
A Time to Tan: Proximal and Distal Effects of Mortality Salience on Sun Exposure Intentions

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According to the dual defense model of terror management, proximal defenses are engaged to reduce the conscious impact of mortality salience, whereas thoughts of death outside of conscious awareness motivate distal defenses aimed at maintaining self-esteem. Two experiments examined these ideas by assessing women's intentions to engage in tanning-related behavior. In Study 1, when concerns about death (relative to dental pain) were in focal attention, participants increased intentions to protect themselves from dangerous sun exposure. In contrast, when thoughts about death were outside of focal attention, participants decreased interest in sun protection. In Study 2, participants primed to associate tanned skin with an attractive appearance responded to mortality concerns outside of focal attention with increased interest in tanning products and services. These findings are discussed in relation to the dual-defense model of terror management, societal determinants of self-esteem, and implications for health risk and promotion.

Keywords: *tanning; self-esteem; mortality salience; proximal defenses; distal defenses*

Each year, millions of Americans purposefully expose themselves to harmful ultraviolet radiation to darken their skin (National Cancer Institute, www.cancer.gov). Although most people are presumably aware of the dangers of tanning, many people still engage in this practice because having tanned skin is often perceived as physically attractive (e.g., Leary & Jones, 1994), and physical attractiveness is one way in which many people derive self-esteem (e.g., Crocker & Wolfe, 2001; Goldenberg, Pyszczynski, Greenberg, & Solomon, 2000). But why should people seek self-esteem at the expense of their own health? Recent research derived from terror management theory (TMT, e.g., Solomon, Greenberg, &

Pyszczynski, 1991) provides a potential answer to this question via a dual-defense model that describes how humans defend themselves from conscious and unconscious concerns about death (for reviews, see Arndt, Cook, & Routledge, in press; Pyszczynski, Greenberg, & Solomon, 1999). This model suggests that people respond to conscious concerns about death with proximal defenses that are aimed at removing the threat; however, after these defenses succeed in removing death concerns from focal attention, or when death concerns are activated outside of conscious awareness (i.e., subliminally), people engage distal defense that serve to assuage unconscious mortality concerns through the symbolic protection offered by a sense of meaning and value (i.e., self-esteem). Notably, this analysis implies that in certain contexts, conscious and unconscious mortality concerns can produce contradictory defensive reactions.

The following two studies use tanning-related behavioral intentions to investigate divergent defensive reactions to reminders of mortality as a function of whether death-related thoughts are inside or outside of current focal attention. Because tanning exposes people to harmful ultraviolet rays and thus can increase one's susceptibility to cancer (National Cancer Institute, www.cancer.gov), when seeking to minimize conscious con-

Authors' Note: We would like to thank Annie Archibald, Lisa Clark, and Jamie Mauldin for their assistance with data collection. This research was supported by National Cancer Institute Grant R01 CA96581. Please address correspondence to Clay Routledge, Department of Psychological Sciences, University of Missouri, Columbia, MO 65211; e-mail: cdrwbc@mizzou.edu.

PSPB, Vol. 30 No. 10, October 2004 1347-1358

DOI: 10.1177/0146167204264056

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cerns with death, intentions to protect one's skin from the sun may be increased as a proximal defense. However, tanned skin is also a potential source of self-esteem, and therefore, intentions to tan one's skin, rather than protect it, provide a viable avenue for distal defense against concerns with death that are outside of conscious awareness. Study 1 investigates the effects of reminders of death on immediate (conscious) and delayed (unconscious) sun-protective intentions. In Study 2, we more directly explore the implications of associating tanned skin with self-esteem on distal defenses to unconscious mortality concerns by manipulating the saliency of tanned skin as a societal standard of self-worth.

TMT of Worldviews and Self-Esteem

Based on the work of Ernest Becker (e.g., 1973), TMT (e.g., Solomon et al., 1991) posits that worldviews, or cultural belief systems, and self-esteem serve to buffer anxiety that is rooted in the uniquely human awareness of mortality. Worldviews related to religious and political ideologies, ethics, romance, and a variety of other domains transform a chaotic and unpredictable world of inevitable death into a meaningful world of order and predictability. In addition, self-esteem allows people to feel like important members of their meaningful cultural world. Together, worldviews and self-esteem elevate humans above mere mortal creatures that are ultimately destined to die and thus help people manage the terror that would otherwise manifest from the realization that all of life's roads are dead ends.

Numerous studies have shown that people react to thoughts about their own death (mortality salience) by defending the institutions, ideas, and individuals that support their worldview. For example, Christian participants asked to write about their own death, compared to those in a control condition, showed increased positive reactions to other Christians and decreased positive reactions to Jewish individuals (Greenberg et al., 1990). Other studies have found similar mortality salience effects on defense of one's opinion on social issues, nation, political party, and even favorite sports team (for a review, see, e.g., Greenberg, Solomon, & Pyszczynski, 1997).

Regarding the relationship between concerns about mortality and self-esteem, studies indicate that high self-esteem reduces the worldview defense that typically follows mortality salience. For example, Harmon-Jones et al. (1997) found that participants with dispositionally high self-esteem (Study 2) or situationally bolstered self-esteem (Study 1) showed decreased levels of worldview defense after mortality salience. Mortality salience also increases intentions to exercise (Arndt, Schimel, & Goldenberg, in press) and even risky driving behavior

(Taubman Ben-Ari, Florian, & Mikulincer, 1999) among participants whose self-esteem is partially derived from such domains. Recent research by Mikulincer and Florian (2002) further explicates the role of self-esteem in terror management processes by showing that mortality salience increases self-serving attributional biases and that such biases reduce the accessibility of death-related thoughts after mortality salience. Taken together, these and other studies (see Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, in press, for a review) support the hypothesis that self-esteem helps defend people from the awareness of mortality.

