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Uncovering an Existential Barrier to Breast Self-exam Behavior

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Abstract

The present research applies an analysis derived from terror management theory to the health domain of breast examination, and in doing so uncovers previously unrecognized factors that may contribute to women's reluctance to perform breast self-examinations (BSEs). In Study 1, when concerns about mortality were primed, reminders of human beings' physical nature (i.e., creatureliness) reduced intentions to conduct BSEs compared to reminders of humans' uniqueness. In Study 2, women conducted shorter exams on a breast model (an experience found to increase death-thought accessibility) when creatureliness was primed compared to a uniqueness and no essay condition. In Study 3, after a creatureliness prime, women performed shorter BSEs when a placebo did not provide an alternative explanation for their discomfort compared to when it did. Advances for theory and breast self-exam promotion are discussed.

> "The body, then, is one's animal fate that has to be struggled against … the creatureliness is the terror"
>
> Ernest Becker (The Denial of Death, 1973, pp. 44, 87)

Breast cancer is the most common cancer among women, and the second leading cause of cancer deaths in women today (American Cancer Society, 2004). However, only about one third of women in the United States regularly perform breast self-exams (BSEs) to screen for the disease (e.g., Elmore, Armstrong, Lehman, & Fletcher, 2005). Accordingly, there has been a substantial amount of research investigating factors that influence breast cancer screening behavior (e.g., Messina et al., 2004; see Curry & Emmons, 1994). Theoretical models (e.g., Fishbein & Ajzen, 1975; Prochaska et al., 1994; Rosenstock, 1974) applied to breast cancer screening (e.g., McCaul, Sandgren, O'Neill, & Hinsz, 1993; Tolma, Reininger, Evans, & Ureda, 2006) have primarily focused on the role of rational decision-making processes, often concerning, among other factors, perceptions of risk and attitudes and norms about breast cancer. However, despite insights gained from such models, as Salovey, Rothman, and Rodin (1998) and others have pointed out, there is still much to be learned about health promotion by examining psychological forces outside rational decision-making processes.

In this vein, recent perspectives have focused on how non-health related motivations can influence health-relevant decisions (e.g., maintaining self-integrity, Sherman, Nelson, & Steele, 2000; impression management concerns, Leary, Tchividjian, & Kraxberger, 1994; social comparison pressures, Gibbons & Gerrard, 1995). We follow this lead, and propose that existential threats posed by the recognition of mortality and human "creatureliness," so to speak, can affect health-relevant behavior. The current approach, inspired by the work of Ernest Becker (e.g., 1973) and guided by terror management theory (TMT; Solomon, Greenberg, & Pyszczynski, 1991), suggests that the awareness of human creatureliness in a context in which mortality is salient can motivate defensive avoidance of body-oriented behaviors (see Goldenberg, Pyszczynski, Greenberg, & Solomon, 2000; Goldenberg, 2005). Terror management research exploring the effects of peoples' concerns about their physicality has yet to be articulated in a manner that affords insight into peoples' reluctance to perform health-relevant behaviors. In the present work, we illustrate how concerns about mortality can interact with concerns about "creatureliness" to undermine women's willingness to perform BSEs.

Terror Management Theory

TMT (see Solomon et al., 1991, for a comprehensive presentation of the theory) builds from a tradition of existential and psychodynamic theory (e.g., Becker, 1973) to posit that the uniquely human awareness of one's mortality, in an animal biologically predisposed for self-preservation, creates the potential for extreme anxiety, or terror. People, however, are usually not plagued by the anxiety that death awareness might be expected to engender; research has revealed that, instead, a great deal of human behavior functions to defend against this potential threat (see e.g., Greenberg, Solomon, & Pyszczynski, 1997). These defenses entail identifying with cultural beliefs and ideologies that facilitate viewing the universe in meaningful and enduring terms, and avenues through which the individual can obtain and maintain a sense of personal significance within that meaning system. From this perspective, self-esteem strivings and maintenance of one's cultural worldview offer symbolic protection from fears surrounding death by enabling individuals to view themselves as valuable members of a cultural reality that persists beyond the point of their own physical demise.

In support of this reasoning, experiments in a dozen different countries show that after being primed with thoughts of their mortality (mortality salience), participants cling to reflections of symbolic meaning and value. For example, one of the more widely documented findings is that mortality salience leads to enhanced favorability toward that which validates one's worldview and increased negativity toward that which threatens it (e.g., Greenberg et al., 1990). Mortality salience has also been found to promote stereotypic thinking and preferences (Schimel et al., 1999), conformity to cultural standards (Greenberg et al., 1992), and discomfort about violating cultural standards (Greenberg, Simon, Porteus, Pyszczynski, & Solomon, 1995), among other defenses. In TMT research, these symbolic defenses are observed most strongly when thoughts of death have been activated but are not the focus of conscious attention. Thus, a typical mortality salience manipulation involves an explicit contemplation of one's mortality, followed by a delay or distraction to let conscious mortality concerns subside (e.g., Greenberg et al., 1994); or alternatively defenses are observed immediately after a subliminal death prime (e.g., Arndt et al., 1997) or exposure to naturalistic death-related stimuli (e.g., walking by a funeral home, Pyszczynski et al., 1996; fatal accident footage, Nelson, Moore, Olivetti, & Scott, 1997). While individuals do respond to conscious mortality concerns with defenses that more logically relate to the problem of death (e.g., health promotion intentions, e.g., Arndt, Schimel, & Goldenberg, 2003; Taubman Ben-Ari & Findler, 2005), it is when mortality concerns are unconscious but accessible that they activate symbolic defenses pertinent to the individual's sources of meaning and value.

The Problem of Creatureliness

There are, of course, a number of ways that people try to maintain the sense that their lives have meaning and value and thereby protect themselves from concerns about mortality. Following the writings of Ernest Becker (e.g., 1973), recent work by Goldenberg and colleagues (e.g., Goldenberg et al., 2000) suggests that one central way that people maintain meaning and feelings of personal value is by viewing themselves as more significant than mere animals. In support of this, Goldenberg et al. (2001) showed that compared to a control condition, mortality salience led to greater preference for an essay describing people as distinct from animals; and within the mortality salient condition but not the control condition, the essay emphasizing differences from other animals was preferred to the essay emphasizing similarities.

The body, especially in context where thoughts of mortality are accessible, has the potential to pose an existential threat because it can remind humans that although they strive to be so much more, they are animals nonetheless. Accordingly, research finds that people are often disgusted by the body and its byproducts and behaviors (e.g., Rozin, Haidt, & McCauley, 2000), and when people are reminded of their mortality they report being more disgusted by "bodily products" (Goldenberg et al., 2001).

Of course the body is a multifaceted stimulus that means a lot of things to people – taking on symbolic value when it is used as a vehicle to obtain self-esteem (e.g., through its appearance or athletic ability; Goldenberg et al., 2002) or as a source of perceived uniqueness or identity (e.g., Burris & Rempel, 2004). However, under certain conditions the body may be cast in an especially physical (and thus not symbolic) light. A recent experiment (Arndt, Goldenberg, Landau, & Kosloff, 2006) demonstrates that reminding participants of the similarity between humans and animals (i.e., creatureliness) leads them to perceived the body in a more physical manner (specifically, selecting more physical [e.g., bones] and less symbolic [e.g., clothes] terms for describing the body). Parallel effects were not found in response to a worldview threat, suggesting that priming human creatureliness does not merely threaten individuals' worldviews, but specifically orients perceptions of the body to focus on its physical, and thus potentially threatening, aspects.

