
Belief in Supernatural Agents in the Face of Death

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Four studies examined whether awareness of mortality intensifies belief in supernatural agents among North Americans. In Studies 1 and 2, mortality salience led to more religiosity, stronger belief in God, and in divine intervention. In Studies 3 and 4, mortality salience increased supernatural agent beliefs even when supernatural agency was presented in a culturally alien context (divine Buddha in Study 3, Shamanic spirits in Study 4). The latter effects occurred primarily among the religiously affiliated, who were predominantly Christian. Implications for the role of supernatural agent beliefs in assuaging mortality concerns are discussed.

Keywords: religion; supernatural agents; mortality salience; culture; existential concerns

The utmost seriousness of religion is linked to the great overriding fear of death. The value of religion . . . is that it deals with the “ultimate concern” and thus fits the biological landscape.

—Walter Burkert, *Creation of the Sacred* (1996, p. 31)

What causes belief in supernatural agents such as God, ancestor spirits, Buddha, Kali, devils, angels, ghosts, and jinns? Counterintuitive person-like agents that partly exist outside of the ordinary natural world, and transcend death, deception, and illusion, are deeply affecting beliefs that are the cornerstone of religions and pervasive all over the world (Atran, 2002; Atran & Norenzayan, 2004; Boyer, 2001; Burkert, 1996; Tylor, 1871/1958). Yet, little is known about the psychological factors that give rise to them. Aside from their central role in religions, these beliefs arguably are the most salient feature distinguishing religion from secular culture. This research is therefore concerned with belief in supernatural agency rather than supernatural beliefs in general or immortality beliefs, although these phenom-

ena are related. We examine one psychological motivation—whether the awareness of death encourages such beliefs.

Awareness of Mortality and Supernatural Agent Beliefs

Social theorists have speculated about the functional connection between existential concerns and religion. Becker (1973), Durkheim (1915/1965), Feuerbach (1843/1972), Freud (1913/1990, 1961), Kierkegaard (1843/1955), and more recently Burkert (1996) have observed the central role that death-related anxieties play in religious behavior. Ethnographic reports support these observations. In many traditional cultures such as the Native American Cheyenne and the Ilahita Arapesh of Papua New Guinea (e.g., Lowie, 1924; Tuzin, 1982), the naturally eruptive anxieties are purposely excited then assuaged (Durkheim, 1915/1965). These initiation rituals that involve “rites of terror” (Whitehouse, 1996) arouse existential anxieties by culturally manipulating, then assuaging, seemingly uncontrollable situations that provoke them: risk of death from unidentifiable sources or sudden isolation and loss of hope. By relieving the ensuing distress, successful completion of the ritual performance in turn authenticates the belief in culturally sanctioned supernatural agents.

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In psychology, the hypothesis linking religion with existential anxieties has received mixed support. In a classic study, Allport and his colleagues (Allport, Gillespie, & Young, 1948) found that among returning World War II frontline soldiers, fear of death was remembered along with heightened faith in God's deliverance. The one experimental study known to us that attempted to manipulate mortality salience and then measure postmanipulation religiosity failed to show a significant effect (Burling, 1993), possibly because religiosity was assessed without a significant delay between the measure and the mortality salience manipulation or because the measure of religiosity used (Batson & Ventis, 1982) is an assessment of religiosity as a quest for spiritual knowledge rather than a commitment to religion.

One religion-related inclination that mortality salience has been found to spur is belief in an afterlife. Osarchuk and Tatz (1973) found that exposure to a death threat led to more afterlife belief than exposure to a shock threat or control. This effect was found, however, only among prior believers in an afterlife. Corroborating this finding, Florian and Mikulincer (1998) found that religious modes of seeking immortality were positively related to the fear of bodily annihilation, although not with other fear of death factors. More recently, Dechesne et al. (2003) found that assurances of literal immortality diminished the impact of mortality awareness on self-esteem strivings and defense of values.

Terror Management Function of Supernatural Agent Beliefs

According to Terror Management Theory (TMT; Greenberg, Solomon, & Pyszczynski, 1997; Pyszczynski, Greenberg, & Solomon, 1999; Solomon, Greenberg, Schimel, Arndt, & Pyszczynski, 2004), cultural worldviews, along with the desire to live up to the standards of one's culture (i.e., self-esteem), serve as a primary psychological buffer against the uniquely human awareness of death. If so, heightening such terror (mortality salience) should increase the need to bolster these worldviews. Consistent with this premise, people temporarily aware of death are more inclined to defend their cultural beliefs (see Greenberg et al., 1997; Solomon et al., 2004, for reviews). Mortality salience may facilitate the enhancing of one's own cultural beliefs directly, for example, by rewarding a hero who upholds cultural values (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). However, most TMT studies examine derogation of alternative worldviews or beliefs and those who hold them because the existence of alternative worldviews is a fundamental threat to the validity of one's own worldview (Greenberg et al., 1997). Typical manifestations of worldview defense under mortality salience include derogating a Jew by Christian participants

(Greenberg et al., 1990) and recommending harsher punishment for a prostitute (Rosenblatt et al., 1989).

Despite the large TMT literature supporting the link between mortality salience and cultural worldview defense, little is known about the effect of mortality salience on supernatural beliefs. This may be because terror management theory draws its inspiration from Ernst Becker (1975), who writes, "Culture means that which is supernatural" (p. 64). Therefore, terror management researchers arguably are already directly addressing supernatural concerns (see, e.g., Solomon, Greenberg, & Pyszczynski, 1991, pp. 97-98). However, research has yet to explore arenas that most people would consider uncontroversially supernatural. Although since its inception terror management theory has posited that religion (particularly belief in literal immortality) serves a defensive role against the terror of death (Dechesne et al., 2003; Solomon et al., 1991), the vast bulk of terror management research has focused on symbolic immortality, or aspects of culture that even secular people can get behind: nationalism, racism, and other forms of outgroup derogation.

Recently, the notion of literal immortality has been investigated in empirical terror management research, indicating that it assuages terror of death enough to eliminate the effect of mortality salience on self-esteem concerns and defense of cultural values (Dechesne et al., 2003). The latter is a welcome study on the role of religious beliefs, such as immortality, in terror management processes. However the important findings of Dechesne et al. are limited in two ways. First, belief in supernatural agents, as a core component of religions, was not examined. Although belief in immortality and belief in supernatural agents are intertwined and mutually reinforcing, they are conceptually distinct core beliefs. Few if any religions posit supernatural agents without an explicit or implicit promise of immortality. But immortality itself is rarely an object of religious worship; it is supernatural agents who are the central objects of devotion and even sacrifice. Second, although it is important to assess the mediating role of religious beliefs in terror management processes, the effect of mortality awareness on religious belief remains to be investigated.