The death-anxiety buffering nature of worldviews and self-esteem has been supported in more than 175 studies in nine different nations using diverse measures, settings, and participant samples. However, the findings in a vast majority of these studies are neither directly nor logically connected to the problem of death. That is, presumably, faith in a cultural worldview and self-esteem will not reduce one's vulnerability to death or serve to increase physical longevity in any way. What they do offer, according to TMT, is a symbolic defense against death awareness by providing a symbolic world in which individuals can identify with cultural beliefs and values that are invulnerable to the biological frailties that render human life finite.

Proximal and Distal Defenses Against the Awareness of Mortality

Given that these symbolic defenses are not directly related to the problem of death, why do people react to thoughts about mortality by defending their worldviews or trying to bolster their self-esteem? The answer to this question can be informed by considering the procedural nature of most terror management studies. In each of these studies, before the critical dependent measure was presented, the explicit mortality salience induction was followed by other materials or some form of a temporal delay. That is, worldview defense and self-esteem striving came not directly after the mortality prime but after a subsequent delay task. A series of studies focusing on the underlying cognitive architecture of terror management processes shed light on the necessity of such a delay task by showing that symbolic defenses occur only after thoughts about death are outside of focal attention (see Pyszczynski et al., 1999, for a review). For example, Greenberg, Pyszczynski, Solomon, Simon, and Breus (1994) found that the accessibility of death-related thoughts does not increase immediately after mortality is made salient but does increase after participants are distracted from mortality concerns by an intervening delay task. Similarly, this research also found that symbolic defenses do not occur immediately after mortality salience but do occur after a delay.

Subsequent studies explained these findings by showing that participants react to explicit mortality cognitions by suppressing death-related thoughts. For example, after mortality salience, preventing the active suppression of death-related thoughts via the use of cognitive load causes immediate increased death-thought accessibility and symbolic defenses (Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997). In contrast, when death-related concerns are activated via subliminal priming methods, symbolic defenses emerge immediately and without apparent need for suppression (e.g., Arndt, Greenberg, Pyszczynski, & Solomon, 1997). Thus, taken together, these studies converge on the proposition that cultural worldviews and self-esteem, referred to as distal defenses, function in part to manage death concerns that are outside of conscious awareness.

In contrast, recent research suggests that the response to conscious concerns about mortality reflects a person's attempt to remove these thoughts from focal attention, either by, for example, denying vulnerability (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000), suppressing death-related thoughts (as discussed earlier), or engaging in behavior (e.g., exercise) that will reduce the threat of physical demise (Arndt, Schimel, & Goldenberg, in press). Such reactions to mortality salience are referred to as proximal defenses and recent studies have been conducted to highlight this form of defense. In one study, Greenberg and colleagues (2000) informed participants that emotionality was associated with either a short or long life-expectancy. Immediately after thinking about mortality, participants were more likely to deny that level of emotionality was associated with a short life expectancy. However, this effect disappeared in conditions in which participants were given a delay before reporting their emotionality.

The proximal and distal defense research empirically supports the current dual-defense model of terror management. In sum, conscious thoughts about death lead to proximal defenses in an attempt to deny or prevent death, whereas unconscious thoughts about death lead to distal, symbolic defenses in an attempt to bolster the belief systems and feelings of self-worth that give life meaning and permanence. With these distinctions in mind, we now turn to a domain of human behavior that can be informed by the dual-defense model of terror management and thus provides a means to further substantiate this theoretical analysis.

Tanning: Self-Esteem at the Expense of Physical Health

According to the National Cancer Institute (www.cancer.gov), skin cancer is the most common form of cancer in the United States, and approximately 40% to 50% of Americans older than age 65 will have this form of cancer at least once. Natural (the sun) and unnatural

(tanning beds) sources of ultraviolet radiation are the most common causes of skin cancer, and even though most people are probably aware of the danger posed by ultraviolet ray exposure, many people purposefully spend extended periods of time exposed to the sun's harmful rays with no or minimal protection (i.e., protective clothing or sunscreen). Furthermore, a popular trend in the United States and other nations throughout the past couple of decades has been to use tanning beds that employ artificial ultraviolet rays produced by lamps to get a tan. In the face of strong evidence that exposure to ultraviolet radiation causes skin cancer, why do so many people fail to take adequate sun protective measures and even seek tans through artificial ultraviolet radiation?

One seemingly obvious reason is that in our culture, and in many others, having tanned skin is perceived as attractive (e.g., Beasley & Kittel, 1997; Leary & Jones, 1994). Not surprisingly, tanners typically state that the primary reason they engage in tanning is to improve their appearance (Hillhouse, Stair, & Adler, 1996). Consistent with this notion, Leary and Jones (1994) demonstrated that concerns about physical appearance and the belief that tanned skin is physically attractive are strong predictors of how much people will engage in tanning-related behavior, and Prentice-Dunn, Jones, and Floyd (1997) found that people high in appearance concerns, compared to people low in appearance concerns, were less likely to take sun-protective measures. In addition, numerous studies have revealed that women are more likely than men to base their self-esteem on their appearance (e.g., Pliner, Chaiken, & Flett, 1990), and thus, not surprisingly, women are particularly likely to engage in frequent tanning (Hillhouse, Turrisi, Holwiski, & McVeigh, 1999). We surmise, then, to the extent that tanning helps people to feel as if they are attaining the cultural standards for attractiveness, tanning behavior can have a positive psychological effect, that is, tanning may be physically harmful but it can also facilitate feelings of self-worth.

