personality followed, conveying either a positive or neutral evaluation that was sufficiently general so that it would be likely to apply to all participants (for a more detailed description of this manipulation, see Greenberg, Solomon, et al., 1992, Study 1).

The packet of questionnaires included a check on the self-esteem manipulation ("How good did the personality assessment make you feel about yourself?") and a question assessing how accurately participants thought the assessment described them (both responded to on 9-point scales); a filler questionnaire (the Eysenck Neuroticism Scale; Eysenck, 1952), which was included to sustain the cover story; the MS manipulation; and the PANAS-X (Watson & Clark, 1991).

MS was manipulated, as in previous experiments (e.g., Greenberg et al., 1990), by having participants respond to two open-ended questions concerning their thoughts and feelings about either their own death or watching television. This questionnaire was labeled the "Projective Life Attitudes Assessment" and asked MS participants to: (a) "Please briefly describe the emotions that the thought of your own death arouses in you" and (b) "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead." Control-condition participants responded to parallel questions about an innocuous topic: watching television.

To assess self-reported affect, we had participants complete the PANAS-X (Watson & Clark, 1991), on which they reported how they felt at the moment. The PANAS-X is an expanded version of the PANAS (Watson, Clark, & Tellegen, 1988). The PANAS-X includes 60 items on which participants rate the extent to which they feel specific emotional states (1 = *very slightly or not at all*, 5 = *extremely*). In addition to assessing the two original higher order scales of positive and negative affect, the PANAS-X assesses 11 specific emotional states: fear (*afraid, scared, frightened, nervous, jittery, shaky*), sadness (*sad, blue, downhearted, alone, lonely*), guilt (*guilty, ashamed, blameworthy, angry at self, disgusted with self, dissatisfied with self*), hostility (*angry, hostile, irritable, scornful, disgusted, loathing*), shyness (*shy, bashful, sheepish, timid*), fatigue (*sleepy, tired, sluggish, drowsy*), surprise (*amazed, surprised, astonished*), joviality (*happy, joyful, delighted, cheerful, excited, enthusiastic, lively, energetic*), self-assurance (*proud, strong, confident, bold, daring, fearless*), attentiveness (*alert, attentive, concentrating, determined*), and serenity (*calm, relaxed, at ease*). Five items of the general positive (*active, inspired, interested*) and negative (*upset, distressed*) affect scales were not used on subscales. The subscales comprising these 11 emotional states were derived from factor analyses, and they possess high internal consistency (α s > .70). The subscales also show (a) convergent validity because they correlate highly with the corresponding Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1971), (b) discriminant validity in that the subscales of the PANAS-X are less highly intercorrelated than POMS counterparts, and (c) convergent and discriminant validity in that well-acquainted peers' ratings correlate with self-ratings.

The packet of materials for the "second study" began with a page that reiterated the cover story. Two handwritten copies of the essays followed, and an evaluation form followed each essay. One of the essays was pro-U.S., and the other was anti-U.S. (see Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992, for a detailed description of the essays). The order of presentation of the essays was counterbalanced. The evaluation forms consisted of three items that assessed the participants' evaluations of each of the authors (the extent to which participants

liked the author, thought the author was intelligent, and thought the author was knowledgeable) and two items that assessed the participants' evaluations of each of the essays (the extent to which the participants agreed with the author's opinions and how true they thought the author's opinion was). Evaluations were made on 9-point scales (1 = *not at all*, 9 = *totally*).

Results and Discussion

Manipulation check. To assess the effectiveness of the self-esteem manipulation, we performed a 2 (personality feedback) \times 2 (MS) analysis of variance (ANOVA) on the item that assessed how good the personality assessment made participants feel about themselves.¹ As expected, a main effect for personality feedback was found, $F(1, 45) = 59.24, p < .001$, which indicated that participants who received a positive assessment felt better about themselves ($M = 8.12$) than did participants who received a neutral assessment ($M = 5.46$). An unexpected, marginally significant main effect for MS also was found, $F(1, 45) = 3.55, p < .07$, which indicated that MS participants felt worse about themselves ($M = 6.46$) than did control participants ($M = 7.16$). This marginal effect was probably spurious, because the measure occurred before the MS manipulation. It does not parallel the interaction effects on the primary dependent variable (see below).

In addition, the ANOVA revealed a marginally significant main effect of personality feedback on ratings of the accuracy of the personality assessments, $F(1, 45) = 3.92, p = .054$. Positive-personality-feedback participants rated their assessments as more accurate ($M = 7.44$) than did neutral-personality-feedback participants ($M = 6.54$). This effect is consistent with previous research on self-serving biases (e.g., Frey, 1978; Greenberg, Pyszczynski, & Solomon, 1982).

Evaluations of the targets. As in previous experiments (Greenberg et al., 1994), we computed two measures of worldview defense: one that reflects preference for the pro-U.S. author and one that reflects preference for the pro-U.S. essay. To create a measure of pro-U.S. author preference, we subtracted the mean of the author items for the anti-U.S. author from the mean of the same items for the pro-U.S. author. Using the same method, we also created a measure of preference for the pro-U.S. essay.

We conducted separate 2 (personality feedback) \times 2 (MS) ANOVAs on the two composites. For the author composite, the analysis revealed main effects of MS, $F(1, 45) = 4.05, p = .05$; and personality feedback, $F(1, 45) = 4.27, p < .05$; and a Personality Feedback \times MS interaction, $F(1, 45) = 4.29, p < .05$ (see Table 1 for means). The main effect of MS indicates that, as in previous experiments, MS participants expressed more preference for the pro-U.S. author ($M = 1.97$) than did control participants ($M = 0.91$). The main effect for personality feedback indicated that neutral-personality-feedback participants expressed more preference for the pro-U.S. author ($M = 1.99$) than did positive-personality-feedback participants ($M = 0.89$).