In this research, we investigate directly the motivational substrates of the culturally widespread belief in supernatural agency, a phenomenon that has received little attention in psychology. Moreover, we explore the question of whether affirmations of supernatural agents operate in a qualitatively different way than most of the documented cases of other-derogating worldview defense. We consider the possibility that in spite of robust findings that mortality salience spurs derogation of culturally different others, it may not be as likely to motivate derogation of culturally different supernatural

agents; in fact, it may actually lead to more acceptance of them. As the guardians of an eternal, meaningful universe, all supernatural agents, culturally familiar or not, may offer death-aware people a direct way out of the existential quandary, perhaps with the subjective possibility of literal immortality, or perhaps with a greater subjective sense of safety, power, or purpose springing from these transcendental agents.

In brief, theorists have hypothesized a functional connection between the awareness of death and supernatural belief, and ethnographic reports encourage this hypothesis. However, as in most observational studies, ascertaining the direction of causality is difficult. Moreover, it is unclear from previous research whether awareness of death is associated with stronger religiosity only because religion is a form of cultural identification or because religion offers belief in death-transcending supernatural agents. We tested the causal hypothesis that awareness of death intensifies belief in culturally familiar and unfamiliar supernatural agents.

Overview of Studies

Whereas in Studies 1 and 2 the supernatural agent considered (God) was a culturally familiar deity, in Studies 3 and 4, we examined culturally unfamiliar deities. In Study 3, mostly Christian participants exposed to a death or a neutral prime contemplated belief in Buddha. In Study 4, mostly Christian religious and nonreligious participants wrote about their death or about two alternative control topics and then indicated their belief in ancestral Shamanic spirits. In the General Discussion, we examine the findings in terms of three possible explanations: other-derogating sectarian worldview defense, nonsectarian inclusive religious worldview defense, and a cognitive inclination toward the supernatural distinct from worldview defense.

STUDY 1

Method

Participants. Participants were 28 undergraduates (16 women; age $M=19$) at the University of Michigan. Of the sample, 46% were European American, 21% Asian American, and 33% Other or did not identify their ethnicity. No religious background information was collected in this study. Participants received class credit in exchange for participation.

Materials and procedure. Participants were randomly assigned to two conditions, mortality salient (MS) or control (from Rosenblatt et al., 1989). In the MS condition, they responded to the open-ended questions, "In the space below, write a paragraph about what will happen to you when you die. Write in some detail about the feelings that the thought of your own dying arouse in

you." In the control condition, participants responded to the open-ended questions, "In the space below, write a paragraph about favorite foods that you have enjoyed eating. Write in some detail about the feelings that these foods arouse in you." Next, they completed a distracter memory task (13 min) in which they studied and then recalled a list of words unrelated to death or foods. Then all participants completed a demographic page, which included questions about age, gender, ethnicity, and so forth. Embedded in this page were the two critical dependent measures: religiosity and belief in God.

Dependent measures. Participants responded to the two questions ranging from 1 (*not at all*) to 7 (*very strongly*): (a) "How religious are you?" and (b) "How strongly do you believe in God?"

Results and Discussion

Mortality salience led to stronger religiosity, $t(26) = 2.03$, $p = .05$, and to a stronger belief in God, $t(26) = 2.34$, $p = .03$ (see Figure 1). These data offer initial experimental evidence that awareness of death motivates religiosity and, more specifically, belief in a higher power.

STUDY 2

Overview

In Study 2, we investigated whether participants primed with death were more likely to explain an unusual phenomenon (the efficacy of prayer) with an affirmation that God exists and that God can answer prayers. This study also assessed whether the effect of mortality salience on supernatural belief hinges on prior religious affiliation.

Method

Participants. Participants were introductory psychology students (39 men, 38 women; age $M=19$) who were 69% European American, 13% African American, 4% Hispanic, 5% Asian, and 9% Other; 74% were Christians, 19.5% reported not having a religion or being an atheist, 5% were Jewish, and 1.5% (1 participant) was Hindu. Participation was in partial fulfillment of course requirements at the University of Illinois, Urbana-Champaign.

Design. The design was a one-way comparison of three between-groups treatments: a mortality salient condition, priming thoughts of death; a religious (control) condition, priming thoughts of religion; and a neutral (control) condition (no prime). The religious prime was included to assess whether death awareness would have an effect on supernatural agent beliefs even relative to thoughts of religion. Before exposure to the priming, participants specified their religious denomination and

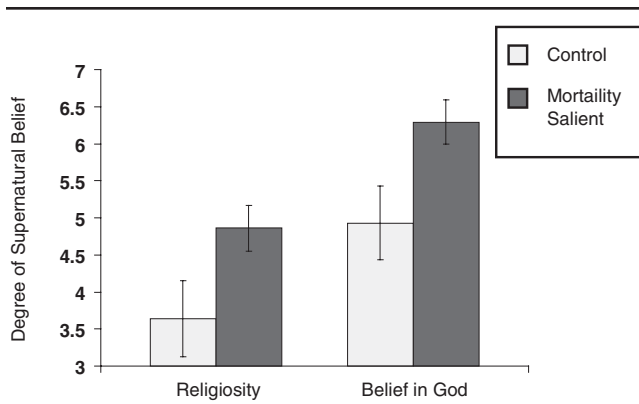


Figure 1 Effect of mortality salience on religiosity and belief in God (Study 1).

NOTE: Scale ranged from 1 to 7.

religious identification. To reduce suspicion, the pretest measures of religious affiliation and identification were embedded in a demographics questionnaire that asked for several demographic variables and identification with each. Specifically, participants wrote down their sex, nationality, religion, and so forth, and then rated on a 1 to 9 scale how important these categories were to their identity.

Death, religious, and neutral primes. The three treatments were based on those used in a study by Cahill, Prins, Weber, and McGaugh (1994), where a graphically and tragically eventful version of a story led to higher levels of adrenaline in participants than an uneventful version. In another study conducted recently (Vexelman, Hansen, & Norenzayan, 2005), the death version of this story induced significantly more death thought accessibility than the neutral version. Each treatment presented a story in 12 sections, with each section presented on a slide (see the appendix). All stories began with a child and the child's mother going to visit the father at the hospital. All stories ended with the mother going to her preschool to pick up her other child. In the neutral prime, the child watches an emergency drill. In the death prime, the child in fact is caught in an accident and what is a drill in the neutral prime is a real operation in the death prime. The death and neutral primes in this study are similar to those of the Cahill et al. (1994) study, although in the present version of the death prime, the child actually dies. In the religion prime, the child encounters a well-dressed man kneeling before a woman in rags and later sees that man alone in the hospital chapel with closed eyes and moving lips. Given the likely connection between religious imagery (e.g., prayer) and affirmation of supernatural belief, we examined the relative strength of the death prime and the religion prime in comparison to the neutral prime. It would be especially interesting if thoughts of death are more potent in

inspiring belief in a higher power than even thoughts of religion.