From the perspective of TMT, the awareness of human creatureliness should create difficulties with body-oriented activities to the extent that thoughts mortality are accessible. For example, Goldenberg, Cox, Pyszczynski, Greenberg, and Solomon (2002) primed participants with creatureliness followed by a mortality salience manipulation and then assessed reactions to the physical and romantic (and hence uniquely human) aspects of sex. Participants reported finding the physical aspects of sex least appealing when mortality salience and creatureliness were juxtaposed. No parallel effects were found in response to the romantic aspects of sex, attesting to the specificity of this problem to physical aspects of the body. The creatureliness manipulation can thus be construed as a situational factor that, by undermining the belief that humans are distinct from animals, strips the body of its more symbolic aspects. In this context, certain (i.e., physical) aspects of the body are hypothesized to pose a threat under conditions where mortality is salient.

A Terror Management Body Analysis of Breast Cancer Screening Behavior

While BSEs are clearly threatening due to the fear of cancer (e.g., Olson & Morse, 1996), worry and discomfort with aspects of the procedure itself may inhibit BSE behavior (e.g., Consedine, Magai, Krivoshekova, Ryzewicz, & Neuget, 2004; Olson & Morse, 1996; Race & Silverberg, 1996). We propose that psychological difficulties with human creatureliness combined with the awareness of mortality may contribute to discomfort with BSEs because the behavior has a dimension to it that potentially leads a woman to confront her physicality (i.e., kneading

though breasts). In addition, in contrast to previously studied body-oriented behaviors (e.g., sex), BSEs are performed for cancer detection, and thus, mortality concerns may naturally be salient in the context of performing a BSE. Thus, these two factors – the physicality of the behavior and the association with cancer – suggest that the current framework may offer insight into women's resistance to perform BSEs.

Three experiments were conducted to test this position. Mortality salience was experimentally primed in Study 1 wherein we examined BSE intentions; and Studies 2 and 3 took advantage of what are likely to be naturalistically primed mortality concerns inherent in the process of breast cancer screening. This assumption was tested in a pilot study to Study 2. In each study, creatureliness was manipulated. The overarching hypothesis of the current studies is that when concerns about death are salient, reminders of creatureliness should highlight the physicality of the procedure and contribute to discomfort with and hesitancy to perform BSEs.

Study 1

Study 1 was designed to test whether priming creatureliness juxtaposed with a mortality salience manipulation would affect women's willingness to perform BSEs. Following the general procedure implemented by Meyerowitz and Chaiken (1987), college women reviewed a pamphlet demonstrating techniques for performing BSEs, and then reported on their intentions to perform BSEs. We included manipulations of mortality salience and creatureliness used in previous TMT research (e.g., Goldenberg et al., 2002). The primary prediction was that the creatureliness prime would lead to lower intentions to perform BSEs when thoughts of death had been activated.

Since the present hypothesis concerns discomfort with breast cancer screening techniques independent of discomfort associated with the fear of cancer, we included an assessment of worry about breast cancer. We had no predictions about whether mortality salience (or creatureliness) would affect worry. Despite the reasonable possibility that thinking about mortality would increase worry about cancer, given the intervening delay between the mortality salience manipulation and the assessment of worry, we assumed thoughts of mortality to be outside of consciousness (Pyszczynski, Greenberg, & Solomon, 1999). Critically, the present analysis specifies that any interaction effects between mortality salience and creatureliness on BSE intentions are not due to explicit concerns about breast cancer. To be clear, we are not disputing that BSEs are frightening because of its association with cancer and death, but instead that concerns about the body's physicality can interact with mortality concerns to create resistance to the procedure itself, independent of health concerns associated with cancer.

Method

Participants

Ninety-three female students participated to earn course credit for General Psychology classes at Boise State University. The participants ranged in age from 17 to 39 years old with a mean age of 20.55 (*SD* = 3.93) and were predominantly Caucasian (89.2%; the remaining were 2.2% Asian American, 1.1% African American, 1.1% Latino, 3.2% other, and 3.2% reporting more than one ethnicity).

Materials and Procedure

Participants were run in groups of about 20. A female experimenter explained that participation involved completing some personality measures for a psychology study and also evaluating some materials for a local health organization. Participants were told that the psychology department had agreed to conduct the study for the health organization in exchange for funding

our research, but the two parts of the study were unrelated – however, in order to save time, the health portion was stapled to the personality assessment, separated by a cover sheet introducing the "health study." The materials are described below, in order of presentation.

Creatureliness manipulation—To increase or decrease the likelihood that individuals would think of themselves in a physical, creaturely manner, among some filler measures, participants read one of two essays, described as having been written by honors students at a local university. The creatureliness essay discussed the biological similarities of humans and animals, claiming that "the boundary between humans and animals is not as great as most people think… our bodies work in pretty much the same way as the bodies of all other animals… whether you're talking about lizards, cows, horses, insects, or humans, we're all made up of the same basic biological products…" The control essay emphasized human uniqueness: suggesting that "although we humans have some things in common with other animals, human beings are truly unique… the potential of the human mind and spirit go far beyond anything remotely similar to what is found in simple animals… humans have language and culture… we create works of art, music, and literature…" (see Goldenberg et al., 2001, for complete essays). Pilot testing revealed that the essays were comparable in level of difficulty.[1] To provide the rationale for reading the essays, participants were told that their reactions to these essays would be assessed at a later point; however, in this study such reactions were not actually assessed.

Mortality salience—As in previous studies (e.g., Greenberg et al., 1990), mortality salience was manipulated with two open-ended questions that reminded participants of either their death or another aversive topic. Both questionnaires were described as an "innovative personality assessment" and consisted of two items with space provided below each for a freely written response. The death questionnaire contained the items: "Please briefly describe the emotions that the thought of your own death arouses in you" and "What do you think happens to you as you physically die and once you are physically dead?" The control questionnaire asked parallel questions about dental pain to demonstrate, as in previous research, that the mortality salience manipulation does not merely activate negative feelings related to thinking about a physically aversive experience.

Word search delay—A word search puzzle was included to provide a delay after mortality salience so that mortality concerns would no longer be conscious at the time the dependent measure is assessed (see e.g., Pyszczynski et al., 1999). As in prior research (e.g., Goldenberg, et al, 1999), participants were asked to search for 12 neutral words embedded in a matrix of letters, taking approximately 4–5 minutes.

Breast self-exam (BSE) pamphlet—After a page introducing the start of the "health study," participants were asked to peruse a one-page pamphlet describing how to do a BSE and were told that their reactions would be assessed. The pamphlet provided participants with a detailed description of how to perform a BSE, including several different methods (grid, spiral, and wedge methods). There was no reference to cancer, disease, or death in this material.

Intentions for BSE—Intentions were assessed with three items: how likely it was that participants would do a breast self-exam in the future, in the next week, and in the next month.

[1]We collected supplemental data to pre-test reactions to the essays (n = 40, 12 females, M age = 20.27) crossed with mortality salience or worry about getting a job after college as a control condition. The essays were found to be comparable in level of difficulty; no differences emerged in how "intellectually challenging" and "hard to understand" the essays were (p = .83) nor did mortality salience interact with essay to affect these judgments (p = .93). In response to concerns expressed by an anonymous reviewer, we also tested whether the essays increased participants' level of religious fundamentalism (Altemeyer & Hunsberger, 1992), and found no main (p > .41, with means in the opposite direction for creatureliness) or interaction effects (p = .73).

