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**MORTALITY SALIENCE AND CONSUMER RISK TAKING:
STRIVING FOR PERSONAL CONTROL AND SELF-ESTEEM**

A Thesis in

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by

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ABSTRACT

From a terror management perspective, this thesis argues that mortality salience (MS) causes consumers to become risk averse. Two mediators (the need for personal control and self-esteem striving) and a moderator (self-esteem relevance of the outcome of the risk) of this relationship are proposed. Three experiments show that MS leads to greater risk aversion, but allowing individuals to acquire control or to acquire self-esteem reduces the effect. A fourth study examines a boundary condition and looks at the effect of the self-esteem relevance of the risk on the risky choice. The research provides insights into how today's consumers deal with existential anxiety in risky choice settings.

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This thesis is dedicated to my mother,
who with her strength and courage
lit the way for me.

*The fear of death follows from the fear of life.
A man who lives fully is prepared to die at any time.*
Mark Twain

Achieving life is not the equivalent of avoiding death.
Ayn Rand

There are subtle and inevitable reminders of human mortality in everyday life—a birthday, the death of a loved one, getting a flu shot, watching a movie, hearing of a natural disaster, and reports of terrorism. Consumer behavior research to date has focused on the effects of mortality salience (MS) on consumption behavior and preferences for products that imply status. For example, it has been shown that reminders of mortality lead to the endorsement of materialistic values, status seeking, and excessive consumption and spending (for a review, see Arndt et al. 2004). The current thesis extends the study of MS by focusing on consumers' risk taking behavior in the context of financial decision making to examine the underlying mechanisms driving consumer choice under MS.

Terror Management Theory (TMT) explains how MS impacts human behavior (Greenberg, Solomon, and Pyszczynski 1997). The explanation stems from the basic premise that people have a unique cognitive ability to think abstractly. This cognitive ability allows people to have an awareness of their own mortality and to envision their inevitable death (Arndt and Solomon 2003). The awareness of one's mortality creates existential anxiety. To cope and reduce this existential anxiety, individuals try to establish a sense of control and create meaning in their lives. Increasing one's belief in a unified cultural worldview (CWV)¹ and enhancing one's own self-esteem help individuals cope with this existential anxiety. Culture brings order

¹ A CWV is a shared reality that provides information about the world to the person, and how the person should live and respond within that culture.

and meaning, and prescribes behaviors that help to enhance self-esteem. Therefore, increasing faith in a CWV and enhancing one's sense of personal value in that culture brings order and reduces the anxiety produced by MS (Greenberg et al. 1997).

Within the TMT framework, the current thesis looks at how MS impacts consumers' risk taking behavior by focusing on financial investment decisions, where the choices have different outcome probabilities for different magnitudes of potential returns, while holding the overall expected value constant. Based on the needs that are activated by MS, the current thesis predicts that MS will increase individuals' risk aversion, and that the two needs induced by MS (the need for control and self-esteem) will mediate the impact of MS on risk taking behavior. Specifically, the desire for personal control induced by MS should lead to greater risk aversion because in a risky choice, the outcome is uncertain and uncontrollable. The desire to enhance self-esteem is also expected to impact risk taking behavior. Self-esteem studies suggest that the outcome of a risky choice can potentially threaten self-esteem as it may lead people to question their abilities in making decisions should the undesirable outcome occur (Josephs et al. 1992). Hence, self-esteem striving should lead to greater risk aversion in order to protect the self-esteem.

In general, when mortality is salient, people with the goal to avoid death, become risk averse to situations that may threaten their physical well-being (Ben-Ari, Florian, and Mikulincer 1999). However, self-esteem striving may also lead to increased risk taking if the risk is perceived to be self-esteem relevant (i.e., something the individual believes s/he can excel at). In other words, if the individual focuses on the potential gains in self-esteem associated with the risk instead of the potential for death, then s/he may become more risk seeking in an attempt to enhance self-esteem. As the self-esteem relevance of the risk increases, the subjective value of the gain of a favorable outcome compared to the loss of one's life increases (Ben-Ari et al.

1999). Following this logic, this thesis presents a boundary condition, and proposes that the self-esteem relevance of the risk will affect the risky decision making process when mortality is salient. It is expected that consumers will become more risk seeking if the gain associated with the risky choice has the potential to increase self-esteem and overwhelms the downside potential death.

The thesis is organized as follows. First, I provide an overview of TMT. Next, I discuss MS's impact on risk taking behavior and the mediating effects of need for control and need for self-esteem. Finally, I consider the boundary condition, the effect of the self-esteem relevance of the risk on choice.

TERROR MANAGEMENT THEORY

TMT posits that humans have an inborn drive for self-preservation. Through evolutionary forces, we have developed complex cognitive skills that make us capable of abstract and self-reflective thought. These cognitive skills allow us to acquire an awareness of our own mortality, which leads to potentially paralyzing terror. The awareness of one's unpredictable and uncontrollable death is in conflict with the drive for self-preservation and makes the world appear unorganized and meaningless. This leads to existential anxiety and results in increased needs for order, predictability, personal control, meaning, and permanence in one's environment, and facilitates striving for bringing these back into one's life (Greenberg, Pyszczynski, and Solomon 1986). The cognitive skills that allow self-awareness and lead to terror also help fight those feelings of anxiety. Two defenses reduce the terror: increasing faith in one's CWV and self-esteem enhancement (Greenberg et al. 1986).

Cultural Worldview Defense and the Need for Control

Culture provides the basis for reducing the existential anxiety induced by mortality salience. A CWV brings order, predictability, meaning and permanence to one's life, and assures us that we are a significant part of that culture (Miller and Mulligan 2002). The feeling that one is a significant part of a meaningful reality allows us to control our MS-induced anxiety (Pyszczynski, Solomon, and Greenberg 2003). CWVs also help us acquire a sense of control over death by promising symbolic or literal immortality and by making what happens after death predictable (Pyszczynski, Greenberg, and Solomon 1998). Culture makes the world appear to have order and promotes the idea that control is possible (Arndt and Solomon 2003). Thus, when lack of control is perceived, those who are embedded in a CWV readily believe that control is possible, and strive to gain it (Arndt and Solomon 2003).

Self-Esteem Defense and the Need for Self-Esteem

Simply belonging to a culture is not sufficient to reduce the existential anxiety induced by MS; we need to be convinced that we are valuable contributors to our culture (Pyszczynski et al. 2003). Meaning for one's existence is found in being a valuable member of a valuable culture (Arndt et al. 2002). Self-esteem is the socially constructed belief that one is valuable (Pyszczynski et al. 2004). Self-esteem enhancement serves a defensive terror management function because a feeling of being valued within one's culture makes one's existence significant and meaningful (Greenberg et al. 1992).

In short, TMT shows that when mortality is salient, life feels unpredictable and out of control. To reduce the anxiety caused by MS, we seek ways to establish order and attain control

(Greenberg et al. 1986). We try to find meaning in our lives and avoid situations that will instill further ambiguity, lack of control, and meaninglessness.

Mortality Salience and Risk Taking

A risk, by its very nature, suggests an unpredictable outcome and entails a chance of loss (Raju 1980; Steenkamp and Baumgartner 1992). Risky decision-making implies circumstances in which the individual lacks control over the outcome of his/her decision. As such, it could be argued that similar to MS, risky situations indicate uncertainty and lack of control, and result in increased anxiety, encouraging us to prefer low risk/low reward options to high risk/high reward options (Raghunathan and Pham 1999).

TMT also explains why some people engage in risky self-destructive acts, such as risky driving, extreme sports, and drug abuse that can potentially kill them (Ben-Ari et al. 1999; Hirschberger et al. 2002; Miller and Mulligan 2002). Generally, MS makes people avoid behaviors that may be self-destructive. The instinct for survival, along with the needs for control and predictability, make the potential to lose one's life outweigh the potential gains that are related to the self-destructive activity. However, there may be circumstances in which the calculated self-esteem gains associated with engaging in the risky behavior seem "worth it." The current thesis extends the study of MS with respect to risk-taking by focusing on risks that are not physically destructive.

Based on the similarity between the needs induced by MS (the need for control and the need for self-esteem enhancement) and the implicit goals instantiated by the nature of risky situations, the current thesis suggests that MS, with the goal to reduce anxiety, will cause consumers to become risk averse.

Hypothesis 1: Mortality salience will cause consumers to become more risk averse compared to a situation in which mortality is not salient.

Mortality Salience and the Need for Control and Risk Taking

This thesis also suggests that the effects of MS on risk taking will be mediated by the needs generated by MS. Risky decisions entail making a choice between precise or uncertain probabilities of gains and losses, where we do not have control over the outcome. When lack of control is perceived, we take action to gain control (Rothbaum, Weisz, and Snyder 1982). As such, when experiencing an increased need for control due to MS, it is expected that individuals who are striving to attain control will avoid risky situations in which they lack control. Taking a risk puts the person in a position that is contrary to their need for control. Therefore, people will avoid uncertainties and situations that entail further lack of control (Spratt, Brumbaugh, and Miyazaki 2001).