Planned comparisons revealed that although MS led to increased pro-U.S. preference among neutral-personality-feedback participants, $t(45) = 2.89, p < .007$, it had no such effect on positive-personality-feedback participants, $t(45) < 1.00$. Looked at differently, in the control condition positive-personal-

Table 1

Mean Preference for the Pro-U.S. Author as a Function of Personality Feedback and Mortality Salience: Experiment 1

Index	Positive feedback				Neutral feedback			
	Mortality salience ^a		Control ^b		Mortality salience ^a		Control ^b	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Author	0.89 _a	1.83	0.90 _a	2.33	3.06 _b	1.57	0.92 _a	1.31

Note. Values reflect differences between participants' ratings of the pro- and anti-U.S. authors (pro-U.S. – anti-U.S.). Higher means indicate a greater difference between ratings of the pro- and anti-U.S. positions. Means that do not share a common subscript differ at $p < .05$.

^a $n = 12$. ^b $n = 13$.

ity-feedback participants did not differ from neutral-personality-feedback participants in preference for the pro-U.S. author ($t < 1.0$); in the MS condition, however, positive-personality-feedback participants displayed less preference for the pro-U.S. author than did neutral-personality-feedback participants, $t(45) = 2.93, p < .006$. These effects support the hypothesis that increased self-esteem reduces the effect of MS on worldview defense.

A 2 (personality feedback) \times 2 (MS) ANOVA performed on the essay composite revealed only a main effect of personality feedback, $F(1, 45) = 4.87, p < .04$, which indicated that neutral-personality-feedback participants exhibited more preference for the pro-U.S. essay ($M = 2.67$) than did positive-personality-feedback participants ($M = 0.96$). No other significant effect emerged ($ps > .60$).

Results on the evaluation-of-the-author composite conformed to predictions, whereas results on the evaluation-of-the-essay composite did not. This same pattern of results has occurred in previous experiments (Greenberg et al., 1994). Some previous experiments have found effects on both measures (e.g., Greenberg et al., 1990), whereas other previous experiments have found effects only on the author composite (e.g., Greenberg et al., 1994). The evaluation-of-the-essay composite may not be as sensitive for detecting MS effects as the evaluation-of-the-author composite, because evaluating essays may be a more rational judgment, whereas evaluating authors may be a more experiential judgment. Consistent with this reasoning, we recently found that MS effects are stronger when participants are encouraged to respond with their gut reactions to target individuals than when they are encouraged to respond more analytically (Simon et al., in press).

Self-reported affect. A multivariate analysis of variance (MANOVA) performed on the 11 subscales of the PANAS-X revealed no significant effects (all $ps > .10$). Because the general positive and negative affect scales of the PANAS-X contain many of the same items that the specific subscales contain, we analyzed positive affect, negative affect, and the difference

¹ In Experiments 1 and 2, order of presentation of the essays and sex of participant had no effects; therefore they were not included in the primary analyses. In Experiment 3 there were too few men to adequately assess effects of sex.

between positive and negative affect with ANOVAs. These ANOVAs produced no significant effects ($ps > .10$). Because of the small ratio of cases to dependent variables, which might reduce the power of the MANOVA and produce a nonsignificant F , we performed 2 (personality feedback) \times 2 (MS) ANOVAs on each of the subscales. These analyses revealed one significant effect: MS participants reported more fear ($M = 1.43$) than did control participants ($M = 1.15$), $F(1, 42) = 4.75$, $p < .05$.

We computed within-cell correlations between pro-U.S. preference (author subscale) and the self-esteem manipulation check and relevant affect subscales; these are reported in Table 2. As can be seen, the only moderately clear pattern of correlations to emerge between worldview defense and affect is for the correlations in the MS-neutral-feedback condition, the condition in which exaggerated worldview defense occurred, to be opposite the other conditions and opposite what might be expected if negative affect mediated the MS-worldview-defense link. That is, greater positive affect and lesser negative affect related to increased worldview defense. These results are consistent with previous research that has found that individuals who respond to MS with increased positive affect or decreased death fear engage in increased worldview defense (Greenberg, Simon, et al., 1995, Study 3; Jones, 1992).

In the positive-personality-feedback condition, responses to the self-esteem manipulation check correlated negatively with pro-U.S. bias, suggesting that increased self-esteem reduced pro-U.S. bias. In the neutral-feedback conditions, these correlations were weak but positive—an unexpected effect. Perhaps asking participants to indicate how the personality feedback made them feel about themselves (the manipulation check), rather than just asking them how they felt about themselves, produced this relationship. With positive feedback the question may have tapped self-esteem feelings, whereas with neutral feedback the question may have tapped a defensive interpretation of the feedback or a more negative initial expectation for what the feedback might indicate (which may result from low dispositional self-esteem). In other words, within the neutral-feedback condition, the participants who scored higher than others on how good the feedback made them feel may have been responding defensively. Alternatively, if they were accurately reporting their self-esteem, they were likely to be the individuals most lacking in dispositional self-esteem. These potential con-

foundings make it difficult to offer a clear interpretation of the variability in responses to the manipulation check within the neutral-feedback condition, which in turn makes it difficult to interpret the within-cell correlations between this measure and worldview defense. In any event, the manipulation, which has been found in other research to affect scores on the Rosenberg (1965) Self-Esteem Scale (Greenberg, Solomon, et al., 1992), was clearly effective at moderating reactions to MS.

Experiment 2

The major finding of Experiment 1 was that increasing self-esteem decreased the worldview defense that occurs in response to reminders of mortality. If this decrease occurred because of the protection that self-esteem provides from mortality concerns, then MS should have less impact not only on individuals whose self-esteem has been situationally elevated but also on individuals who are dispositionally high in self-esteem. To test this idea, we conducted a conceptual replication of Experiment 1 in which the situational self-esteem manipulation was replaced with a measure of dispositional self-esteem. On the basis of predictions derived from terror management theory and the results of Experiment 1, we predicted that MS would have less of an effect on individuals with high self-esteem than on individuals with moderate self-esteem.