The first and last item were taken from previous research (Meyerowitz & Chaiken, 1987; van Ryn, Lytle, & Kirscht, 1996, respectively); and we added the item assessing intention for this coming week to include pressing motivation in the assessment. Participants responded on 9-point scales ranging from "not at all likely" to "extremely likely." Given the high internal consistency of the three items (α = .84), we averaged participants' responses.

Worry about breast cancer—Participants were asked, on a scale from 1 to 7, how worried they were about getting breast cancer, among several demographic items.

Results

To test whether the juxtaposition of mortality salience and creatureliness reduced BSE intentions, we conducted a 2 (mortality salience) × 2 (creatureliness) analysis of variance (ANOVA) on this composite measure. The results of this analysis revealed a main effect only of creatureliness, $F(1,89) = 5.14$, $p = .026$, $\eta_p^2 = .055$, with the creatureliness prime leading to a reduction in intentions to conduct BSEs relative to the non-creatureliness prime ($M = 4.81$, $SD = 2.37$ vs. $M = 5.87$, $SD = 2.23$). This effect was qualified by an interaction with mortality salience, $F(1,89) = 4.08$, $p = .046$, $\eta_p^2 = .044$. Cell means are presented in Figure 1. The nature of this interaction was such that only when mortality was salient did the creatureliness prime reduce exam intentions, $t(89) = 3.01$, $p = .003$, $\eta_p^2 = .093$. In the dental pain control condition, the essays did not affect exam intentions ($p = .86$). Looked at differently, there was a marginal effect of mortality salience in the creatureliness condition ($p = .098$), but no effect of mortality salience when human uniqueness was primed ($p = .236$).

We next conducted a 2 (mortality salience) × 2 (creatureliness) analysis of covariance (ANCOVA) that included worry about breast cancer as a covariate. Consistent with other research (e.g., McCaul et al., 1996; Murray & McMillan, 1993, see Hay, Buckley, & Ostroff, 2005 for a review), worry about breast cancer was associated with increased BSE intentions, $F(1,88) = 10.75$, $p = .001$, $\eta_p^2 = .042$, but the mortality salience and creatureliness manipulations had the same pattern of significant effects even when worry was controlled ($p = .05$ for interaction; $p = .001$ for the pairwise comparison in the mortality salient condition). These findings indicate that conscious worry about breast cancer did not mediate the effects of mortality salience and creatureliness on BSE intentions. In addition, there were no effects of mortality salience (or creatureliness) on worry (ps >.32), presumably because such concerns were assessed when thoughts of death were likely to be unconscious.

Discussion

In Study 1, reminding women of their creaturely nature in conjunction with mortality salience led to lower BSE intentions relative to an essay that emphasized human uniqueness. Although there was a main effect of creatureliness, it was qualified by the interaction with mortality salience. Therefore, the juxtaposition of the mortality and creaturely prime was critical for the effect in this study. Moreover, these effects were independent of self-reported worry about breast cancer. Thus, the effects of these primes do not appear to affect BSE intentions through rational concerns associated with discovering cancer, but instead appear to influence BSE intentions as a result of non-health related existential concerns provoked by reminders of one's mortal and creaturely nature.

Study 2

In Study 1, the creatureliness manipulation hindered intentions to engage in breast cancer screening only when mortality was primed. However, it seems likely that conducting a breast exam (i.e., for the purpose of detecting breast cancer) has the potential to naturally render

mortality salient and thus motivate avoidance of screening behavior when concerns about creatureliness have been activated. Indeed, a recent series of studies by Arndt, Cook, Goldenberg, and Cox (2007) revealed that thoughts of cancer can increase the accessibility of death-related cognitions. Therefore, when participants are dealing with a closer approximation to an actual breast exam experience, because of an inherent increase in death thought accessibility, priming creatureliness might decrease breast cancer screening behavior even in the absence of an explicit mortality salience manipulation. The purpose of Study 2 was to examine this hypothesis by having participants perform a breast exam on a breast model.

Pilot study

An assumption of Study 2's design is that a breast exam would increase death-thought accessibility (in the absence of an explicit mortality reminder) due to its association with cancer. To test this assumption, we conducted a pilot study in which 38 women were asked to complete two tasks in counter-balanced order: a breast exam on the breast model used in Study 2, and a word-fragment completion task that measured death thought accessibility (word fragments could be completed with either death-related or neutral words, e.g., COFF _ _ could be "coffee" or "coffin," developed by Greenberg et al., 1994). The results of a t-test supported the hypothesis. Participants wrote more death-related words after the breast exam than before it, $t(36) = -2.07$, $p = .046$, $d = .61$ ($M = 1.59$, $SD = .94$ compared to $M = 1.05$, $SD = .67$).[2] Extensive research suggests this measure detects the activation of death-related thought outside of focal attention (e.g., Arndt et al., 1997; Greenberg et al., 1994).

Given these findings, in Study 2, we did not explicitly manipulate mortality salience. After reading the essay describing humans' similarity to animals, human uniqueness, or a neutral essay, participants conducted a breast exam on a breast model while the amount of time spent on the exam was surreptitiously recorded. In this way we sought to extend the findings of Study 1 and previous research by using an outcome measure that involves actual behavior. In addition, including a neutral condition in combination with human creatureliness and uniqueness allowed for the teasing apart of the effects of the creatureliness essay from the effects of the uniqueness essay.

Method

Participants

Eighty-four female undergraduates from Boise State University participated in the experiment and were randomly assigned to the creatureliness, uniqueness, or neutral prime conditions. Participants' ages ranged from 18 to 37 ($M = 20.89$, $SD = 4.32$) and most were Caucasian (86.7%; the remaining were 6% Asian American, 3.6% Latino, 1.2% other, and 2.4% reporting more than one ethnicity).

Materials, Apparatus, and Procedure

Participants were scheduled one at a time with a female experimenter. The study was described as consisting of two parts. As in Study 1, the first part was described as an attitudes and

[2]Although it may seem reasonable that a breast exam on a breast model would activate death-related thought, one may then wonder why death-related thoughts did not seem to be activated in the control condition of Study 1 when participants were confronted with a brochure describing how to conduct a BSE. We suspect that a critical difference may lie in the experiential realism of actually performing the exam as compared to merely reading about how to do one. We conducted an additional pilot study in which 35 college age women completed the death thought accessibility measure either before or after being asked to examine the same BSE pamphlet used in Study 1. There was no difference in death accessibility as a function of the BSE pamphlet, $t > 1$, $p = .47$. Thus, it appears that breast-exams have the potential to activate thoughts of death and that an important factor influencing the realization of this potential is the realism of the experience. For college women conducting a breast exam on a breast model is sufficient to activate death-related thought, but simply reading a pamphlet is not.

personality assessment; the second part was described as a women's health study being conducted in collaboration with the nursing department.

Creatureliness manipulation—Participants in the creatureliness or uniqueness conditions received the same essays used in Study 1, embedded among some filler measures, with questions assessing participants' reactions at the end of the packet. A third condition in which participants were not provided with an essay was also included.