TMT explains that MS contributes to the feeling that one lacks the ability to control one's life. Yet socialization into a CWV suggests that control is possible. The perceived lack of control, along with the understanding that control is feasible, facilitates the desire for acquiring it. If control is acquired in some way, then perhaps the desire for control that MS enhances will be sufficiently satisfied to mediate the impact of MS on the risky choice. As such, the perceived ability to satisfy the desire for control should mediate the effects of MS on risk aversion.

To clarify, in this thesis, the term mediation is used to refer to a theoretical analysis as opposed to a statistical analysis. Spencer, Zanna, and Fong (2005) point out that statistical mediation analyses are not always appropriate to study psychological processes. They suggest that experimental-causal-chain designs, in which both the independent variable and the mediator

variable are manipulated and the mediation process is tested in a *moderation of the process design*, are preferable because they experimentally show the causal relationship and allow stronger inferences to be made. This study follows an experimental-causal-chain design as suggested by Spencer et al. (2005) and studies the mediating relationship between MS, need for control, and risk taking experimentally. In other words, the mediating effect is not tested using the traditional Baron and Kenny (1986) mediation analysis; instead it is tested in a *moderation of the process design* as suggested by Spencer et al. (2005). More specifically, given that MS leads to an increased need for control, I expect that providing a way to satisfy this desire for control external to the choice will reduce the effects of MS on risk aversion, resulting in less risk averse behavior when control is provided. In other words, if MS induces a desire to acquire control, but control is provided by other means, then the drive to acquire control should be satisfied. As such these individuals should not need to assert control in the risky choice task by becoming risk averse since they have met their need.

Hypothesis 2: When mortality is salient, individuals who have not been able to satisfy their desire for personal control will be more risk averse, relative to those for whom the desire for control has been satisfied.

After mortality has become salient, if control is acquired, then individuals should become less risk averse. If, however, mortality is salient and the need for control is not satisfied, then individuals should be significantly more risk averse compared to those for whom the desire for control was satisfied or mortality was not salient.

Mortality Salience and the Need for Self-Esteem and Risk Taking

The need for self-esteem enhancement induced by MS is also expected to impact risk-taking behavior. In general, individuals who are lower in self-esteem are more risk averse in order to avoid feelings of self-doubt. Further, there are different kinds of consumer risks: financial, physical, performance, social, and psychological. Individuals may associate the outcomes of some risky choices with greater harm to self. Those risks may be avoided for self-esteem protection (Mandel 2003). Josephs et al. (1992) also observe that some risky decisions can be threatening to self-esteem since the option that is chosen has the potential to yield an outcome that is less desirable compared to the foregone alternative, thereby causing the individual to doubt their decision making abilities. This doubt further reduces self-esteem. Consequently, individuals who are feeling low in self-esteem and who are striving for higher levels of it will avoid taking risks for purposes of self-esteem protection.

TMT shows that under MS, individuals strive for self-esteem. Hence, it is expected that people for whom mortality is salient will avoid situations where there are threats to their self-esteem. As suggested by Josephs et al. (1992), making a risky choice puts the self-esteem at stake. As such, the threat to self-esteem posed by MS and the self-esteem striving induced by MS should lead to greater risk aversion. If, however, a way for individuals to satisfy their self-esteem needs outside of the risky choice task is provided, it may diminish the impacts of MS on risk taking in a financial choice.

Specifically, I expect that providing a way to improve self-esteem will mediate the effects of MS on risk aversion, resulting in less risk aversion when self-esteem is acquired. The proposed mediating effect analysis, similar to hypothesis 2, will also be tested by following the

Spencer et al. (2005) experimental-causal-chain design to examine the mediating relationship between MS, the need for self-esteem enhancement, and risk taking. As in hypothesis 2, the mediating effect is not tested using the traditional Baron and Kenny (1986) mediation analysis; instead it is tested in a *moderation of the process design* as suggested by Spencer et al. (2005). In other words, if MS induces a desire to acquire self-esteem (which should lead to greater risk aversion) (Josephs et al. 1992; Mandel 2003), it is expected that if self-esteem can be acquired outside of the choice context and satisfy the drive for self-esteem enhancement by other means, then these individuals will have already met their need for self-esteem enhancement.

Hypothesis 3: When mortality is salient, individuals who have not been able to satisfy their desire for self-esteem enhancement will become more risk averse relative to those for whom the desire for self-esteem enhancement has been satisfied.

After mortality has become salient, if self-esteem is acquired, then these individuals should no longer be as risk averse. If, however, after mortality has become salient, the need for self-esteem is not satisfied, then individuals should become significantly more risk averse compared to those for whom the need for self-esteem was satisfied or mortality was not salient.

Mortality Salience and Risk Taking and the Boundary Condition

As mentioned earlier, TMT also suggests that MS may make individuals take potentially self-destructive risks if the outcome of the risk is self-esteem relevant. For these individuals, the activity and the potential gains may provide feelings of self-worth (Ben-Ari et al. 1999). The self-esteem relevance of the outcome of a risk makes the person risk prone by making the individual focus more on the potential gains of the risky behavior rather than the potential losses (i.e., death). Hence the current thesis suggests that under MS, individuals will become more risk

seeking if the potential gains acquired by taking the risk are relevant to their self-esteem. The self-esteem relevance of the outcome of the risk and the potential gains in self-esteem associated it will affect the effect of self-esteem striving on risk taking.

Hypothesis 4: When mortality is salient, the self-esteem relevance of the outcome of the risky choice will affect the effect of mortality salience on risk aversion, causing individuals for whom MS was induced to become more risk prone if the risk is self-esteem relevant, compared to when it is not self-esteem relevant.

Four studies test these predictions. Study 1 tests the direct effect of MS on risk taking and finds evidence in support of hypothesis 1. Study 2 experimentally tests the mediating effect of the need for control on the relationship between risk taking and MS and finds evidence in support of hypothesis 2. Study 3 experimentally tests the mediating effect of the need for self-esteem, and finds evidence in support of hypothesis 3, and study 4 experimentally tests the boundary condition, the affect of the self-esteem relevance of the outcome of the risk, and finds evidence in support of hypothesis 4.

STUDY 1

Study 1 was designed to test the initial hypothesis that MS causes individuals to become more risk averse compared to those for whom mortality is not salient.

Participants

The study was conducted with 219 undergraduate students (69 female and 150 male) who received extra course credit for research participation. The ages of the participants ranged from 19 to 37 ($M = 21$). The study took approximately 50 minutes to complete.

Design and Procedure

The study was a between-subjects experiment conducted in the context of a binary investment choice. MS was manipulated and its effect on risk taking was measured.

Mortality Salience Manipulation. The MS manipulation that is used in most TMT experiments was used in this study (e.g., Greenberg et al. 1990; Harmon-Jones et al. 1997). In the MS condition, the participants responded to two open-ended questions about death: 1) *“Please briefly describe the emotions that the thought of your own death arouses in you.”*; 2) *“Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.”* Participants in the non-MS condition responded to a neutral topic: 1) *“Please briefly describe the emotions that the thought of watching TV arouses in you.”*; 2) *“Jot down, as specifically as you can, what you think will happen to you the next time you watch TV.”*

Following the procedure used by Greenberg et al. (1990), two distracter tasks followed the manipulation of MS: a word search puzzle comprised of fifteen neutral words, and Watson et al.’s (1998) 20-item Positive Affect Negative Affect Schedule (PANAS). These distracter tasks are the standard tasks used in most TMT experiments. They are critical to assure that MS is present at a nonconscious level. Responses to MS differ depending on people’s conscious or nonconscious awareness of mortality (Pyszczynski et al. 1999). The current study focuses on these non-conscious processes².

² To establish the validity of the MS manipulation, a pretest was conducted with 30 participants. After the MS manipulation and the distracter tasks (word-search puzzle and PANAS), individuals were asked to respond to four items adapted from Boyar’s (1964) Fear of Death

Risk Taking. After the PANAS, participants were asked to review and choose between two investment options. The two investment options had different outcome probabilities and different magnitudes of gain and loss, but the expected values of the investments were identical. More specifically, participants were asked to indicate their preference between: 1) (High risk option): “60% chance of gaining 20% on your investment, and 40% chance of losing 20% of your investment,” and 2) (Low risk option): “70% chance of gaining 10% on your investment, and 30% chance of losing 10% of your investment.” Once a preference was indicated, participants rated the appeal of each investment on a scale from 0 to 7, where 0 was not appealing at all and 7 was extremely appealing.

