

Literal and Symbolic Immortality: The Effect of Evidence of Literal Immortality on Self-Esteem Striving in Response to Mortality Salience

Mark Dechesne
University of Nijmegen

Tom Pyszczynski
University of Colorado at Colorado Springs

Jamie Arndt, Sean Ransom, and Kennon M. Sheldon
University of Missouri—Columbia

Ad van Knippenberg and Jacques Janssen
University of Nijmegen

Three studies investigated the effect of encouraging participants to believe in an afterlife on the relationship between mortality salience and self-esteem striving. Participants were exposed to essays arguing either in favor of or against the existence of an afterlife, and reminded about death or a control topic. Mortality salience led to increased accuracy ratings of a positive personality description (Studies 1 and 2) and increased striving for and defense of values (Study 3) among participants who read the essay arguing against an afterlife, but not among participants who read the essay in favor of it. The implications for the terror management analysis of self-esteem, the appeal of immortality beliefs, and the interplay between self-esteem striving and spiritual pursuits are discussed.

"I don't want to attain immortality through my work; I want to attain immortality by not dying."—Woody Allen

Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg, & Pyszczynski, 1991) posits that a broad range of seemingly unrelated forms of human thought and behavior are rooted in a need to deny that physical death is the end of human existence. Although some of these thoughts and behaviors, such as belief in an afterlife and observance of religious rituals, bear obvious logical connection to the problem of death, others, such as self-esteem striving and nationalism, do not. Although TMT differentiates between the former, referred to as *literal immortality seeking*, and the latter, referred to as *symbolic immortality seeking*, little is known about the relationship between these two types of immortality striving. Of interest, most religions teach that fame, fortune, and success in the present life are of little significance when compared with the prospects of what might await us in the afterlife. The recent terrorist attacks in New York

City and Washington, DC suggest that people may be willing to forsake concerns about the present, and even sacrifice their own lives, if they are strongly convinced that a better life awaits them after death. Of course the difficulty for most of us is that there is no way of knowing what, if anything, actually does lie ahead for us after death. Despite the proliferation of afterlife beliefs throughout the world, there has been little systematic research designed to explicate how such beliefs affect basic human motives. The experiments reported in this article explored the relationship between literal and symbolic immortality striving by investigating the effect of exposing people to evidence that supports or challenges a belief in literal immortality on their pursuit of symbolic immortality, in the form of self-esteem striving and cultural worldview defense, after being reminded of their mortality.

TMT and Research

TMT posits that the juxtaposition of an instinctive desire for life with an awareness of the inevitability of death in an animal instinctively programmed for self-preservation and continued existence creates the potential for paralyzing terror. This potential for terror is kept under control by a dual-component cultural anxiety buffer consisting of self-esteem and faith in one's cultural worldview. From this perspective, self-esteem is derived from the cultural worldview and is attained by maintaining faith in the validity of one's worldview and the belief that one is living up to the standards of value that are part of it. Because both of these psychological structures are fragile social constructions, which are maintained largely through a process of consensual validation by others, the behavior of others has the power to impinge on the effectiveness of one's anxiety buffer. Consequently, people respond favorably to others who help them maintain self-esteem or faith in their cultural worldviews and unfavorably to others who threaten their self-esteem or faith in their cultural worldviews.

A growing body of research, to date consisting of well over 130 separate studies conducted in nine different countries, has provided

Mark Dechesne and Ad van Knippenberg, Department of Social Psychology, University of Nijmegen, Nijmegen, the Netherlands; Tom Pyszczynski, Department of Psychology, University of Colorado at Colorado Springs; Jamie Arndt and Kennon M. Sheldon, Department of Psychological Sciences, University of Missouri—Columbia; Sean Ransom, School of Journalism, University of Missouri—Columbia; Jacques Janssen, Department of Culture and Religion, University of Nijmegen, Nijmegen, the Netherlands.

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Correspondence concerning this article should be addressed to Mark Dechesne, Department of Social Psychology, University of Nijmegen, P.O. Box 9104, Nijmegen 6500 HE, the Netherlands. E-mail: dechesne@psych.kun.nl

support for the theory. Because the research reported here was focused primarily on the role of death-related concerns in self-esteem striving, and because much of the evidence for other aspects of TMT has been recently reviewed elsewhere (for a general review, see Greenberg, Solomon, & Pyszczynski, 1997; for a review of evidence concerning the cognitive mechanisms through which these effects occur, see Pyszczynski, Greenberg, & Solomon, 1999), we will focus our discussion here on studies of the effects of mortality salience on self-esteem striving.

The Death-Denying Function of Self-Esteem Striving

From the perspective of TMT, people are motivated to maintain positive self-images because of the protection from deeply rooted death-related fears that self-esteem provides. Initial evidence for this proposition came in the form of studies testing the anxiety-buffer hypothesis, which states that if self-esteem provides protection against the fear of death, then increasing self-esteem should produce lower levels of anxiety in response to threats of various sorts. Research has shown that both experimentally induced increases in self-esteem and high levels of dispositional self-esteem produce lower levels of subjectively experienced anxiety, physiological arousal, death-denying defensiveness, and death-thought accessibility in response to death-related stimuli (e.g., Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997; Greenberg et al., 1993; Greenberg, Solomon, et al., 1992; Harmon-Jones et al., 1997).

Additional evidence for the anxiety-buffering function of self-esteem comes from studies testing the mortality salience hypothesis, which states that, to the extent that a psychological structure provides protection against fear, reminders of the source of that fear should lead to increased need for that structure. Thus, if self-esteem provides protection against the fear of death, then reminders of death should produce increased self-esteem striving. In support of this reasoning, research has shown that reminders of death lead to (a) increased acceptance of dissimilar others among those for whom tolerance is a central worldview component and among those for whom the value of tolerance has recently been primed (Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992), (b) increased anxiety and discomfort when performing behaviors that violate important cultural norms (Greenberg, Porteus, Simon, Pyszczynski, & Solomon, 1995), (c) increased attempts to fit in among those whose belongingness has been threatened and increased attempts to stand out among those whose individuality has been threatened (Simon, Greenberg, Arndt, et al., 1997), (d) increased self-reported risk taking and risky driving on a driving simulator among those for whom driving is a source of self-esteem (Taubman Ben-Ari, Florian, & Mikulincer, 1999), (e) increased optimism about successful sports teams and decreased identification after a loss by a favorite sports team (Dechesne, Greenberg, Arndt, & Schimel, 2000), (f) decreased ingroup identification in response to threats to one's ingroup (Dechesne, Janssen, & van Knippenberg, 2000a), (g) increased ethnic identification among those primed with positive exemplars of one's ethnic group and decreased ethnic identification among those primed with negative exemplars of one's ethnic group (Arndt, Greenberg, Schimel, Pyszczynski, & Solomon, 2002), and (h) increased identification with one's physical body and increased interest in the physical aspects of sex among those high in body self-esteem and

decreased body monitoring among those low in body self-esteem but high in body objectification (Greenberg, McCoy, Pyszczynski, Greenberg, & Solomon, 2000). Although manifested in a variety of ways, all of these studies show that reminders of one's mortality lead to increased striving to attain self-esteem by living up to the standards of one's cultural worldview and defending one's self-esteem against information that challenges it.

Literal and Symbolic Immortality

It should be noted that none of the beliefs or behaviors investigated in these studies bear any obvious logical or semantic relation to the problem of death. Regardless of how correct one's worldview is or how well one meets its standards of value, one still knows that death is inevitable—self-esteem does nothing to change that. TMT posits that the cultural worldview and the self-esteem that is derived from it provide a form of symbolic immortality, the sense that one is a valuable part of something larger, more significant, and longer lasting than one's individual existence. Thus, by being a good American, a caring parent, a committed sports fan, a creative musician, or a brilliant scientist, and by believing in the ultimate importance and value of such pursuits, one is able to feel part of something that extends into eternity (cf. Florian & Mikulincer, 1998). In this sense, the protection provided by self-esteem is symbolic rather than literal, experiential rather than rational (cf. Epstein, 1994). According to TMT (for more thorough discussions, see Greenberg et al., 1997; Solomon et al., 1991; Pyszczynski et al., 1999), this protection is based on preverbal experiential linkages formed through early interactions with parents and primary caregivers and reinforced repeatedly across the life span by one's culture.

Research on the cognitive underpinnings of worldview defense is consistent with this view. Simon, Greenberg, Harmon-Jones, et al. (1997) have shown that mortality salience leads to worldview defense when one is in an experiential mode of processing but not when one is in a rational mode; presumably a rational mode of processing would interfere with such seemingly irrational defensive maneuvers that appear unrelated to the problem of death. Other research has shown that worldview defense occurs primarily when thoughts of death are on the fringes of consciousness, when they are highly accessible but not in current focal attention (Arndt, Greenberg, Pyszczynski, Solomon, & Simon, 1997; Arndt, Greenberg, Solomon, et al., 1997; Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994). Greenberg, Arndt, Simon, Pyszczynski, and Solomon (2000) have shown that whereas distal defenses emerge when thoughts of death are on the fringes of consciousness, more proximal defenses that attempt to cope with the problem of death in a more rational manner emerge when thoughts of death are in current focal attention. Specifically, this study showed that worldview defense, in the form of derogation of a person who criticized the United States, was increased by mortality salience after a delay and distraction but not immediately after presentation of death-related stimuli. However, proximal defense, in the form of denying one's vulnerability to an early death, emerged immediately after mortality salience but not after a delay and distraction.