Concerning the reactions of the high- and moderate-self-esteem individuals in the control conditions, we predicted that individuals with high dispositional self-esteem would engage in more worldview defense than would individuals with moderate dispositional self-esteem. This prediction is predicated on the idea that individuals high in self-esteem may be deriving more self-worth from the cultural worldview and therefore may be more invested in the worldview and more biased in favor of it.

For Experiment 2, only individuals with moderate dispositional self-esteem and individuals with extremely high dispositional self-esteem were invited to participate in the experiment. We did this to make Experiment 2 maximally comparable with Experiment 1 and to avoid including individuals with extremely low dispositional self-esteem, because recent experiments have shown that mildly depressed individuals, who tend to be low in self-esteem, engage in especially high levels of worldview defense in response to MS (Simon, Greenberg, Harmon-Jones, Solomon, & Pyszczynski, 1996). As in Experiment 1, participants wrote about death or a neutral topic and then read and evaluated an essay by an author who praised the U.S. and an essay by an author who criticized the U.S.

Method

Participants. Fifty introductory psychology students (32 women and 18 men) from the University of Arizona participated to partially fulfill a course requirement. All participants had taken part in a mass survey session at the beginning of the semester. We categorized participants who scored above the 75th percentile (greater than 36) of the distribution on the Rosenberg Self-Esteem Scale (Rosenberg, 1965) as high in self-esteem ($M = 38.4$) and those who scored between the 25th (28) and 50th percentiles (32) of the distribution as moderate in self-esteem ($M = 30.4$). We chose these percentile ranges to maximize the difference between the groups and to avoid including individuals with extremely low self-esteem (below the 25th percentile). We first recruited individu-

Table 2
*Within-Cell Correlations Between Indexes and
Worldview Defense: Experiment 1*

Index	Positive feedback		Neutral feedback	
	Mortality salience	Control	Mortality salience	Control
Self-esteem check	-.26	-.38	.22	.02
Positive affect	-.12	.47	.70*	.06
Negative affect	-.03	.45	-.31	.21
Fear	-.17	.65	-.31	.18
Self-assurance	-.15	.39	.46	.14
Jovial	-.23	.43	.67*	-.05

Note. All indexes were scored so that higher values reflect greater amounts of the construct (self-esteem, affect, worldview defense).

* $p < .05$.

als who scored at the extreme high ends of the two self-esteem groups (40 and 32) and worked down from there to fill the high- and moderate-self-esteem groups. Only participants who remained within these ranges on a second Rosenberg (1965) Self-Esteem Scale administered at the experimental sessions were used in the primary analyses. We randomly assigned participants to the MS or control condition of the 2 (MS) \times 2 (self-esteem: high vs. moderate) factorial design.

Procedure. The procedure was identical to that used in Experiment 1, except that the self-esteem manipulation was excluded. As in Experiment 1, participants completed a booklet of personality measures, which included the Rosenberg Self-Esteem Scale (to check on the classification of participants' levels of self-esteem) and the open-ended questions about either death or TV. They then read and evaluated a pro- and an anti-U.S. essay.

Results

Evaluations of the targets. We computed the same composite author and essay evaluation measures used in Experiment 1 and in previous experiments (Greenberg et al., 1994; Simon et al., 1996). We conducted separate 2 (self-esteem) \times 2 (MS) ANOVAs on each composite. For both measures, a significant main effect of MS, $F(1, 46) = 4.17, p < .05$ (author composite), and $F(1, 46) = 4.99, p < .04$ (essay composite); and an MS \times Self-Esteem interaction, $F(1, 46) = 4.36, p < .05$ (author), and $F(1, 46) = 4.15, p < .05$ (essay) were revealed (see Table 3 for means). The main effect of MS indicates that, as in previous experiments, participants who were induced to think about their mortality exhibited greater preference for the pro-U.S. author ($M = 2.56$) and essay ($M = 3.04$) than did participants who were induced to think about a neutral topic ($M = 1.56$, for author; $M = 1.58$, for essay).

Planned comparisons revealed that, as predicted, this increase in worldview defense occurred only among moderate-self-esteem participants. Among moderate-self-esteem participants, MS led to increased preference for the pro-U.S. author, $t(46) = 2.87, p < .007$, and essay, $t(46) = 2.97, p < .006$, relative to the control condition. In contrast, MS had no effect on pro-U.S. preference on either measure among high-self-esteem participants (both $ts < 1.0$). Looked at differently, in the absence of MS, high-self-esteem participants exhibited greater pro-U.S.

preference than did moderate-self-esteem participants, $t(46) = 2.14, p < .04$ (author), and $t(46) = 2.09, p < .05$ (essay), but with MS, high- and moderate-self-esteem participants did not differ from each other on either measure ($ts < 1.0$). Although high-self-esteem participants engaged in more worldview defense than moderate-self-esteem participants in the absence of MS, only moderate-self-esteem participants responded to MS with an increase in worldview defense.² Participants high in dispositional self-esteem were significantly less affected by reminders of mortality than were participants with moderate dispositional self-esteem.

Significant effects emerged on both author and essay evaluations in the present experiment, whereas they emerged on the author but not the essay evaluations in Experiment 1. Some previous experiments have found effects on both measures (e.g., Greenberg et al., 1990), whereas other previous experiments have found effects on the author but not the essay evaluations (Greenberg et al., 1994). As discussed earlier, these differences may result from the degree of analytical orientation participants use when responding to the essays. Perhaps the psychological environment of Experiment 1, as compared to that of Experiment 2, caused participants to respond more analytically. Recent research suggests that subtle differences in the appearance or demeanor of the experimenter can encourage either a relatively analytic or a relatively experiential orientation to the target evaluations (Simon et al., in press).

