

He Shoots, He Scores: The effect of Mortality Salience on Risky Decisions in a Basketball Task  
as a Function of Competition and Self-Esteem

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**Abstract**

The current study was designed to examine the effects of mortality saliency (MS) and competition on risk-taking behavior in a sports-related setting as moderated by self-esteem. A basketball task was used to simulate sports risk, in which participants had the option of shooting from three lines: worth one point (least risky option), three points, and five points (riskiest option). Participants were either under the impression that they were competing with another participant or not. It was hypothesized that high self-esteem individuals, when primed with death thoughts and under the illusion of competition, would be most likely to shoot from the five point line, thus taking the greatest risk. It was also hypothesized that high self-esteem in general would positively predict risk taking. Results revealed an unpredicted gender effect, thus data were analyzed separately for male and female participants. For women but not men, self-esteem did positively predict risk-taking in the basketball task. While the original hypothesis was unconfirmed by the results, exploratory analyses, which replaced self-esteem with self-reported athleticism, exposed significant interactions between experimental conditions and athleticism for both genders.

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One autumn evening, a Junior Varsity football coach in upstate New York had his bus driver stop at a cemetery on the way home from a game, which they had just lost. He asked the players to get out and lay down on graves. The coach then told the players that the deceased they were lying above would give anything to trade places and fight to have a winning season. Before leaving, the coach urged each teammate to rise from the dead and bring their season back to life (Smith, 2011).

The coach in this example took controversial measures that were ostensibly aimed at inspiring and motivating his players to work harder and care more about winning. What he probably did not realize, though, is that awareness of death can and does affect decision-making processes. Research has shown that death awareness (mortality salience; MS) can lead high self-esteem individuals to make risky decisions (Landau & Greenberg, 2006). This risk taking is a result of subconscious defenses against death awareness, whereby risk-taking bolsters self-esteem, which itself is a defense against death anxiety. The current study was aimed to apply this research to sports, and to introduce the stakes-raising element of competition.

Humans have the incredible ability to make deliberate decisions for ourselves, knowing that each one has an effect on our future. We are able to identify the implications of our decisions, which is why some decisions are explicitly more risky than others. Risky decisions exist in almost every aspect of life. Financially, socially, and educationally, people are constantly faced with important choices that have the potential to lead to either positive or negative outcomes. Psychological theories of decision-making have attempted to explain why we make the decisions that we do. The traditional theories of risk, such as Expected Utility

Theory, Prospect Theory, and Regret Theory, each attempt to explain risk based on various cognitive processes people weigh when faced with a riskier-than-normal decision (Bleichrodt, Cillo, & Diecidue, 2010; Josephs, Larrick, Steele, & Nisbett, 1992; Tversky & Kahneman, 1981).

Though many of these theories have examined risk-taking behaviors in economic contexts, less research has examined risk taking in a sports-related setting. Broken down, a sport is simply a series of successive decisions: Dodge left or right? Pass the ball or keep running with it? Shoot or not? In sports, competition raises the stakes regarding the outcome of these decisions, and therefore competition involves decisions that entail both physical and emotional risks. What makes sports-related decisions different than some everyday ones, though, is each decision must be made quickly and generates immediate consequences. Each decision in a sport is a split-second one – a player cannot contemplate each option for hours, days, or even longer, as he or she could when faced with another type of decision. This, combined with the short amount of time one has to perform during a game, race, or match, can make decisions riskier and riskier as the clock ticks away. These factors may make risky decision making in sports more susceptible to subconscious processes, like those involved in defense against death awareness, and less driven by the kinds of higher-order cognitive processes described by traditional theories of risk. The current study was designed to examine this possibility.

Specifically, based on findings showing that, when existential concerns are active, high self-esteem individuals are likely to choose high risk/high pay-off opportunities, I hypothesized that individuals with high self-esteem for whom mortality is made salient would most readily choose the riskiest option in a basketball task when prompted with the appearance of competition.

### **Traditional Theories of Risk**

Risk is a widely studied topic in psychology and has been analyzed from a variety of perspectives. These theories of risk attempt to explain both the cognitive and emotional processes people undergo when faced with a risky decision. The most widely used risk theories typically address economic situations, though, and there is little to no research on risk theory pertaining to sports. One aim of the current study is to examine why people make risky sports-related decisions. Do sports-related risky decisions follow traditional theoretical models of risk, or are there other factors that come into play?

One traditional theory of decision-making is expected utility (EU). Based on EU Theory, one makes a decision after weighing both the pros and cons of each alternative, and chooses the option with the highest value and outcome expected (Josephs, Larrick, Steele, & Nisbett, 1992). Despite being very influential, subsequent research has since discredited parts of EU theory and recent theories have challenged its basic principles and credibility.