Of course denying one's vulnerability to an early death is a far cry from literal immortality. People know that regardless of how well they maintain their health, death is still inevitable. Nonetheless, most cultures promise some form of literal immortality in-

volving continued life after physical death to at least some their constituents, in the form of heaven, reincarnation, or some other form of afterlife. Recent surveys estimate that the vast majority of the world's population believes in some form of life after death. Of interest, research outside of the TMT framework has shown that subtle intimations of mortality can produce increased belief in an afterlife and more favorable attitudes toward death, rather similar to the increased self-esteem striving found in terror management research. In a classic study, Osarchuk and Tatz (1973) reminded one third of their participants about mortality by exposing them to slides depicting morbid scenes and compared them with participants who were anticipating a painful shock and a group that was not exposed to anxiety-provoking stimuli. Osarchuk and Tatz found greater belief in an afterlife in the mortality salience condition compared with the other two conditions, although this effect was significant only among participants who indicated high belief in an afterlife in a preexperimental session. Moreover, Schoenrade (1989) conducted an experiment in which she first identified participants with a strong compared with weak belief in an afterlife, subsequently reminded half of the participants about death, and finally asked participants to indicate their valence associations with death. Participants with a strong belief in an afterlife who were confronted with death indicated both more positive and negative associations with death, compared with similar participants who were not reminded of death. In contrast, participants with a weak belief in an afterlife responded to a confrontation with mortality with only less positive associations.

Although the distinction between literal and symbolic immortality has been part of TMT since its initial inception, we know of no research that has explored the implications of this distinction. Hence, a critically important means of managing the potential for existential terror—that is, belief in an afterlife—has been ignored in all previous terror management research. Yet, the notion that faith in God or other spiritual pursuits can provide a means of transcending many of the baser motives or concerns of life has been a central theme in both Western and non-Western theology and philosophy since the beginnings of written history. Most (but not all) religions teach that the promise of some form of afterlife makes concerns about one's value in the present world of comparatively little consequence. Christian, Buddhist, Hindu, and Islamic theology all teach that the ultimate goal of life is to qualify for heaven, nirvana, or reincarnation, and suggest that pursuit of worldly success is at best irrelevant and at worst a hindrance to the attainment of this most important goal. Does confidence in the existence of an afterlife mitigate concerns with self-esteem and worldly success?

The central purpose of the present research was to address this question by investigating the impact of information that supports a belief in an afterlife on the pursuit of self-esteem in response to reminders of one's mortality. If, as TMT suggests, self-esteem striving is motivated by the fear that death entails absolute annihilation, then reminders of death would have less impact on self-esteem striving when people are given good reason to believe in some form of literal immortality, that physical death is not the end of existence. Thus, we hypothesized that although mortality salience would increase self-esteem striving (as in previous studies) among participants who were provided evidence refuting belief in an afterlife, it would have less (or no) effect on self-

esteem striving among participants who were provided evidence supporting belief in an afterlife.

Study 1

Our manipulation of belief in an afterlife capitalized on recent publicity and controversy concerning the "near-death experience," in which people who have been pronounced clinically dead have reported a variety of similar experiences, including a sensation of floating outside of their bodies, traveling through a "tunnel of light," and experiencing a great deal of calm and tranquility (cf. Ring & Elsaesser Valarino, 1998). Whereas some have claimed these reports provide evidence of the existence of life after death, others have argued that these experiences result from a variety of physical processes, including oxygen deprivation, expectancies, and motivated distortion of experiences (Kastenbaum, 1986). Because reports of such experiences provide at least the hope of an objective scientific answer to the question of whether life continues after physical death, and because our participant population consisted of college students with a high level of respect for science, we manipulated information relevant to afterlife beliefs by providing participants with a summary of a supposed scientific conference devoted to this issue. Half of the participants read a summary that argued that near-death experiences provide convincing evidence for some form of life after death, and half read a summary that argued that all such reports could be easily explained as the result of normal biological and psychological processes associated with oxygen deprivation to the brain.

Mortality salience was manipulated by asking open-ended questions about either death or a neutral topic, and participants were then given very positive feedback concerning their personalities, supposedly based on personality tests taken earlier in the session. Dechesne, Janssen, and van Knippenberg (2000b) have shown that mortality salience increases participants' judgments of the validity of such positive personality reports. Therefore, we used participants' reports of the validity of this positive personality feedback as our measure of self-esteem striving. We predicted that although mortality salience would increase ratings of the validity of the positive personality feedback among no-afterlife participants, information supporting belief in an afterlife would reduce or eliminate this effect.

Method

Participants. Fifty-four students at the University of Nijmegen, Nijmegen, the Netherlands, participated in the study, and were randomly assigned to conditions in a 2 (mortality salience vs. control) \times 2 (evidence supporting vs. refuting belief in an afterlife) factorial design. Their participation was voluntary and was rewarded with 5 Dutch guilders (approximately \$2.25 US).

Procedure and materials. Upon arrival at the laboratory, participants were welcomed by the experimenter, and the duration and procedure of the study were briefly explained. They were then led to an individual cubicle and instructed to seat themselves in front of a microcomputer. After the experimenter informed participants that all instructions and surveys would be communicated by the computer, she asked them to read the introduction on the screen, wished them good luck, and left.

The introduction stated that the Department of Personality had recently begun to investigate how a variety of personality surveys could be combined to form a general description of one's personality, and that participants would therefore fill out several personality surveys, from which a

global personality description could be determined. The introduction further stated that the department also had an interest in the relation between personality characteristics and memory, and that, as a secondary aspect of the study, participants would be asked to read a recent newspaper article at the beginning of the study and to write down what they could recall of it at the end of the study.

After participants pressed a button, a screen appeared that announced the "newspaper article" and encouraged participants to read it carefully. The newspaper article appeared on the next screen. The article was bogus, was actually written by the researchers, and was presented in one of two versions. The two versions both summarized recent scientific and medical research on the near-death experience, and were similar in form and style, but diametrically opposed in content (see Appendix for a complete description). Participants in the "afterlife" condition read a version informing them that leading medical investigators had recently conducted extensive research on the near-death experience, and found considerable evidence for the probability of continued existence after physical death. This alleged evidence included the similarities among reports of those who had a near-death experience, the occurrence of the experience among skeptics, the lack of a physical explanation, reports of observations that would be difficult to explain without assuming an out-of-body experience, and the near-universal conviction of people who had a near-death experience that physical death is not the end of life. Participants in the "end-of-life" condition read a version of the article that informed them that the near-death experience can be readily explained as the result of physiological and psychological processes. This assertion was allegedly based on the rare occurrence of the near-death experience, the specificity of the experience to religious people, the connection between oxygen deprivation and the near-death experience, and the measurement of specific physiological processes during the experiences. Participants were instructed to press a button when they finished reading the article.

Although the summaries differed in content, the presentation style was identical, and both summaries contained approximately the same number of words. Participant's reading time of the summaries was measured to control for potential differences in processing due to motivational factors or expectancy incongruence. It is possible that the content of one of the summaries would be perceived as either more surprising or more pleasant to read, and consequently would not only induce or decrease belief in afterlife but also would be more thoroughly processed during the subsequent tasks. By measuring the difference in reading times between immortality salience conditions, we could examine this possibility. Participants' reading time was measured by the time difference between the initial appearance of the articles and the pressing of the button to continue to the next part of the study.

After the articles, the introduction of the "personality" part of the study appeared. The instruction briefly reiterated the interest of the Department of Personality in the construction of a global personality description on the basis of several personality surveys and informed participants about the procedure of the study. This part of the study consisted of several filler personality surveys and tasks that were included to support the cover story, the mortality salience manipulation, an affect measure, a personality description, and an assessment of participants' perceptions of the validity of their personality description. Participants first filled out two filler surveys and a filler evaluation task. Then, mortality salience was induced for half of the participants using a procedure similar to the majority of terror management studies (e.g., Greenberg et al., 1990, 1994; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Participants were informed that research has revealed that the first, intuitive answer to questions about particular topics can provide considerable information about one's personality. Participants in the mortality salience condition were asked to write down, in one sentence, the first thing that came to their minds when thinking about death. Participants in the control condition were asked an identical question except that the topic was "watching television" instead of death. The study continued with the Positive and Negative Affect

Schedule (PANAS; Watson, Clark, & Tellegen, 1988), a measure that was included to assess potential mood differences produced by the previous question. Participants were asked to rate, on a scale ranging from 1 (*not at all*) to 5 (*extremely*), the extent to which they felt the various emotions listed in the PANAS *at this moment*.