Positive Affect Negative Affect Schedule (PANAS). PANAS is comprised of two parts measuring positive and negative affect; 10 positive items (coefficient alpha = .74) and 10 negative items (coefficient alpha = .77) (Watson et al. 1998). PANAS asks participants to indicate how they feel by rating adjectives such as “interested,” “distressed,” “jittery,” and “excited” on a scale from 1 to 5, where 1 is very slightly or not at all, and 5 is extremely. A higher score on this scale means higher levels of positive or negative affect. Using PANAS as part of the distracter task also allows me to take into account any mood effects that may have been induced by the MS manipulation.

Scale. The items included: 1) “The idea that I may die young does not affect me” (reverse coded), 2) “The idea of dying makes me anxious,” 3) “Some people are afraid to die, but I am not” (reverse coded), and 4) “I am not at all disturbed by the finality of death” (reverse coded). The participants responded on a 1-to-7 scale where 1 was strongly disagree and 7 was strongly agree. A fear of death score was created by averaging the responses; a higher score on this scale indicated a higher level of fear of death. A comparison of the means showed a significant difference in the fear of death between the MS and the non-MS (TV) groups ($F(1, 28) = 10.10, p < .01; M = 5.52$ for the MS group; $M = 3.62$ for the non-MS group). Furthermore this manipulation did not induce any mood effects. The results of the mean comparisons on the PANAS (both positive and negative) indicated no differences in the moods of the participants in the MS or the TV condition (all $p > .65$).

Domain-Specific Risk-Attitude Scale (Financial Risk Attitude: FRA): The final section of the study included Weber, Blair, and Betz's (2002) "Domain-specific Risk-attitude Scale" (FRA), a 13-item scale that measures general risk taking attitudes with respect to investment situations (coefficient alpha = .84). The FRA asks participants to rate their likelihood of taking financial risks such as "betting a day's income on horse races" or "co-signing a car loan for a friend" on a scale from 1 to 5, where 1 is extremely unlikely and 5 is extremely likely. A higher score on this scale indicates a more positive attitude toward financial risks.

Results

In support of hypothesis 1, participants in the MS condition were more risk averse than those in the control group. In the MS condition, 57% of the participants preferred the low risk option, while 39% of the participants in the non-MS group (TV) preferred this same low risk option. A logistic regression, with choice as the dependent variable (choice of the low risk option coded as 1), and MS as the independent variable, showed a significant positive effect of MS on the investment choice ($b = .70$, Wald $\chi^2 = 6.36$, $p < .05$). This shows that individuals in the MS condition preferred the low risk option more than those in the non-MS condition.

Participants also indicated how appealing they thought each investment option was. A mixed ANOVA, with the judged appeal of the two investment options as the repeated-measures factor and MS as the between-subjects variable, showed a significant interaction effect of MS and the within-subjects factor ($F(1, 217) = 7.43$, $p < .01$). The pattern of the interaction was such that the high risk option was less appealing to the participants in the MS condition than to those in the control condition ($F(1, 217) = 4.45$, $p < .05$; $M = 4.11$ for the MS group; $M = 4.48$ for the non-MS group). Although the low risk option was not significantly different in terms of how

appealing it was for the participants, the direction of the means of the appeal measure for the two groups was as predicted ($F(1, 217) = 2.37, p > .10; M = 4.46$ for the MS group; $M = 4.17$ for the non-MS group).

Alternative Explanations and Control Variables. To make sure that the effect of MS on the investment choice was not driven by a mood effect induced by MS or by individuals' general financial risk taking attitude, the PANAS and FRA were tested to rule out these factors as alternative explanations for the preference for the low risk investment option. The ANOVA on positive affect (PANAS Positive) indicated no differences in positive affect ($p > .50$) between the experimental groups. However, the ANOVA on negative affect (PANAS Negative) indicated a slight difference in the negative affect between the experimental groups ($F(1, 214) = 3.78, p < .10; M = 1.90$ for the MS group and $M = 1.76$ for the non-MS group; a higher score on the PANAS Negative scale indicates higher levels of negative feelings. Note that the significant effect of MS on negative affect is inconsistent with the findings of the pretest (reported in footnote 2) and other TMT research (see, for example, Ferraro, Shiv, and Bettman 2005). I have no explanation for the anomalous finding other than to note that students at the end of the semester may have been more susceptible to feelings of negative affect.

Given that MS had a significant effect on negative affect, a second logistic regression was run to rule out the alternative explanation that the choice of the low risk option was motivated by the negative mood that was induced by the MS manipulation. An analysis with choice as the dependent variable (choice of the low risk option coded as 1), and MS and PANAS negative as independent variables continued to show a significant effect of mortality salience. Specifically, MS had a positive effect on the choice of the low risk option ($b = .74, \text{Wald } \chi^2 =$

7.00, $p < .01$; see table 1) even when negative affect was controlled for. Furthermore, the effect of PANAS negative on choice was not significant ($p > .45$).

Finally, the ANOVA conducted on FRA also indicated no difference in general financial risk taking attitudes between the groups ($p > .30$). Since there was no difference between the experimental groups in terms of FRA, this variable was not further analyzed.

TABLE 1

STUDY 1: CHOICE OF LOW RISK OPTION*

LOGISTIC REGRESSION RESULTS CONTROLLING FOR NEGATIVE AFFECT

Predictors	B	S.E.	WALD χ^2	DF	P	EXP(B)
MS (Coded as 1)	.744	.281	6.995	1	.008	2.103
PANAS Negative	.019	.026	.534	1	.465	1.019
Constant	-.813	.502	2.631	1	.105	.443

* Low risk option coded as 1.

Discussion

As predicted, MS caused individuals to become more risk averse. The MS group had a greater preference for the low risk option (i.e., the option that offered a smaller probability of loss and a smaller probability of gain) than the high risk option (i.e., the option that offered a larger probability of loss and a larger probability of gain), despite the fact that the expected values of the investments were equal. Furthermore, the MS group indicated that the high risk option was less appealing to them compared to the control group. These findings are the first to show that MS leads to greater risk aversion, even when the risk does not threaten one's physical well being.

STUDY 2

Study 2 was designed to test the mediating effect of the need for control on risk taking behavior experimentally. The study is based on the logic that if MS induces an increased need for control, but that need is satisfied elsewhere, the effect on the outcome should be negated. As such, those individuals who are allowed to acquire control within the study prior to the risky choice task should satisfy this need, and therefore should become less risk averse in the risky investment task that follows. In other words, those individuals who were not allowed to acquire a sense of control after mortality is made salient, should be more risk averse compared to those who were allowed to acquire a sense of control through an unrelated task after the MS induction.

Participants

The study was conducted with 232 undergraduate students (143 female and 89 male) who received extra course credit for their research participation. The ages of the participants ranged from 18 to 31 ($M = 20$). The study took approximately 20 minutes to complete.

Design and Procedure

This study was a 2 (MS) x 2 (Perceived Control) between-subjects experiment. MS and perceived control were manipulated, and risk aversion was measured within the context of the same financial decision making task as in study 1.

Manipulation of Mortality Salience. The MS manipulation used in study 1 was also used here. Unlike study 1, however, study 2 included a manipulation check for MS because this study

was relatively short and the effects of MS were expected to still be active at the conclusion of the study. The manipulation check for MS participants involved asking participants to respond to the same four items on the same 1-to-7 scale adapted from Boyar's (1964) Fear of Death Scale. These were the same items used in the pretest for study 1 that established the validity of the MS manipulation.

Manipulation of the Need for Control (Perceived Control). To test for the mediating effect of the need for control on risk taking behavior, half of the participants in the MS and non-MS (TV) conditions were allowed to acquire a sense of personal control after the induction of MS and prior to the risky choice task. The group that was allowed to acquire personal control made a decision which was unrelated to the investment choice task. More specifically, at the start of the study, all of the participants were led to believe that the MS manipulation and the distracter tasks (the word search puzzle and the PANAS) were "mind clearing" tasks. After the administration of the distracter tasks, all of the participants were told that they were going to engage in one last mind clearing task before moving on to the survey. At this point, half of the participants were told they could choose one of three different kinds of puzzles to solve as their final mind-clearing task. The three puzzles were a word search (comprised of six neutral words), word unscramble (comprised of six neutral words), and sentence unscramble (comprised of six neutral sentences). The participants in the "no perceived control" condition were given a puzzle that was yoked to the type of puzzle chosen by the participants in the "perceived control" condition. In the no perceived control condition, participants were not informed that other puzzles were available. Note that the choice of the final mind-clearing task was totally unrelated to the risky investment choice.

A manipulation check for the perceived control manipulation was included at the end of the survey. Participants who were allowed to acquire a sense of control were asked to think back to the part of the study when they made the choice about the puzzle they wanted to solve. In contrast, the participants who were not allowed to acquire control were asked to think back to the part of the study right before they started reading about the investment scenario. All of the participants were asked to indicate how much “*in control*,” “*worried*,” “*helpless*,” “*powerful*,” “*responsible*,” “*autonomous*,” and “*controlled*” they felt at the time. The participants rated each of these adjectives on a scale from 0 to 7 where 0 indicated not at all, and 7 indicated very much. A measure of perceived control was created by averaging the responses, reverse coding as needed.