Kahneman and Tversky's (1979) prospect theory is one such opponent of EU. In particular, prospect theory challenges the main principle of EU – that people are generally averse to risk, and this preference for (low) risk is consistent (Josephs et al., 1992). Instead, prospect theory proposes that once people weigh the likelihoods, benefits, and costs of a risky decision, they make task-independent decisions in which they underweigh moderate and large probabilities and overweigh small probabilities (Kusev, van Schaik, Ayton, Dent, & Chater, 2009). Tversky and Kahneman (1981) presented participants with binary decision-making scenarios to analyze under which conditions we are risk averse and risk preferring. Participants given the choice between a certain gain of \$800 and the 85% chance to gain \$1,000 chose the certain gain option. But, when given the option between a certain loss of \$80 and an 85% chance of losing \$100, participants preferred the former, the uncertain (risky) alternative. Hence,

according to prospect theory, when framed negatively in the form of monetary loss, participants were more likely to choose the riskier option than when framed positively in the form of monetary gain.

Although prospect theory sheds light on the cognitive processes behind risky decision-making, regret theory (RT) takes into account both the psychological and emotional factors underlying decision-making under uncertainty (Josephs et al., 1992). RT suggests that we ponder the outcomes of the choice we make, as well as the outcomes of the other alternatives we did not choose. People take into account their feelings about a decision after the fact, and if these feelings imply regret, people will choose the least-regrettable alternative, even if it is riskier. Thus, RT implies that humans are regret averse, more so than risk averse, and so we will make decisions we feel will lead to the least amount of regret (Bleichrodt, Cillo, & Diecidue, 2010). Although supported by a great deal of evidence, these risk theories attempt to explain decision-making as if it were universal, yet leave out the idea that personality factors, like self-esteem, can also influence risky decisions.

### **Risky Decisions and Self-Esteem**

According to regret theory of decision-making, people weigh the emotional costs when faced with a risky decision and then choose the option they are least likely to regret. And because we know the feelings associated with regret, we work to avoid it at all costs by making decisions more likely to lead to feelings of rejoice (Josephs et al., 1992). While an individual's decision-making process involves cognitive and emotional methods, the personality trait of self-esteem has been shown to affect one's likelihood to make a risky decision (Landau & Greenberg, 2006). The results of our own decisions can weigh heavily on our feelings about ourselves. So, if a decision leads to regret, many people begin to doubt their choice as well as other, more internal

factors like their judgment and aptitude (Josephs et al., 1992). When these and other self-esteem related abilities are threatened, it is a person's level of self-esteem that determines which alternative to make when faced with a risky decision.

Josephs et al. (1992) presumed that those low in self-esteem lack the self-esteem maintaining resources to buffer against the potential of failure, while high self-esteem individuals are abundant in such resources and can easily access them to protect self-esteem, even in the face of failure. They found that, when faced with the choice between a certain gain or an uncertain gain of slightly higher value, low self-esteem individuals were significantly more risk averse than were high self-esteem individuals, and high self-esteem individuals were 50% more likely to choose the risky option. Therefore, self-esteem level is a clear indicator of one's likelihood to make a risky decision, and should increase the likelihood of choosing the riskiest decision in the current study's basketball task.

### **Risky Decisions and Terror Management Theory**

Another reason self-esteem could influence risky decisions is that the emotional consequences of lowered self-esteem may extend beyond simple feelings of diffidence. Terror management theory (TMT) suggests that self-esteem is a vital mechanism that shields the self from the unmitigated fear of mortality we as humans must cognitively accept in daily life. A wide body of empirical research has supported TMT (Landau & Greenberg, 2006), which suggests that all species, including humans, have certain primal biological needs. One of these needs is to protect ourselves and our genes in order to survive and pass on our genes. But, humans have extraordinary intellectual and cognitive abilities unique to our species. Three distinctly human cognitive capacities are 1) looking at events in terms of causality, 2) conceptualizing future events, and 3) reflecting on ourselves and past events (Solomon,

Greenberg, & Pyszczynski, 1991). These three cognitive functions allow humans to do something most other species cannot: we realize death is always imminent and inevitable. (Jonas et al., 2008). The human motivation for self-preservation, combined with awareness of death, creates the potential for incapacitating terror. This terrifying awareness that our most important self-preservation motivations cannot be satisfied and might be expected to adversely affect our ability to function.