BSE model and behavior—The experimenter explained that the women's health study concerned the effectiveness of a breast model for teaching BSEs. At this time a breast model manufactured by Health Edco (a division of WRS Group, Ltd.) was removed from a cabinet. The model consisted of a replica of a woman's torso made of Biolike (a latex-free oil based product which feels like real skin) mounted on an 18" by 13" collapsible easel, which was placed flat on the desk. The experimenter explained that participants were to read through the instructional flyer and take as much time as they need to conduct a thorough exam on one of the breasts.[3] The instructions were taken from a pamphlet provided by Health Edco and provided a short written description of the spiral method of conducting a BSE. The experimenter then left the room for approximately 4 minutes, to give the participant privacy. A concealed video camera was used to measure the duration of the breast exam. The camera was positioned so as to record only the participants' hands on the breast model (i.e., no identifying information was recorded).

Reactions to the essays—Participants who were in either of the two essay conditions were asked to complete one more questionnaire as part of the attitudes and personality study. They were provided the six questions used in previous research (Goldenberg et al., 2001) assessing their reactions to the essay. Specifically, participants were asked, "How much do you think you would like this person?," "How intelligent do you believe this person to be?," "How knowledgeable do you believe this person to be?," "Is this person's opinion well-informed?," "How much do you agree with this person's opinion?," and "From your perspective, how true do you think this person's opinion is of the topic they discussed?" All items were responded to on a 9-point scale, with 1 reflecting the most negative evaluation and 9 the most positive response. As in previous research, these items formed a reliable scale ($\alpha = .93$). The evaluations were included to test that the effects of the manipulation were not on account of an explicit reaction to the essays themselves, but rather the impact of the essays on the reactions to conducting a breast exam.

Finally, participants completed some demographic information followed by a formal debriefing session in which the hypotheses were revealed and the necessity of the concealed video camera was explained. Participants were given an opportunity to decline to allow their video footage to be used; no participants objected.

Results

The purpose of the present study was to examine whether the creaturely essay would reduce the amount of time participants' spent performing a breast exam in a context where performing a breast exam was previously shown to make thoughts of death accessible. An ANOVA revealed the hypothesized effect of creatureliness on breast exam duration, $F(2, 81) = 3.18$, $p = .047$, $\eta_p^2 = .073$. Pairwise comparisons showed that after women read the essay emphasizing creatureliness, they spent a significantly shorter amount of time examining the breast than in

[3]The breast model included one breast with lumps and one without, to which participants were randomly assigned. However, there were no effects involving breast type on duration, or in the ancillary study, on death accessibility (*p*s > .55). Also, all findings are unchanged as a result of including which breast was examined as a factor in the analysis.

both the humans uniqueness, t(81) = 2.12, $p = .037$, and the no essay condition, t(81) = 2.26, $p = .026$, between which there was no difference ($p = .90$). The means are presented in Figure 2.

In this study, we also assessed participants' self-reported reactions to the essays. As found in prior research (Goldenberg et al., 2002), evaluations of the essay discussing the similarities between humans and animals were more negative ($M = 4.98$, $SD = 1.98$) than the essay emphasizing human distinctiveness from animals ($M = 6.36$, $SD = 1.10$), $t(58) = -3.19$, $p = .002$. To check whether the reduced exam duration in the creatureliness essay condition was simply due to the negative evaluation of the creaturely essay, we re-performed our original analysis with essay reactions as a covariate. This analysis was therefore necessarily only performed on the conditions in which participants received one of the two essays. The results of this ANCOVA revealed that the significant effect of creatureliness on exam duration was not affected by including the essay reactions in the model ($p = .02$).

Discussion

The present results indicate that women exposed to the essay emphasizing the similarities between humans and animals conducted shorter exams than women who read the human uniqueness essay and women in the no-essay condition, whereas there was no difference between the two latter conditions. These findings are important for several reasons. First, it seems clear that breast exam behavior was affected by the creatureliness and not the human uniqueness essay manipulation. Second, although we hypothesized and found a main effect of creatureliness, this was in a context where mortality concerns were presumably activated as a function the naturalistic context of a breast exam. Third, the present findings extend the results of Study 1 and previous research by demonstrating that concerns associated with creatureliness can affect actual body-oriented behavior and not just self-reported attitudes and intentions. And fourth, finding that the creatureliness manipulation reduced behavior in a context that offered no potential to discover cancer on oneself further supports the argument that BSE behavior can be affected, not only by worry about cancer, but due to the psychological implications of creatureliness for the exam itself.

Study 3

Although the findings of Studies 1 and 2 offer convergent support for the analysis that existential concerns associated with creatureliness in a context where mortality concerns are likely to be activated can interfere with women's willingness to conduct BSEs, a more ecologically valid test would be provided by (a) using a sample of women at greater risk for breast cancer, that is, older women; and (b) having women examine their own breasts, as opposed to examining a model. Thus, in Study 3 we recruited and randomly assigned women from the community, age 35 and over, to the creatureliness or uniqueness essay condition and then measured the amount of time they spent conducting a BSE in a private exam room. We did not manipulate mortality salience, again assuming that an actual BSE would be sufficient to heighten death-thought accessibility, especially among women whose age puts them at greater risk of breast cancer.

Another goal of Study 3 was to provide direct insight into the role that discomfort with the exam plays in these effects. To examine the hypothesis that reminders of one's creatureliness increase the discomfort that one experiences when faced with a BSE, and that it is this discomfort that undermines the behavior, this study included a variant of a classic misattribution of arousal manipulation (e.g., Zanna & Cooper, 1974). Misattribution paradigms have a strong track record in demonstrating the role of arousal on a psychological process (see e.g., Arndt & Goldenberg, 2002, for a review). The logic of the paradigm is that if a form of

arousal is thought to contribute to a psychological process (e.g., dissonance induced attitude change, or in this case, avoidance of breast exam behavior), then providing people with an alternative attribution for the source of the arousal (e.g., a placebo) should reduce or eliminate psychological and behavioral reactions. The appeal of the misattribution paradigm, then, is that it allows one to see the influence of an explicit arousal label on a behavior that the person is typically unaware is influenced by arousal. In Study 3, before performing the BSE, participants were led to believe that they were also sampling a water product that contained herbal additives with energizing (or calming) properties and that some people have reported a feeling of slight nervousness (or drowsiness) after having consumed it. We expected that the creatureliness essay would lead to more discomfort with the exam and thus lower exam duration, unless a feasible alternative explanation (i.e., the energy water placebo) was provided for the discomfort. In other words, if participants are experiencing discomfort but are led to attribute that discomfort to another source (the energy water placebo), they should conduct longer BSEs than participants primed with creatureliness who lack this attributional alternative.

Method

Participants

Female participants aged 35 and up were recruited though a local newspaper in Boise, Idaho. The advertisement explained that volunteers were being sought for a study concerning women's health behaviors, and that participants would be compensated with $20 for one hour of their time. To avoid the inclusion of women who had breast cancer, a telephone screening was first conducted in which women were asked to report on their current health status and history, as well as to confirm that they were age 35 or older. Women of appropriate age who did not mention breast cancer in the telephone conversation were called back and scheduled for the study. At the time of the study, however, five women reported having breast cancer, and therefore their responses were not included. In addition, two women reported that they did not conduct the breast exam, two declined to drink the water (placebo), and eight subjects did not provide the time estimates necessary to compute the dependent variable in this research.