A filler task was then included, because research has shown that participants must first be distracted from mortality salience for it to produce increased distal or symbolic defense (cf. Pyszczynski et al., 1999). Specifically, participants were instructed to evaluate 10 symbols (i.e., all symbols above the numerical keys of the keyboard, e.g., "!" and "@" on a 9 point-scale, ranging from 1 (*very ugly*) to 9 (*very beautiful*). It was then explained to participants that their input was sufficient to create a global personality description of them. Participants were further told that the Department of Personality had thus far developed eight personality profiles and that the scores of participants could be used to determine which of these personality profiles would be the most accurate depiction of themselves. When participants pressed a button, a small clock appeared on the screen, in addition to a statement that the computer was now determining the best-fitting profile.

A minute later, the personality profile was announced, and then shown on the screen. The profile was actually identical for all participants and has been shown in previous research (Dechesne et al., 2000b) to be rated as more valid after mortality salience. The profile stated (in Dutch) the following:

People with this personality profile are generally liked by others. Their willingness to entertain both themselves and others is highly commended. These people are often intelligent too. Although they have their own ways of doing things, the chances of getting an influential position are very high. Their creativity enables them to solve many problems. Charm smoothes satisfactory involvement in intimate relations. Charm and wisdom makes them attractive to many. It is possible, though, that these characteristics emerge only later on in life. The chances are that ambitions prevent these people from doing everything that they would like to do.

After participants read the profile, they were asked to indicate on a 9-point scale, ranging from 1 (*not applicable*) to 9 (*very applicable*), their agreement with the following three statements about the accuracy of the description: (a) "The description I just read presents an accurate image of my personality"; (b) "The description I just read reflects the relevant aspects of my personality"; and (c) "The description I just read provides a complete and consistent description of my personality." A composite created by summing responses to these three items constituted the primary dependent variable (Cronbach's $\alpha = .91$). As a check of the positivity of the description, participants were also asked to rate on a 9-point scale, ranging from 1 (*not applicable*) to 9 (*very applicable*), their agreement with the statement that "the description provides a positive depiction of my personality."

Finally, to maintain consistency with the cover story, participants were asked to write down what they could remember of the newspaper article they read. Upon finishing, participants were invited to return to the main room, where they were debriefed, given their payment, and thanked for their contribution.

Results

Perceived positivity of personality description. To check whether participants perceived the personality description as positive, we conducted a one-sample *t* test comparing the test value of 5 (the midpoint of the scale) with participants' rating of the positivity of the description. This analysis yielded a significant effect, $t(53) = 22.33, p < .001$, indicating that participants indeed considered their profiles to be positive ($M = 7.98$). Furthermore,

a 2 (mortality salience vs. control) \times 2 (afterlife vs. end-of-life) between-subjects analysis of variance (ANOVA) performed on this measure failed to detect differences between conditions, all $F_s(1, 50) < 1.56$, *ns*. This absence of effects suggests that the description was perceived as equally positive across conditions.

Accuracy of personality description. Our primary interest was to investigate whether mortality salience increases the perceived accuracy of the positive personality description, and whether evidence concerning an afterlife moderates this effect. To this end, we analyzed participants' composite measure of personality profile accuracy as a dependent variable in a 2 (mortality salience vs. TV salience) \times 2 (afterlife vs. end-of-life) ANOVA.¹ This analysis yielded a main effect of mortality salience, $F(1, 50) = 11.85$, $p < .002$, and a Mortality Salience \times Afterlife interaction, $F(1, 50) = 4.10$, $p < .05$. The relevant means are displayed in Table 1.

Planned comparison tests revealed that mortality salience led participants to rate the positive personality feedback as more valid relative to the control condition in the end-of-life condition, $t(50) = 3.87$, $p < .001$, but not in the afterlife condition, $t(50) = 1.0$, *ns*. Looked at differently, participants rated the positive personality feedback as more valid in the end-of-life than in the afterlife condition when exposed to mortality salience, $t(50) = 2.61$, $p < .02$, but not in the control condition, $t(50) = 0.30$, *ns*. These results thus provide support for the main hypothesis. Reminders of mortality led to greater perceived accuracy of a positive personality description when participants were presented with evidence that discourages belief in an afterlife, but this effect was eliminated when people were presented with evidence that encourages belief in an afterlife.

Affect. To check whether these results might have been caused by differences in affective state as a result of the mortality salience manipulation or the content of the article, we conducted separate 2 (mortality salience) \times 2 (article) ANOVAs on the positive and negative affect measures. Both analyses failed to detect significant results (all $p_s > .16$). The absence of differences in affective states suggests that the present results were unlikely to have been caused by subjectively experienced affect.

Reading time. To examine potential differences in processing of the two articles, a *t* test was conducted to compare differences

in reading time of the articles between the afterlife and end-of-life article conditions. This test failed to detect significant differences between the two article conditions, $t(52) = 0.78$, $p < .44$ ($M = 57.44$ and $SD = 12.98$ for the afterlife article; $M = 60.26$ and $SD = 13.52$ for the end-of-life article). We also examined the correlation between reading time and applicability of personality description, which was found to be weak ($r = .08$, $p < .70$). Finally, to further rule out the possibility that the effects reported above were caused by differential processing of the articles, we reanalyzed the Mortality Salience \times Article interaction on perceived accuracy of the personality description, while including reading time as a covariate. This analysis of covariance (ANCOVA) yielded virtually identical results as the initial ANOVA, with the main effect of mortality salience and the Mortality Salience \times Afterlife interaction remaining, $F(1, 49) = 11.99$, $p < .002$, and $F(1, 49) = 4.33$, $p < .05$, respectively. The finding that reading time did not affect these effects renders the possibility that the critical Mortality Salience \times Afterlife interaction on self-esteem striving is the result of differences in processing of the afterlife-confirming and the afterlife-refuting information highly unlikely.

Discussion

The results of Study 1 suggest that encouraging a belief in literal immortality reduces the effect of mortality salience on the pursuit of symbolic immortality in the form of self-esteem striving. Whereas, consistent with previous findings by Dechesne et al. (2000b), mortality salience led to increased ratings of the validity of positive personality feedback among participants presented with evidence that the near-death experience is an artifact of biological processes accompanying death, this effect was eliminated by providing participants with arguments that the near-death experience is compelling evidence of life after death. To the extent that viewing positive personality feedback as more valid reflects striving to maximize self-esteem, a form of symbolic immortality, these findings suggest that providing hope of literal immortality reduces the tendency to pursue symbolic immortality in response to mortality salience.

These findings also provide further support for the core TMT proposition that self-esteem functions to provide protection against death-related concerns. Previous studies, reviewed in the introduction, have shown that mortality salience increases self-esteem striving and cultural worldview defense, whereas reminders of various other aversive events do not. The present findings provide further evidence linking self-esteem striving to death-related concerns and the pursuit of symbolic immortality by showing that providing people with evidence that life does not end at death eliminates the effect of mortality salience on self-esteem striving. Taken together, these two lines of research provide converging evidence for the TMT proposition that self-esteem strivings function to provide protection against death-related concerns. Because the contention that self-esteem functions to assuage concerns about death has been one of the most controversial and frequently

Table 1
Cell Means for the Interaction of Mortality Salience and Article Content on Perceived Accuracy of the Personality Description Found in Study 1

Mortality salience condition	Article on near-death experience	
	Afterlife explanation	End-of-life explanation
Mortality salience		
<i>M</i>	14.50 _a	20.28 _b
<i>SD</i>	6.51	4.91
<i>n</i>	14	14
Control		
<i>M</i>	12.23 _a	11.54 _a
<i>SD</i>	6.71	5.17
<i>n</i>	13	13

Note. Scores could range from 3 to 27, with higher scores indicating greater perceived accuracy of the positive personality description. Means that do not share a common subscript differ at $p < .02$.

¹ Participants' gender was initially included in all analyses. Because we found no significant effects of this factor, it was dropped from the analyses reported in the *Results* section of Study 1.

criticized aspects of TMT and the program of supporting research (e.g., Leary & Baumeister, 2000; Leary & Schreindorfer, 1997), we view this finding as particularly noteworthy.

The analyses of self-reported affect and reading time failed to detect any influence of these variables on self-esteem striving. The finding that mortality salience did not lead to changes in participants' affective state is consistent with numerous previous studies (see, e.g., Greenberg et al., 1997, for a thorough discussion). The finding that there was no difference in reading time between the two articles, and that reading time played no significant role in the participants' self-esteem striving, is of particular relevance for the interpretation of the present results. It greatly reduces the plausibility of the alternative explanation that the differences in article content induced different amounts of processing and that these differences in attention might have been responsible for the results.