Self-reported affect. A MANOVA performed on the 11 subscales of the PANAS-X revealed no significant effects (all $ps > .29$). We analyzed positive affect, negative affect, and the difference between positive and negative affect with 2 (self-esteem) \times 2 (MS) ANOVAs. For positive affect, a significant main effect of self-esteem occurred, $F(1, 45) = 9.30, p < .005$, which indicated that high-self-esteem participants reported more positive affect ($M = 3.03$) than did moderate-self-esteem participants ($M = 2.44$). For the difference between positive and negative affect, a significant main effect of self-esteem occurred, $F(1, 45) = 6.13, p < .02$, which indicated that high-self-esteem participants reported more of a difference between positive and negative affect ($M = 1.65$) than did moderate-self-esteem participants ($M = 1.02$). No significant effects were found for negative affect ($p > .70$). As in Experiment 1, we performed 2 (self-esteem) \times 2 (MS) ANOVAs on the subscales. They revealed that high-self-esteem participants reported more self-assurance ($M = 2.90$) and joviality ($M = 2.55$) than did moderate-self-esteem participants ($Ms = 2.22$ and 2.12 for self-assurance and joviality, respectively), $F(1, 44) > 4.16, ps < .05$.

We examined the correlations between relevant affect subscales and pro-U.S. preference scores for author and essay within each condition. None of these correlations were significant (all $ps > .10$). Although high-self-esteem participants reported higher positive affect than did moderate-self-esteem participants, the results from the within-cell correlations displayed in Table 4 suggest that affect was not responsible for the effects of self-esteem on worldview defense.

Table 3
Mean Preference for the Pro-U.S. Author and Essay
as a Function of Dispositional Self-Esteem
and Mortality Salience: Experiment 2

Index	High self-esteem				Moderate self-esteem			
	Mortality salience ^a		Control ^b		Mortality salience ^b		Control ^b	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Author	2.31 _a	1.88	2.86 _a	1.81	2.86 _a	2.01	0.78 _b	1.32
Essay	2.71 _a	2.27	2.58 _a	2.76	3.42 _a	2.26	0.58 _b	2.02

Note. Values reflect differences between participants' ratings of the pro- and anti-U.S. authors and essays (pro-U.S. – anti-U.S.). Higher means indicate a greater difference between ratings of the pro- and anti-U.S. positions. Within rows, means that do not share a common subscript differ at $p < .05$.

^a $n = 14$. ^b $n = 12$.

² We tested homogeneity of variances of dependent variables in each experiment using Bartlett-Box F . The probability of the variances differing between conditions was relatively large ($ps > .25$), suggesting that the differences among condition means, especially in Experiment 2, do not reflect ceiling effects.

Table 4
Within-Cell Correlations Between Affect Indexes and Worldview Defense: Experiment 2

Index	High self-esteem				Moderate self-esteem			
	Mortality salience		Control		Mortality salience		Control	
	Author	Essay	Author	Essay	Author	Essay	Author	Essay
Positive affect	.25	.44	.18	.24	.18	.11	-.48	-.23
Negative affect	.15	-.32	.07	-.07	.09	.25	.18	-.22
Fear	-.14	-.30	.01	-.13	-.14	.03	.10	-.21
Self-assurance	-.01	.18	.33	.37	-.07	-.07	-.29	-.28
Jovial	-.06	.54	.01	.11	-.00	.12	.05	.22

Note. None of the correlations are significant. All indexes were scored so that higher values reflect greater amounts of the construct (affect, worldview defense).

The results of Experiment 2 are generally consistent with the results of Experiment 1. Both support the prediction derived from terror management theory that self-esteem would reduce the worldview defense produced by MS. In Experiment 2, participants with moderate dispositional self-esteem behaved as the participants in Experiment 1 who were given neutral personality feedback and as participants in previous MS experiments who were not screened for self-esteem (e.g., Greenberg et al., 1990; Rosenblatt et al., 1989): When reminded of their mortality, they exhibited higher levels of worldview defense. In contrast, high-self-esteem, whether experimentally increased, as in Experiment 1, or dispositionally high, as in Experiment 2, prevented participants from responding to MS with increased worldview defense.

In the MS condition of Experiment 2 moderate-self-esteem participants did not evidence more worldview defense than did high-self-esteem participants, whereas in Experiment 1 they did. Perhaps this difference in results occurred because in the control condition of Experiment 2, moderate-self-esteem participants evidenced less worldview defense than did high-self-esteem participants, whereas in the control condition of Experiment 1 they did not. Because in the control conditions of Experiment 2 high-self-esteem participants displayed more worldview defense than did moderate-self-esteem participants, MS increased the level of worldview defense of moderate-self-esteem individuals to the level normally exhibited by high-self-esteem individuals. The key point remains that in both Experiments 1 and 2, MS increased the worldview defense of moderate-self-esteem participants, but it did not increase the worldview defense of high-self-esteem participants.

The greater worldview defense by dispositionally high-self-esteem participants in the control condition is consistent with the notion that high-self-esteem individuals are more invested in their cultural worldviews because they are more able to derive a sense of personal value from them. Because of their perceived success in meeting the standards of value that are part of their culture, these individuals may be more committed to their culture and thus more likely to defend it under normal circumstances. Relatedly, because the culture is linked to the self through social identification, individuals with high dispositional self-esteem may view their culture in a self-serving manner, similar to the manner in which they exhibit self-serving biases in other self-relevant beliefs (e.g., Sackheim, 1983; Taylor & Brown, 1988).

Individuals whose self-esteem was experimentally raised in Experiment 1 did not respond with high levels of worldview defense in the control condition. Although high dispositional self-esteem is associated with high commitment to and defense of the cultural worldview, temporarily increased self-esteem may not be. Perhaps only long-standing, relatively stable evaluations of the self are sufficient to evoke such reactions to people who impinge on the culture. Regardless of the source of the differences between the way in which individuals with high trait and increased state self-esteem responded to the targets in the control condition, high levels of self-esteem, whether trait or state, consistently undermined the power of MS to produce increased worldview defense. Apparently high self-esteem of either type is effective in short-circuiting the worldview defensive reactions produced by reminders of mortality.