Whereas these particular studies elucidate a relationship between tanning, appearance concerns, and self-esteem, they do not explicate the reasons why people are willing to compromise their physical health to gain self-esteem. However, recent studies focusing on how self-esteem derived from physical appearance can be used to manage death-related concerns shed light on this question. For example, Goldenberg, McCoy, Pyszczynski, Greenberg, and Solomon (2000) found that participants high in body-esteem responded to thoughts about death by more highly identifying with their bodies. In addition, for those who value physical appearance but feel like they are not capable of living up to cultural standards of attractiveness, thoughts about death de-

creased monitoring one's appearance. More recently, Goldenberg, Arndt, and Brown (2003) showed that mortality salience led women to restrict their consumption of a nutritious but fattening food and that the effects of mortality salience on (particularly overweight) women's eating are mediated by the extent to which mortality salience affects their perception of their body relative to the cultural standards for thinness. Thus, engaging in appearance-based behavior can be understood as part of an individual's effort to live up to cultural standards of value in the service of managing concerns about mortality.

From the perspective of the dual-defense model of TMT, given the physical dangers associated with sun exposure, the proximal defense against conscious mortality concerns should be to protect oneself from the sun's dangerous radiation. Limiting one's exposure, wearing protective clothing, or using sunscreen would all be behaviors consistent with a direct effort to protect oneself from conscious concerns about death. However, to the extent that dangerous exposure to ultraviolet radiation is a prerequisite to having tanned skin and having tanned skin is a dispositionally or situationally important contingency of self-worth, ironically, the distal, symbolic defense against unconscious mortality concerns could be to purposefully engage in such behavior, even if this behavior is physically threatening. Thus, depending on the consciousness of death-related thought, reminders of mortality should either decrease (proximal) or increase (distal) intentions to expose oneself to the harmful rays of the sun.

STUDY 1

The goal of Study 1 was to explore how sun-protective behavior can reflect the engagement of proximal and distal terror management defenses. First, to test the distal defense component of the model, we needed participants for whom tanning was relevant to their self-esteem, so we recruited participants who had previously indicated that being tanned was at least somewhat important to their sense of self-esteem. Also, because previous research has suggested that physical appearance as a source of self-esteem is less common among men (e.g., Pliner et al., 1990), we focused our analyses on women. Participants either wrote about death or the control topic of dental pain and then indicated their interests in buying a variety of sunscreen products ranging in sun protection factors (SPF) either immediately after the manipulation (when primed thoughts are in focal attention) or after first completing a delay puzzle task (when previous research has shown the primed thoughts are outside of focal attention; see Pyszczynski et al., 1999).

Our hypothesis was that after mortality salience, compared to the control topic of dental pain, participants in the no delay condition would take the proximal defense route against conscious death concerns and show an increased interest in buying the sunscreen products that would provide protection from solar radiation (i.e., sunscreen with higher SPF). On the other hand, participants in the delay condition should take the distal defense route against unconscious death concerns and show a decreased interest in buying the sunscreen products that would provide protection, presumably because such products also inhibit one's ability to get a tan.

Method

Participants. Forty-five female participants from introductory psychology classes at the University of Missouri, Columbia, were recruited for this study and given partial course credit for their participation. Specifically, in a mass screening session, participants indicated their level of agreement on a 5-point scale (1 = *not at all*, 5 = *very much*) with the statement, "Having tanned skin is part of my image and self-esteem." Female students indicating that being tanned was at least somewhat important to their self-esteem (those scoring a 2 or higher) were recruited for a 2 (salience: mortality vs. dental pain) \times 2 (delay: no delay vs. delay) between-subjects experiment.¹ During the mass screening, participants also completed the Rosenberg Self-Esteem Scale (Rosenberg, 1965) and a question regarding how many times per month they engage in tanning behavior. Because this study implies a relationship between self-esteem and tanning behavior, we wanted to control for individual differences on self-esteem and tanning frequency so these two variables were used as covariates in our analyses.

Materials and procedure. At the start of each session, the experimenter, who was blind to conditions, told participants that they were taking part in a study exploring how personality relates to consumer behavior. In sessions composed of one to six people, participants, after signing a consent form, were given a packet containing all of the materials and provided with partitioned workspaces to ensure privacy. After completing all materials, participants were fully debriefed.

To bolster the cover story, participants began by completing filler personality measures. The first independent variable was the mortality salience or dental pain writing task (e.g., Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). This manipulation consisted of having participants respond to two open-ended questions: "Please briefly describe the emotions that the thought of your own death arouses in you" and "Jot down, as specifically as you can, what you think will hap-

pen to you physically as you die and once you are physically dead." The control condition consisted of parallel questions regarding the experience of dental pain.

Next, half of the participants moved directly to the dependent variable and half of the participants completed a puzzle delay task before the dependent variable was presented. The puzzle delay task, derived from Greenberg et al. (2000), involved having participants spend 3 min searching for television-related words (e.g., channel, program) embedded in two standard letter matrices. Again, the purpose of this factor was to allow the evaluation of reactions to both conscious and unconscious concerns about mortality.

For the dependent variable, participants first read instructions stating that they were going to look at a variety of skin-related summer products and make some ratings. Participants also were instructed to assume that all of the products being rated were equal in price. Using a 9-point scale (1 = *no*, 9 = *yes*), participants were presented with a picture and description of a sunscreen product and asked the question, "Would you buy this?" For each product, the name of the product and the SPF were provided and were followed by a black-and-white photo of the product. There were a total of 11 different sunscreen products representing 5 different common commercial brands. The products had SPF ranging from 0 to 65. Specifically, four products contained SPF of 4 or less and thus provide little sun protection, whereas the remaining 7 products, constituting our primary dependent variable, contained SPF of 15 or greater and thus provide effective sun protection (www.cancer.gov). SPF ranged across brands to avoid confounding preferences for brand with SPF.