This left a total sample of 99 women. The woman ranged in age from 35 to 66, with a mean age of 45.22 (*SD* = 7.03). The sample was predominately Caucasian (91.8%; 2% Hispanic; 1% Native American; and 5.1% multi-ethnic), relatively low socio-economic status (e.g., 60% reported household incomes under $35,999) and the majority were not highly educated (e.g., over 70% had less that a 4-year college degree). Fifty percent of the women were married, 20.4% were divorced, 16.3% were single, 10.1% were living with a partner, and 3.1% were widowed.

Materials and Procedure

When participants arrived at the laboratory, the experimenter explained that the study involved a series of tasks on consumer reactions, personality, and health behaviors that were being combined for reasons of convenience. Specifically, participation would involve three components: sampling a water product for a national beverage manufacturer purportedly funding the research; completing personality questionnaires and evaluating an essay so the university can learn how the community feels about the ideas of its students; and performing a BSE and answering some questions concerning women's health. They were ensured complete privacy during the exam. After explaining the procedure, they were provided with an informed consent form, and also verbally informed that their participation was voluntary and their responses anonymous. Upon providing written consent, they were brought to a private room containing a small desk and chair as well as a doctor's exam table for conducting the BSE.

Placebo manipulation—The first part of the experiment involved sampling the water product. Two parallel conditions were created to differ only as to whether they provided or did not provide an explanation for any arousal participants might be experiencing. The experimenter said, "I'm not sure if you're familiar with this type of product, but many companies have come out with water products that contain herbal additives. You are going to be asked to try this new product and then evaluate it. We can't reveal the name of the product at this time because the company doesn't want you to be influenced by brand names, but you will be able to read a description of the product." They were then given a card with the following description:

> "(ENERGY/CALMING) WATER – this product is called (Energy/Calming) Water and it has been supplemented with herbs to create a feeling of (energy/calmness). The effects of this product should be subtle, but some people have reported a feeling of slight (nervousness/drowsiness) after having consumed it."

For those consenting to try the water, the experimenter poured one full 16 oz glass from a bottle with a label reading "(Energy/Calming) Water," and stated that it was important that they drink the entire cup.

Creatureliness manipulation—Participants were then provided with a questionnaire packet, including the essay about human creatureliness or uniqueness. Completion of these materials allowed sufficient time for the participant to believe the water could take effect prior to the BSE.

BSE—After participants completed the packet, they were told that it was time for the BSE. They were once again ensured complete privacy and that they would not be interrupted at any time during the exam. It was emphasized that it was very important for them to actually perform the BSE, because there would be questions about it afterward. They were given the same flyer used in Study 2, which provided a technique that they were asked to use when performing the exam. The experimenter then left them alone in the exam room and instructed them to close the door when they were ready to begin and open it to let the experimenter know when they were finished. The experimenter surreptitiously started a stopwatch when the door closed and stopped it when the door opened.

Participants were then given the last packet of materials to complete. This included "a consumer evaluation" form assessing their reactions to the water, their assessment of BSE duration and demographic information.

Consumer evaluation—To provide a manipulation check for the effectiveness of the placebo, the "consumer evaluation" asked participants to indicate how much they liked the product, how much they liked the taste of the water, and whether they would be interested in buying it. This form also asked participants to rate the extent to which they were feeling "relaxed," "stimulated," "calm," "anxious," "at ease," "jittery," "comfortable," "nervous," "mellow," and "agitated." Responses for all items were indicated on a 7-point scale. As intended, the affective items comprised anxiety and calmness subscales. The results of a principal components analysis with a varimax rotation revealed only two factors; the five anxiety items loaded on one factor and the five calmness items loaded on the other. These two factors accounted for 74.53% of the variance. Internal consistency for each scale was high; αs = .81 for anxiety and .95 for calmness.

BSE reactions and demographics—Participants were then asked to answer a couple of questions about their BSE, including whether they had actually performed one (as said previously, two were excluded because they indicated that they had not) and the approximate

length of time (in min and sec) of the BSE that they had conducted. This was followed by a number of demographic items, including cancer history.

Reactions to the essays—The last part of the packets contained six questions (the same ones used in Study 2) assessing reactions to the essay (α = .94).

When participants completed the materials, the experimenter conducted an extensive debriefing, in which the hypotheses of the study were described and the placebo was revealed. The experimenter ensured that participants were not upset and provided them with contact information for the principal investigator as well as referral information to any women expressing concern about their breast health. Women were then thanked and paid $20 for participating.

Results

The indices of BSE duration included the experimenter's objective measure of how long participants spent in the exam room as well as participants' estimates of how long they spent conducting the BSE. While the experimenter's estimate offered the reliability of a stopwatch, the participants' offered added validity because they were able to discount the time that was not spent on the actual exam (e.g., removing a garment, reading instructions). Estimates for exam times ranged from 25 to 600 sec and time spent in the room ranged from 33 sec to 649 sec. The two assessments were highly correlated, $r = .58$, $p < .001$, and thus were averaged to provide the assessment of BSE duration.

To assess the impact of the creatureliness essay and misattribution manipulations, we conducted a 2 (placebo) × 2 (creatureliness) ANOVA on the composite measure of time spent on the BSE. This analysis revealed no main effects (*p*s > .51), but did reveal the expected interaction between the essay and placebo condition, $F(1,95) = 4.15$, $p = .044$, $\eta_p^2 = .042$. Cell means are presented in Figure 3. Pairwise comparisons revealed a trend for the creatureliness essay to lead to shorter exam times than the uniqueness essay in the calming water condition (i.e., when no alternative explanation for their arousal was available), $t(95) = 1.63$, $p = .106$. Moreover, participants primed with creatureliness conducted longer exams when a feasible alternative explanation was provided by the energy water (as compared to the calming water condition), $t(95) = 1.91$, $p = .059$, $\eta_p^2 = .037$. Although there appeared to be a slight decrease in exam time among the uniqueness/energy water participants relative to the uniqueness/calming water condition, this difference did not approach significance ($p = .33$), nor was there an effect of the creatureliness essay in the energy water condition ($p = .21$).

As in Study 2, a 2 (placebo) × 2 (creatureliness) ANOVA on reactions to the essay revealed that women felt more positively about the human uniqueness essay compared to the human creatureliness essay, $F(1,95) = 8.09$, $p = .005$, $\eta_p^2 = .078$. There were no effects of the water, nor any interaction, on the evaluations of the essays (*p*s > .56). As in Study 2, including reactions to the essay as a covariate in the analysis produced the same significant pattern of results ($p = .04$).

To investigate the effects of the placebo manipulation on self-reported anxiety and calmness, we examined participants' responses to the anxiety and calmness related items on the consumer evaluation form. The results of a 2 (placebo) × 2 (creatureliness) ANOVA on anxiety items revealed a main effect for the placebo, $F(1,95) = 6.60$, $p = .012$, $\eta_p^2 = .065$, with women who received the energy water reporting more anxiety ($M = 2.00$, $SD = 1.05$) compared to women in the calming water condition ($M = 1.59$, $SD = .56$). Looking at the calmness items, there was only a marginally significant interaction between the placebo and essay condition, $F(1,95) = 3.56$, $p = .062$, $\eta_p^2 = .036$, reflecting that the energy water made the woman feel less calm than

the calming water (M = 4.63, SD = 1.26 compared to M = 5.30, SD = 1.11), but only when they were reminded of creatureliness, $F(1,95) = 3.75$, $p = .056$, $\eta_p^2 = .038$; in the human uniqueness condition there was no difference ($p = .46$).