Study 2

Despite the support provided by Study 1 for our central hypotheses about the relationship between literal and symbolic immortality striving, several important issues remain. First, it is unclear whether the findings of Study 1 reflect a decreased effect of mortality salience on self-esteem striving produced by evidence supporting the existence of an afterlife, an increased effect of mortality salience produced by evidence that challenges the existence of an afterlife, or both. To address this question, we included a control condition in Study 2 in which participants were given an essay to read that was completely irrelevant to the question of literal immortality.

An additional purpose of Study 2 was to provide a control for reminders of general aversive events with which to compare our mortality salience treatment. Comparing thoughts of death with thoughts of watching television confounds mortality salience with the salience of the general category of negative or aversive events. Thus, it could be argued that the effects found in Study 1 were not due to mortality salience, per se, but would have been produced by any type of aversive thoughts. Although many previous studies have found that the effects of mortality salience are not paralleled by thoughts of other aversive events (for a review, see Greenberg et al., 1997), we thought it prudent to include a control for general aversive events in Study 2. To this end, control participants were asked to jot down thoughts about experiencing dental pain, a clearly aversive event that is unrelated to death.

The design for Study 2 was a 2 (mortality salience vs. dental pain salience) \times 3 (afterlife vs. end-of-life vs. neutral control) factorial, modeled closely after that of Study 1. We predicted that mortality salience would lead to increased ratings of the validity of positive personality feedback in the neutral and end-of-life conditions but not in the afterlife condition. We had no clear predictions as to whether the end-of-life condition would yield a stronger mortality salience effect than the neutral control condition, because this should depend on participants' preexisting levels of belief in an afterlife, and this was not assessed in this study.

Method

Participants. Eighty-three students at the University of Nijmegen participated in the study voluntarily, and were given 5 Dutch guilders (\$2.25 US) for their participation.

Procedure and materials. The procedure and materials used in Study 2 were identical to those in Study 1, with the following exceptions. First, a neutral control condition was added in which participants were not given information relevant to the question of immortality or the near-death experience. Participants in this neutral control condition read an article that concerned animal navigation. This article was of approximately the same length as the near-death experience article, and it summarized the results of scientific investigation and highlighted the controversies in this area of research. At the same time, the article contained no references to near-death experiences, nor to death-related issues, and could therefore be used as a neutral condition. Secondly, in the personality part of the study, participants in the control condition wrote down the first sentence that came to their minds when thinking about dental pain, rather than when thinking about watching television.

Results

Perceived positivity of personality feedback. Parallel to Study 1, we conducted a one-sample *t* test with a test value of 5 to determine whether the personality description was perceived as positive. In accordance with this contention, the analysis revealed a significant difference between the mean positivity rating of the feedback ($M = 7.86$) and the midpoint of the scale, $t(82) = 21.13$, $p < .001$. The main effects and interaction of a 2 (mortality salience: death vs. dental pain) \times 3 (article: afterlife vs. end-of-life vs. neutral) ANOVA on the perceived positivity of the personality feedback were not significant (all $ps > .27$), suggesting that the personality description was viewed equally positively in all conditions.

Perceived accuracy of the personality description. A 2 (mortality salience: death vs. dental pain) \times 3 (article: afterlife vs. end-of-life vs. neutral) between-subjects ANOVA on the composite measure of perceived accuracy of the personality description yielded significant main effects of mortality salience, $F(2, 77) = 14.79$, $p < .001$, article, $F(2, 77) = 3.53$, $p < .04$, and a significant interaction between these factors, $F(2, 77) = 4.23$, $p < .02$.² The relevant means are displayed in Table 2. We subsequently used planned comparison tests to determine the reliability of the effects of mortality salience in the three afterlife information conditions. Whereas, in comparison with the dental pain control, mortality salience led participants to rate the positive personality feedback as significantly more valid in the neutral control condition, $t(77) = 2.77$, $p < .008$, and the end-of-life condition, $t(77) = 3.99$, $p < .001$, it had no effect in the afterlife condition, $t(77) = 0.06$, *ns*.

To get a more precise understanding of the direction of these effects, we also examined the simple main effects of afterlife information separately in the mortality salience and dental pain conditions. These analyses revealed a significant effect of article in the mortality salience condition, $F(2, 77) = 7.62$, $p < .002$, but not in the dental pain control condition, $F(2, 77) = 0.34$, *ns*. More specific pairwise comparisons revealed that, in the mortality salience condition, participants in the afterlife condition rated the positive personality feedback as less accurate than those in either the end-of-life condition, $t(77) = 3.57$, $p < .002$, or neutral information condition, $t(77) = 3.15$, $p < .003$. Mortality salient

² As in Study 1, we explored the possibility of potential gender differences in the obtained effects. But because we found none, we did not include gender as a factor in the reported results.

Table 2
Cell Means for the Interaction of Mortality Salience and Article Content on Perceived Accuracy of the Personality Description Found in Study 2

Mortality salience condition	Article on near-death experience		Neutral article: Animal navigation
	Afterlife explanation	End-of-life explanation	
Mortality salience			
<i>M</i>	12.38 _a	18.42 _b	17.71 _b
<i>SD</i>	3.59	4.01	3.81
<i>n</i>	14	14	14
Control			
<i>M</i>	12.46 _a	11.64 _a	13.00 _a
<i>SD</i>	5.15	5.00	5.17
<i>n</i>	13	14	14

Note. Scores could range from 3 to 27, with higher scores indicating greater perceived accuracy of the positive personality description. Means that do not share a common subscript differ at $p < .02$.

end-of-life and neutral participants did not differ from each other, $t(77) = 0.42$, *ns*. Finally, in the dental pain condition, the three comparisons between the various afterlife information conditions were all non-significant (all t s < 0.80).

Affect. To examine the potential role of affect in this pattern of results, we conducted 2 (mortality salience) \times 3 (article) ANOVAs on the measures of positive and negative affect. For both analyses, all main effects and interactions were nonsignificant, all F s(2, 77) < 1.14 , thus making an explanation of the present findings in terms of consciously experienced affect unlikely.

Reading time. As in Study 1, we registered participants' reading time for the different articles. A one-way ANOVA failed to detect significant differences between the article conditions, $F(2, 80) = 0.54$, $p < .58$ ($M = 55.23$ and $SD = 17.19$ for the afterlife article; $M = 59.96$ and $SD = 13.81$ for the end-of-life article; $M = 58.64$ and $SD = 20.40$ for the animal navigation article). Moreover, there was no correlation between participants' reading time for the article and the subsequent accuracy judgment of the personality description ($r = .04$, $p < .73$). Finally, when participants' reading times were included as a covariate in the analysis of the effects of article and mortality salience on accuracy of the personality feedback, the main effects of article and mortality salience, as well as the interaction, remained significant, $F(2, 76) = 3.46$, $p < .04$; $F(2, 76) = 14.57$, $p < .001$; and $F(2, 76) = 4.17$, $p < .02$, respectively. Hence, these analyses provide no evidence for an alternative account of the present findings in terms of differences in processing.

Discussion

Study 2 replicated the findings of Study 1 and demonstrated that it was the information supporting the existence of an afterlife that eliminated the effect of mortality salience that would occur under neutral conditions rather than the information that challenged the existence of an afterlife that produced an effect that would not occur under neutral conditions. Whereas participants in both the neutral and end-of-life conditions responded to mortality salience with increased self-esteem striving, participants in the afterlife condition showed no such effect. Study 2 also demonstrated the effect of mortality salience relative to an

aversive-thoughts control condition, thus showing that the effect of mortality salience is not simply a response to thoughts of any type of aversive event. The fact that, as in previous studies, the mortality salience induction produced no effect on participants' affective state lends further credence to this interpretation. Moreover, as in Study 1, we failed to find evidence that the articles on the near-death experience were processed differently, rendering alternative explanations on the basis of processing style less plausible.

Of interest, the effect of mortality salience on participants in the end-of-life condition did not differ from its effect on participants in the neutral control condition. Several interpretations for this lack of difference are possible. First, it may be that the Dutch college students who participated in this study were highly skeptical about the possibility of an afterlife and that the "scientific evidence" debunking the near-death experience did little to augment their skepticism. Alternatively, it may be that the tendency for mortality salience to increase self-esteem striving is a very strong and robust one that occurs unless something is done to undermine it, as was the case in the afterlife condition. The fact that mortality salience effects have been obtained in previous studies under diverse circumstances with diverse participant populations, some of whom were religious and probably had strong beliefs in an afterlife, is consistent with this possibility. It may be that chronic afterlife beliefs have little effect on responses to mortality salience unless they are primed or bolstered by supporting evidence. As we noted earlier, the difficulty with beliefs in an afterlife is that one can never know for sure that such beliefs are correct; the "scientific evidence" provided by the essays in the present studies may have provided this much needed confirmation and thus reduced participants' need to respond to mortality salience with increased self-esteem (symbolic immortality) striving. Finally, it may be that participants were simply unconvinced by the research summary that argued that the near-death experience results from simple biological processes. An interesting question for future research is whether people who fervently hold extremely strong beliefs in an afterlife would show similar effects in the absence of some sort of situational support for, or at least priming of, these beliefs.