Results and Discussion

The purpose of this study was to investigate intentions to buy sunscreen products that would provide actual protection; therefore, we combined the seven items concerning sunscreen with high SPF (15 or greater). Reliability analysis supported the construction of this composite variable ($\alpha = .73$).

We wanted to control for variance associated with individual differences in self-esteem and tanning frequency so we first tested for possible interactions between our manipulations, self-esteem, and tanning frequency by conducting a regression analysis in which our two experimental manipulations (dummy coded), self-esteem, tanning frequency, and all possible interactions were used as predictors and the seven-item high SPF product scale was the outcome variable. There were no significant interactions between the manipulations and self-esteem or tanning frequency (all t s < 1.1, p s > .25) so subsequent analyses treat self-esteem and tanning frequency as covariates.

TABLE 1: Cell Means for the Significant Salience \times Delay Interaction on Self-Reported Interests Buying High SPF Sunscreen

	No Delay	Delay
Mortality salience		
<i>M</i>	5.56	3.83
<i>SD</i>	1.63	1.47
<i>N</i>	10	10
Dental pain salience		
<i>M</i>	4.46	5.02
<i>SD</i>	1.48	.93
<i>N</i>	13	12

NOTE: Higher numbers reflect higher interests in protective sunscreen products.

To test our hypothesis regarding the dual-defense model of terror management, a 2 (salience: mortality vs. dental pain) \times 2 (delay: no delay vs. delay) analysis of covariance (ANCOVA) controlling for global self-esteem (Rosenberg, 1965) and frequency of tanning was conducted on the seven-item high SPF product scale. The predicted Salience \times Delay interaction was found, $F(1, 39) = 12.80, p < .001$.² Means and standard deviations are available in Table 1.

Follow-up pairwise comparisons were conducted to further explore our hypotheses. First, mortality salience conditions were compared to dental pain conditions. For the no delay condition, mortality salient participants indicated higher levels of interest in buying high SPF sunscreen than did dental pain participants, $t(21) = 2.14, p < .05$. In contrast, for the delay condition, mortality salient participants indicated lower levels of interest in buying high SPF sunscreen than did dental pain participants, $t(20) = 2.28, p < .05$. These findings support the hypothesis regarding proximal and distal defenses. When no delay was present, mortality salience increased interest in buying products that provide protection from dangerous solar radiation; however, when a delay was present, mortality salience decreased interest in buying the protective products, presumably because such products also inhibit the ability to get a tan. Further supporting this assertion, within the mortality salience condition, no delay participants showed more interest in buying protective sunscreen than did delay participants, $t(18) = 3.14, p < .05$, whereas within the dental pain condition, there was no significant difference between no delay and delay participants ($t = 1.15$).

To assess whether these effects were specific to high SPF sunscreen, we combined the four items concerning sunscreen with low SPF (4 or lower) to create a low SPF scale ($\alpha = .74$). We then conducted the 2 (salience: mortality vs. dental pain) \times 2 (delay: no delay vs. delay) ANCOVA on the four-item low SPF scale using the same

covariates as before and did not find a significant interaction ($F = .013$). This finding ruled out the possibility that the salience and delay variables were simply affecting participants' interest in buying products in general. That is, it appears, as we predicted, that participants were in fact distinguishing between SPF values when making their product ratings.

In sum, Study 1 demonstrates how defensive reactions to conscious and unconscious mortality concerns can diverge. When the threat of mortality is in focal attention, people are motivated to protect themselves from that threat; however, once the threat is outside of conscious awareness, the physical dangers of sun exposure appear to take a backseat to the need to maintain self-esteem.

STUDY 2

Study 1 provided support for the dual-defense model of terror management within the domain of tanning by showing that immediately after mortality salience people make decisions that will directly protect them and reduce vulnerability to skin cancer (proximal defenses). However, when a delay is provided after mortality salience, people engage in distal, symbolic defenses. In this case, these responses entailed lower intentions to use safe sun products, even though such a decision is potentially harmful to one's health.

Study 2 was designed to more fully explore tanning-related behavior as a distal defense against death concerns outside of focal attention. Specifically, we designed Study 2 with four distinct goals in mind. First, in Study 1, we found our predicted effects for women who had indicated that tanning was somewhat important to their sense of self-esteem; here, we wanted to manipulate the salience of tanning as a source of self-esteem to provide convergent support for the role of self-esteem in distal defenses related to tanning. As a number of researchers point out, bases of self-worth can vary both dispositionally and situationally (see, e.g., Crocker & Wolfe, 2001) and a more thorough understanding of the involvement of self-esteem contingencies can be achieved by examining the construct from both perspectives. Thus, in Study 2, we sought tighter experimental control over this component of our model by randomly assigning participants to conditions that either did or did not prime the importance of tanning to self-esteem instead of selecting participants based on individual differences. Second, because these studies may potentially help provide a better understanding of the relationship between self-esteem and health-related behavior, we wanted to use a manipulation indicative of a real-world platform that promotes tanning behavior (i.e., advertisements). Third, Study 1

found that after mortality salience and a delay, people decreased interest in products that provide protection. Although consistent with predictions, this finding does not directly speak to people's active pursuit of being tan. Therefore, in this study, we examined whether there would be a general increase in interest in products and services that facilitate getting a tan but undermine physical health. Such a finding would show that people not only fail to take protective action but also actively intend to engage in unhealthy behavior in efforts to live up to cultural standards. The fourth goal pertained to the specificity of mortality salience in producing terror management defenses. Previous TMT research has compared the effects of mortality salience with the salience of a variety of other aversive events (e.g., thoughts of pain, failure, taking an exam, worries about the future, social exclusion; see Greenberg et al., 1997, for a partial review); however, McGregor, Zanna, Holmes, and Spencer (2001) and van den Bos (2001) have recently suggested that mortality salience may activate feelings of uncertainty that, in turn, lead to defensive behavior. Although a number of TMT findings may be seen as inconsistent with this uncertainty interpretation (discussed later), we wanted to determine if the effects of mortality salience on tanning intentions could be explained by an uncertainty hypothesis, and thus, in this study, we used the same uncertainty treatment that was developed by van den Bos (2001) as a control condition.