Assessment of belief in supernatural agency. Under the guise of a different study about "Academic Articles and Media Reporting," the dependent variable of interest was the response to questions about an actual *New York Times* article (Nagourney, October 2, 2001) covering a scientific study on the power of prayer (copy available from the authors). The *Times* article was introduced as follows:

The popular media often reviews articles from academic research that have been previously published in other journals. Please read the following article from the *New York Times* and answer the questions on the following pages.

The article referred to a study by Cha, Wirth, and Lobo (2001) in which women in a Korean fertility clinic were randomly assigned to groups that were either prayed for or not. Christian groups in the United States, Canada, and Australia prayed for the women to get pregnant. The results showed that the women in the prayed-for group became pregnant at twice the rate of the women in the group not prayed for. After reading the article, participants rated their agreement with statements that probed their perceptions of the study.

The statements of interest in assessing supernatural agent beliefs were the following: (a) the God that prayer groups were praying to exists, (b) God/a higher power exists, (c) God/a higher power can answer prayers, and (d) the experiment offers evidence that God/a higher power can answer prayers. Other statements (not included in the dependent variable) assessed perceptions of the prayer study without reference to the existence or efficacy of a God or higher power. Example statements were as follows: "The study was scientifically rigorous," "If the study were replicated several times, one would get the same results," and "The findings in the study might be the result of coincidence." These statements did not directly assess belief in God. Rather, they assessed perceptions of the credibility of the study and thus were not part of the dependent measure. Participants rated agreement with statements on a 9-point scale.

Procedure. Participants met in groups of 10 to 18. After administering the demographics and demographic identification measures, the experimenter handed participants written instructions that said,

Shortly you will view a short story about a child. The story will be presented on slides. After reading each slide, please close your eyes and imagine the scene. Try to see, hear, and feel what is happening in the scene.

The experimenter presented each slide on an overhead projector, laying each slide on the overhead for 10 s and then removing the slide and turning the projector off for 10 s while preparing the next slide. Participants were randomly assigned to the MS version, the neutral version, or the religious version of the slide story, although participants were run in blocks of the same condition. Experimenters were not necessarily blind to condition, however, because they could potentially read each slide as they showed it to participants, although they were blind to the hypotheses of the study. (Study 3 addressed these potential problems by running each participant individually and ensuring that experimenters were blind to the conditions.) The main advantages that this overhead method offered were to ensure consistency of how long participants spent reading each slide and to give the content of the slides vivid focal significance.

Participants then completed the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) to investigate whether the primes produced different levels of positive and negative affect. They then received the dependent measure, which was headed "Academic Articles and Media Reporting" and introduced the *New York Times* article on Cha et al.'s (2001) prayer study in the following way:

The popular media often reviews articles from academic research that have been previously published in other journals. Please read the following article from the *New York Times* and answer the questions on the following pages.

This cover story was meant to divert attention from the prayer-related content of the study. Finally, participants completed a suspicion probe (Aronson, Ellsworth, Merrill, & Gonzales, 1990) and were thanked and debriefed.

Results

Suspicion probe. The suspicion probe revealed that about one third of participants perceived the experiment as evaluating their religious beliefs, although there were no significant differences in this recognition by condition, $\chi^2(2, N = 77) = 0.48, ns$. No one guessed the hypothesis that the experiment was assessing the effect of the story on their express religious beliefs. Also, no one expressed any suspicion about the genuineness of the newspaper article. Therefore, no participants were dropped from the main analysis.¹ There were no significant differences by condition for any of the statements that did not directly address supernatural belief (all p s = ns), suggesting that the article was interpreted in a similar way in the three conditions.

Influence of primes on belief in supernatural agency. The four critical dependent measures of supernatural belief were combined into a composite index of supernatural belief ($\alpha = .92$). As can be seen in Figure 2, belief in supernatural agency increased as a function of the mortality salience manipulation, supporting the hypothesis. A one-way ANOVA on the three conditions revealed a difference between groups on the index of supernatural belief, $F(2, 74) = 2.99, p = .06$. Contrasts on the four-statement index showed significant differences in supernatural belief between both the death prime and the neutral prime, $t(74) = 2.43, p = .03$, and between the death prime and the religious prime, $t(74) = 2.17, p = .04$, but not between the religious and neutral primes, $t < 1$. The index score for the death prime was highest, indicating more supernatural belief ($M = 7.15, SD = 1.75$), whereas the index scores for the religious and neutral primes were lower and about equal ($M = 5.98, SD = 2.16$ for the religious prime and $M = 6.03, SD = 1.67$ for the neutral prime).

It is difficult to compare Christians versus non-Christians due to the low n for the latter (8 in neutral, 4 in death). However we could assess whether the effect of death on supernatural agent belief remained after controlling for religious affiliation and religious identification. An ANOVA assessing the contrast between death and neutral primes, holding religion constant (Christian vs. non-Christian), did not change the pattern of results, showing an effect of death prime, $F(1, 46) = 4.02, p = .05$. Holding religious identification (measured on a continuous scale) did not change this effect either, $F(1, 46) = 4.59, p = .04$.

The role of negative affect. To evaluate whether the different primes had different emotional effects, a one-way ANOVA was conducted on an index of negative affect assembling the 10 negative words in the scale ($\alpha = .86$) and an index of positive affect assembling the 10 positive words in the scale ($\alpha = .86$).² For negative affect, the overall ANOVA was significant, $F(2, 74) = 8.30, p < .001$, and the contrast between death and the other two primes was significant, $t(74) = 15.80, p = .001$ (greater negative affect in the death prime), whereas there was no difference between the religious and neutral primes ($F < 1$). For the positive affect index, the overall ANOVA was $F(2, 74) = 1.76, p = .17$. These results suggest that the death prime induced negative affect in addition to awareness of death.³

Discussion

The results of Study 2 offer experimental evidence that thoughts of death increase belief in supernatural agency, replicating the pattern in Study 1. Agreement with supernatural explanations for the unusual increase in fertility rates among prayed-for women was higher in

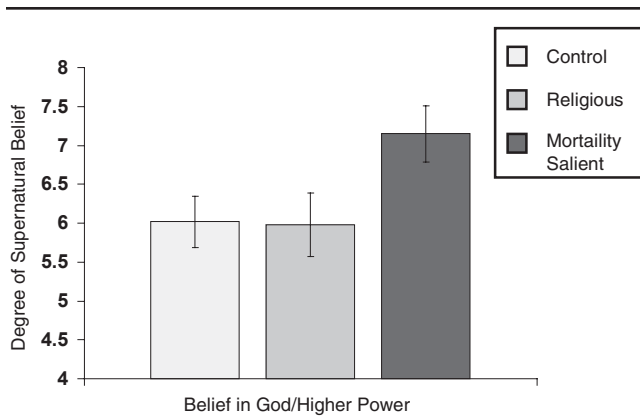


Figure 2 Effect of mortality salience on belief in Christian God (Study 2).