Study 3

Studies 1 and 2 provided evidence that exposing participants to information supporting the existence of an afterlife eliminates the increased self-esteem striving that mortality salience produces in the absence of such information. Nonetheless, TMT posits that self-esteem is just one part of a broader anxiety-buffering system that also requires faith in a cultural worldview that provides the basis from which self-esteem is derived. The cultural worldview also provides a conception of reality that gives life meaning, order, stability, and a sense of permanence. TMT posits that symbolic immortality, the sense that one is a valuable part of something greater than oneself, is obtained by (a) maintaining faith in one's worldview and (b) living up to the standards of value inherent to that worldview.

Study 3 was designed to conceptually replicate and extend the results of the first two studies in three important ways. First, we sought to demonstrate these effects with a different type of self-esteem striving that comes closer to the literal definition of self-esteem as the sense that one is living up to internalized cultural standards of value. To assess participants' attempts to live up to standards of value, we made use of a measure recently developed by Kasser and Sheldon (2000, Study 2). In contemporary capitalistic culture, maximizing profit even to the extent that it can be considered greedy, is highly valued. Therefore, mortality salience would be expected to enhance the tendency to maximize profit among those who share a capitalistic worldview. In the research by Kasser and Sheldon, participants engaged in a forest management game in which they were asked to play the role of a company owner competing with three other companies for a bid to harvest timber in a national forest. The crucial dependent variable was the amount of acreage participants were willing to bid for, while being aware of the detrimental effects of the harvest for the environment. Consistent with the hypothesis that mortality salience enhances attempts to maximize profit, Kasser and Sheldon found that participants who were reminded of their mortality made larger bids than those in the control condition. In the present study, we included this procedure, and hypothesized that the effects found by Kasser and Sheldon would be replicated in control conditions but would be eliminated when participants were provided with evidence supporting the existence of an afterlife.

The second purpose of Study 3 was to extend the previous findings to defense of the cultural worldview. To the extent that maintaining faith in one's cultural worldview is part of the system that functions to assuage mortality concerns by providing a sense of symbolic immortality, it follows that strengthening belief in an afterlife should attenuate the effects of mortality salience on people's need to defend their worldviews against threat. Although this hypothesis is conceptually similar to the guiding hypothesis of the previous studies, it suggests that immortality salience attenuates a wider variety of reactions to mortality salience than simply striving for a positive self-image, as demonstrated in Studies 1 and 2. In Study 3, we investigated whether immortality salience indeed attenuates effects of mortality salience on both defense of one's cultural worldview and attempts to live up to its standards of value.

To assess worldview defense, we used a measure of devaluation and punishment of moral transgressors developed by Florian and Mikulincer (1998). In the first published studies on TMT, Rosenblatt et al. (1989) found that mortality salience led to a larger bail

bond being recommended for a moral transgressor, a woman accused of prostitution in Study 1. Florian and Mikulincer (1998) demonstrated the robustness of this effect by showing that reminders of mortality led to harsher judgments of and recommended punishments for 19 different types of moral transgressions. Florian and Mikulincer's (1998) findings are particularly relevant to present concerns because they also showed that those with a strong sense of symbolic immortality did not punish the moral transgressions more harshly after being reminded about death, whereas those who lacked this sense did. To the extent that literal and symbolic immortality are interchangeable, it can be hypothesized that immortality salience should attenuate the effects of mortality salience on harshness of punishment for moral transgressions.

Apart from extending the range of phenomena that are affected by our immortality salience and mortality salience manipulations, an additional goal of Study 3 was to examine whether the findings obtained in Study 1 and 2 could be replicated in a different country than the Netherlands. Clearly, beliefs in immortality and representations of life after death vary widely across cultures. Nonetheless, we suggest the general principles underlying literal and symbolic immortality are the same across cultures. By conducting Study 3 at the University of Missouri—Columbia, we could rule out the possibility that the findings of Studies 1 and Study 2 were unique to the Dutch participants used in these studies.

Method

Participants. One hundred fifty-three students from the University of Missouri—Columbia participated in the study and were randomly assigned to conditions in a 2 (mortality salience vs. control) \times 2 (evidence supporting vs. refuting belief in an afterlife) \times 2 (news feature vs. hard-news format) factorial design. Their participation was voluntary and was rewarded with partial research credit toward their introductory psychology class. Fifteen participants were later excluded from the data set because they had missing data. This left a final sample of 44 females and 94 males.

Procedure and materials. Upon arrival at the laboratory, participants were greeted by an experimenter who informed them that the study was designed to measure how different kinds of reading material affect recall. As a secondary aspect of the study, participants were told they would help pretest various personality assessments for use in future studies. Participants were led to individual cubicles where they read and signed a consent form. All materials were given to the participants in blank manila envelopes, with the researcher blind to conditions. Following completion, all materials were placed in general drop boxes so as to facilitate feelings of anonymity.

Participants were first given a photocopy of a bogus newspaper story about near-death experiences that, as in the first two studies, strongly conveyed either supportive or refuting evidence that near-death experiences imply the existence of life after death. These articles were English translations of those used in the previous studies, modified in two ways. First, to enhance believability of the articles, we used professional graphic design software to fashion the articles to look identical in format (e.g., typeface, folio line) to a large urban newspaper. Second, we manipulated whether the information in the article was conveyed in either a "hard-news" or "news feature" format. In the former case, the articles were essentially the same as in the first two studies with only minor stylistic changes. In the latter, the article followed a news feature style and began with a bogus anecdote about a person's near-death experience. The article then related, in a slightly condensed fashion, the same information on near-death experience as the hard-news articles. The two styles of articles were matched for length and, with the exception of the opening anecdote and subsequent transition in the news feature article, were worded the same

as those in corresponding hard-news conditions. Initial analyses included this stylistic manipulation as an independent variable, but because these analyses revealed that it did not interact with mortality salience on any of the critical dependent measures, it is not discussed further.

After finishing the story, participants were given a packet of questionnaires and asked to complete the questions in order with their first natural response. After two filler questionnaires, participants completed the typical mortality salience or control induction used in many prior terror management studies (e.g., Rosenblatt et al., 1989). Participants in the mortality salience condition were asked to write two short paragraphs in response to the following items: "Please describe the emotions that the thought of your own death arouses in you" and "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead." Participants in the control condition responded to parallel questions about the experience of dental pain, as in prior studies (e.g., Arndt, Greenberg, Solomon, et al., 1997). This questionnaire was followed by a filler task to serve as a delay and the Positive and Negative Affect Schedule—Expanded Form (PANAS-X; Watson & Clark, 1992), a scale designed to assess self-report affect.

Greed intentions were assessed by engaging participants in a forest management game framed in the context of a resource dilemma (Kasser & Sheldon, 2000; Sheldon & McGregor, 2000). Participants were given materials that presented a hypothetical scenario wherein the participant owned a timber company that was to bid against three other companies in harvesting timber in a 400-acre national forest. They were told of both the benefits and the problems associated with making either large or small bids in a given year, and were reminded that the forest might disappear if all the companies consistently made large bids. As our primary measures, participants were asked to indicate how much acreage (up to 100 acres) they would bid in each of 3 successive years.

The forest management questionnaire was followed by an English translation of Florian and Mikulincer's (1997) personal transgression subscale, taken from the Multidimensional Social Transgression scale. This questionnaire was used to index worldview defensive responses. It presented 10 scenarios that describe events in which a crime or transgression against an individual occurs. For example,

A frustrated burglar destroyed the life masterpiece of a renowned sculptor, one week before the sculpture's completion and public unveiling. The burglar, who was disappointed by the small amount of money he was able to find during the robbery, tied up the sculptor and forced him to watch as he smashed the ceramic sculpture with a sledge hammer. The stunned sculptor: "Nineteen years of work, the best of my talent, turned into a pile of rubble." (p. 379)

After each transgression, participants were asked to rate both the severity of the transgression and how heavily they thought the perpetrator should be punished, on 7-point Likert scales with 1 indicating *more lenient responses* and 7 indicating *more severe responses*. Previous research attests to the reliability of the instrument and its sensitivity to defensive responses provoked by mortality salience (Florian & Mikulincer, 1997; Mikulincer & Florian, 2000). After completion of all materials, participants were debriefed, compensated with experimental credits, and thanked for their time.