Measurement of Risk Taking and FRA. Following the perceived control manipulation, participants were presented with the financial investment task, the same task that was used in study 1. As in study 1, study 2 also included Weber et al.’s (2002) Domain-specific Risk-attitude Scale (FRA) to measure participants’ general attitudes towards financial risks after the investment decision was made.

Results

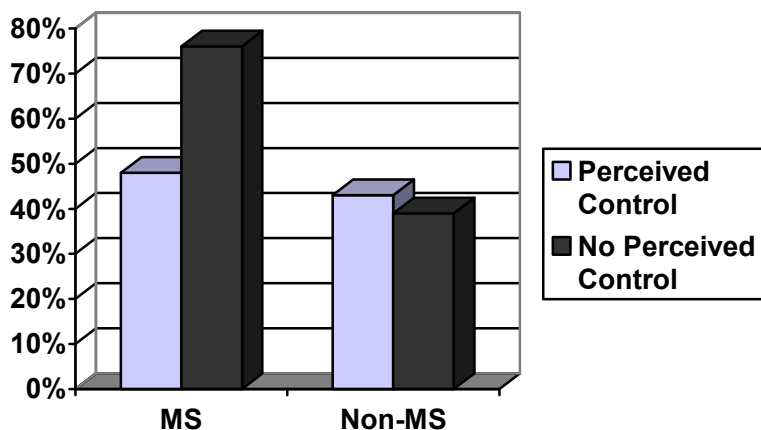
Manipulation Checks. A 2x2 ANOVA on responses to the 4 items adapted from Boyar’s (1964) Fear of Death Scale showed a significant main effect of MS and indicated that the MS group was more concerned about death and dying in comparison to the non-MS (TV) group ($F(1, 226) = 4.69, p < .05; M = 4.36$ for the MS group and $M = 4.10$ for the non-MS group). A higher score on this scale indicates a greater fear of death. There were no effects of perceived control or the interaction between MS and perceived control on the fear of death measures (both $p > .50$).

A 2x2 ANOVA on responses to the perceived control manipulation check showed a significant main effect of Perceived Control. As expected, participants in the perceived control group felt more “*in control*” in comparison to the group without perceived control ($F(1, 226) = 12.23, p < .001; M = 2.02$ for the perceived control group and $M = 1.57$ for the no perceived control group). A higher score on this scale indicates higher perceived control.

Investment Choice. In support of hypothesis 2, participants in the MS condition without perceived control were more risk averse than those in either of the non-MS conditions (TV with and without perceived control) as well as the MS group with perceived control. Specifically, in the MS no perceived control condition, 76% of the participants preferred the low risk option, while only 39% of the participants in the non-MS (TV) no perceived control group preferred this same low risk option. In the MS with perceived control condition, 48% of the participants preferred the low risk option; 43% of the participants in the non-MS (TV) with perceived control condition preferred the low risk option (see figure 1).

FIGURE 1

STUDY 2: PREFERENCE FOR THE LOW RISK OPTION



A logistic regression, with investment choice as the dependent variable (choice of the low risk option again coded as 1), and MS, Perceived Control, and the interaction of MS and Perceived Control as independent variables, showed two significant effects. First, the main effect of MS was significant ($b = 1.60$, Wald $\chi^2 = 15.25$, $p < .001$). MS had a positive effect on the choice of the risk averse option. MS caused individuals to become more risk averse. Second, as predicted, the interaction effect was significant and negative ($b = -1.41$, Wald $\chi^2 = 6.51$, $p < .05$). The participants for whom mortality was made salient, and who were allowed to acquire a sense of perceived control prior to the risky choice task were not positively affected by the MS manipulation. They were not as risk averse as those participants for whom mortality was made salient but who were not allowed to acquire a sense of perceived control prior to the risky choice task (see table 2).

TABLE 2
STUDY 2: CHOICE OF LOW RISK OPTION*
LOGISTIC REGRESSION RESULTS

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (Coded as 1)	1.603	.411	15.247	1	.000	4.968
Perceived Control (Coded as 1)	.148	.384	.147	1	.701	1.159
MS x Perceived Control	-1.414	.554	6.506	1	.011	.243
Constant	-.435	.274	2.531	1	.112	.647

* Low risk option coded as 1.

In order to further analyze the effect of the interaction (MS x Perceived Control), a simple main effects analysis was conducted looking at the effect of the MS manipulation by comparing the effect of the MS manipulation on those individuals who received the Perceived Control manipulation and those who did not receive it. A logistic regression analysis, with the investment choice as the dependent variable (choice of the low risk option coded as 1), showed a significant and positive effect of MS on the group that did not receive the perceived control manipulation within the study ($b = 1.60$, Wald $\chi^2 = 15.25$, $p < .001$; see table 3). Those participants in the MS condition who were not allowed to acquire a sense of personal control within the study indicated a significantly higher preference for the low risk option.

TABLE 3
STUDY 2: MAIN EFFECTS ANALYSIS*

Experimental Groups		B	S.E.	Wald χ^2	DF	P	Exp(B)
No Perceived Control	MS (Coded as 1)	1.603	.411	15.247	1	.000	4.968
	Constant	-.435	.274	2.531	1	.112	.647
Perceived Control	MS (Coded as 1)	.189	.372	.258	1	.611	1.208
	Constant	-.288	.270	1.135	1	.287	.750

* Low risk option coded as 1.

Alternative Explanations and Control Variables. To make sure that the effects of MS and perceived control on the investment choice were not driven by either mood or by the individuals' general financial risk taking attitudes, these two additional factors were further tested. Recall that as in Study 1, the PANAS was included as a part of the distracter task to assess the mood of the

participants after the MS induction. The FRA was also again administered to measure general attitudes toward financial risks.

The 2x2 ANOVA on positive affect (PANAS Positive) indicated no differences in positive affect between the experimental groups (all $p > .30$) and thus will not be discussed further. The 2x2 ANOVA on negative affect (PANAS Negative), however, again indicated a significant main effect of MS on PANAS Negative ($F(1, 228) = 10.64, p < .001, M = 1.56$ for the MS group and $M = 1.35$ for the non-MS group). The main effect of perceived control and the interaction of MS and perceived control on PANAS negative were both non-significant (both $p > .50$). Again, the significant effect of MS on negative affect is inconsistent with the findings of the pretest and other TMT research (see Ferraro et al. 2005).

Given that there was a significant effect of MS on negative affect, in order to control for any effect of negative affect on the investment choice, a second logistic regression analysis was conducted. In that binary logistic regression, PANAS Negative was included as a predictor of the choice of the low-risk option (see table 4). As expected, the analysis showed a positive and significant main effect of MS on the investment choice ($b = 1.63, \text{Wald } \chi^2 = 15.47, p < .0001$) even when negative affect (PANAS Negative) was controlled for. The interaction between MS and perceived control also showed a significant effect on the risky investment choice even when negative affect (PANAS Negative) was controlled for. The interaction had a negative effect on the choice of the low risk option ($b = -1.41, \text{Wald } \chi^2 = 6.41, p < .05$). Overall PANAS negative did not have any effect on the investment choice ($p > .60$). This suggests that the negative affect that was induced by the MS manipulation is not a confounding variable and it did not have any effect on the choice of the low risk option. Hypothesis 2 was supported.

Finally, the 2x2 ANOVA conducted on FRA indicated no differences in the general financial risk taking attitudes between the experimental groups (all $p > .50$). Since there were no differences between the experimental groups in terms of FRA, this variable was not further analyzed.

TABLE 4

STUDY 2: CHOICE OF LOW-RISK OPTION*

LOGISTIC REGRESSION RESULTS CONTROLLING FOR NEGATIVE AFFECT

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (Coded as 1)	1.630	.414	15.466	1	.000	5.103
Perceived Control (Coded as 1)	.149	.385	.150	1	.699	1.160
MS x Perceived Control	-1.405	.555	6.413	1	.011	.245
PANAS Negative	-.015	.029	.265	1	.607	.985
Constant	-.235	.474	.247	1	.620	.790

* Low risk option coded as 1.

Discussion

As predicted, participants for whom mortality was salient but who were allowed to acquire a sense of control within the study before the risky choice task became less risk averse, relative to those participants for whom mortality was salient but who were not allowed to acquire control. The MS group that was not permitted to acquire control had a greater preference for the low risk option. The need for control instantiated by MS mediates the preference for the low risk option.

STUDY 3

Recall that I predicted that MS would not only increase the desire for control (as experimentally demonstrated in study 2), but that MS would also increase the desire for self-esteem enhancement. Study 3 was conducted to experimentally test the mediating effect of the need for self-esteem on the relationship between MS and risk aversion.