Participants therefore either wrote about death or feelings of uncertainty and then were presented with an advertisement for a store offering tanning products and services, which either featured a picture of an attractive and tanned woman standing on a beach or a picture of a beach ball. Participants then indicated how much they wanted to shop at the store and use the store's tanning services and how interested they would be in receiving coupons from the store for tanning bed sessions and tanning oil. It was predicted that for participants who were primed with the attractive and tanned woman, mortality salience, relative to uncertainty, would increase liking of the advertisement, the store, and interest in the products that would facilitate tanning (i.e., tanning sessions and tanning oil), presumably because the advertisement would prime an association between tanning and physical attractiveness.

Method

Participants. Seventy-five female participants from introductory psychology classes at the University of Missouri, Columbia, were given partial course credit for their participation in a 2 (salience: mortality vs. feelings of uncertainty) \times 2 (advertisement: tanned woman vs. beach ball) between-subjects experiment.

Materials and procedure. At the start of each session, the experimenter, who was blind to conditions, told participants that they were taking part in a study conducted jointly by the Psychology and Business Departments to explore how personality relates to advertising. To enhance the realistic nature of our dependant measures, participants were told that they would be evaluating an advertisement for an actual company that is planning on opening a store in Columbia, Missouri, in the near future. In sessions composed of one to four people, participants completed all of the materials in individual cubicles to ensure privacy. After signing a consent form, participants were given the first packet, which consisted of filler personality measures to bolster the cover story, the mortality salience or uncertainty manipulation, and the same puzzle delay task used as a manipulation in Study 1. Once participants completed the first packet, they were given the second packet, which consisted of the tanned woman or beach ball advertisement and the dependent measures. After all materials were completed, participants were fully debriefed.

As in Study 1, the mortality salience condition consisted of two open-ended questions related to thoughts about death. For the control topic, we had participants respond to questions concerning feelings of uncertainty that were phrased parallel to the mortality salience condition as in van den Bos (2001). These questions were as follows: "Please briefly describe the emotions that the thought of feeling uncertain arouses in you" and "Jot down, as specifically as you can, what you think will happen to you physically as you feel uncertain and once you are uncertain."

For the advertisement manipulation, participants were presented with a full-color flyer for a fictional store called "The Beach Company." On the page before the actual advertisement was a paragraph instructing participants that they would be evaluating a flyer from a national retail company that is planning on opening up a local store later in the upcoming summer. Half of the participants were presented with a flyer for The Beach Company that featured a picture of an attractive and tanned woman wearing a bikini and standing with a surfboard on the beach and the other half were presented with a flyer that featured a picture of a beach ball. Besides these manipulated differences, the flyers were identical. The flyers listed the various services provided by the company (e.g., tanning beds, bathing suits, sunglasses, etc.) and provided a Web address for the company to enhance the appearance of authenticity.

The dependent measure consisted of a variety of questions following the advertisement that are related to tanning behavior. First, on 9-point scales (1 = *not at all*, 9 = *very*), participants were asked how much they liked the advertisement, how interested they were in shopping at

TABLE 2: Cell Means for the Significant Salience \times Advertisement Interaction on Evaluation of and Interest in Tanning Products and Services

	<i>Tanned Woman</i>	<i>Beach Ball</i>
Mortality salience		
<i>M</i>	5.63	4.67
<i>SD</i>	1.41	2.48
<i>N</i>	20	19
Uncertainty salience		
<i>M</i>	4.24	5.29
<i>SD</i>	2.2	1.81
<i>N</i>	18	18

NOTE: Higher numbers reflect higher evaluations of and interests in tanning products and services.

The Beach Company, and how interested they were in using The Beach Company's tanning salon. Next, participants were provided with a list of products and services offered by The Beach Company and were instructed to indicate how interested they were in receiving coupons for each of these products or services on 9-point scales (1 = *not at all*, 9 = *very*). This list of products and services included two items directly related to tanning (tanning sessions and tanning oil) and three items specifically included to reduce suspicion (bathing suits, sunglasses, and clothing).

Results

We first constructed a composite dependent variable concerning participant evaluations of The Beach Company and their tanning products and services. This measure consisted of the items concerning how much participants liked the advertisement, how interested they were in shopping at The Beach Company, how interested they were in using the company's tanning salon, and how interested they were in receiving coupons for tanning sessions and tanning oil from the company. The alpha for this composite variable was .80, indicating that the five items formed a reliable index.

To test our primary hypothesis regarding the interaction between salience and advertisement, we conducted a 2 (salience: mortality vs. uncertainty) \times 2 (advertisement: tanned woman vs. beach ball) ANOVA on the composite dependent variable. The predicted interaction was found, $F(1, 71) = 4.69$, $p < .05$. Means and standard deviations are available in Table 2.