Results

Moral transgressions. Following previous research examining mortality salience effects on the personal transgression subscale (e.g., Florian & Mikulincer, 1997; Mikulincer & Florian, 2000), we computed a composite index of severity judgment that averaged across the 10 severity ratings, and a composite index of punitive judgment that averaged across the 10 punishment ratings. Cronbach's alpha was .86 for severity ratings and .87 for punishment ratings, indicating the respective items contributed to reliable

composites. These composites were then subjected to a 2 (male vs. female) \times 2 (afterlife vs. end-of-life) \times 2 (mortality salience vs. dental pain salience) ANOVA. This analysis yielded the predicted Mortality Salience \times Afterlife interaction on punishment ratings, $F(1, 130) = 4.24, p < .05$. The relevant cell means are presented in Table 3. This interaction did not approach significance for severity ratings. There were no significant main or interaction effects involving gender with either analysis.

To examine whether the pattern of this interaction on punishment ratings conformed to predictions, we conducted a series of planned comparisons. As one would expect from previous research, mortality salient end-of-life participants displayed harsher punishment ratings of social transgressors than did dental pain end-of-life participants, $t(130) = 2.27, p < .05$. However, consistent with our hypotheses, the afterlife information attenuated this effect. Mortality salient afterlife participants showed no difference from either dental pain salience condition ($ts < 1$), and evidenced lower punishment ratings than did mortality salient end-of-life participants, $t(130) = 1.93, p < .06$.

Greed. Because all three of participants' forest consumption bids were highly intercorrelated (Cronbach's alpha = .80), we created a composite index of greed scores by averaging across the three bids. We then subjected this composite to a 2 (male vs. female) \times 2 (afterlife vs. end-of-life) \times 2 (mortality salience vs. dental pain salience) ANOVA, an analysis that yielded a significant three-way interaction between gender, afterlife, and mortality salience, $F(1, 130) = 4.67, p < .04$. The relevant means are displayed in Table 4.

Following standard data analytic techniques, subsequent analyses revealed that the Afterlife \times Mortality Salience interaction was significant for male participants, $F(1, 90) = 4.10, p < .05$, but not for female participants ($F < 1.78, p > .18$). We therefore confined our pairwise comparisons to the pattern for male participants. Replicating Kasser and Sheldon's (2000) results, among males, end-of-life mortality salient participants evidenced more greed by intending to harvest more forest than did end-of-life dental pain participants, $t(130) = 2.56, p < .05$. However, as with social transgressions, this greed effect of mortality salience was eliminated by the afterlife information. Mortality salient afterlife par-

Table 3
Cell Means for the Interaction of Mortality Salience and Article Content on Punitiveness Toward Social Transgressions Found in Study 3

Mortality salience condition	Article on near-death experience	
	Afterlife explanation	End-of-life explanation
Mortality salience		
<i>M</i>	4.96 _a	5.40 _b
<i>SD</i>	0.98	0.89
<i>n</i>	34	31
Control		
<i>M</i>	5.03 _a	4.89 _a
<i>SD</i>	0.97	0.85
<i>n</i>	37	36

Note. Scores could range from 1 to 7, with higher scores indicating more punitiveness. Means that do not share a common subscript differ at $p < .06$.

Table 4
Cell Means for the Interaction of Gender, Mortality Salience, and Article Content on Forest Consumption Bids Found in Study 3

Mortality salience condition	Males		Females	
	Article on near-death experience		Article on near-death experience	
	Afterlife	End-of-life	Afterlife	End-of-life
Mortality salience				
<i>M</i>	62.83	76.23	60.27	55.90
<i>SD</i>	26.78	24.26	17.74	24.62
<i>n</i>	24	21	10	10
Control				
<i>M</i>	65.65	59.69	55.71	67.03
<i>SD</i>	24.42	16.41	48.35	18.82
<i>n</i>	23	26	14	10

Note. Scores could range from 0 to 166, with higher scores indicating more greed.

ticipants intended to harvest fewer acres than did mortality salient end-of-life participants, $t(130) = 2.03, p < .05$, and did not differ from either dental pain condition, $t_s < 1$.

Affect. The PANAS-X (Watson & Clark, 1992) is a 60-item adjective checklist (scored on a 5-point scale with 1 being *low* and 5 being *high*) that contains subscales for positive and negative mood, as well as 11 other specific mood subscales. Because items in the positive and negative mood scales also appear in the other subscales, we conducted a 2 (male vs. female) \times 2 (afterlife vs. end-of-life) \times 2 (mortality salience vs. dental pain salience) multivariate analysis of variance (MANOVA) on the 11 specific subscales and 2 (male vs. female) \times 2 (afterlife vs. end-of-life) \times 2 (mortality salience vs. dental pain salience) ANOVAs on the positive and negative mood scales. There were no significant effects involving mortality salience or afterlife condition in the MANOVA on the specific subscales, nor with the ANOVA on negative mood.

There was, however, a significant effect of mortality salience on positive mood, $F(1, 130) = 5.96, p < .02$, that indicated higher positive mood in the dental pain condition ($M = 2.77$) than in the mortality salience condition ($M = 2.48$). Although analyses of positive mood did not reproduce the respective interactions on punitiveness and greed, to assess whether different levels of positive mood could account for these effects, we conducted 2 (male vs. female) \times 2 (afterlife vs. end-of-life) \times 2 (mortality salience vs. dental pain salience) ANCOVAs, with positive mood as a covariate on both punishment ratings and greed ratings. Both the Mortality Salience \times Afterlife interaction on punishment ratings, and the Gender \times Mortality Salience \times Afterlife interaction on greed remained significant ($F_s > 4.30, p_s < .05$). This suggests that, as with the previous studies and previous terror management research, mood cannot account for the critical effects.

Discussion

Study 3 was designed to investigate the effects of immortality salience on a wider variety of social phenomena than the self-esteem striving tendencies studied in the first two experiments. Study 3 revealed that immortality salience reduced the effects of mortality salience on the tendencies to defend and bolster one's

worldview, as reflected in participants' judgments of moral transgressions, and the effects of mortality salience on these tendencies. Whereas priming death in the absence of afterlife-confirming information led participants to judge moral transgressions more harshly and led male participants to enhance their striving for material gains, no such effects were found when afterlife-confirming information was primed prior to mortality salience. As such, further support was provided for the hypothesis that belief in immortality reduces the striving for symbolic immortality following a reminder of mortality.

It is also worth noting that Study 3 was conducted independently of the first two studies, and not only contained different dependent measures compared with the previous studies, but was also conducted in a different setting, with American college students instead of Dutch students as participants. Replicating the effects of Studies 1 and 2 in a different setting and with a different setup substantially increases the generalizability of these results.

Although the findings of Study 3 are highly consistent with the previous two studies and our conceptual analyses, it should nonetheless be noted that the pattern of results contained several unpredicted results. First, in contrast with previous research using the social transgressions scale (Florian & Mikulincer, 1997; Mikulincer & Florian, 2000), we found no significant effect on the severity ratings of the moral transgressions scale, although the pattern of means were in the expected direction. It may be worth noting that those studies were conducted in Israel as opposed to the United States. Thus, it may be that the psychological reactions of American and Israeli participants to transgressions manifest themselves in slightly different ways. Perhaps American participants have more firmly established preexisting beliefs about what constitutes crime severity, leaving only their judgments of punishment particularly vulnerable to situational influences. Previous research with American participants that has examined the effect of mortality salience on responses to moral transgressors (e.g., Rosenblatt et al., 1989) has typically only measured punitive judgments (i.e., bail amounts) without directly asking about perceived severity of the offense; this makes it impossible to compare the current null effect with previous studies of American students.

In addition, whereas prior work by Kasser and Sheldon (2000) has demonstrated that mortality salience enhances greed among both sexes, we found effects of mortality salience on greed only among men, and the scores of female participants even suggest a nonsignificant tendency in the opposite direction. That is, female participants in the mortality salience end-of-life condition tended to have lower harvest bids, whereas harvest bids were a bit higher in the mortality salience afterlife condition. This might suggest that, at least in the present forest management simulation paradigm, mortality salience had a weak tendency to engender less greed among females; a trend that was then reduced by the afterlife information. This could be seen as broadly consistent with previous research that has recently uncovered gender differences in the activation of spontaneous worldview defensive beliefs in response to mortality salience (Arndt, Greenberg, & Cook, *in press*). Perhaps women have more environmentally friendly conservationist attitudes and are less attuned to the value of economic growth. However, we caution against confident interpretation because the effects among women were not significant. Future research should attend to this potential gender difference.

The inconsistencies mentioned above do not pertain directly to our main hypothesis. Our main hypothesis stated that providing compelling evidence for the existence of an afterlife would reduce the effects of mortality salience on the need to bolster faith in one's worldview and defend one's worldview, and would also reduce the effects of mortality salience on the striving for material wealth. Although there were gender differences in the effects of mortality salience on the striving for material gain, and the effects of mortality salience on responses to moral transgressions emerged on the punishment but not severity scales, the major hypothesis was clearly supported by the data of Study 3.