Discussion

The results of this study support the hypothesis that BSE behavior can be inhibited by discomfort (i.e., anxiety) with screening behavior as a function of priming creatureliness in a context likely to prime thoughts of death. Women who were given the creaturely prime conducted longer BSEs when they were given an excuse for feelings of distress (the energy water) than when they were not provided with such an excuse (the calming water). This suggests that the misattribution cue was successful in (mis)directing participants' perceived source of their discomfort, thus facilitating a longer (and presumably more thorough) examination.

Although the finding that women's BSEs were longer in the creatureliness condition when they were provided with the misattribution opportunity compared to when they were not provides strong support for our hypothesis, within the calming water conditions, the effects of the creaturely essay (vs. the uniqueness essay) on BSE duration were not quite statistically significance. We suspect the weaker effect of creatureliness in this study may have resulted from an anxiety-reducing effect of the calming water placebo. However, because Study 3 was designed to elucidate how discomfort conducting a BSE when concerns about one's creaturely and mortality are active, we opted to use a control condition (i.e., the calming water) which paralleled the energy water placebo rather than an entirely neutral (i.e., no placebo) condition, which would have provided an optimal context for testing the human creatureliness versus human uniqueness essay effect. In light of clear support for this difference in the previous studies, the present tendency in the predicted direction (even under conditions of a calming placebo) provides converging evidence discomfort caused by existential factors can undermine breast screening behavior.

In addition, the findings of this study extend the generalizability of our results by showing similar effects on women with greater risk of breast cancer when performing a BSE on their own breasts. This is a significant departure from much of the research in TMT, which for the most part has focused on attitudinal outcomes among college students. Such generalizability can play a critical role in establishing the theoretical viability of these ideas.

General Discussion

Three studies support the hypothesis that women's concerns about their creaturely and mortal nature can create discomfort and undermine willingness to engage in BSEs. In Study 1, the juxtaposition of mortality and creatureliness reminders reduced women's intentions to conduct BSEs. Study 2 moved beyond self-report intentions and showed that creatureliness priming reduced breast exam behavior on a breast model (an experience found to increase death thought accessibility). Study 3 demonstrated that one reason that reminders of creatureliness inhibit screening behavior that presumably makes death salient is discomfort associated with the exam. By using a misattribution of arousal paradigm, this study provided evidence that actual BSE duration was unaffected by the creatureliness prime when participants had an alternative explanation for the psychological discomfort they were presumably experiencing.

Taken together, the present research offers a number of theoretical and practical contributions. We begin by addressing specific conceptual issues regarding the role of mortality salience, arousal, and the use of behavioral outcomes in the current research. We then discuss the contribution of this work to theories in health psychology and specifically to an emerging terror

management health model. Finally, we discuss some potentially fruitful applications of this research for breast exam promotion.

Conceptual Issues

The Role of Mortality Salience—The naturalistic context of Studies 2 and 3, while offering advantages in terms of external validity, does leave some ambiguity in terms of how much mortality salience contributed to the present effects. Clearly mortality salience was instrumental in Study 1, as the creatureliness manipulation only reduced BSE intentions when mortality was primed. Moreover, it is likely that in Studies 2 and 3 the more realistic BSE experience primed mortality, and the pilot data for Study 2 supports this position. However, because mortality salience was not experimentally manipulated in these studies, it is difficult to isolate the extent to which it contributed to the effects. Although some studies (e.g., Cox, Goldenberg, Arndt, & Pyszczynski, 2007) have found that creatureliness can exert a main effect on body-related outcomes, the findings of Study 1, and other research documenting creatureliness by mortality salience interactions on body-oriented judgments (e.g., Goldenberg et al., 2002), suggest that reminders of death create a situation in which activating concerns with creatureliness may have an especially robust impact. TMT is the only perspective to articulate when and why creatureliness may be problematic for people; however, more research is needed to clarify the extent to which mortality concerns need to be salient for creatureliness to influence judgment and behavior.

The Role of Arousal—The present findings provide the first evidence that concerns about creatureliness in a mortality salient context may exert effects by leading participants to attribute unpleasant arousal to a body-oriented behavior. This can be seen as broadly consistent with an emerging picture of how arousal can be misattributed in terror management responses, as Greenberg et al. (2003) found that mortality salience produces its effects on worldview defense in part through activating a potential for (but not actual) arousal (i.e., a placebo purported to block the potential for arousal reduced worldview defense in response to mortality salience). Of course, in the current research there was no non-bodily activity and thus it is difficult to determine whether the manipulation was in itself arousing in the context of presumed mortality salience, or whether it created a potential for arousal that was actualized by the BSE. Prior research showing that the interactive effect of creatureliness and mortality salience are specific to body-oriented behaviors (e.g., Cox et al., 2007) and that it does not increase negative affect prior to exposure to the body-related behavior (Goldenberg et al., 2002), however, suggests that the latter is more likely. In any case, Study 3's finding that an alternative explanation for participant's discomfort enabled individuals primed with creatureliness to conduct longer BSEs provides the first evidence that arousal can inhibit BSE behavior.

Behavioral Outcomes—The current research also extends prior work by demonstrating that concerns about creatureliness and mortality can inhibit actual behavior. Previous studies exploring the effects of people's concerns about creatureliness have generally relied on self-report ratings of attitudes and reactions to stimuli (e.g., Goldenberg et al., 2002). However, given the well documented ambiguity associated with self-reports and how they map onto people's actual behavior (cf. Nisbett & Wilson, 1977; Gilbert, Pinel, Wilson, Blumberg, & Wheatley, 1998), the present work provides vital evidence supporting the use of the construct of creatureliness to understand behavioral outcomes. In addition, the behavioral assessment of exam duration highlights a novel tool for studying actual BSE (and other health) behavior, in addition to assessing self-reports of future (i.e., intentions, as in Study 1) or past (i.e., compliance) behavior, as is more typical in health research. Although more research is necessary to examine how this dependent variable maps onto behavioral compliance, there is evidence that shorter duration exams are less thorough (e.g., Barton, Harris, & Fletcher, 1999; Fenton et al., 2005). In applying what is already an established precedent outside of

health psychology (i.e., assessing the degree of a psychological threat by measuring the duration that one endures it, e.g., Wicklund & Frey, 1980; Thorpe & Salkovskis, 1995), the current research offers methodological as well as conceptual advances.

Advances for Theory

Implications for Health Psychology—Although models focusing on more rational health motivations (e.g., Fishbein & Ajzen, 1975; Prochaska et al., 1994; Rosenstock, 1974) have contributed invaluably to health promotion, it is increasingly recognized that insight into health can be gained by examining psychological forces outside rational decision-making processes (Salovey et al., 1998). For example, there has been a growing understanding of how emotional reactions (e.g., Cameron, 1997; Witte, 1992) and self-serving biases (e.g., Croyle, Sun, & Hart, 1997; Gerrard, Gibbons, Reis-Bergan, & Russell, 2000) can contribute to health decisions. Interestingly, while these perspectives share health as a motivating concern (i.e., either the betterment of, or the fear or denial of risks to it), researchers have also uncovered a broader range of social psychological motives applicable to health decisions. Self-presentational motives (e.g., Leary et al., 1994) and appearance striving (Mahler, Kulik, Gerrard, & Gibbons, 2006), self-consistency (Stone, Aronson, Crain, Winslow, & Fried, 1994), social comparison (Gibbons & Gerrard, 1995), and a general need to protect the integrity of the self (Reed & Aspinwall, 1998; Sherman et al., 2000) have been implicated in decisions that affect health outcomes. These perspectives all recognize that motives not rooted in health can affect health-relevant decisions and outcomes. The current framework is in line with this general position in that reduced behavior and intentions occurred not on account of the health-relevance of the behavior, but on account of the implications for the self. Specifically, this research suggests that threats associated with the creatureliness and mortality of the self may exert a barrier to physical health behaviors.