With that established, we embarked on an initial investigation of how self-esteem affects responses to MS. Recent evidence (Greenberg et al., 1994) suggests that immediately after MS, death-related concerns are actively suppressed, and that after a delay and distraction from MS, the accessibility of death-related constructs increases. In parallel fashion, increased worldview defense occurs only after a delay and distraction from MS. In conjunction with more recent research, this evidence suggests that the exaggerated worldview defense that occurs following MS results when the accessibility of death-related constructs is high. Perhaps self-esteem reduces the exaggerated worldview defense by promoting the sustained suppression of death-related constructs. If so, increased self-esteem should eliminate the delayed increase in the accessibility of death-related constructs that normally occurs following MS. We designed Experiment 3 to test this hypothesis.

Experiment 3

Greenberg et al. (1994) proposed that the problem of death exerts its effects on worldview defense primarily when death concern is on the fringes of consciousness, that is, when it is highly accessible but not in current focal attention. In support of this idea, Greenberg et al. (1994) found that: (a) relatively subtle reminders of mortality produce stronger effects than more blatant and impactful ones (Experiment 1); (b) although strong MS effects are obtained when participants are distracted from thoughts of death in the time between the MS treatment and

assessment of worldview defense, these effects are eliminated when participants keep death constructs in focal attention during this interval (Experiments 2 and 3); and (c) although there is no increase in the accessibility of death constructs immediately after an MS induction, the accessibility of such constructs increases after a delay and distraction, precisely those conditions under which MS produced its effects on worldview defense (Experiment 4).

If the initially low death-construct accessibility following MS results from an active suppression of death-related constructs following MS, then high cognitive load (i.e., simultaneous involvement in several tasks that consume mental resources) should disrupt the suppression process (Wegner, 1992, 1994), thereby leading to immediately high accessibility of death-related constructs following MS. In addition, if high death-construct accessibility is a prerequisite of increased worldview defense, then under high cognitive load increased worldview defense should emerge immediately following MS. Recent research has supported both of these lines of reasoning by showing that if participants are cognitively busy immediately after MS, both death-construct accessibility and worldview defense are high (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, in press). In addition, other recent research has shown that subliminal priming of the word *dead* causes both high death-construct accessibility and worldview defense immediately after the prime (Arndt, Greenberg, Pyszczynski, & Solomon, 1996). Taken together, these findings suggest that when death is highly accessible but just outside of focal consciousness, increased worldview defense occurs. Perhaps high self-esteem reduces worldview defense by facilitating the suppression of death-related constructs following MS. By keeping death-construct accessibility low, high self-esteem eliminates the need for intensified worldview defense following MS.

In Experiment 3 we tested this possibility by assessing the effect of increasing participants' self-esteem on the accessibility of death constructs immediately after the MS treatment and after a delay and distraction from MS. If self-esteem reduces worldview defensive responses to MS by reducing the delayed increase in death-construct accessibility that MS produces, then increasing participants' self-esteem should prevent this delayed increase from occurring in response to MS. To test this hypothesis, we manipulated self-esteem and MS as in Experiment 1. After the MS manipulation, participants completed a paper-and-pencil word-fragment completion task to assess the accessibility of death constructs, were distracted for a few minutes, and then completed another paper-and-pencil word-fragment completion task.

Method

Participants. Forty-eight introductory psychology students (37 women and 11 men) from the University of Arizona participated to partially fulfill a course requirement. Participants were randomly assigned to conditions of the 2 (personality feedback: neutral vs. positive) \times 2 (MS treatment: MS vs. control) factorial design.

Procedure. The procedure for the present experiment was similar to that used in Experiment 1, except for the following:

1. The questionnaire checking the manipulation of self-esteem was not attached to the packet of questionnaires used in the "first experiment" but was given to participants and collected before they received the filler questionnaire, the MS manipulation, and the affect scale.

2. After participants completed the packet for the "first study," the experimenter gave them a second packet of materials that "were being pretested for future studies" and asked them to work on the materials in the order they were presented. Participants worked at their own pace and were not timed. Included in the packet was a paper-and-pencil word-fragment completion task, a short passage to be read that served as a distraction, another paper-and-pencil word-fragment completion task, and a questionnaire asking participants to recall details of the passage.

3. Once participants finished their packets, they returned to the main room, and the experimenter asked them to write on a piece of paper the items from the affect scale they could remember. Once they finished this, the experimenter asked them to write as much as they could remember about their personality assessment. Memory was assessed for exploratory purposes. After participants finished writing, they were debriefed.

Materials. The self-esteem manipulation and questionnaires used in the "first study" (which included the MS manipulation) were identical to the ones used in Experiment 1. The packet of "materials being pretested" began with a paper-and-pencil word-fragment completion task, similar to tasks used by other researchers (e.g., Bassili & Smith, 1986; Gilbert & Hixon, 1991; Horowitz, White, & Atwood, 1968; Tulving, Schacter, Stark, 1982; Warrington & Weiskrantz, 1970, 1974), that was used to assess death-construct accessibility. The instructions on the task asked participants to "complete the following by filling in letters in the blanks to create words. Write in one letter per blank. Some words may be plural." Included were 26 words to be completed: Four were designed to be related to television, 4 were designed to be related to death, and 18 were included as fillers. The task was designed so that death-related (television-related) words could be completed as either death-related words (television-related words) or as neutral words (e.g., D E _ _ could be DEAD or DEEP). A second word-fragment completion task, which followed the reading passage (described below), was identical to the first except for the words included. Order of presentation of word-fragment completion tasks was counterbalanced, to assess whether the particular set of word fragments contributed to the effects; results indicated that it did not.