NOTE: Scale ranged from 1 to 9.

the death prime than in the control prime or even the religious prime.

Belief in the efficacy of Christian prayer is uncontroversially a part of most of the Christian participants' cultural worldview. However, the effect of mortality salience on supernatural belief emerged, holding constant religious affiliation and religious identification, raising the possibility that the effect may reflect a tendency to endorse a supernatural agent irrespective of the participants' cultural-religious affiliation or the cultural familiarity of the agent itself. Does mortality salience increase supernatural belief even when the supernatural agent is presented in a culturally unfamiliar context? Study 3 addressed this question.

STUDY 3

Overview

Study 3 had three goals: to determine (a) whether mortality salience encourages supernatural agent beliefs in a culturally less familiar context, (b) whether religious affiliation mediates the belief in a culturally alien higher power when death is salient, and (c) whether negative affect mediates the effect of mortality salience on supernatural belief. As in Study 2, participants were exposed to the death prime or neutral prime (the religious prime of Study 2, which did not differ from the neutral one, was dropped) and the dependent variable was agreement with supernatural belief statements after reading a "Buddhist prayer" version of the *New York Times* article on Cha et al.'s (2001) prayer study.⁴ By responding to statements about "Buddha/a higher power," participants may defend their sectarian cultural worldview by denying Buddha or they may defend their nonsectarian religious worldview by embracing a higher power. Greater support for "Buddha/a higher power" does not necessarily

mean greater belief in Buddha, although at a minimum it means more openness to a higher power in a culturally unfamiliar context.

Method

Participants. Forty-one volunteers (32 women) from the Urbana-Champaign area participated in exchange for \$6 (age $M = 23$); 51% were European American, 12% African American, 20% Asian, and 17% Other or did not report their ethnicity. Of the participants, 59% were Christian; 24% claimed to have no religion or claimed to be atheist, agnostic, undecided, or "nonpracticing"; and the remaining 17% claimed some other religion or spiritual/religious orientation, including one Buddhist. No one guessed the true purpose of the study; however, 6 participants expressed suspicion about the genuineness of the article and therefore were dropped from the analysis.

Design and materials. The study was a simple between-groups design (death prime vs. neutral prime). Participants received the prime, followed by the PANAS and then the newspaper report of the prayer study. The dependent variable of Study 2 was used again, with the following amendments: where the original *New York Times* article had stated, "The researchers gave members of different Christian denominations in the United States, Canada, and Australia photographs of the patients and asked them to pray," the amended version for Study 3 stated, "The researchers gave members of different Buddhist denominations in Thailand, Taiwan, and Japan photographs of the patients and asked them to pray."

The statements were left intact except "God" was replaced with "Buddha." In addition, the existence questions were amended because the Buddha is based on a historically living person and it is as unclear for the purposes of assessing supernatural belief to affirm or deny Siddhartha's existence as it is to affirm or deny Jesus's existence. Therefore, the questions asked whether Buddha is now able to hear prayers (implying that Siddhartha exists as an immortal spirit).

Procedure. The procedure for Study 3 was similar to that of Study 2, although further steps were taken to minimize potential experimenter bias. Specifically, the use of slides was dropped and instead each participant read the story on 12 pieces of paper. Thus, participants were randomly assigned to either the death version or the neutral version of the prime story without the experimenter being aware of which version each participant received. Furthermore, we assessed prior religious identification on an earlier day by e-mail or phone (ranging between 2 days and a week depending on scheduling urgency) so that participants would not be as conscious

of the demographic assessment while doing the experiment.

After giving informed consent, participants read and imagined the slide story, filled out the PANAS, read the article, and completed the dependent measures. Following this, participants completed an additional neutral task and then completed the PANAS again.⁵ Participants completed a suspicion probe at the end and were debriefed.

Results and Discussion

Influence of primes on belief in supernatural agency. The four supernatural belief items were combined to serve as the dependent measure ($\alpha = .85$). Mortality salience increased belief in supernatural agency, $F(1, 33) = 5.20$, $p = .03$. Item by item, mortality salience increased supernatural belief for “Buddha/a higher power can hear prayers,” $F(1, 34) = 5.54$, $p = .02$; for “The experiment offers evidence that Buddha/a higher power can answer prayers,” $F(1, 34) = 5.45$, $p = .03$; and for “Buddha/a higher power can answer prayers,” $F(1, 33) = 6.65$, $p = .01$. There was no effect for “The Buddha that prayer groups were praying to exists” ($F < 1$). This null result suggests that mortality salient participants were not more inclined to believe in Buddha per se but not inclined to deny Buddha’s supernatural existence either. As in Study 2, no significant differences emerged for any of the statements assessing perceptions of the article (all $ps = ns$).

Role of religious affiliation. It is difficult to compare Christian participants with non-Christians given the low n for the latter (5 in one condition, 7 in the other). However, among Christian participants only, the effect of prime was significant for all three statements mentioning Buddha/a higher power but not for “the Buddha that prayer groups were praying to exists.” Also, although Christian scores on the Buddha/higher power endorsement index were at or below the neutral midpoint in the neutral condition, $t(13) = -1.49$, $p = .16$, they scored significantly above the midpoint in the death condition, $t(9) = 3.77$, $p = .004$. It would appear that, if anything, Christians were manifesting a mildly defensive motivation at the sully of “higher power” with “Buddha” in the neutral condition, a defense they abandoned for a culturally inclusive endorsement of a higher power in the mortality salience condition.

Finally, an alternative method of measuring the role of religious affiliation was to examine participants’ degree of identification with their own religion as entered on their demographics forms. (Those who indicated no religion were given a score of 1 out of 9.) We ran correlations between (non-Buddhist) religious identification and agreement with the Buddha-supporting supernatural belief statements, excluding the 1 Buddhist participant who was in the control condition. In the

neutral prime, these two variables were uncorrelated, $r(18) = .03$, $p = ns$. In the death prime, however, the correlation of the supernatural index with religious identification was positive, $r(16) = .68$, $p < .01$, indicating that the mostly Christian participants who identified with their religious faith were more inclined to endorse belief in a higher power than to deny Buddha under mortality salience.

Role of affect. We examined the effect of the mortality salience manipulation on an index of negative affect variables ($\alpha = .87$) and an index of positive affect variables ($\alpha = .83$). Participants felt more negative affect after the mortality salience prime, $t(34) = 2.47$, $p = .02$. However, when we included negative affect as a covariate in an ANCOVA, mortality salience still affected belief in the Buddha/higher power index, $F(1, 33) = 3.54$, $p = .07$.