The study design, as in study 2, was also based on an experimental-causal-chain. The design follows the logic that if MS induces a need for self-esteem, then those individuals who are allowed to acquire self-esteem before making the investment choice, should not strive for acquiring or protecting their self-esteem in the risk taking task, as much as those individuals who are not allowed to acquire self-esteem. In other words, individuals for whom mortality was made salient and who were not allowed to acquire self-esteem should be more risk averse compared to those to whom mortality was made salient but were allowed to acquire self-esteem in an unrelated task.

Participants

The study was conducted with 162 undergraduate students (116 female and 45 male; 1 person did not report gender) who received extra course credit for research participation. The ages of the participants ranged from 17 to 45 ($M = 20$). The study took approximately 45 minutes to complete.

Design and Procedure

The study was a 2 (MS) x 2 (Self-esteem Enhancement) between-subjects experiment. MS and self-esteem enhancement were manipulated, and risk aversion was measured within the same financial investments context used in studies 1 and 2.

Manipulations. The same MS manipulation used in studies 1 and 2 was again used here. In order to manipulate self-esteem enhancement a design similar to study 2 was used. At the start of the study, all of the participants were led to believe that the MS manipulation and the distracter tasks (the word search puzzle and the PANAS) were “mind clearing” tasks (as in study 2).

To test the mediating effect of self-esteem striving on risk aversion, and to manipulate self-esteem enhancement a procedure similar to Greenberg et al (1992) and Harmon-Jones et al. (1997) was used. After the MS induction and the administration of the distracter tasks (i.e., the word-search puzzle and the PANAS), half of the participants were given self-esteem enhancing feedback. More specifically, they were told that the word search puzzle was part of an intelligence test. “*Individuals who complete the word search puzzle in less than 5 minutes are considered to be of above average intelligence.*” Note that the average time to complete the word search was well under 5 minutes.

Based on the Barnum effect (Forer 1949), the bogus self-esteem enhancing feedback provided was worded in such a way that the feedback was likely to apply to each participant. As such, those who received the feedback experienced a boost to their self-esteem and thus satisfied their need for self-esteem enhancement. The no self-esteem enhancement group completed the same word search puzzle, but was not provided with the bogus self-esteem enhancing feedback. They were simply told that they had completed the final mind clearing task. Specifically, these

participants were told that “*Individuals who spend 3 minutes or more on the mind clearing task are considered to have cleared their minds and are ready to start the actual survey.*”

The self-esteem enhancement manipulation was pretested to assure that it induced self-esteem but did not induce a positive mood that would systematically interfere with the risky investment choice. In the pretest, participants were asked to respond to the word search puzzle and the PANAS. Upon completion of these two tasks, half of the participants were provided with the self-esteem enhancing feedback as described above, and the rest of the participants were provided no self-esteem enhancing information. Next, all of the participants were asked to respond to a few additional questions measuring their self-esteem and mood. To assess any mood effects, participants responded on a 1-to-5 scale to the 4-item Peterson and Sauber (1983) Mood Short Form from the Handbook of Marketing Scales (Bearden, Netemeyer, and Mobley 1993) (coefficient alpha = 0.78). This mood measurement was followed by a 4-item measurement of self-esteem described below (as the manipulation check for self-esteem enhancement).

The pretest revealed that the self-esteem enhancement manipulation indeed induced higher self-esteem. Those individuals who were led to believe that the word search puzzle was part of an intelligence test and who received the bogus positive feedback, reported that they did, in fact, feel higher levels of self-esteem ($F(1, 32) = 8.44, p < .01; M = 5.53$ for the self-esteem induced group, $M = 4.53$ for the no self-esteem comparison group; a higher score indicates higher levels of self-esteem). Finally, the self-esteem enhancement manipulation did not impact mood ($F(1, 32) = 0.17, p > .90; M = 4.78$ for the self-esteem group, $M = 4.86$ for the comparison

group; a higher score indicates higher level of positive mood). For completeness, participants completed the word search puzzle in 3.5 minutes³ (SD = .90), on average.

Manipulation Checks. The manipulation check for self-esteem enhancement was included at the end of study 3. Participants were asked how they felt about themselves right before they read the investment scenario. All of the participants responded on a scale from 1 to 7 where 1 indicated “*strongly disagree*” and 7 indicated “*strongly agree*” to a series of four adjectives following the stem “I felt”: *confident, smart, worthy, and successful*. A measure of self-esteem was created by averaging the responses.

Measurement of Risk Taking. Following the manipulation of MS and self-esteem enhancement, participants were presented with the financial investment choice, the same choice as that used in studies 1 and 2. Finally, as in studies 1 and 2, this study also included Weber et al.’s (2002) Domain-specific Risk-attitude Scale (FRA).

Results

*Manipulation Check for Self-esteem Enhancement*⁴. A 2x2 ANOVA on the responses to the 4-item self-esteem measure collected post-decisionally showed a significant main effect of the self-esteem enhancement manipulation and indicated that the participants in the self-esteem enhancement group felt better about themselves in comparison to the group that did not receive self-esteem enhancing feedback ($F(1, 157) = 15.80, p < .001; M = 5.30$ for the self-esteem

³ Participants who took more than 5 minutes to complete the puzzle were dropped from the analyses.

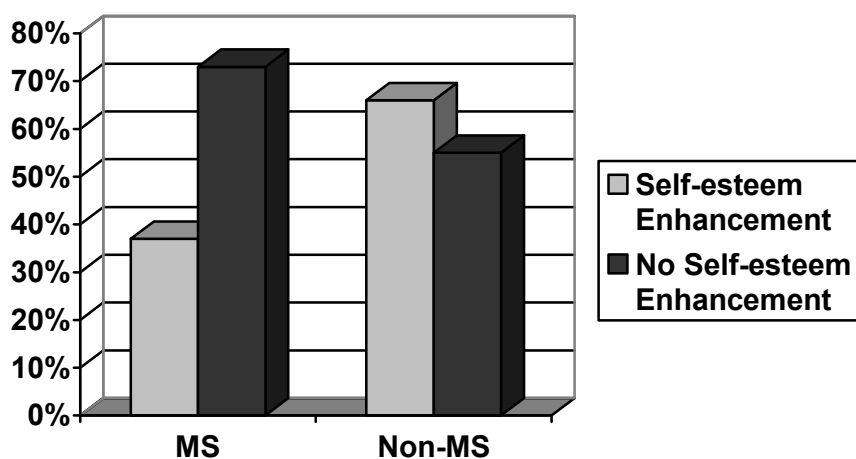
⁴ As in Study 1 because of the length of the survey this study also did not include a manipulation check for the MS manipulation.

enhancement group and $M = 4.58$ for the no self-esteem enhancement group). A higher score on this scale indicates a higher sense of self-esteem.

Investment Choice. In support of hypothesis 3, participants in the MS condition without the self-esteem enhancement manipulation were more risk averse than those in either of the non-MS conditions (TV with and without self-esteem enhancement) as well as the MS group receiving the self-esteem enhancing manipulation. Specifically, in the MS no self-esteem enhancement condition, 73% of the participants preferred the low risk option, while only 55% of the participants in the non-MS no self-esteem enhancement group preferred this same low risk option. In the MS with self-esteem enhancement condition, 37% of the participants preferred the low risk option; 66% of the participants in the non-MS (TV) with self-esteem enhancement condition preferred the low risk option (see figure 2).

FIGURE 2

STUDY 3: PREFERENCE FOR THE LOW RISK OPTION



A logistic regression, with the investment choice as the dependent variable (choice of the low risk option was coded as 1), and MS, Self-esteem Enhancement and the interaction of MS and Self-esteem Enhancement as independent variables, showed, as predicted, a significant and negative effect of the interaction on the choice of the low risk investment option ($b = -1.97$, Wald $\chi^2 = 8.65$, $p < .005$). The combination of MS and Self-esteem Enhancement made individuals much less risk averse compared to those who did not receive any self-esteem enhancing feedback. In the latter, participants' preference for the high risk option increased (see table 5).

TABLE 5
STUDY 3: CHOICE OF LOW-RISK OPTION*
LOGISTIC REGRESSION RESULTS

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (Coded as 1)	.790	.499	2.506	1	.113	2.203
Self-esteem Enhancement (Coded as 1)	.468	.444	1.111	1	.292	1.597
MS x Self-esteem Enhancement	-1.972	.671	8.652	1	.003	.139
Constant	.191	.310	.380	1	.538	1.211

* Low risk option coded as 1.