Contributions to Terror Management Theory—Not only has health research generally failed to consider existential motivations, but research on TMT, until recently, has also neglected to address its potential relevance to health. This represented a critical, and seemingly obvious, gap, considering that mortality concerns are likely to be active in the context of health threats. We recently proposed a TMT health model (Goldenberg & Arndt, 2007) which suggests that while conscious concerns with death instigate direct defenses aimed at reducing one's perceived health risk (and thereby facilitating the removal of death related thought from consciousness), unconscious resonance of death-related cognition may impact health outcomes by exacerbating a broader set of motives, increasingly identified by health researchers (see above, e.g., Sherman et al., 2000), concerning the integrity of the self.

In support of the model, it has been shown that when thoughts of death are conscious, individuals may increase their health intentions (e.g., Taubman Ben-Ari & Findler, 2005) or deny their vulnerability to health risk (Greenberg et al., 2000), and that individual differences in health coping styles moderate such effects (Arndt, Routledge, & Goldenberg, 2006). In contrast to these health-focused defenses, non-conscious mortality concerns have been shown to affect health to the extent that the behaviors are relevant to self-esteem. For example, mortality salience has been shown to increase fitness intentions (Arndt et al., 2003) and increase tanning intentions (Routledge, Arndt, & Goldenberg, 2004) among individuals whose self-esteem is contingent on such behavior or in response to primes that frame the behavior as self-esteem relevant. Although the current findings share some similarities with these latter findings to non-conscious mortality concerns by focusing on the (threat to the) symbolic value of the body, the current series of studies are the first to examine the causal effects of creatureliness in the context of health relevant domain. In this way, the present studies extend the applicability of an existentially informed analysis not only to a novel health-relevant domain but also via a

previously unexamined psychological mechanism within the context of an emerging TMT health model.

Applications for Breast Exam Promotion

Theory-consistent predictions across three studies, including effects on actual BSE behavior, suggest that the current analysis may offer novel practical implications for BSE promotion. Although the effects of the manipulations typically accounted for a relatively small amount of the variance in BSE outcomes, small effects can be important, especially when the manipulations are subtle and not obviously related to the dependent variable (Prentice & Miller, 1992). While factors identified by traditional health models (e.g., attitudes, subjective norms, and perceived control, McCaul, Sandgren, O'Neill, & Hinsz, 1993; self efficacy and planning, e.g., Luszczynska & Schwarzer, 2003) have been found to account for greater variance in BSE behavior, the current approach is clearly meant to complement, not compete with, other models of health behavior, by highlighting an additional concerns that may be particularly relevant in the context of BSEs.

In this light, an important objective for future research is to better understand how the factors identified by these experiments may manifest in real-world settings. With regard to thoughts of death, it would be useful to consider how aspects of the health context may render mortality concerns more or less accessible. For example, would perceived risk of breast cancer activate thoughts of mortality in the context of breast cancer screening? Presumably it would, and this leads to an interesting set of predictions. While rationally oriented models (e.g., the Health Belief Model) specify that perceived risk should increase motivations to screen, the present analysis suggests that, if concerns about creatureliness are also accessible, a perceived risk-death activation link should increase discomfort with performing BSEs. This may explain why, according to a recent meta-analysis (Katapodi, Lee, Facione, & Dodd, 2004), while perceived risk does exert a reliably positive influence on mammography adherence (which may be less mutable by psychological factors than BSEs, see Siegler & Costa, 1994), it does not reliably predict BSE screening. Thus, research designed to identify factors that naturalistically prime mortality may provide insight into people's decisions regarding their health.[4]

Another important next step to consider is how concerns about creatureliness relate to breast cancer screening in the absence of an experimental manipulation of creatureliness. At least in the context of Study 2, the default cognition in approaching BSEs appeared to be that of human uniqueness, for this condition did not differ from a no-essay control. However, there may be aspects of health settings that can activate concerns about creatureliness (e.g., looking at one's naked figure in the bathroom mirror, seeing one's X-ray in the doctor's office) or aspects of instructional brochures that can make creatureliness more accessible, such as explicit photos (found to deter BSEs among individuals high in erotophobia, Labranche, Helweg-Larsen, Byrd, Choquette, 1997). Applied health workers only stand to gain by considering whether interventions and instructional materials can be delivered in ways that reduce the likelihood of casting BSEs in a creaturely light.

[4]In this vein, features of health communications, such as how they are framed, may also have the potential to differentially activate death-related cognition. According to work derived from prospect theory (Rothman, & Salovey, 1997), messages can be framed so as to highlight the advantages of performing a behavior (i.e., gain framed) or to make salient the disadvantages of NOT performing the behavior (i.e., loss framed). With reference to the current perspective, the way a message is framed may increase or decrease the likelihood that mortality concerns are implicated by virtue of whether the message highlights health risk. Pilot research we recently conducted provides preliminary support for this analysis. In the context of BSEs, a gain frame (i.e., "conducting breast self-exams can protect your health) led to heightened death-thought accessibility as compared to a loss frame (i.e., "not conducting breast self-exams can put your health at risk"). Indeed, previous research on message framing indicates that effective behavioral promotion is found in the conditions in which mortality should be less salient (see e.g., Rothman, & Salovey, 1997). Although it is premature to draw firm conclusions at this point, this may represent a promising direction for future research.

In terms of mitigating the potential for threat associated with creatureliness, health communications that emphasize uniquely human aspects of behavioral health control or frame BSEs as empowering may help avoid the potential to focus on the physicality of the behavior, and thereby enable individuals to focus on its esteem-relevant symbolic aspects. Other future directions include exploring whether some previously identified predictors of BSEs interact with the variables identified in the present work. For example, can positive normative beliefs concerning BSEs (e.g., McCaul et al., 1993) or high self-esteem (Cope, 1992) or high body-esteem (Olson & Morse, 1996) mitigate the effects of creatureliness on BSE behavior? One aspect that these variables have in common is that they highlight an individual's capacity to construct and maintain a symbolic identity; doing so may allow women to more productively confront breast screening.

Due to insufficient evidence that BSEs reduce mortality rates associated with breast cancer, the American Cancer Society has recently changed their guidelines so that monthly BSEs are now considered optional. Although comfort examining one's own breast is still important so that women are familiar with how their breasts feel and better able to recognize changes in their breast (see new guidelines, www.cancer.org, especially for younger women for whom regular mammography is not recommended, Smith et al., 2003), it is obviously important to explore the applicability of this analysis to mammography, which has been found effective in reducing breast cancer mortality rates (www.cancer.org). In ongoing research, Goldenberg, Routledge, and Arndt (2006) found that women high in neuroticism who were undergoing mammography report more psychological discomfort after a creatureliness induction, suggesting that our analysis may not be limited to BSEs. In this light, a theoretical analysis that can shed light on factors affecting comfort with BSEs as well as other breast cancer screening modalities has practical importance.