To summarize, the results of Study 3 corroborated those of Studies 1 and 2, further confirming that mortality salience increases belief in supernatural agents. The effect of mortality awareness on supernatural belief emerged even when the supernatural agent in question was a culturally alien one, and this effect was stronger for participants identified with Christianity. However, the effect of mortality salience on the one item that uncontroversially addressed belief in Buddha (without mention of a higher power) did not reach significance, suggesting that sectarian defenses may have mitigated the effect. On the other hand, there was no hint of evidence for derogating Buddha under mortality salience, not even for the latter Buddha item divorced from any mention of higher power.

However, according to TMT, there is often more than one accessible cultural worldview (Greenberg et al., 1997). Perhaps the cultural worldview that participants were inclined to bolster was not the parochial belief in the Christian God but the superordinate belief in a universal higher power (whether given the name Buddha or God). Both God and Buddha are deified figures of major world religions. Any inclination to endorse statements about their existence and powers might reflect a more general openness to a higher power rather than openness to any garden-variety supernatural agents. It is also conceivable that participants were responding to the familiar concept of “prayer” even if the context was culturally foreign. Study 4 was conducted to address these issues.

STUDY 4

Overview

Study 4 had three goals. The first goal was to replicate the finding obtained in Study 3 with obscure culturally alien supernatural agents (ancestral Shamanic spirits) that do not represent a major world religion and are not

associated with the culturally recognizable concept of prayer. Second, mortality salience was manipulated independent of negative affect to rule out the possibility that the effects can be attributable to mere negative affect rather than to death awareness specifically. Third, we examined whether the effect of mortality salience on supernatural belief generalizes to the nonreligious, atheists, and agnostics.

Method

Participants. The present study analyzed the responses of 142 undergraduate students from the University of British Columbia (101 women, age $M = 20$) who participated in this experiment for partial fulfillment of psychology course requirements. Participants were 46% European Canadians, 38% East Asian Canadians, and 16% Other; 57% indicated a religion (56 Christians, 25 non-Christians) and 43% explicitly indicated that they did not have a religion, were atheist, or were agnostic. Out of 146 participants who completed the measures, 4 were dropped from the analysis for expressing suspicion about the authenticity of the newspaper article related to the dependent variable.

Design and procedure. The study was introduced as an investigation of “narratives, emotions, and cognition.” Participants were randomly assigned to three conditions: mortality salient (MS), control–negative affect (NA), and control. In the MS condition, participants responded to the same open-ended questions as in Study 1, namely, “In the space below, write a paragraph about what will happen to you when you die. Write in some detail about the feelings that the thought of your own dying arouse in you.” In the control-NA condition, participants responded to the open-ended questions, “In the space below, write a paragraph about a visit to the dentist where you experience great pain due to a failure of the anesthetic. Write in some detail about the feelings that the thoughts of your dental pain arouse in you.” In the control condition, participants responded to the open-ended questions, “In the space below, write a paragraph about your participation in a team activity. Write in some detail about the feelings that the thoughts of your participation in team activity arouse in you.” Participants were given 5 min for this task.

Immediately following the manipulation, all participants completed the PANAS, followed by a distracter memory task (8 min) in which they studied and then recalled a list of words unrelated to the content of the study (door, sweater, engine, etc.). This task was included because the explicit mortality salience manipulation in this study would likely cause the initial suppression of thoughts of death. A distracter ensures that thoughts of death have slipped below the surface of consciousness and can affect subsequent psychological mea-

asures (Pyszczynski et al., 1999). Then, all participants read a newspaper article ostensibly from the *South China Morning Post* chronicling the use of clairvoyant Shamans in the Russian Military during and after the Cold War; rated a series of statements regarding the article, including statements affirming culturally alien supernatural agents; and then completed the PANAS again, completed a set of personality measures, another distracter task, and a demographic questionnaire, which included an open-ended question about religious background and the single-item religious identification scale used before. Finally, a suspicion probe was administered. After a full debriefing, participants were dismissed.

In addition to the mortality salience manipulation, religiosity also was considered as a between-groups variable. Participants who wrote “nonreligious,” “atheist,” or “agnostic” in response to the demographic questionnaire were classified as nonreligious. Those who wrote down a religion or a religious denomination were classified as religious.

Assessment of belief in supernatural agency. Under the guise of a different study about modern media reporting, the dependent variables of interest were agreement ratings regarding supernatural belief in response to a doctored article from the English-language *South China Morning Post* (SCMP). The newspaper article that participants read (available from the authors) described a secret program in the Russian military that employed clairvoyant Siberian Shamans to assist in intelligence gathering. It described Shamans meditating to awaken their powers and then channeling a Shamanic ancestral spirit who would help them visualize the location of a specific person such as a Russian hostage in Chechnya. It went on to describe instances where such practices led to success but also quoted Kremlin officials who doubted the effectiveness of the program. In actuality, we adapted this story from an authentic article published in the SCMP about the use of clairvoyants in intelligence gathering for the American military (Beck, 1995). The doctored article was introduced to participants as follows:

In an age where media needs to compete more seriously with entertainment, journalists must often tell their stories with flair, humor, and intrigue. At the same time, however, they must attempt to maintain objectivity to present a fair account of the story they tell. Read the following article and see how well you feel the author achieves this balance.

Participants read the article and rated their agreement with a series of statements relevant to it. The statements of interest in assessing supernatural belief were the following: (a) Paranormal clairvoyance (seeing objects and events that cannot be perceived by the senses) is not pos-

sible (reverse-scored), (b) The ancestral spirits that Shamans rely on probably exist, (c) The ancestral spirits that Shamans rely on probably offer reliable guidance and information, (d) The achievements of the Russian clairvoyant program offer evidence that ancestral spirits exist, (e) The achievements of the Russian clairvoyant program offer evidence that ancestral spirits can offer reliable guidance and information, (f) God/a higher power exists, and (g) God/a higher power can offer reliable guidance and information. Statement a probes belief in clairvoyance in particular. Statements b and c are global statements of belief in ancestral spirits, whereas statements d and e are about the alleged achievements of the Russian clairvoyant program. Finally, statements f and g probe belief in God/a higher power in general. Other statements (not included as part of the dependent variable) dealt with the tone, style, and objectivity of the article. As in Studies 2 and 3, participants rated the statements on a scale ranging from 1 to 9, where higher numbers indicate more agreement.

Results and Discussion

Influence of primes on negative affect. To disentangle thoughts of mortality from negative affect, we first checked if the control conditions differed from each other or from the mortality salient condition. The indices of negative affect items were comparable across conditions, $M = 1.53$, $SD = .48$, for mortality salience; $M = 1.62$, $SD = .59$, for dental pain; and $M = 1.40$, $SD = .35$, for team activity (all p s = ns), replicating past research in the Terror Management literature.