Follow-up pairwise comparisons were conducted to directly test the hypothesis that for those who were primed with an attractive tanned woman, mortality salience, relative to uncertainty, should increase evaluations of and interest in The Beach Company and its tanning products and services. As predicted, in the attractive tanned woman condition, mortality salient

participants were more positive toward The Beach Company and its tanning services than were participants in the uncertainty condition, $t(36) = 2.14, p < .05$. However, there was no difference between the mortality and uncertainty conditions in the beach ball control conditions, $t < 1$. There were also no significant differences between the tanned woman and beach ball conditions within either the mortality or uncertainty salience conditions, both $t_s < 1.57$.

We also considered whether the tanned woman advertisement led mortality-salient participants to be more positive even toward nontanning products by conducting a 2 (salience: mortality vs. uncertainty) \times 2 (advertisement: tanned woman vs. beach ball) ANOVA on a composite variable ($\alpha = .71$) of the three items assessing interest in nontanning products. As expected, this interaction was not significant ($F < 1$).

Supplemental Analyses and Discussion

The results of Study 2 demonstrate that the importance of tanned skin can be primed by an advertisement and thus render tanning intentions more conducive to terror management in response to mortality salience. Although the present findings converge with those from Study 1 to implicate the influence of (dispositional or situational) self-esteem contingencies on defenses against distal mortality concerns, there is one finding that merits additional consideration. In Study 1, we found that when a delay followed mortality salience, participants decreased their endorsement of safe sun products, whereas in Study 2, there was not a conceptually similar effect within the nonprimed beach ball condition. However, because we recruited participants for Study 1 who had indicated that tanning was at least somewhat relevant to self-esteem but did not do so for Study 2 (so as to manipulate the saliency of the contingency), it is unclear whether the findings from Study 2 within the nonprimed beach ball condition replicate those from Study 1. Fortunately, a subset of the participants in the beach ball condition ($N = 26$) from Study 2 completed a mass pretest earlier in the semester in which they answered the same importance of tanning to self-esteem item used as a selection criterion in Study 1. Because we did not select participants in Study 2, we had data for people who indicated that tanning is not at all important to their self-esteem (i.e., the people that would have not participated in Study 1). This allowed us to create an additional factor that represented tanning as not important to self-esteem (those scoring a 1) versus important to self-esteem (those scoring a 2 or higher; the same criterion used to select participants in Study 1).³ With this new factor we conducted a 2 (tanning importance) \times 2 (salience) ANOVA within the beach ball control condition.

If Study 2 did in fact replicate the delay condition in Study 1, we would expect an interaction in which, after mortality salience, people for whom tanning was important would indicate greater interest in and higher evaluations of The Beach Company's products and services relative to those in the mortality salience condition for whom tanning was not relevant and to all participants in the uncertainty condition. Because our N dropped to 26, statistical power was greatly reduced; however, the predicted pattern of results did emerge, $F(1, 26) = 2.84, p = .11$. Mean patterns of this analyses indicated that mortality salient participants for whom tanning was important showed increased interest in tanning products and services ($M = 6.96$) compared to mortality salient participants for whom tanning was not important ($M = 3.68$), uncertainty participants for whom tanning was important ($M = 5.14$), and uncertainty participants for whom tanning was not important ($M = 4.15$).

Following the recommendations of Rosenthal, Rosnow, and Rubin (2000), we conducted a series of orthogonal contrast comparisons and found, consistent with our hypothesis, that mortality salient participants in the tanning is important group were significantly more interested in tanning products and services than were all other groups combined, $t(23) = 2.52, p < .05$. There were no differences between uncertainty salience participants in the tanning is important group and the two remaining tanning is not important groups ($t = 1.17$), or between mortality salience and uncertainty conditions within the tanning is not important group ($t = .64$). This pattern of means and contrast analyses are consistent with and expand the results obtained in the delay condition of Study 1.

These findings build on those of Study 1 to explicate the nature of distal defenses against concerns about mortality. In Study 1, we found that people who indicated that tanned skin was an important facet of their self-esteem responded to mortality concerns outside of focal attention by decreasing their interest in sun-protective products. In this study, however, mortality salience increased tanning intentions for those who had been primed to associate tanned skin with physical attractiveness. That is, when tanned skin was associated with physical attractiveness, participants showed effects conceptually parallel to those in the delay condition of Study 1. However, when this association was not primed (i.e., the beach ball condition), participants did not engage in this form of distal defense. Presumably, there was no effect in the beach ball condition because tanning was not primed as a desired characteristic and this sample included participants for whom tanning was not part of their self-esteem. Indeed, supplemental analyses that examined participants within the beach ball condi-

tion suggested that there was an increased interest in tanning products and services for those who had previously indicated that tanning was important to their self-esteem compared to other participants for whom tanning was not important. Combined, these findings build from previous work on situational influences on self-worth (e.g., Crocker & Wolfe, 2001) and highlight the relationship between self-esteem and unconscious death concerns, suggesting that people can be directed toward specific societal standards of value as a means of defense against thoughts of death outside of focal attention.

In addition, Study 2 enabled us to see that mortality salience differed from uncertainty salience in increasing tanning intentions among those for whom this domain had been situationally primed. We shifted from dental pain to uncertainty as a control topic because of recent suggestions that a general concern about uncertainty may underlie the effects produced by mortality salience (McGregor et al., 2001; van den Bos, 2001). These researchers have found, for example, that just as mortality salience has led to ingroup favoritism and elevated importance ratings for procedural fairness in some studies, so too in other studies has the salience of uncertainty.