Conclusion

While there is clearly more work to be done, consistent findings across three studies suggest that an existential perspective is relevant to BSE behavior. Although more traditional health models have made significant inroads toward elucidating factors that can pose barriers to breast cancer screening, the current perspective can broaden the current understanding by considering the unique nature of threats associated with concerns about mortality and creatureliness and the often non-rational ways that people deal with these threats. Armed with this broader perspective, researchers and health professional may be in a better position to facilitate productive health behaviors.

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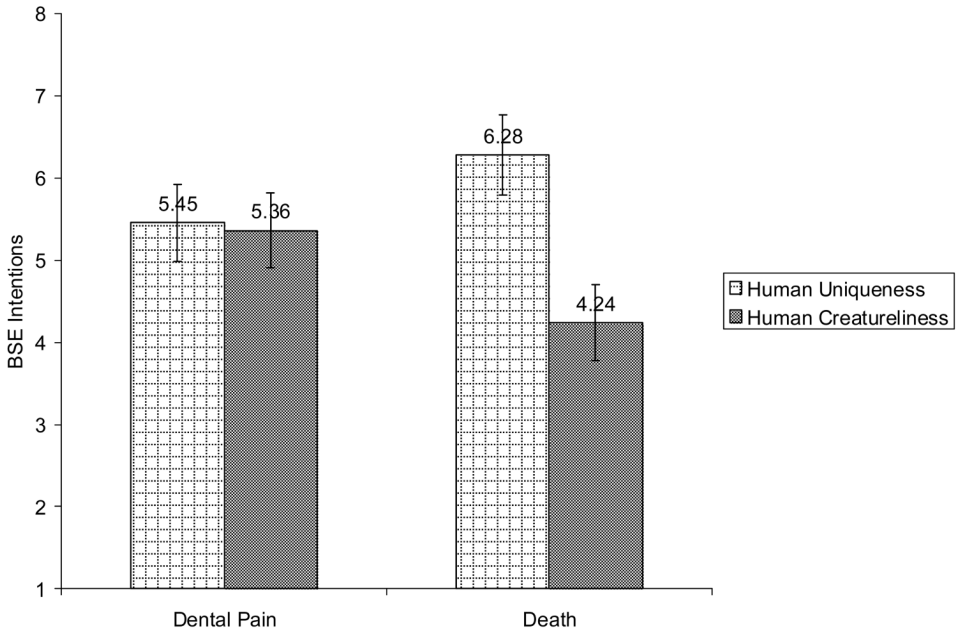

Figure 1.
The Effects of Mortality Salience and Creatureliness on Intentions to Perform Breast Self Exams
Note: Error bars represent the standard error of the mean.

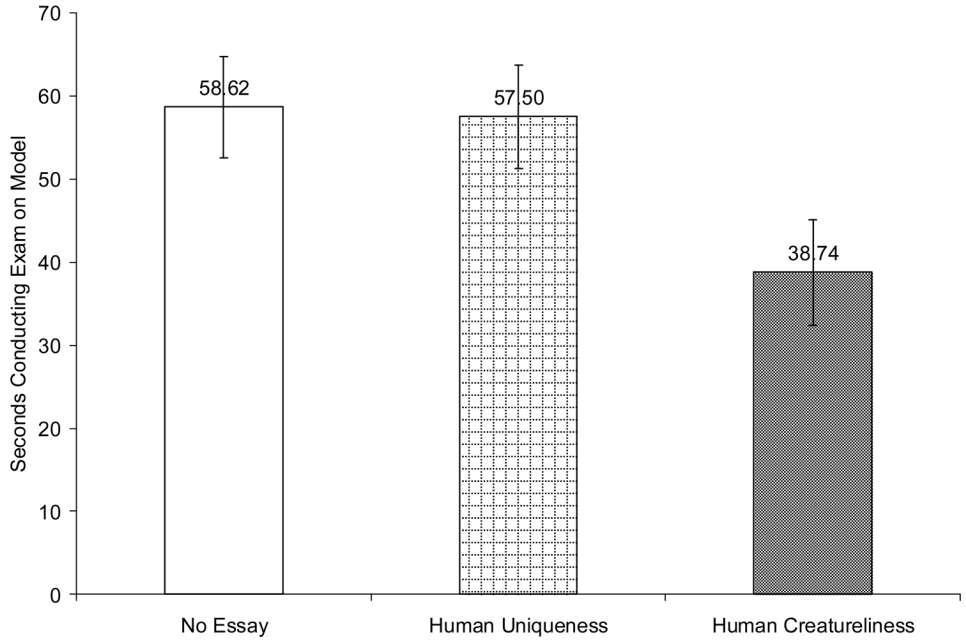

Figure 2.
The Effects of Creatureliness on Breast Model Exam Duration
Note: Error bars represent the standard error of the mean.

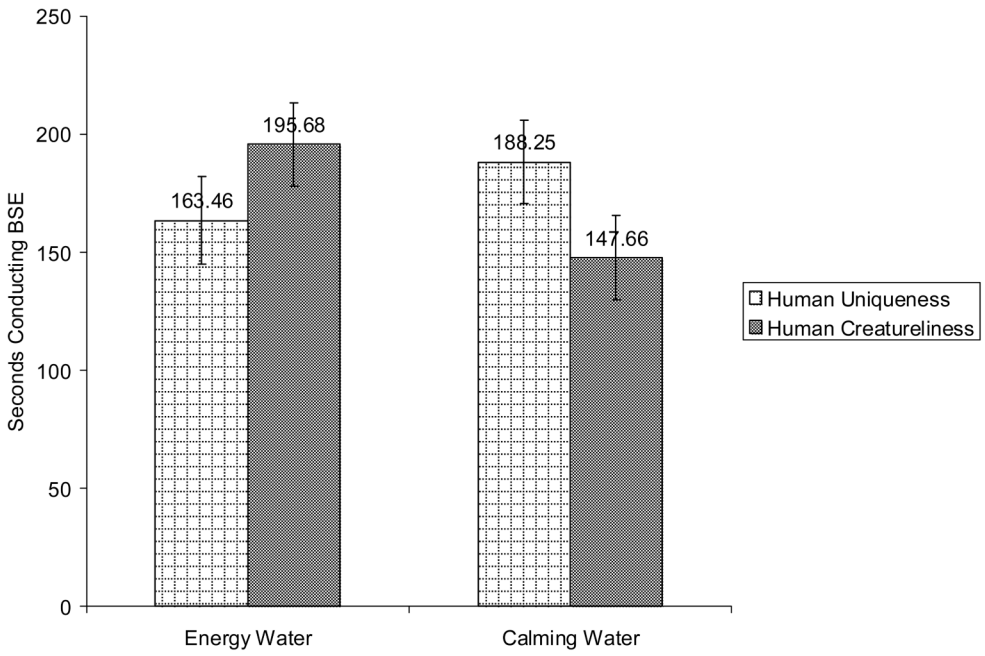

Figure 3.
The Effects of Placebo and Creatureliness on BSE Duration
Note: Error bars represent the standard error of the mean.