General Discussion

The relationship between immortality beliefs and the way people live their daily lives has long been a topic of interest to philosophers, religious leaders, and lay people as well. In the present research, when participants were exposed to compelling arguments that life continues in some form after death, the effect of mortality salience on self-esteem striving was completely eliminated. In terror management theoretic terms, this suggests that strengthening belief in literal immortality has the potential to reduce the need to pursue symbolic forms of immortality, such as self-esteem, as a means of controlling one's fear of death.

The present findings thus provide some support for the views of the panoply of religious leaders and philosophers who have argued that faith in God or spiritual pursuits can provide a means of transcending the concerns of daily existence. To the extent that such beliefs typically (though not always) entail the hope of some form of literal immortality, the present findings testify to the potential efficacy of such beliefs in enabling the individual to transcend both the core existential fear of death and the pursuit of self-esteem and personal value that take up so much time and energy in our daily lives. Of course, one of the core propositions of TMT is that the pursuit of self-esteem functions to control this deeper concern.

The present findings provide further support for this basic TMT proposition. Whereas previous research has shown that reminders of death but not reminders of other aversive events lead to in-

creased self-esteem striving, the present findings show that directly addressing the fear of death by providing evidence that death is not the end of existence eliminates this effect of mortality salience on self-esteem striving. The TMT analysis of the function of self-esteem has been, and probably will continue to be, a point of contention among self-theorists (e.g., Leary & Baumeister, 2000; Leary & Schreindorfer, 1997; Muraven & Baumeister, 1997). However, combined with the various other findings supporting the TMT analysis of self-esteem reviewed in the introduction, the present findings that reminders of death but not other aversive events lead to increased self-esteem striving and that making it easier to believe in some form of afterlife eliminates this effect seems hard to account for without assuming that the pursuit of self-esteem has at least something to do with the problem of death. We therefore believe that the present findings are particularly relevant to the ongoing discussion concerning the origins and functions of self-esteem.

This is certainly not to say that the pursuit of self-esteem or faith in an afterlife is the ultimate answer to the human dilemma. The present findings do, however, help explain the widespread prevalence of self-esteem striving and belief in various forms of life after death, and shows at least one way that these two very basic human proclivities relate to each other. But, as TMT research has made clear, religious faith is no guarantee against the human evil wrought by fear (e.g., Greenberg et al., 1990). Indeed, TMT has long emphasized the role of the need to maintain faith in the absolute validity of one's beliefs in the genesis of prejudice, violence, warfare, and genocide (cf. Pyszczynski, Solomon, & Greenberg, 2002). Although faith in an afterlife may have the potential to free us from core fears and the compulsion to continually prove our value and the correctness of our beliefs, the dizzying array of different versions of how an afterlife might work, combined with the impossibility of providing proof of the accuracy of any such belief system, provides a sobering counterpoint to any hopes that such beliefs could provide the ultimate answer to human problems. And then there is the question of objective reality: How could one possibly know that life continues after death when one must first die to obtain evidence of any afterlife that may exist?

This, of course, is precisely why reports of the near-death experience have so fascinated people and commanded such great attention in contemporary discourse, both popular and scientific. Such reports seem to have the potential to provide a glimpse of what might be lurking on the other side of life. However, as the controversy surrounding this phenomenon illustrates (cf. Kastenbaum, 1986; Ring & Elsaesser Valarino, 1998), both threatening and comforting explanations for reports of the near-death experience can be easily generated and no scientifically acceptable resolution to this controversy seems likely in the foreseeable future. The present findings suggest that these comforting and threatening interpretations are likely to affect how the individual responds when reminders of his or her mortality are salient.

All three of the present studies showed that when provided reason to believe in the existence of some form of literal immortality, people are less likely to respond to death-related thoughts by increasing their striving for self-esteem or defense of their worldview. Thus, it appears that the pursuits of literal and symbolic immortality are at least somewhat interchangeable means of dealing with death-related concerns and that contextual factors determine which avenue is pursued (cf. Dechesne, 2001; Halloran &

Kashima, 2000). The present findings are consistent with those of McGregor et al. (1998) in suggesting that once the individual moves toward one form of terror management defense, there is less need to pursue other interchangeable defensive tactics.

Admittedly, with the notion that defensive tactics that people use to deal with existential concerns are largely interchangeable, TMT runs the risk of becoming too flexible. It might be inferred that any effect of mortality salience can be predicted post hoc. Additionally, it may appear that mortality salience is hypothesized to enhance a particular response, whereas an exactly opposing reaction may be equally plausible. It is necessary, therefore, to specify what TMT does and does not predict regarding the effects of mortality salience on social phenomena.

First, we believe that any theory that attempts to account for psychological defenses should incorporate the notion of malleability, simply because such defenses, by their essence, can take on a variety of seemingly different, often irrational, but functionally interchangeable forms. Indeed, most perspectives on the regulation of the self-concept acknowledge that self-defense is multifaceted (e.g., Steele, 1988; Tesser, Martin, & Cornell, 1996). TMT, similar to dissonance theory (Festinger, 1957) and Tesser's work on the plasticity of self-defense (Tesser, Crepaz, Collins, Cornell, & Beach, 2000), suggests that the defense that will be actually used to shield against terror depends to a great extent on what aspect of self or one's worldview is currently most salient, accessible, or psychologically pressing (see, e.g., McGregor et al., 1998). In the first two studies, participants were primed with death and then given positive personality feedback. This feedback provided a salient, pressing opportunity for bolstering self-esteem. Other studies have shown that people respond to mortality salience by bolstering self-esteem or worldview in a wide variety of other ways (increased risk taking among those who value risk, increased body identification among those who are proud of their bodies, increased nationalism among those who identify with their country). Some studies have shown that once the threat is defused by responding to one aspect of self, there is no need to respond defensively in other domains (e.g., McGregor et al., 1998). Study 3 reveals a gender difference in how people responded to the mortality salience manipulation: Males showed increased competitiveness whereas females did not exhibit increased competitiveness. This is consistent with previous findings (Arndt et al., in press) and suggests differences in which values are chronically accessible to men and women. Notably, however, in that research the spontaneous activation effects of mortality salience could be shifted with situational primes, thereby offering further support for the multifaceted nature of such defenses.

Hence, the accessibility or salience of information relevant for terror management purposes (e.g., information about one's self-worth, one's identity, or about the existence of an afterlife) appears to have important implications for the specific forms that terror management defenses take. The mechanisms underlying the combined effects of this information and mortality salience on social behavior do require further specification, however, because the information can actually both increase and decrease the appeal of a particular social behavior as a response to mortality salience. The present studies, for example, demonstrate that the salience of afterlife-confirming information reduces defensive self-enhancement after mortality salience. Similarly, Harmon-Jones et al. (1997) have shown that chronically high and experi-

mentally induced levels of self-esteem reduced worldview defense and death-thought accessibility after mortality salience. Moreover, Mikulincer and Florian (2000) have shown that securely attached individuals are less likely to engage in defensive punishment of moral transgressors after mortality salience than nonsecurely attached individuals. These findings thus suggest that salience or accessibility of information to deal with mortality concerns reduce further effects of mortality salience on social behavior.

Other findings, however, suggest that salience or accessibility of such information enhances rather than reduces mortality salience effects. Mikulincer and Florian (2000) have also demonstrated that, although securely attached individuals did not exhibit increased harshness in their punishment of moral transgressors after mortality salience whereas nonsecurely attached individuals did, securely attached individuals expressed a greater desire to affirm relationships with significant others. In a related vein, Lieberman, Arndt, Personius, and Cook (2001) found that mortality salience increased punitiveness toward hate-crime offenders when no particular victim was specified, but decreased such punitiveness when the victim threatened the participants' worldview. In addition, Halloran and Kashima (2000) investigated Australian Aborigines in a terror management experiment, and found that when Aborigine identity was made salient, mortality salience led to greater collectivism, but when Australian identity was made salient, mortality salience led to greater individualism. The findings by Halloran and Kashima are particularly noteworthy, because they demonstrate that the salience of information related to identity can lead to both a stronger sense of individualism, but can also lead to the opposite, that is, a stronger sense of collectivism.

Taken together, the foregoing studies suggest that salience or accessibility of information relevant for terror management purposes can either enhance or reduce subsequent effects of mortality salience on social behavior. The difference between studies showing enhanced mortality salience effects and studies showing reduced mortality salience effects may lie in the relation between the salient or accessible information and the subsequently measured social behavior (cf. Arndt & Greenberg, 1999). We propose a "substitution hypothesis" when there is no relation between the information and the social behavior studied: If there is no relation between the information and the social behavior studied, the salience of this information is likely to reduce the effects of mortality salience on the specific social behavior. For example, as Harmon-Jones et al. (1997) have shown, because there is no direct relation between global self-esteem and defense of one's country, the effect of mortality salience on the increased defense of one's nation when criticized will be mitigated because of the availability of global self-esteem, a feature that is hypothesized to buffer against anxiety. In contrast, we propose a "contingency hypothesis" in the presence of a relation between the information and the social behavior studied: If there is a relation between the information and the social behavior studied, the salience of this information is likely to enhance the effects of mortality salience on the specific social behavior measure. For example, Arndt and Greenberg (1999) have shown that whereas affirmation of global self-esteem reduced general defensiveness after mortality salience, affirmation of a specific aspect of the self (i.e., the participants' major) enhanced the effect of mortality salience on the defense against criticism on this specific dimension.