TMT posits that people make decisions and behave in ways to avoid this concept of our own imminent and unavoidable death with a dual-component anxiety buffer consisting of cultural worldviews and self-esteem. Cultural worldviews portray the universe in a systematic, fair, predictable manner with the potential for literal or symbolic immortality. Self-esteem also plays a role in terror management, allowing humans to feel a sense of meaning and purpose in that they are living up to the acceptable standards and values prescribed by the “worldview immortality formula.” Thus, through self-esteem people may feel qualified for symbolic or literal immortality. For example, subscribing to any religion and following its rules allows one the belief of some sort of afterlife, or literal immortality. A person can also be rendered symbolically immortal, if he or she is influential enough in his or her lifetime. For example, the sports star Michael Jordan made himself symbolically immortal through an extremely successful and influential basketball career (Landau & Greenberg, 2006).

If TMT is correct that self-esteem and worldviews work together to buffer death anxiety, it follows that conscious thoughts of mortality should lead to defensive efforts to bolster worldviews and/or self-esteem. Indeed, people’s reactions to laboratory manipulations of MS support the notion that self-esteem is a terror management mechanism. That is, increasing the amount of death-related thought exaggerates people’s efforts to preserve or enhance self-esteem



(Landau & Greenberg, 2006). Thus in relation to risky decisions, TMT posits that mortality salient high self-esteem individuals will choose high-risk/high-payoff options in an attempt to *enhance* self-esteem. These individuals have abundant protective resources to shield self-esteem if the high-risk decision does not yield favorable results. Conversely, mortality salient low self-esteem individuals (who lack readily available self-preserving resources) will choose a low-risk/low-payoff decision in a heightened effort to *preserve* self-esteem (Landau & Greenberg, 2006).

In Landau and Greenberg's study, participants were primed with MS or not, then asked to imagine telling a joke during their commencement speech at their college graduation.

Participants could choose from Joke A (high pay-off/high risk) which would be extremely funny if successful, or Joke B (low pay-off/low risk) which would guarantee some reaction from the audience but would not be as funny as Joke A. They were asked to choose a joke in a series of 10 trials, in which the success rate of Joke A decreased with every trial. Landau and Greenberg found that mortality salient high-self esteem individuals were more likely to choose high-risk/high-payoff options than low self-esteem individuals. High self-esteem individuals were also significantly more likely to choose the risky option than were control high self-esteem participants who were not mortality salient.

**Mortality salience, self-esteem, and competition.** Mortality salience encourages those high in self-esteem to enhance their self-esteem when faced with a risky decision. Therefore, when choosing between a low risk/low pay-off option and a high risk/high pay-off option, high self-esteem individuals should choose the high risk/high pay-off selection. This choice should apply to sports-related decisions. Self-esteem acts to buffer against threatening death thoughts, and thus excellent sports performance, to the extent that it enhances self-esteem, should also

serve a death-denying function and individuals should be motivated to excel in sports when death is made salient.

One feature of sports that make them self-esteem relevant is competition. Competition, unlike death thoughts, is not a purely human phenomenon. All species experience competition, at its basic level, for resources like food and shelter. It raises the stakes and creates an atmosphere where risky decisions must be made instantly and are often necessary in order to obtain the desired results. For instance, some animals must risk predation in order to forage for food. Humans, however, are unique in that they simulate the urgency of risky survival conditions in the form of sports. Competition – the notion that an activity can be “won” or “lost” to another person or team of people - elevates the risk level of decisions in sports by creating a scenario where self-esteem can be either raised or lowered as a function of performance. The current study therefore posits that the combination of MS, high self-esteem and the element of competition will make high self-esteem individuals choose the riskiest option in a sports-related setting.

A substantial body of research supports the idea that competition increases performance. Eisenberg and Thompson (2011) found that musical performers showed heightened motivation and enhanced improvisational skills when primed with competition. Other studies have looked at competition during cognitive tasks or in more educational settings. Gneezy, Niederle and Rustichini (2003) found that men in a competitive setting solved more mazes than men in a noncompetitive setting. Competition has also been shown to increase endurance performance. In their 2011 study, Cooke, Kavussanu, McIntyre, Boardly, and Ring (2011) found that when primed with competition, participants endured for longer than those in the individual condition in a handgrip dynamometer task of performance measurement. And, while this research has shown

that competition can alter performance in a variety of settings, there is little to no research that shows the effects of competition on risky decision making.