There are a number of potentially interesting points to consider when thinking about the viability of the idea that mortality salience produces its effects by activating concerns about uncertainty. On a conceptual level, just because mortality and uncertainty salience can engender similar responses in certain scenarios does not mean that one is reducible to the other. TMT has never claimed that concern about death is the only threat that will engender defensive responses; rather, the theory suggests that the specter of unavoidable mortality is a unique psychological predicament and will thus have some unique effects apart from other threatening topics, as the present study demonstrates. On an empirical level, it is unclear how an uncertainty explanation could account for the scope or specificity of the variety of effects the TMT literature has generated. As just a few examples, previous research indicates that threats of animality (Goldenberg, Pyszczynski, McCoy, Greenberg, & Solomon, 1999) and relationship disruption (Mikulincer, Florian, Birnbaum, & Malishkovitz, 2002), which from the perspective of TMT compromise the effectiveness of people's cultural buffers against death concerns, produce increased death thought accessibility and that bolstering of one's worldview (e.g., Arndt, Greenberg, Solomon, et al., 1997) or self-worth (Mikulincer & Florian 2002) reduce death thought accessibility. Moreover, a variety of the other control topics that have been used in previous TMT research should engender feelings of uncertainty (e.g., meaninglessness, worries about the future; see Greenberg et al., 1997) but

have not produced effects that parallel mortality salience. Finally, in addition to the present study, other recent research has found that mortality salience, relative to uncertainty salience (using the same uncertainty manipulation developed by van den Bos, 2001), increases pursuit of meaning (Landau et al., 2003), distancing from the elderly (Martens, Greenberg, & Goldenberg, 2003), and dislike for a person who disrespected the cultural meaning of time (Arndt & Routledge, 2003).

Thus, although this study does not indicate whether feelings of uncertainty would increase self-esteem strivings, it does suggest that the present tanning effects are not due to concerns with uncertainty. Based on McGregor et al. (2001) and van den Bos (2001), as well as other research, uncertainty is likely an important existential issue that plays a significant role in human motivation; however, the current studies in conjunction with a wider body of research indicate that mortality salience effects cannot be explained by the notion that they simply activate thoughts of uncertainty.

GENERAL DISCUSSION

The two studies presented provide empirical support for the distinct nature of defenses when mortality concerns are inside or outside of conscious attention and deepen our understanding of the relationship between concerns about death, societal standards, and the pursuit of self-esteem. In addition, these studies provide insight into why people often endanger their health by failing to take measures to protect their skin from the sun and even go to great lengths to assure that it is adequately tanned. In the following paragraphs, we discuss the present findings in relation to the dual-defense model of terror management, societal determinants of self-esteem, and the potential health consequences that may result from symbolic defenses against unconscious concerns about mortality.

Managing Conscious and Unconscious Mortality Concerns

Study 1 reveals the divergent responses to conscious and unconscious death concerns. The immediate reaction to thoughts about mortality, relative to thoughts about dental pain, was an increased interest in purchasing sunscreen products of sufficient SPF to provide protection from the sun's harmful radiation. This finding is consistent with previous terror management research showing that people respond to conscious death concerns with an attempt to minimize the threat. For example, Arndt, Schimel, and Goldenberg (in press) found increased intentions to exercise immediately after a

mortality salience induction. Such findings demonstrate that people can and often do engage in adaptive behavior that serves to protect them from conscious threat. Notably, proximal defense also can include responses to threat that provide the perception of safety but do not actually provide increased physical protection (e.g., denying vulnerability to an early demise; Greenberg et al., 2000). An important task of future research is to uncover those situations and dispositions that facilitate more adaptive proximal defenses.

However, as TMT suggests, defenses against conscious concerns about mortality are not the only defenses that humans employ. According to TMT, it is the unconscious resonance of mortality concerns that in part drive strivings for self-esteem. In Study 1, the inclusion of a puzzle delay task after the mortality salience prime significantly reduced participants' interests in purchasing protective sunscreen. This particular finding highlights the counterintuitive nature of some distal defenses. Following previous research (Taubman et al., 1999), when mortality concerns are activated outside of focal attention, behaviors that serve to boost self-esteem, even at the expense of physical health, appear to be the preferred route of defense.

In Study 2, we further explored these ideas by priming the association between tanned skin and attractiveness. In Study 1, participants were recruited if they indicated that tanning was somewhat important to their self-esteem. This criterion was important because we would not expect people to use tanning-related behavior as a defense against unconscious death concerns if such behavior was irrelevant to their self-esteem. That is, a domain that is insignificant to one's self-esteem will be of little value when one is attempting to maintain or increase self-esteem (Crocker & Wolfe, 2001). For example, in the Taubman et al. (1999) research, it was only those participants for whom driving ability was relevant to self-esteem that became riskier in their driving behavior after mortality salience. Conceptually similar findings also were suggested by the supplemental analyses in Study 2 in that it was those participants for whom tanning had some self-esteem relevance that showed the most increase in tanning intentions. To provide convergent support for the role of this self-esteem contingency, in Study 2, we situationally primed tanned skin as a source of self-esteem via the tanned and attractive woman flyer as opposed to recruiting participants who had already indicated that tanning was important to self-esteem. This change in methodology was an important component of the current research because it allowed us to randomly assign participants to a tanning importance condition, thus giving us greater experimental control over this component of the model and enabling us to test

the model with two different techniques. After being exposed to the tanned woman advertisement, but not after the beach ball advertisement, mortality salience increased liking for the tanning orientation of The Beach Company relative to uncertainty salience. Although previous research has tended to rely on dispositional indices of self-worth contingencies, there is some recent evidence that investment in such contingencies can vary as a result of situational experiences (Crocker, Karpinski, Quinn, & Chase, 2003). The present studies add to this literature by further demonstrating the potential malleability of the base from which people derive self-esteem and its candidacy as an avenue for psychological defense.