Influence of primes on belief in supernatural agency. The seven supernatural statements showed good internal reliability ($\alpha = .82$). An omnibus ANOVA testing for the effect of prime (mortality salience, dental pain, neutral) by religiosity (religion indicated vs. not) revealed a main effect of religiosity, $F(1, 136) = 14.66$, $p = .001$, but neither the effect of prime, $F(2, 136) = 1.17$, nor the interaction, $F(2, 136) = 1.20$, reached statistical significance. A closer inspection revealed that among the nonreligious, the three experimental groups did not differ on the seven-item index of supernatural agent belief, $F < 1$. The picture was different among religious participants. Contrasting the death condition with the two control conditions revealed a significant main effect, $F(2, 77) = 4.58$, $p = .04$. The death prime was significantly different from the team activity control prime, $t(78) = 2.02$, $p = .05$, although it fell short of significance for the dental pain control prime, $t(78) = 1.63$, $p = .11$. The two control primes were not different from each other, $F < 1$.

The seven supernatural statements tapped into theoretically distinguishable aspects of supernatural agent beliefs that are central to the purpose of this study, namely, culturally familiar versus unfamiliar deities;

therefore, they also were examined in three separate clusters. We computed three subscales: the first, "alien spirits," ($\alpha = .78$) consisted of items a, b, and c (belief in clairvoyance, belief in the existence of ancestral spirits, belief that spirits guide); the second, "evidence for clairvoyant program," consisted of items d and e, $r(141) = .76$, $p < .001$, regarding the achievements of the Russian clairvoyant program; and the third subscale, "God/a higher power" consisted of items f and g, $r(141) = .79$, $p < .001$, regarding belief in the existence of the culturally familiar God/a higher power.⁶ Figure 3 represents these indices of supernatural belief as a function of experimental condition among the religious and the nonreligious. Because the three experimental groups were virtually identical (all F s < 1) among the nonreligious, the remaining analyses focus on the religious participants.

The mortality salient condition increased belief in "alien spirits" for religious participants, $t(79) = 2.61$, $p = .01$ (Figure 3, panel A). Item by item, there was stronger supernatural belief in the mortality salient condition than control for paranormal clairvoyance, $t(79) = 2.51$, $p = .01$, Shamanic spirits exist, $t(79) = 2.49$, $p = .02$, and Shamanic spirits guide, $t(79) = 1.82$, $p = .07$. There were no effects of experimental condition on "evidence for clairvoyant program," $F < 1$.

The simple effect of mortality salience on belief in "God/a higher power" reflected a nonsignificant trend in the expected direction for participants who indicated a religion, $t(78) = 1.55$, $p = .12$. Thus, the effect of mortality salience on belief in God/a higher power did not reach significance and failed to replicate the first two studies. It is intriguing that mortality salience motivated the culturally alien belief more reliably than the culturally familiar belief. One possible explanation for this is that mortality salience moved people toward believing in the most cognitively accessible supernatural agency, which, in this case, were Shamanic spirits. A second possibility is that because participants always expressed belief in "alien spirits" before they expressed belief in "God/a higher power," their existential need to defend against thoughts of death already had been reduced by the time they evaluated the latter statements. This could occur because terror management processes, such as worldview bolstering (and possibly supernatural belief in this case), leads to reduction of death thought accessibility (Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997).

Role of religious affiliation among the religious. Perhaps the effect of mortality awareness on belief in Shamanic spirits was driven by non-Christian religious participants. However, there was little evidence for this alternative account. A Prime (death vs. neutral) \times Religious Background (Christian vs. non-Christian) two-way ANOVA performed only on religious participants regarding the

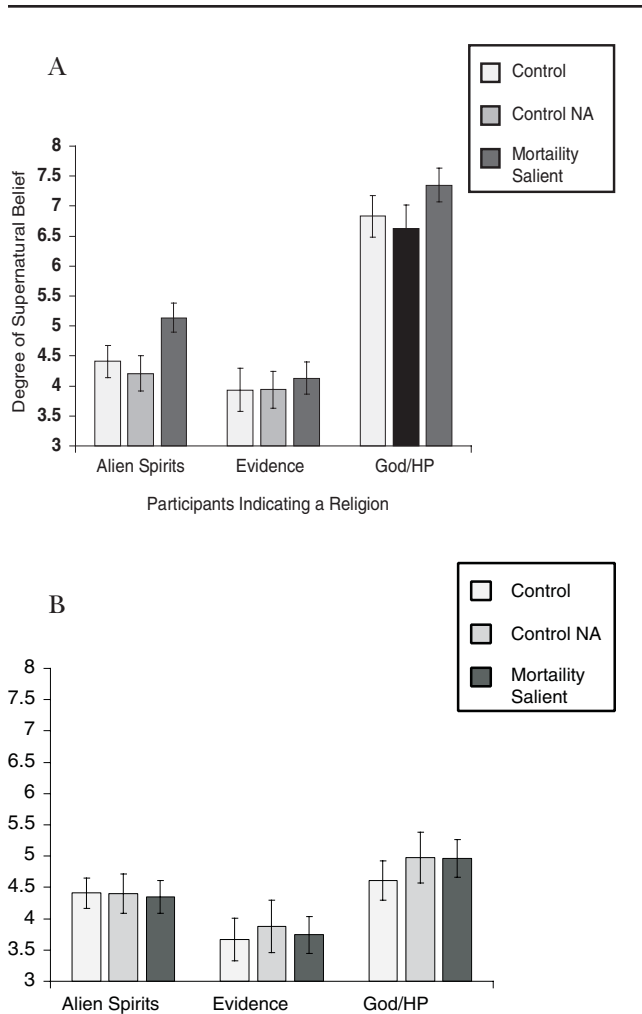


Figure 3 Effect of mortality salience on belief in Shamanic ancestral spirits, evidence for clairvoyant program, and God/a higher power for participants indicating a religion (panel A) and for nonreligious participants (panel B).

NOTE: Scale ranged from 1 to 9. HP = higher power.

alien spirits index revealed a main effect of prime, $F(1, 77) = 7.04, p = .01$, and a nonsignificant trend for religious background, $F(1, 77) = 2.59, p = .11$, but no significant interaction, $F < 1$.

As in Study 3, we ran correlations between religious identification and inclination to agree with the “alien spirits” subscale. In the death prime, the correlation was positive, $r(53) = .34, p = .01$. In the control primes, however, these two variables were uncorrelated, $r(89) = .08, p = ns$, replicating the pattern in Study 3.

There were no effects of mortality salience on beliefs in the success of the purported clairvoyant program or on perceptions of the validity of the article, all F s < 1 . No other significant effects or interactions were found, all F s < 1 . This renders unlikely an alternative explanation of the results—mortality-salient gullibility or being more

likely to accept any cock-and-bull story under mortality salience. This account does not explain the failure of participants to believe more in the virtues of the Russian intelligence-gathering program under mortality salience. The prime very specifically affected belief in supernatural agency, although not the merits of the government’s intelligence-gathering operations.