In order to further analyze the effect of the interaction between MS and Self-esteem enhancement on choice, a simple main effects analysis was conducted comparing the effect of MS on those who received self-esteem enhancing feedback and on those who did not. A logistic regression analysis, with the investment choice as the dependent variable (low risk option was coded as 1), showed a significant and negative effect of MS on the group that received self-esteem enhancing feedback ($b = -1.18$, Wald $\chi^2 = 6.97$, $p < .05$; see table 6). The effect of MS on

the group that that did not receive self-esteem enhancing feedback was positive and approaching significance ($b = .79$, Wald $\chi^2 = 2.51$, $p = .113$; see table 6). This suggests that within the MS condition, those individuals who received self-esteem enhancing feedback were much less risk averse (even risk-seeking) compared to those who did not receive self-esteem enhancing feedback.

TABLE 6
STUDY 3: MAIN EFFECTS ANALYSIS*

Experimental Groups		B	S.E.	Wald χ^2	DF	P	Exp(B)
No Self-esteem Enhancement	MS (Coded as 1)	.790	.499	2.506	1	.113	2.203
	Constant	.191	.310	.380	1	.538	1.211
Self-esteem Enhancement	MS (Coded as 1)	-1.182	.448	6.968	1	.008	.307
	Constant	.659	.318	4.297	1	.038	1.933

* Low risk option coded as 1.

Alternative Explanations and Control Variables. To make sure that the effect of the interaction between MS and Self-esteem Enhancement was not driven by a mood effect (i.e., a negative mood induced by the MS induction or by a positive mood induced by the self-esteem enhancement manipulation) or by the individuals' general financial risk taking attitudes (FRA), these additional variables were further investigated. Recall that as in studies 1 and 2, PANAS was included as a part of the distracter task to assess the mood of the participants immediately after the MS induction, and in this study the Peterson and Sauber (1983) Mood Short Form was included after the choice task to measure mood after the self-esteem enhancing feedback was provided. FRA was again administered to measure general attitudes toward financial risks.

As expected, the 2x2 ANOVA on positive affect (PANAS Positive) and negative affect (PANAS Negative) indicated no differences in positive or negative affect between the experimental groups (all $p > .50$). Furthermore, the 2x2 ANOVA conducted on FRA indicated no differences in the general financial risk taking attitudes between the experimental groups (all $p > .50$). As such these variables were not further analyzed by controlling for them in the logistic regression as was done in studies 1 and 2.

Contrary to the self-esteem enhancement manipulation pretest, however, the 2x2 ANOVA with the scores on the Mood Short Form scale as the dependent variable, indicated that the self-esteem enhancing feedback induced a marginally significant more positive mood in the groups that received self-esteem enhancing feedback ($F(1, 157) = 3.83$ $p < .10$; $M = 4.90$ for the self-esteem enhancement group and $M = 4.52$ for the no self-esteem enhancement group; a higher score indicates better mood). Note that this finding works against the basic hypothesis. A positive mood should lead to greater risk aversion (Isen, Nygrgen, and Ashby 1988). Instead, in this study, those who received the positive affect-inducing self-esteem enhancing feedback were less risk averse and more risk seeking. Thus the true effects of the self-esteem manipulation are likely to be understated in the current work.

Nonetheless, in order to control for any effects of the positive affect induced by the self-esteem enhancement manipulation, a second logistic regression analysis was conducted. In that binary logistic regression analysis, mood (Peterson and Sauber (1983) Mood Short Form) was included as a predictor of choice (choice of the low-risk option coded as 1). The analysis again showed a significant effect of the interaction between MS and the self-esteem enhancing feedback ($b = -1.92$, Wald $\chi^2 = 8.11$, $p < .005$). The main effect of MS was marginally significant and was in the expected direction ($p < .10$ one-sided; see table 7). All other effects were non-

significant. More specifically, the effect of the mood induced by the self-esteem enhancement manipulation on the risky investment choice was not significant ($p > .70$). Hypothesis 3 was supported. The effect of the interaction was still negative and significant, even when the positive mood induced by the self-esteem enhancing feedback (which should run counter to the original hypothesis and increase risk aversion (Isen et al. 1988)) was controlled for. Self-esteem enhancement mediates the effects of MS on risk aversion.

TABLE 7

STUDY 3: CHOICE OF LOW RISK OPTION*

LOGISTIC REGRESSION RESULTS CONTROLLING FOR POSITIVE MOOD

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (Coded as 1)	.738	.502	2.159	1	.142	2.091
Self-esteem Enhancement (Coded as 1)	.428	.450	.906	1	.341	1.535
MS x Self-esteem Enhancement	-1.916	.673	8.110	1	.004	.147
Mood after choice and manipulations	-.012	.038	.091	1	.763	.989
Constant	.453	.760	.356	1	.551	1.573

* Low risk option coded as 1.

Discussion

As predicted, participants for whom mortality was salient and who were allowed to enhance their self-esteem within the study before the risky choice, became less risk averse relative to those participants for whom mortality was salient but who were not allowed to

enhance their self-esteem. The MS group that was not permitted to acquire an improved sense of self-esteem had a greater preference for the low risk option.

STUDY 4

Although Study 3 clearly established that the desire for self-esteem enhancement mediates the relationship between MS and risk taking in a financial investment task, it did not address the issue of the self-esteem relevance of the risky task. Recall that when individuals believe that taking a risk will lead to self-esteem gains that outweigh the potential for loss of one's life, they are more likely to engage in risky behavior that may put their life at risk. Study 4 was designed to experimentally test this boundary condition. Namely, I test the affect of the self-esteem relevance of the outcome of the risk on the relationship between MS and risk taking. This study was based on the logic that if participants believed there were self-esteem gains associated with taking the risk, they should have become more risk seeking relative to those who did not believe that there were self-esteem enhancing benefits associated with the risky investment choice task.

Participants

The study was conducted with 217 undergraduate students (143 female and 74 male) who received extra course credit for their research participation. The ages of the participants ranged from 18 to 26 ($M = 20$). The study took approximately 45 minutes to complete.

Design and Procedure

The study was a 2 (MS) x 2 (self-esteem relevance of the outcome of the risk – “Competition”) between-subjects experiment. MS and the self-esteem relevance of the outcome of the risk were manipulated, and risk aversion was measured within the financial investment context used in the previous studies.

Manipulations. The same MS manipulation used in studies 1, 2 and 3 was used here. Upon the completion of the MS manipulation and the distracter tasks, participants were presented with the same financial investment choice task as used in studies 1, 2 and 3. However, in this study, to manipulate the self-esteem relevance of the outcome of the risk and to make the outcome of the risk self-esteem relevant, half of the participants were led to believe that their investment choice would be tested in a competition. More specifically, participants in the “competition” condition were told that, *“After everyone has indicated their investment choices, the researcher will scan all of the surveys into a computer simulation, and the outcome of the investment choices of each participant will be assessed.”* To increase the face validity of the study, in addition to the focal investment choice, participants answered a series of investment questions, many of which corresponded to items comprising the FRA. Participants were then told that the participant who made the most money in that series of investment decisions would be publicly announced and rewarded. To make “winning” this competition self-esteem relevant, a statement about the value of winning a competition followed this statement. According to Crocker et al. (2003), competition is a contingency of self worth for college students. Hence, performance in the investment task should have become self-esteem relevant in light of the competition.

Note that the manipulation of the self-esteem relevance of the outcome of the risk was pretested prior to Study 4 to make sure that the competition made the investment task self-esteem relevant for the participants. In this pretest, half of the participants were led to believe that a competition was involved as described above in the self-esteem relevance of the outcome of the risk manipulation. Right after this manipulation the participants in both conditions (competition and no competition) were asked to respond to four statements indicating how self-esteem relevant the task was to them. More specifically the participants responded to four statements adopted from Crocker et al.'s (2003) Contingencies of Self-worth Competition Subscale; "*My self-worth will be influenced by how well I do on this investment task,*" "*My self-worth will be affected by how well I do in comparison to others,*" "*Knowing that I am better than others on this task will raise my self-esteem,*" "*I will feel worthwhile when I perform better than others on this investment task*" on a 1-to-7 scale, where 1 was strongly disagree and 7 was strongly agree. The ratings of these four statements were averaged to create a score of self-esteem relevance of the investment task. A comparison of the participants who were in the competition (no competition) condition revealed that the task was more (less) self-esteem relevant ($F(1, 30) = 9.60, p < .005$; $M = 3.75$ for the competition group and $M = 2.65$ for the no competition group).