Cultural Standards of Self-Worth and Symbolic Defenses

From a TMT perspective and many others, the behaviors that provide positive self-esteem are heavily influenced by cultural prescriptions concerning what is good and bad or desirable and undesirable. In Study 2, the use of the advertisement condition, as suggested earlier, allowed us to examine one way in which societal standards are disseminated to individuals and how such standards can influence a symbolic defense against unconscious death concerns. Participants who viewed the tanned and attractive woman flyer, but not those who viewed the beach ball flyer, showed an increased interest in tanning-related products and services as a function of mortality salience, presumably because the culturally prescribed association between attractiveness and tanned skin was salient for these participants. It is possible that other associations also could have been provoked by the advertisement but we are not aware of any other explanation that can account for the observed findings, especially when considered in conjunction with the results from Study 1 wherein participants were selected based on self-esteem relevance. Of course, an important task of future research will be to further examine the variety of consequences that can be elicited by self-esteem-relevant advertisements.

In American culture, tanned skin is one of many physical characteristics that is associated with beauty (Leary & Jones, 1994), and physical appearance, especially for women (e.g., Fredrickson & Roberts, 1997; Pliner et al., 1990), is often considered an important part of one's self-worth. As many researchers have shown, people often go to great lengths, often causing irreparable bodily harm, to try to attain the particular cultural standards deemed to make the body beautiful (see, e.g., Goldenberg, Pyszczynski, et al., 2000). The current analysis builds on these ideas by suggesting that when symbolic defenses are most pertinent (i.e., when death-

related cognition is activated but not in focal attention), the cultural standards that provide meaning are at least somewhat malleable.

Self-Esteem and Health

Perhaps ironically, the current studies suggest that some of the behaviors that people engage in to defend themselves from death concerns can actually increase the probability of succumbing to disease and death. The previous section specifically addressed the relationship between societal standards and the need for self-esteem and thus provided a framework for understanding why what is socially desirable is sometimes more important than what is healthy. Indeed, this proposition has provided the impetus for a variety of social and political movements directed toward undermining mass media and marketing campaigns that associate certain physical characteristics or harmful products with standards of self-worth. For example, anti-tobacco lobbyists were able to put an end to the television broadcast of cigarette advertisements at least in part because they presented a compelling case that such advertisements aimed to associate smoking with looking and being "cool." This is particularly important given that media portrayals of smoking can increase susceptibility to smoking behavior (e.g., Sargent et al., 2002). Similarly, theory and research regarding the objectification of women focuses on how societal standards of beauty bear negative physical and psychological health consequences for adolescent girls and young adult women who are the primary demographic targets of a variety of media, products, and services related to physical attractiveness (Fredrickson & Roberts, 1997; also see, e.g., Vohs, Heatherton, & Herrin, 2001).

The present research potentially helps provide a deeper understanding of why people engage in risky or unhealthy behavior to gain feelings of self-worth. Studies 1 and 2, in distinct ways, support the terror management hypothesis that people defend themselves from unconscious death concerns not necessarily by engaging in physically protective or adaptive behavior but instead by investing in the cultural standards of value that imbue life with meaning. To this end, as we have asserted, when death-related concerns are functioning at an unconscious level, the crucial determinant of defensive behavior is not how healthy or physically protective it is but, instead, how well such behavior will serve to increase self-esteem.

Conclusion

The current studies demonstrate how reactions to unconscious death concerns can pose a threat to one's health. However, we need not necessarily end our discussion on a pessimistic note. Because standards of self-

esteem are for the most part derived from cultural prescriptions of what is desirable, behaviors that promote health also can be self-esteem enhancing and thus utilized as a defense against unconscious death concerns. For example, Arndt, Schimel, and Goldenberg (in press) found that after a mortality salience and delay prime, participants who had previously indicated that exercise was important to their self-esteem expressed increased intentions to exercise. The same rationale may therefore apply to tanning. To the extent that societal ideals do not celebrate the beauty of tanned skin but instead focus on healthier values, protecting oneself from the harmful rays of the sun could function to help people defend against both conscious and unconscious death concerns.

NOTES

1. We focused on women because there were not a sufficient number of men indicating that tanning was a part of their self-esteem to obtain the statistical power needed to detect effects. The lack of qualified men is consistent with previous research showing that physical attractiveness as a source of self-esteem is most pronounced among women.

2. We also conducted the 2×2 ANOVA without the use of covariates and our interaction remained significant, $F(1, 44) = 6.08, p < .05$; thus, these effects are not dependent on the use of self-esteem and tanning habits as covariates.

3. For both studies, we considered treating the importance of tanning to self-esteem as a continuous predictor in a multiple regression equation; however, this proved problematic for a variety of reasons. In Study 1, we only selected those who scored 2 or higher, only a single participant scored a 5, and more than 50% of the participants scored a 3. Thus, this question did not solicit the variability on which a regression analysis could capitalize. In addition, this variable was a single item developed for selection (or not) criterion, not for use as a continuous predictor. Given these issues, we chose not to use this item as a continuous predictor in either study but to create a dichotomous factor that allowed us to replicate and extend the findings from Study 1. However, in case it is of interest, we also note that in Study 2 (where the full range of values is represented), the within-cell correlations between importance of tanning to self-esteem and endorsement of tanning services are consistent with our analysis; that is, within the beach ball condition, when mortality was salient, greater relevance of tanning to self-esteem was associated with increased interest in tanning services and products ($r = .64, p = .01$), whereas this relationship was much less pronounced within the uncertainty condition ($r = .18, p = .59$). For reasons discussed above, these correlations should be viewed with caution; however, they are consistent with other reported analyses.

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Received July 21, 2003

Revision accepted January 2, 2004