Following the first word-fragment completion task was a distraction, a 7-page passage to be read. Written instructions included on the first page of the passage asked participants to read the short story and told them that their "natural memory for different aspects of the story" would later be assessed. The passage was an excerpt from "The Growing Stone," a short story from the collection *Exile and the Kingdom* (Camus, 1957). This excerpt was used because it was a mundane descriptive passage with no affective, death-related, or existential references. The final questionnaire of the packet, included to sustain the cover story, asked participants five questions about the passage.

Results and Discussion

Manipulation check. To assess the effectiveness of the self-esteem manipulation, we performed a 2 (personality feedback) \times 2 (MS) between-subjects ANOVA, which revealed a main effect for personality feedback, $F(1, 44) = 106.83, p < .0001$, indicating that positive-personality-feedback participants reported feeling better about themselves ($M = 8.44$) than did neutral-personality-feedback participants ($M = 5.26$). No other effects were significant (all $ps > .55$).

Accessibility of words following MS. We performed a 2 (personality feedback) \times 2 (MS) between-subjects \times 2 (time of completing accessibility measures) within-subjects ANOVA on the accessibility of death-related words. The ANOVA revealed a main effect of time, $F(1, 44) = 4.96, p < .04$; a Personality Feedback \times Time interaction, $F(1, 44) = 10.97, p < .002$; an MS \times Time interaction, $F(1, 44) = 7.79, p < .008$; and a Personality Feedback \times MS \times Time interaction, $F(1,$

Table 5
Mean Accessibility of Death-Related Words for the Mortality Salience (MS) × Time Interaction and the Personality Feedback × Time Interaction: Experiment 3

Interaction	Time after MS induction			
	Immediate		Delay	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
MS × Time				
MS ^a	0.96	0.55	1.63	1.31
Control ^a	0.83	0.70	0.75	0.61
Personality Feedback × Time				
Positive feedback ^b	0.92	0.64	0.76	0.78
Neutral feedback ^c	0.87	0.63	1.65	1.23

Note. The higher the mean, the greater the accessibility of death-related words.

^a *n* = 24. ^b *n* = 25. ^c *n* = 23.

44) = 7.55, $p < .009$. The main effect of time indicated that participants completed fragments with death-related words more after a delay ($M = 1.19$) than immediately after the MS manipulation ($M = 0.90$). As revealed by examination of the means of the Personality Feedback × Time interaction (see Table 5), death was most accessible (compared to other conditions) after the delay for neutral-personality-feedback participants and, as revealed by examination of the means of the MS × Time interaction, death was most accessible (compared to other conditions) after the delay for MS participants.

Planned comparisons revealed that although death-construct accessibility increased after the delay in the neutral-personality-feedback-MS condition, $t(44) = 5.31$, $p < .001$, it did not increase in the positive-personality-feedback-MS condition. In the other conditions, death was equally accessible after the delay and immediately following the MS manipulation (all $ts < 1.0$, see Table 6 for means). Looked at differently, accessibility when measured immediately after the MS treatment did not differ as a function of condition (all $ts < 1.0$), but after the delay, death was more accessible for neutral-personality-feedback-MS participants than for participants in each of the other conditions (all $ts > 6.25$, $ps < .001$).

We performed a 2 (personality feedback) × 2 (MS) between-subjects × 2 (time of completing accessibility measures)

within-subjects ANOVA on the accessibility of television-related words. No effects were significant (all $ps > .34$).

Affect. A 2 (personality feedback) × 2 (MS) between-subjects MANOVA performed on the 11 affect subscales of the PANAS-X revealed no significant effects (all $ps > .15$). A 2 (personality feedback) × 2 (MS) ANOVA performed on positive affect, negative affect, and the difference between positive and negative affect revealed no significant effects for positive affect or the difference between positive and negative affect ($p > .20$). However, a main effect of MS occurred for negative affect, $F(1, 43) = 5.04$, $p < .04$, indicating that MS participants reported more negative affect ($M = 1.42$) than did control participants ($M = 1.15$). We also computed ANOVAs for each of the affect subscales. For fear, a main effect of MS occurred, $F(1, 41) = 8.11$, $p < .01$, indicating that MS participants reported more fear ($M = 1.36$) than did control participants ($M = 1.08$).

Table 7 presents the within-cell correlations between death-construct accessibility after a delay and (a) responses to the self-esteem manipulation check and (b) relevant affect scales. None of the correlations are significant. However, in the positive-personality-feedback condition, the correlations suggest that the better the positive feedback made participants feel about themselves, the less death-related words were accessible after a delay.

Recall of the personality feedback, affect scales, and story. We calculated recall of the personality feedback by counting the number of pieces of information that participants recalled correctly and incorrectly. We calculated recall of the affect scales by counting the number of affect items that participants recalled correctly and incorrectly. For the story, we assessed recall by calculating whether questions were answered correctly or incorrectly, with incorrect responses given a value of 1 and correct responses given a value of 2. Because there were five questions about the story, we subjected the five items to a principal-components factor analysis with varimax rotation. Examination of the scree plot revealed two factors, with eigenvalues of 1.38 and 1.28, accounting for 27.7% and 25.5% of the variance. Questions 1 and 2 loaded highly (loadings $> .73$) on Factor 2, and Questions 3, 4, and 5 loaded highly (loadings $> .58$) on Factor 1.

We subjected the responses to these three recall measures to 2 (personality feedback) × 2 (MS) between-subjects ANOVAs. The only significant effect to emerge was a main effect of personality feedback on Factor 1 of the questions that assessed

Table 6
Mean Death-Construct Accessibility for the Personality Feedback × Mortality Salience (MS) × Time Interaction: Experiment 3

Time after MS induction	Positive feedback				Neutral feedback			
	MS ^a		Control ^b		MS ^c		Control ^b	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Immediate	0.92 _a	0.49	0.92 _a	0.79	1.00 _a	0.63	0.75 _a	0.62
Delay	0.77 _a	0.93	0.75 _a	0.62	2.64 _b	0.92	0.75 _a	0.62

Note. The higher the mean, the greater the accessibility of death-related words. Means that do not share a common subscript differ at $p < .05$.