The foregoing analysis provides a clearer picture of the effects of the present studies and other terror management research and hopefully will provide a useful heuristic for understanding which of the many ways individuals will choose to use when coping with death-related thoughts. We have suggested that literal and symbolic immortality are unrelated means to deal with mortality concerns. Hence, the substitution hypothesis applies: The salience of one of the two is expected to reduce the effect of mortality salience on the striving for the other. The contingency hypothesis would have applied if the information about the near-death experience would have conveyed that only people with particular traits are eligible for attainment of immortality. In that case, we would have predicted that participants in the death condition relative to the control condition would have indicated greater applicability of the personality description if and only if the personality description would have contained those traits described as necessary for the attainment of immortality. But again, because the articles on the near-death experience did not contain criteria for the attainment of immortality, we based our predictions on the substitution hypothesis.

With regard to the actual beliefs and values studied in the present studies, the appropriate contingency hypothesis would be that the combined effects of immortality salience and mortality salience would enhance belief in afterlife to a greater extent than the separate factors, because the articles on the near-death experience are relevant for terror management purposes and there exists a direct relation between the content of the articles and belief in afterlife. We (Decesne & Pyszczynski, 2001) have recently begun to address this possibility empirically, and the results of this research are highly consistent with this analysis. Specifically, we presented participants with either the afterlife-confirming information or the afterlife-refuting information on the near-death experience, then reminded half of the participants about death and the other half about dental pain, and finally measured their belief in an afterlife using a scale originally developed by Osarchuk and Tatz (1973). The contingency hypothesis and our assumption for the studies in this article suggests that afterlife-confirming information strengthens belief in afterlife. This is exactly what we found in the new study, and particularly among those participants who were reminded of death. Moreover, and somewhat more intriguingly, we also found in the new study that mortality salience led to decreased belief in an afterlife among participants who read afterlife-refuting information prior to the mortality salience manipulation. We believe this new research contributes to insights in the results of the studies reported in this article because it indicates that belief in afterlife and self-esteem striving are affected in exactly opposite ways by the immortality salience and mortality salience manipulations. This is, of course, highly consistent with our general substitution hypothesis that belief in afterlife makes the symbolic immortality striving after mortality salience redundant.

The present studies, however, focused exclusively on the effect of situational support for belief in literal immortality. This should not be taken to imply that dispositional differences in immortality beliefs operate in a similar substitutable manner. A large number of studies have demonstrated mortality salience effects on diverse forms of symbolic immortality striving in widely varying populations, many of which were likely to contain a large percentage of people with strong dispositional beliefs in an afterlife. Thus, simply believing in the existence of an afterlife is unlikely to make

people immune from the pursuit of self-esteem and faith in secular aspects of their cultural worldviews. Everyday experience tells us that simply believing in some form of life after death provides no respite from the need for self-esteem or a stable and coherent understanding of the world around us. Nonetheless, investigations of the impact of such dispositional differences in immortality belief may be a fruitful direction for future research.

Conclusion

In 1927, Sigmund Freud published a very influential piece of work entitled *The Future of an Illusion*. In this writing, Freud contemplated the future of religion in a society where rationality increasingly became the norm. Freud was pessimistic about the viability of rationality as a societal standard, however, because he believed that unconscious fears of death would always suffuse everyday thinking, and would always lead people to prefer, in his views, the irrational belief in afterlife derived from religion over, again in his views, a rational perspective on life. Six decades later, Shelley Taylor and Jonathan Brown (1988) published a similarly influential piece of work entitled *Illusion and Well-Being*. Taylor and Brown proposed that most people have perceptions of themselves that are more positive than warranted on the basis of objective criteria. Such illusory positive perceptions of self are, according to Taylor and Brown, adaptive. In fact, illusory positive self-views were argued to be characteristic of "normal" individuals and to be absent among the depressed. Taylor and Brown therefore concluded that illusions about the self, in addition to illusions about the world and about the future, help people to deal with what they called the "flotsam and jetsam of life" (p. 204), and hence are to be considered enviable for those who lack such illusions.

To be sure, the strivings for immortality and a positive self-image are two different things. Nonetheless, a closer look at the positions of Freud (1927) and Taylor and Brown (1988) also reveals a striking functional convergence: Both belief in afterlife and self-positivity are conceived of as means to cope with problems inherent to human existence. Consistent with both the perspectives of Freud and of Taylor and Brown, TMT posits that belief in afterlife and positive self-worth are different yet functionally similar in the sense that both serve as means to help people cope with one of the core problems of life, its ending. We believe the present studies comprise the first systematic attempt to experimentally demonstrate this functional convergence. We hope the present results provide an impetus for further experimental investigation that will shed light on the interplay between strivings for heavenly and earthly senses of significance, as well as the psychological functions that such strivings serve.

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Appendix

Immortality Salience Manipulations

Immortality Salience

One of the most exciting scientific developments of the past decade has been the findings from rigorous scientific investigation of the near-death experience. Although scientists were initially skeptical of these reports, recent studies conducted by leading researchers at Harvard Medical School and Princeton University very strongly suggest that these experiences are very real indeed, and may suggest that some sort of existence does in fact continue after the physical death of the body. The following is a summary of the major points made in a recent summary of this research, reported by Dr. Henry Zimmerman of the Harvard Medical School.

There is remarkable similarity in the reports of over 600 separate people who were declared clinically dead but were then revived and regained consciousness, including the following: (a) an out-of-body experience in which the person experiences the sensation of floating above the room and observing medical attempts to revive his or her body, (b) a feeling of moving through a tunnel of bright light toward an even greater source of light, (c) an absolute feeling of comfort and safety and an absence of fear or pain, and (d) some form of contact with previously departed loved ones or other caring persons. These same experiences were reported by virtually all people, regardless of religious background or belief. Even avowed atheists have reported this experience. In one famous case, a psychologist who had written articles critical of previous reports of this experience reported nearly identical events after nearly dying after a swimming accident; this of course led to a dramatic change in his opinions about the meaning of the near-death experience. In the cases where careful physical measurements could be taken, there were no signs of physical brain activity during this period, even when the most modern equipment was used. This shows that the body had clearly stopped its physical functioning while these experiences were occurring. Perhaps most remarkably, people have been able to report the physical details of the room in which this occurred

that could be seen only from the perspective of above the room. In other cases, detailed reports of conversations had in the room by medical personnel have been made. A total of 98% of people who have this experience return absolutely convinced that death is not the end of existence. Although additional research on this topic is clearly needed, the majority of medical authorities now acknowledge that these experiences provide serious evidence for the possibility that existence continues after the point of physical death.

Immortality Critical Condition

One of the most misleading and often misinterpreted developments of the past decade has been the finding from rigorous scientific investigation of the so-called near-death experience. Although many people rushed to the conclusion that these "reports" were evidence of life after death, today scientists are convinced that these reports simply reflect hallucinations produced by a damaged brain that is deprived of oxygen. Recent studies conducted by leading researchers at Harvard Medical School and Princeton University very strongly suggest that these experiences are very rare and correspond with clear evidence of crisis responses in the brain of injured or ill people. These so-called experiences provide no convincing evidence that anything other than simple physical and chemical reactions occur after the death of the physical death of the body. The following is a summary of the major points made in a recent summary of this research, reported by Dr. Henry Zimmerman of the Harvard Medical School.

Although there is some similarity in the reports of separate people who were declared clinically dead but were then revived and regained consciousness, the vast majority (98.3%) report no such experiences. Supposed out of body experiences, tunnel of light, and other reports have been shown to occur only when there is damage to specific parts of the brain that are involved in dreaming and fantasy. Oxygen deprivation appears to play

a major role in this damage. These experiences are consistently reported only among people with strong religious background or belief in an afterlife. Although 12% of religious people who are declared clinically dead but then are revived have the "near-death experience," only 1.2% of nonreligious people declared clinically dead have this experience. Only a few cases of such experiences among the nonbelievers can probably safely be attributed to oxygen deprivation combined with a desire to believe in some form of afterlife. In all cases where careful physical measurements could be taken, there were clear signs of low-level physical brain activity during this period. This shows that the body had clearly *not* stopped its physical functioning while these experiences were occurring and that some form of brain activity is responsible for the experience.

People's reports of things observed while in the near-death state bear no resemblance to things that were actually occurring during this period. So-called recollections of observations from above the room have been shown to be completely inaccurate. Although many people would like to believe that the so-called near-death experience is evidence of life after death, this is clearly a result of normal psychological processes and the desire to believe in such things.

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