To summarize, people with a prior inclination to religion were more likely to believe in supernatural agents when death was salient. However, the effect did not reach significance for statements regarding belief in God/a higher power; therefore, the results in this study are limited to culturally alien supernatural agents. The absence of this effect among the nonreligious limits the scope of our findings to those who already espouse a religion, suggesting that mortality salient belief in the supernatural—even the culturally alien supernatural—is a kind of religious worldview defense, albeit a particularly inclusive kind. It is interesting to note, however, that although the nonreligious under mortality salience did not show stronger supernatural belief, neither did they derogate supernatural agents in defense of a secular worldview.

GENERAL DISCUSSION

We found that the awareness of mortality reliably increased the tendency to believe in supernatural agency. Mortality awareness increased religious identification, belief in God, and belief in the efficacy of divine intervention (Studies 1 and 2). Mortality awareness also led to stronger belief in supernatural agents, even in the context of Buddhist prayer (Study 3) and clairvoyant Shamans consulting their ancestral spirits (Study 4), although this latter effect held only among religious participants. The only two exceptions to the general pattern of results were that there was no reliable effect on belief in God in Study 4 and no reliable effect on one supernatural item, “Buddha . . . could hear prayers” in Study 3. In the following section, we explore the merits of three possible explanations for these findings.

Are Supernatural Agent Beliefs a Form of Sectarian Worldview Defense, of All-Encompassing Religious Worldview Defense, or Distinct Cognitive Inclination?

Three explanations for the effect of mortality awareness on supernatural belief are considered. One explanation maintains that this effect is a typical case of cultural worldview defense working on the same principle as the outgroup derogation strategies commonly found in the Terror Management literature (Greenberg et al., 1997). The most straightforward interpretation of this hypothesis predicts that mortality awareness should lead to increased acceptance of culturally familiar supernatural agents and increased rejection of culturally unfamiliar

iar ones. The second explanation of this effect also posits a worldview defense, but one that is specifically religious and nonsectarian. According to this explanation, mortality salience effects will occur regardless of cultural familiarity of the supernatural agents and also that the effect should occur primarily among religious participants but not among the nonreligious. The third explanation privileges belief in supernatural agents as a distinct psychological inclination. This account predicts that awareness of mortality, at least in some contexts, should facilitate belief even in culturally alien supernatural agents and that this effect would occur regardless of religious affiliation or degree of religiosity.

First, we consider whether the effects can be explained in terms of outgroup derogating cultural (sectarian) worldview defense. That mostly Christians would be more likely to endorse belief in God under mortality salience is not surprising in light of this interpretation. That this may be the case even if tacking on the word “Buddha” in Study 3 is more surprising, but perhaps it can be explained by assuming that participants correctly grasped that “Buddha/a higher power” technically could mean “Buddha OR a higher power.” Those who believed in a higher power but not Buddha still could have answered in the affirmative. Or perhaps participants were a priori open to Buddha as a culturally legitimate deity to begin with. Furthermore, the effect did not materialize for the item “the Buddha that prayer groups were praying to exists,” and this may indicate that sectarian worldview concerns may have played a role. And finally, it could be argued that the majority Christian participants actually thought “Jesus” when they read “Buddha/a higher power” or “ancestral Shamanic spirits,” but only in the death condition where existential concerns were most salient.

Although the sectarian worldview defense explanation cannot be ruled out definitively given these considerations, in our view, it does not persuasively account for the overall findings. It does not easily account for why participants who were more religious (mostly Christians) had stronger belief in culturally alien supernatural agents, but only in the mortality salience condition, again including “Buddha/a higher power” (Study 3) and Shamanic ancestral spirits (Study 4). Also, it does not easily account for why Christians were reluctant to endorse “Buddha/a higher power” or “Shamanic spirits” in the neutral conditions and why the reluctance diminished in the death condition. Furthermore, supernatural belief in the neutral condition even for Buddha/a higher power (Study 3) was considerably lower compared to that for God/a higher power in the Christian prayer context (see Figure 2, Study 2). Moreover, other studies have found that religious identification is positively correlated with measures of cultural traditional-

ism, authoritarianism, and religious exclusivity, or the tendency to privilege one’s religion over others (Hansen & Norenzayan, 2005; see also Duck & Hunsberger, 1999), further supporting the view that religiously identified participants do not have an a priori openness to religiously different groups or beliefs. Rather, it appears that mortality awareness instigated an inclination to override outgroup derogation strategies in favor of supernatural belief.

As to whether the existence of Buddha or ancestral spirits were literally mentally replaced in the minds of participants with the existence of the Christian God in the mortality salient condition but not in the neutral conditions, this is conceivable, yet it is puzzling as to why participants were considerably less inclined to believe in Buddha or Shamanic spirits than in God even in the mortality salient condition. Finally, mortality salience caused stronger belief in Shamanic spirits in Study 4, where the culturally familiar concepts of “prayer” and “higher power” were removed and replaced with the less familiar religious concept of Shamans, ancestral spirits, and spirit channeling. Even if one is inclined to dispute the evidence on these bases, however, it is worth noting that, at the very least, culturally different supernatural agents, including “the Buddha that prayer groups were praying to exists,” were never denied or derogated under mortality salience. Even nonsignificant trends were toward acceptance, not rejection.

The data thus are more persuasively in line with the notion that supernatural agent beliefs are a form of religious worldview defense that, unlike the commonly observed outgroup derogating strategies, can be inclusive of culturally different deities and specific to participants with an a priori religious worldview. This possibility received support in that (a) mortality awareness increased supernatural agent beliefs regardless of whether the beliefs in question were culturally familiar and (b) this effect was specific to religious participants only.

Why would a cultural worldview defense often manifest itself through outgroup derogation yet religious worldview defense operate in an all-inclusive rather than sectarian manner? Insofar as the mere existence of other humans who hold a different cultural worldview is threatening (Greenberg et al., 1990), to posit the existence and power of the deities associated with such rival worldviews could conceivably be even more threatening. The probable reason for why alternative deities are not threatening, whereas alternative cultural groups are, may be precisely that alternative cultural groups carry no positive information about our own potential for immortality (or meaning or other existential need), whereas alternative deities still do, even if indirectly. If Buddha and Siberian ancestral spirits exist after death, then so

may our spirits—whether we are Buddhists or Shamans or otherwise.