^a *n* = 13. ^b *n* = 12. ^c *n* = 11.

Table 7
Correlations Between Indexes and Delayed Death-Construct Accessibility: Experiment 3

Index	Positive feedback		Neutral feedback	
	Mortality salience	Control	Mortality salience	Control
Self-esteem check	-.42	-.49	.21	-.28
Positive affect	-.12	-.55	.10	-.32
Negative affect	-.15	.19	-.31	.51
Fear	-.18	.04	-.23	-.22
Self-assurance	-.28	-.49	.18	-.01
Jovial	-.08	-.46	.02	-.43
Recall Story 1	.12	.00	.23	.18
Recall Story 2	-.42	.33	-.29	.05
Recall feedback correct	.55	-.24	.38	-.36
Recall feedback incorrect	-.41	-.18	.36	.19
Recall affect correct	.09	-.22	-.04	-.07
Recall affect incorrect	.15	-.06	.43	-.08

Note. None of the correlations are significant. All indexes were scored so that higher values reflect greater amounts of the construct (affect, correct responses, incorrect responses).

recall of the story, $F(1, 43) = 11.59$, $p < .01$, which indicated that high-self-esteem participants were more likely to correctly recall questions composing this factor than were moderate-self-esteem participants. No other significant effects resulted (all $ps > .12$). Within-cell correlations between recall indices and delayed death accessibility were computed and are reported in Table 7. As can be seen, no clear pattern of relationships emerged.

The results of Experiment 3 support the idea that increasing self-esteem facilitates the sustained suppression of death constructs. When participants received neutral personality feedback and were then reminded of their mortality, they evidenced increased death-construct accessibility following a delay and distraction from MS. In contrast, when participants received positive personality feedback and were then reminded of their mortality, they did not evidence this increase in death-construct accessibility. These results suggest that the reduction of worldview defense produced by high levels of self-esteem may result from the effect that self-esteem has on death-construct accessibility, a point to which we return later.

General Discussion

Taken together, the results of the present experiments support the terror management theory proposition that self-esteem provides protection against concerns about death. Experiment 1 demonstrated that experimentally elevated self-esteem reduces the worldview defense that occurs in response to reminders of mortality. Experiment 2 demonstrated that individuals with high dispositional self-esteem do not respond to MS with increased worldview defense, whereas individuals with moderate self-esteem do. Experiment 3 demonstrated that increasing self-esteem prevents the delayed increase in death-construct accessibility that occurs in response to MS (Greenberg et al., 1994), suggesting that self-esteem may reduce the effects of MS on worldview defense by preventing the delayed increase in death-construct accessibility that MS produces (although we were

unable to test this mediational hypothesis directly; see below). The present results converge with the results of previous experiments (Greenberg et al., 1994) in showing that worldview defense is increased under the same conditions that lead to high death-construct accessibility.

The present results are particularly notable because, by combining the anxiety-buffer and MS hypotheses, they show that self-esteem not only reduces anxiety and anxiety-mediated behavior but also reduces symbolic defensive responses to concerns about death. In past research on the anxiety-buffer hypothesis, increased self-esteem reduced self-reported anxiety and skin conductance in response to strong anxiety-producing threats. Although the previous experiments provide support for the terror management theory proposition that the psychological function of self-esteem is to buffer anxiety, the present results show that self-esteem undermines the effects of MS, which are not mediated by anxiety. Research testing the MS hypothesis indicates that MS is different from strong anxiety-producing threats, MS exerts its effects on worldview defense by means of different processes, and MS effects are not produced by the salience of other future negative events (e.g., Greenberg et al., 1994; Greenberg, Simon, et al., 1995). Therefore, the present evidence that self-esteem reduces MS effects extends the effects of self-esteem beyond general anxiety buffering and establishes a specific relation to the problem of death, which constitutes significant new support for the terror management analysis.

Self-Esteem, Suppression, and Worldview Defense

An important question is exactly how heightened self-esteem keeps death-related constructs from becoming highly accessible after MS. One conceivable, but in our view unlikely, explanation for the results of Experiment 3 is that the positive personality feedback simply provided such an effective distraction that the additional cognitive load kept death-related constructs from becoming accessible. This seems unlikely because (a) research (Greenberg, Solomon, et al., 1992; Greenberg et al., 1993) has not found that the positive personality feedback is more memorable than the neutral feedback or that it leads to poorer recall of other subsequently presented material, and (b) recent research has found that cognitive load leads to increased rather than decreased death-construct accessibility following MS (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, in press).

A more theoretically interesting but unlikely explanation is that increased self-esteem may have reduced the need to suppress the death-related constructs. That high death-construct accessibility did not occur immediately after MS in the positive-personality-feedback condition seems to argue against this possibility.

In our view, the best explanation for the results of Experiment 3 is that by reducing concerns about mortality, high self-esteem facilitates sustained suppression of death-related constructs. Although further research is needed to test this hypothesis and to specify the exact mechanisms through which the effect may occur, if this hypothesis is confirmed it would suggest an important refinement of our understanding of the role of self-esteem in reactions to reminders of death: Self-esteem may fortify a frontline, direct defense against death-related concern and may do so by reducing the accessibility of death-related

constructs.³ Indeed, it may be this process that eliminates the need for the indirect, symbolic worldview defense.