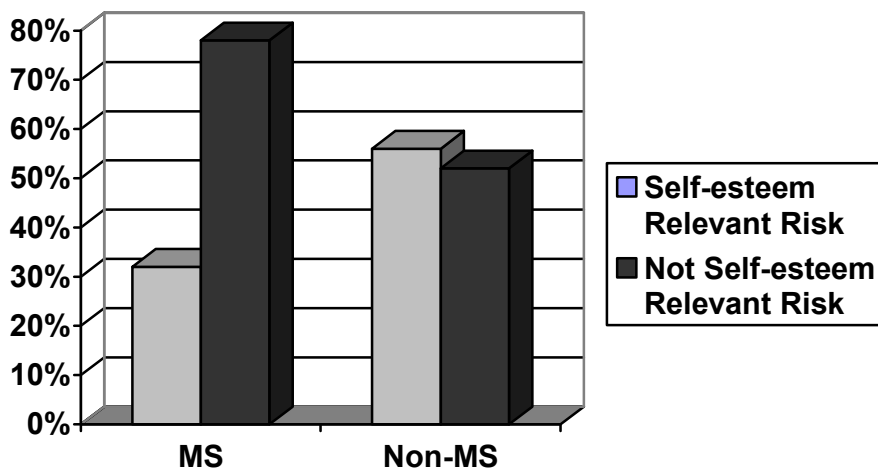
Risk Taking. Although I had collected multiple investment choices from participants, only the first risky investment option was analyzed. Once one risky investment choice is made, additional choices show no differences between MS and non-MS subjects. That is, once the first decision is made, the desires for control or for self-esteem enhancement are satisfied and the motivation for the goal of risk reduction dissipates.

Results

Investment Choice. Regardless of the level of motivation reported in the manipulation check discussed above, and in support of hypothesis 4, participants in the MS condition without competition were more risk averse than those in either of the non-MS conditions (TV with and without competition) as well as the MS group with competition. Specifically, in the MS no competition condition, 78% of the participants preferred the low risk option, while only 52% of the participants in the non-MS (TV) no competition group preferred this same low risk option. In the MS with competition condition, 32% of the participants preferred the low risk option; 56% of the participants in the non-MS (TV) with competition condition preferred the low risk option (see figure 3).

FIGURE 3

STUDY 4: PREFERENCE FOR THE LOW RISK OPTION



A logistic regression, with investment choice as the dependent variable (choice of the low risk option coded as 1), and MS, Competition, and the interaction of MS and Competition as independent variables yielded, as predicted, two significant effects. First, there was a significant and positive main effect of MS on choice ($b = 1.20$, Wald $\chi^2 = 7.83$, $p < .01$). MS caused individuals to become more risk averse. Second, there was a significant and negative interaction (MS* Competition) on the choice of the low risk investment option ($b = -2.20$, Wald $\chi^2 = 14.13$, $p < .0001$). The interaction of MS and competition made MS individuals who were engaged in a competition much less risk averse compared to those who did not receive information about a competition. It increased their preference for the high risk option (see table 8).

TABLE 8
STUDY 4: CHOICE OF LOW-RISK OPTION*
LOGISTIC REGRESSION RESULTS

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (coded as 1)	1.199	.429	7.833	1	.005	3.318
Competition (Coded as 1)	.170	.385	.195	1	.659	1.185
MS x Competition	-2.196	.584	14.129	1	.000	.111
Constant	.077	.278	.077	1	.782	1.080

* Low risk option coded as 1.

In order to further analyze the effect of this interaction on the investment choice, I further looked at the effect of the MS manipulation and compared the effect of the MS manipulation on those who believed that the outcome of the risky choice task was self-esteem relevant (competition manipulation) and on those who did not believe that that the outcome of the risky

choice task was self-esteem relevant (no competition group). A logistic regression analysis, with the investment choice as the dependent variable (low risk option coded as 1), showed a significant and positive effect of MS on the no-competition group ($b = 1.20$, Wald $\chi^2 = 7.83$ $p < .01$; see table 9). The effect of MS on the competition group was also significant, but negative ($b = -1.00$, Wald $\chi^2 = 6.30$, $p < .05$). This analysis suggests that those individuals for whom mortality was salient and who were further led to believe that there was a competition involved and thus perceived a self-esteem benefit in taking the risk, had a higher preference for the high risk option, while those who did not perceive any self-esteem benefits with taking the risk remained risk averse and had a higher preference for the low risk option.

TABLE 9
STUDY 4: MAIN EFFECTS ANALYSIS*

Experimental Groups		B	S.E.	Wald χ^2	DF	P	Exp(B)
No Competition	MS (Coded as 1)	1.199	.429	7.833	1	.005	3.318
	Constant	.077	.278	.077	1	.782	1.080
Competition	MS (Coded as 1)	-.997	.397	6.299	1	.012	.369
	Constant	.247	.267	.855	1	.355	1.280

* Low risk option coded as 1.

Alternative Explanations and Control Variables. Once again, to assure that the effects of MS and the interaction between MS and the self-esteem relevance of the outcome of the risk (Competition) on the investment choice were not driven by a mood effect or by the individuals' general financial risk taking attitudes (FRA), these additional variables were investigated further.

As in studies 1, 2, and 3, the PANAS was included as a part of the distracter task to assess the mood of the participants' right after the MS induction. In this study again, the Peterson and Sauber (1983) Mood Short Form scale was included after the choice task to measure the mood after the investment choice.

As expected, the 2x2 ANOVA on positive affect (PANAS Positive) indicated no differences in positive affect (all $p > .50$) between the experimental groups. As such this variable was not further analyzed. However, as in studies 1 and 2 and contrary to the pretest, expectations, and the MS literature, the 2x2 ANOVA on negative affect (PANAS Negative) again showed that the participants in the MS condition were experiencing slightly more negative feelings ($F(1, 212) = 4.60, p < .05; M = 1.91$ for the MS group, and $M = 1.75$ for the non-MS group).

As such a logistic regression was conducted including PANAS (negative) as an independent variable as well as the MS, Competition, and the interaction of MS and Competition as independent variables to rule out that the choice was motivated by the negative mood induced by the MS induction (the low risk option was again coded as 1). This logistic regression analyses yielded 2 significant effects. First, the main effect of MS was significant and positive ($b = 1.22, \text{Wald } \chi^2 = 7.92, p < .01$), suggesting that even when negative affect was controlled for, MS led to greater risk aversion. Furthermore, the effect of the interaction was significant and negative ($b = -2.17, \text{Wald } \chi^2 = 13.75, p < .0001$). Again, even when negative affect was controlled for, the belief that there is a self-esteem benefit in taking the risk removed the effect of MS on risk taking behavior. The effect of PANAS Negative on choice was not significant ($p > .73$, see table 10). These results show that the interaction (MS* Competition) effect and the main effect of MS on

choice were significant even when the negative affect induced by the MS manipulation was controlled for. Hypothesis 4 was supported.

FRA also indicated no differences in the general financial risk taking attitudes between the experimental groups (all $p > .30$). As such this variable was not further analyzed. Likewise, the Peterson and Sauber (1983) Mood Short Form did not reveal any systematic differences in mood across the competition conditions (all $p > .10$). As such, this variable was also not further analyzed.

TABLE 10

STUDY 4: CHOICE OF LOW-RISK OPTION*

LOGISTIC REGRESSION RESULTS CONTROLLING FOR NEGATIVE AFFECT

Predictors	B	S.E.	Wald χ^2	DF	P	Exp(B)
MS (Coded as 1)	1.219	.433	7.929	1	.005	3.383
Competition (Coded as 1)	.130	.387	.113	1	.737	1.139
MS x Competition	-2.174	.586	13.752	1	.000	.114
PANAS Negative	-.009	.028	.114	1	.736	.991
Constant	.246	.573	.184	1	.668	1.279

* Low risk option coded as 1.

Discussion

As predicted, participants for whom mortality was salient and who were led to believe that a competition was being held in conjunction with the choice task perceived that there were self-esteem benefits associated with the outcome of that investment choice. When the competition was announced within the study and before the risky choice task, MS participants became much less risk averse and more risk seeking in an effort to achieve potential gains for the

self-esteem from “winning”. For those in the MS group who had no opportunity to enhance self-esteem by engaging in the competition, their responses revealed a high level of risk aversion, just as studies 1, 2, and 3 revealed.

GENERAL DISCUSSION

This thesis tested the impact of MS on risk taking in the context of financial investment decisions. From a TMT perspective, it is argued that MS will lead to greater risk aversion. A risky situation puts people in a position in which they face what they are trying to avoid—uncertainty and lack of control. The thought of an uncontrollable death makes individuals feel that the world lacks order and meaning. This makes them strive for control and meaning. Self-esteem is the belief that the person is a valuable contributor to their CWV, and when self-esteem is acquired, people get the feeling that their existence is meaningful. This relieves the existential anxiety caused by MS.

Through four experiments, I found that subconscious reminders of human mortality (MS) cause consumers to become risk averse (study 1). The psychological relationship between MS and consumer risk aversion was explored and I found that the effect of MS on risk averse behavior is mediated by two factors: the need for personal control (study 2), and self-esteem striving (study 3). A boundary condition was also explored (study 4). When the self-esteem relevance of the outcome of a risky choice is high, consumers may become more risk seeking. In other words, mortality salience can cause consumers to become risk prone if they perceive that they can obtain self-esteem benefits from taking the risk.