Finally, we consider the possibility that belief in supernatural agency is altogether psychologically distinct from worldview defense strategies. If so, (a) mortality salience should increase supernatural agent beliefs even for culturally unfamiliar deities and (b) this effect should occur regardless of whether participants have a priori religious beliefs. Although the findings were largely consistent with the first expectation, they were not with the second one. Nevertheless, we leave this as an open possibility. Theoretically, thoughts of death may trigger a distinct evolved cognitive inclination to process information from the world in agentive terms as a reliable survival habit, and this tendency then may be overextended to nonagentive natural elements in the world, such as winds, mountains, and clouds, giving rise to supernatural agent beliefs (Atran & Norenzayan, 2004; Guthrie, 1993; Norenzayan & Atran, 2004). Second, unlike Study 4, Study 2 found that the effect of mortality salience on supernatural belief remained even when holding prior religiosity constant. Third, it is possible that the absence of an effect for atheists in Study 4 is due to suppression of an effect rather than to a lack thereof. If so, one might be able to find evidence for this effect among atheists in implicit measures, a possibility that remains to be tested.

The mortality salient inclination to endorse supernatural agent beliefs is consistent with the broad framework of TMT (Dechesne et al., 2003; Solomon et al., 1991, 2004) in that religious concerns have been viewed as a

core defense against the terror of death. Nevertheless, with a few notable exceptions, most Terror Management studies have focused on nonsupernatural strategies such as self-esteem maintenance and secular worldview defense, perhaps because the connection between death and secular defenses are less obvious to make. However, religions are a prime animating force in most societies and for most people's lives (e.g., Lester, 2001). Belief in supernatural agency might be the first line of defense against the terror of death for most people in most cultures in the world. In this regard, supernatural agency and literal immortality may potentially override symbolic immortality through cultural defensiveness or self-esteem, at least for those who are religious (e.g., Dechesne et al., 2003).

Conclusion

As the saying goes, in a sea storm, voyagers will pray to any God. Our own findings corroborate this saying, at least for "voyagers" who already espouse religious beliefs. As such, our findings support the idea that belief in supernatural agency is a core response to the human awareness of mortality. Awareness of mortality, then, can offer something better than mere jingoistic social cohesion and derogation of culturally alien worldviews. Perhaps further research will show that it can even foster the nobler instincts of the world's faithful, encouraging an ecumenical openness to alien religious beliefs, a possibility that favors the spiritual path of Gandhi over that of Khomeini in a world consumed by religious strife.

APPENDIX
Three Versions of the Prime Story

<i>Neutral</i>	<i>Death</i>	<i>Religious</i>
1. A mother and her child are leaving home in the morning.	A mother and her child are leaving home in the morning.	A mother and her child are leaving home in the morning.
2. She is taking the child to visit the father's workplace.	She is taking the child to visit the father's workplace.	She is taking the child to visit the father's workplace.
3. The father is a laboratory technician at Victory Memorial Hospital.	The father is a laboratory technician at Victory Memorial Hospital.	The father is a laboratory technician at Victory Memorial Hospital.
4. They check before crossing a busy road.	They check before crossing a busy road.	They check before crossing a busy road.
5. While walking along, the child sees some wrecked cars in a junk yard and finds them interesting.	While crossing the road, the child is caught in a terrible accident and is critically injured.	While walking along, the child sees a well-dressed man kneeling before a woman in rags, as if asking her forgiveness.
6. At the hospital, the staff are preparing for a practice disaster drill, which the child will watch.	At the hospital, the staff prepares the emergency room, to which the child is rushed.	At the hospital, the child's father shows him around his lab. The child's thoughts are elsewhere.
7. An image from a brain scan machine used in the drill attracts the child's interest.	An image from a brain scan machine used in a trauma situation shows severe bleeding in the child's brain.	An image from a brain scan that he sees reminds him of something in the surprised woman's face.
8. All morning long, a surgical team practices the disaster drill procedures.	All morning long, a surgical team struggles to save the child's life.	On his way around the hospital, the child sees the well-dressed man sitting alone in the hospital chapel.
9. Make-up artists are able to create realistic-looking injuries on actors for the drill.	Specialized surgeons are able to reattach the child's severed feet but cannot stop the internal hemorrhaging.	The man is moving his lips silently, eyes closed. The child wants to sit beside him but the father leads him away.
10. After the drill, while the father watches the child, the mother leaves to phone her other child's preschool.	After the surgery, while the father stays by his dead child, the mother leaves to phone her other child's preschool.	After a brief tour, while the father watches the child, the mother leaves to phone her other child's preschool.
11. Running a little late, she phones the preschool to tell them she will soon pick up her child.	Barely able to talk, she phones the preschool to tell them she will soon pick up her child.	Running a little late, she phones the preschool to tell them she will soon pick up her child.
12. Heading to pick up her child, she hails a taxi at the number nine bus stop.	Heading to pick up her child, she hails a taxi at the number nine bus stop.	Heading to pick up her child, she hails a taxi at the number nine bus stop.

NOTES

1. When a less stringent criterion of guessing was used, only a few participants were able to guess anything close to the idea that we wished to see what effect the prime of the slide story had on their religious belief (1 in neutral, 3 in religious, and 3 in death). Analysis of the results without the latter participants did not change the findings.

2. Positive affect words were interested, alert, excited, inspired, strong, determined, attentive, enthusiastic, active, and proud. Negative affect words were afraid, irritable, distressed, ashamed, upset, nervous, guilty, scared, hostile, and jittery. These indices were assembled in accordance with the use of Positive and Negative Affect Scale (PANAS) in previous literatures (Watson, Clark, & Tellegen, 1988).

3. Because of an experimental error in the instructions, about half of the participants in the death prime did not put their identification number on the PANAS measure. As a result, the PANAS was analyzed only according to the means of the three experimental conditions. Because all participants in a block were run in the same condition (due to the use of the overhead), we were able to match all (even unmarked) PANAS scores with the correct condition, but unmarked PANAS measures could not be matched with the individual subjects who completed them.

4. In a separate, similar study, we assessed the dependent measure after an intervening filler task that introduced a significant delay between prime and dependent measure. Mortality awareness had no effect on supernatural belief, $F < 1$. Past studies have shown that the influence of explicit measures of mortality salience, such as writing about one's death, increase after a delay because thoughts of death are initially suppressed. They are rendered accessible only after delay

because suppression is relaxed over time. In contrast, less explicit manipulations, such as walking past a funeral house, quickly fade with the passage of time (Greenberg, Solomon, & Pyszczynski, 1997; Pyszczynski, Greenberg, & Solomon, 1999). Because the effect disappeared with the introduction of delay, our inducement of mortality salience adapted from Cahill, Prins, Weber, and McGaugh (1994) is likely to be implicit.

5. The PANAS was administered a second time for a purpose unrelated to the hypotheses of this study. All references to the PANAS measure in this research are to the first administration of the PANAS.

6. A confirmatory factor analysis on the seven supernatural statements showed that a three-factor solution indeed corresponds to the three clusters examined. The only exception was that the statement, belief that spirits guide, loaded on the "evidence for clairvoyant program" subscale as well as on the "alien spirits" subscale.

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