Although we would be more confident that increased death-construct accessibility causes increased worldview defense if we could find within a single experiment a correlation between death-construct accessibility and worldview defense, we believe that this would be extremely difficult if not impossible to do. Measuring death-construct accessibility is likely to alter the spontaneous process by which worldview defense is produced, because participants are likely to become consciously aware of death constructs as part of the measurement process. Although direct evidence of the hypothesized mediating effect of death-construct accessibility has not been provided within a single experiment, the results reviewed demonstrate that the conditions under which an increase in death-construct accessibility occurs (delay and distraction after an MS induction, moderate or unmanipulated self-esteem, cognitively busy immediately after MS, subliminal presentation of a death construct) are the same as those under which increased worldview defense occurs, and the conditions that inhibit an increase in death-construct accessibility (immediately after an MS induction, high self-esteem) are the same as those under which increased worldview defense does not occur. In addition, recent research has revealed that following MS, the opportunity to engage in worldview defense reduces the accessibility of death constructs relative to a condition in which participants do not have an opportunity to defend the worldview (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, *in press*). By showing that worldview defense reduces the accessibility of death constructs, these results suggest that heightened accessibility motivates such defense. In light of these results, the idea that self-esteem reduces MS-produced worldview defense because it eliminates the delayed increase in death-construct accessibility seems particularly plausible. Although future research is needed to fully understand the role of death-construct accessibility, the existing evidence is consistent with this interpretation.

Role of Affect

An important issue for further inquiry is the precise role that affect plays in these effects. Previous experiments have suggested that the subjective experience of affect does not play a significant role in the production of MS effects. Although the within-cell correlations of the present research suggest that affect did not mediate the effects of MS on worldview defense, MS participants in Experiments 1 and 3 reported increased fear—the first time such an effect has emerged in MS research. That the effect emerged in Experiments 1 and 3 and not in Experiment 2, or in 20 or so past experiments, suggests that the personality feedback manipulation may have produced this effect by increasing self-consciousness, by increasing experimenter demand to report fear after MS, or through some similar process.

Perhaps evidence of increased negative affect following MS (especially answering the open-ended question that asked participants to describe the emotions that the thought of death arouses in them) has not been found in past research because participants interpret the self-report measure as inquiring how they feel above and beyond the feelings that MS evoked. Such an interpretation suggests that MS would not evoke increased

reported negative affect, even though it would evoke increased *actual* negative affect. Though conceivable, this interpretation would have difficulty explaining why increased negative affect has not emerged when mortality was made salient by means of death anxiety questionnaires (Greenberg, Simon et al., 1995, Study 3; Rosenblatt et al., 1989, Study 6). Moreover, this interpretation would have difficulty accounting for the results of experiments in which parallel questions about other aversive events (e.g., next important exam, worries about life after college) produced increased negative affect but not increased worldview defense (Greenberg, Simon, et al., 1995). Finally, this view could not account for the lack of negative affect despite the occurrence of worldview defense following subliminal presentation of the word *dead* (Arndt, Greenberg, Pyszczynski, & Solomon, 1996).

One intriguing possibility that deserves attention is that affective responses to MS are suppressed along with thoughts of death and have not been detected in previous experiments because affect has been measured immediately after the MS induction. Much as with the accessibility of death constructs following MS, affect may increase after a delay. Although more research designed to assess this possibility is needed, the results of one experiment shed light on this issue. In this experiment, delay did not increase reports of negative affect, even though delay did increase worldview defense (Harmon-Jones, Arndt, & Greenberg, 1996).

Other Future Research Directions

According to the present results, increasing self-esteem prior to the MS induction reduces worldview defense. Do these same effects emerge if self-esteem is increased after the MS induction? That is, must the self-esteem boost precede rather than follow MS to effectively reduce the effects of MS? Results from Experiment 1 and previous research (Greenberg, Simon, et al., 1995; Jones, 1992) might appear to lend support to the idea that the self-esteem boost will be ineffective at reducing MS effects if it follows the MS induction. That is, when individuals respond to MS with increased positive affect or decreased death fear, which may reflect increased self-esteem, they engage in increased rather than decreased worldview defense. However, responding to MS with increased positive affect or decreased death fear is different than having one's self-esteem elevated from an external source and may reflect a defensive reaction to the concern about death that stems from the same concern as does worldview defense, thereby yielding a positive correlation between them. In contrast, externally altering self-esteem occurs independently of the participant's level of defensiveness, and therefore increased self-esteem may be able to reduce MS-produced worldview defense even when increased after the MS induction. Further research is necessary to address this question.

Another question worthy of future research is how self-esteem derived from different aspects of the worldview relate to MS-produced worldview defense. In the present research, we chose to manipulate self-esteem derived from one aspect of the worldview (i.e., personality) and then assessed its effects on

³ We thank an anonymous reviewer for suggesting this interesting explanation.

reactions to people who threatened and supported a different aspect of the worldview (i.e., the U.S.). Doing this reduced worldview defensive reactions to MS. However, if one's self-esteem is increased, and the aspect of the worldview from which self-esteem is derived is then threatened, how might individuals react? Perhaps individuals would react with more worldview defense than usual, but MS would not increase this reaction. Alternatively, because increased self-esteem is directly predicated on an aspect of the worldview that is being attacked, the attack might undermine the self-esteem boost and thereby negate its ability to reduce worldview defense in response to MS.

Conclusion

Although many theories posit that individuals need self-esteem and that the need for self-esteem mediates a broad range of social behavior (e.g., Blaine & Crocker, 1993; Greenwald, 1980; Tesser, 1988), the question of why self-esteem is such a basic human need has been mostly ignored by contemporary self-theorists. Terror management theory provides what we believe is a plausible and useful answer to this important question. The results of the present research provide the strongest evidence to date that self-esteem provides protection against deeply rooted anxiety about mortality. Along with other evidence (see Greenberg, Solomon, & Pyszczynski, in press, for a recent review), this research suggests that concern about mortality has unique psychological significance and plays an important role in individuals' striving to live up to their cultural standards of value (self-esteem) and in their reactions to individuals and ideas that challenge the way they conceive of themselves and the world in which they live. By showing that heightened self-esteem undermines the effect of MS on worldview defense, the present findings support the contention that self-esteem and faith in the cultural worldview are part of the same terror management system. With this established, an important next step is to delve more deeply into the affective and cognitive processes by which faith in the cultural worldview and self-esteem serve their terror management functions.

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Received November 22, 1994

Revision received June 1, 1996

Accepted June 17, 1996 ■