This research provides insights into how individuals deal with existential anxiety in risky choice settings. Table 11 provides a summary of the findings and displays the preferences for the low risk option in each study and in each experimental condition. These preferences demonstrate that individuals become risk averse when mortality is salient. However, if the individual is allowed to acquire control (study 2) or to acquire self-esteem (study 3), the effect is removed and the individual goes back to his/her baseline preference for risk. Furthermore, if the individual perceives that s/he can acquire self-esteem by taking the risk, then the effect is reversed and MS causes individuals to become risk seeking.

TABLE 11

PREFERENCE FOR THE LOW RISK INVESTMENT OPTION IN EACH STUDY

	Study 1	Study 2		Study3		Study 4	
		Perceived Control	No Perceived Control	Self-esteem Enhancement	No Self-esteem Enhancement	Self-esteem Relevant Risk	Not Self-esteem Relevant Risk
MS	57%	48%	76%	37%	73%	32 %	78 %
Non-MS	39%	43%	39%	66%	55%	56 %	52 %

The current study contributes to the MS literature by showing that under MS, individuals become more risk averse to situations that are not threatening to their physical well being. The current work further contributes to the literature by establishing two mediators of this relationship. When mortality is salient, individuals, to avoid further lack of control and to avoid possible damage to their self-esteem, become more risk averse. If these two needs are satisfied,

then the impact of MS on risk aversive behavior is mediated. This research also highlights the fact that under MS, risk aversion is not the only reaction to risk. Some individuals may perceive that some risks provide potential self-esteem benefits. Thus, in their efforts to acquire self-esteem, these risks are embraced (not avoided) because the potential gains associated with the risk outweigh the potential losses.

Managerial Implications

This thesis research was conducted to understand how consumers respond to reminders of human mortality. The current work shows that financial investments are directly affected by very temporary increases in mortality salience. Financial investments are not the only types of risks faced by consumers on a daily basis, however. It seems reasonable to assume that the impacts of mortality salience are likely to be substantial and present in a variety of risky choice settings. To the marketing manager, understanding the impact of mortality salience on the choices of their customers needs to be better understood to potentially buffer its effects on sales. Managers that allow some control to their customers or who implement strategies to increase the self-esteem of their customers may enable the effects of MS to be negated and return those customers to their baseline behavior. At a more global level, variety seeking and adopting new products are also risky consumer behaviors. Depending on the product category and the individual customer, it is possible that when MS arises, certain groups of consumers may become more variety seeking because it is self-esteem relevant. Likewise, the same strategies may lead to more or less new product trial when mortality is salient. Buying a new product within a particular category can be self-esteem relevant to some individuals while it is not to some others. The results of this thesis

can help marketing managers understand the likely effects of mortality salience on behavior and better predict the probability of risk aversion or risk seeking outcomes. This will allow them to more effectively manage these effects.

Another specific consumer behavior that may be impacted by MS is brand loyalty. Staying loyal to a product or a brand that worked for the individual in the past involves a degree of risk aversion. Sometimes a marketing manager may be motivated to persuade consumers to switch brands. When this is the case, MS may make it harder to persuade consumers. As such, it is important for the marketing manager to understand how consumers are affected by MS and how they can control for its effects. This research was conducted for descriptive purposes only. The goal is to understand how mortality salience affects customers when it is induced by events that cannot be controlled by marketing managers.

I urge the readers of this thesis to use the findings of this research with caution. It is the ethical responsibility of the marketing manager to do no harm to customers. It is not hinted here that mortality should be made salient in consumption and purchase contexts by marketing managers. The goal here is only to understand how consumers respond to events that make mortality salient that are outside of the firm's control.

Limitations and Future Directions

A limitation of this dissertation is that it studies financial investment behavior and risk taking within a hypothetical setting. The study can be extended and external validity improved by conducting the same study with an adult population that is investing real money.

The negative mood induced by MS in some of the experiments in this dissertation (although the effects are always non-significant) is also running counter to the MS literature; as such it might be important to revisit the affect of the MS manipulation on affect to better contribute to the MS literature in general.

With the globalization of our society and the ready access of individuals to news from around the world, understanding the impacts of mortality salience on a variety of consumer behaviors is likely to increase in importance. Although I have examined a risky choice context, there are many other consumer contexts in which MS is likely to have increasing impact. Variety seeking, new product trial, and brand loyalty are but a few. Further, a focus on cross-cultural differences in MS impacts will likely be a fruitful avenue for future research.

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APPENDIX A**MORTALITY SALIENCE MANIPULATION****Mortality Salience Condition**

1. Please briefly describe the emotions that the thought of your own death arouses in you.
2. Please jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.

Non-Mortality Salience (TV) Condition

1. Please briefly describe the emotions that the thought of watching TV arouses in you.
2. Please jot down, as specifically as you can, what you think will happen to you the next time you watch TV.

APPENDIX B

DISTRACTER TASK: WORD SEARCH PUZZLE

Please spend a few minutes finding the listed words in the word search puzzle provided.

C E L P P A W O R D
M T E K R A M D W T
K R A D N E L A C N
I E P M T N T E Y A
T L E E R O O R B H
C C N I A T R B O P
H Y C V I T R K O E
E C I O N O A N K L
N I L M R C P E O E
T B R E T U P M O C

pencil	parrot
train	bicycle
word	computer
bread	kitchen
cotton	movie
calendar	book
elephant	apple
market	

APPENDIX C

DISTRACTER TASK: PANAS

Please read each item and then indicate in the space next to that word, on a scale from 1 to 5, where 1 is very slightly or not at all and 5 is extremely, to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
Very slightly or not at all	a little	moderately	quite a bit	extremely

_____	Interested	_____	Irritable
_____	Distressed	_____	Alert
_____	Excited	_____	Ashamed
_____	Upset	_____	Inspired
_____	Strong	_____	Nervous
_____	Guilty	_____	Determined
_____	Scared	_____	Attentive
_____	Hostile	_____	Jittery
_____	Enthusiastic	_____	Active
_____	Proud	_____	Afraid

APPENDIX D**RISKY CHOICE TASK****Scenario:**

Your family established a trust fund in your name when you were an infant. The money in the fund is being managed by an independent trustee until the trust agreement expires on your 25th birthday. The money in your trust fund will switch to your management after your 25th birthday. The trustee, with your family's permission, is interested in understanding your preferences when it comes to making investment decisions. He tells you that he has researched some options for investing and come up with two investment options that seem reasonable. He wants you to review these options and indicate which one you would prefer to invest in if you were investing \$5000.

INVESTMENT OPTIONS:

Please choose one of the two investment options.

Option I: The first investment option is an investment portfolio with a 60% chance of gaining 20% on your investment, and a 40% chance of losing 20% of your investment.

Option II: The second investment option is an investment portfolio with a 70% chance of gaining 10% on your investment, and a 30% chance of losing 10% of your investment.

Which option do you prefer?

I prefer option_____.

APPENDIX E

SELF-ESTEEM RELEVANCE OF THE OUTCOME OF THE TASK

“COMPETITION” MANIPULATION

Competition Group:

This survey will ask you to make a series of financial decisions. Once all of the research participants have made their financial decisions, the researcher will scan all responses into the computer and run a simulation, assessing the decisions of each participant.

The participant who made the best decisions will win a prize and his/her name will be publicly announced in the PSMA Newsletter, the Penn State Student Newsletter and The Smeal College of Business Website. The winner will also get a sweatshirt that identifies them as the winner of this competition. (We will use your random research id # to contact you. Please make sure you hang on to your research id card.)

We understand that winning a competition is very important. Winning makes people feel very good about themselves, and in most cases it indicates academic success. Winning competitions like the one here also increases your chances of getting a good and high paying job (you can put this on your resume), as such there is no time limitation; you should take your time in making your decisions.

In order to not decrease your chance to win this competition, do not talk about this competition to anyone until the study is completed and the results are announced on the newsletters and the Smeal Website.

No-Competition Group:

The following survey will ask you to make a series of financial investment decisions. We would like to remind you that there is no time limitation; you should take your time in making your decisions.

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CONFERENCE PRESENTATIONS

- Atalay, A. Selin and Melea D. Press, “Stinkin’ Inconvenience! How Consumers Experience and Respond to Disgust,” presented at the Working Paper Session, 33rd Annual Meeting of the Association for Consumer Research, Orlando, FL, March 2006.
- Atalay, A. Selin, “Mortality Saliency and Consumer Risk Taking” presented at the 2nd Annual Penn State Emotion Network Conference, University Park, PA, April 2006.
- Atalay, A. Selin, “Mortality Saliency and Consumer Risk Taking: Striving for Personal Control and Self-esteem,” presented at the 36th Annual Haring Symposium, Bloomington, IN, March 2006.
- Atalay, A. Selin and Margaret G. Meloy, “When the Going Gets Tough, the Tough Go Shopping: An Examination of Self-Gifting Behavior,” Working Paper Session, 32nd Annual Meeting of the Association for Consumer Research, San Antonio, TX, September 2005.