### **The Current Study**

Since risky decisions carry the plausibility of a better outcome, competition should increase the desire to make a risky decision. When combined with the empirical evidence that mortality salience increases the likelihood of high self-esteem individuals to make risky decisions, I predicted that mortality salient high self-esteem individuals would be most likely to make risky, sports-related decisions when put in a competitive situation. I hypothesized that the same resources available to high self-esteem individuals that buffer against mortality concerns will also come into play during competition. Thus, high self-esteem individuals would make decisions to enhance self-esteem by choosing the high-risk/high payoff option in a sports-related task, just as they would when faced with non sports-related risky-decisions. I also predicted that low self-esteem individuals would choose low-risk/low-payoff decisions, regardless of mortality salience condition.

## **Method**

### **Participants**

108 Union College undergraduate students (34 males and 74 were females) participated in this study for course credit or cash. Three participants were eliminated due to suspicion (i.e., they suspected deception), leaving 105 participants.

### **Materials and Procedure**

The present study was designed to measure the effects of MS and competition on risk-taking behaviors as moderated by self-esteem. To do this, I manipulated MS and competition, and measured self-esteem level. I also measured trait competitiveness and athleticism as

possible moderators or covariates. Participants were tested one at a time. All participants signed informed consent forms prior to beginning the experiment.

Participants were given a packet containing three questionnaires, which started with a brief paragraph explaining that the purpose of the study was to discover the relationship between certain personality traits and athleticism. This paragraph also told the participants they would participate in a “brief test of athletic ability.” Participants were given the Rosenberg Self-Esteem questionnaire, the Griffin-Pierson Competitiveness questionnaire, and a questionnaire designed for this study to assess athleticism (Rosenberg, 1965; Griffin-Pierson, 1990). The Rosenberg Self-Esteem questionnaire consists of 10 items like “On the whole, I am satisfied with myself.” It is on a 7-point Likert scale, 1 indicating “strongly disagree” and 7 indicating “strongly agree.” The competition questionnaire has 15 items, such as “I have always wanted to be better than others”; each statement is rated on a 5-point Likert scale, 1 indicating “strongly disagree” and 5 indicating “strongly agree.” The athleticism questionnaire consists of 8 items with statements like “I think I am more athletic than the average person,” and each statement is rated on a 5-point Likert scale, 1 indicating “strongly disagree” and 5 indicating “strongly agree.”

Two open-ended questions were used to prompt participants to think and write about their own death (MS) or dental pain (D), which they did after completing the three questionnaires. Participants answered the questions about death if they were assigned to the MS condition, bringing death thoughts to the forefront of their thoughts just before the basketball task. Questions about dental pain were used in the control condition to ensure that these participants were introduced to unpleasant thoughts prior to the basketball task, but not having any relation to death or dying. Individuals in both conditions were instructed to give their gut-level responses prior to reading the questions. A cover story stated to the participants that:

This assessment is a recently developed, innovative personality assessment. Recent research suggests that feelings and attitudes about significant aspects of life tell us a considerable amount about the individual's personality. Your responses to this survey will be content-analyzed in order to assess certain dimensions of your personality. Your honest responses to the following questions will be appreciated.

The questions participants answered were “1) Please briefly describe the emotions that the thought of your own death [dental pain] arouses in you, and 2) Jot down, as specifically as you can, what you think will happen to you as you physically die and are physically dead [as you experience dental pain and once you've experienced it]” (Landau & Greenberg, 2006).

After completing the packet, participants were told they would be shooting some hoops with a basketball. A door-mountable SKLZ Pro Mini Hoop was used for the basketball task. Three possible shooting lines were marked with duct-tape on the floor. The first line was set up 6 feet from the hoop and was worth 1 point, the second line was set up 7.5 feet from the hoop and was worth 3 points, and the third line was set up 8.5 feet from the hoop and was worth 5 points.

If assigned to the non-competitive condition (NON), the researcher told participants that the task was to try to measure athletic ability, but obviously it was not a realistic test of these skills. They were told to have fun with it and not take it too seriously. The researcher explained the value of each line and its difficulty. Participants were given one practice shot from each line and then had 10 shots to accumulate points; they could choose any line to shoot from and could move from one line to another in between shots, while the researcher kept score.

If assigned to the competition condition (COMP), the researcher left the lab for approximately 5 minutes while the participant took the questionnaires in order to make the participant believe she was setting up another participant in the next-door laboratory to perform the same basketball task. COMP participants were told their athleticism would be measured, and

that they were competing against the participant in the lab next door who was doing the same task, so it was to their benefit to accumulate as many points as possible. If they defeated the participant next door, they would be entered into a raffle to win \$50. The researcher explained the point value and difficulty of each line, and participants were allowed one practice shot from each line before the researcher kept score of 10 shots.

Following the basketball activity, participants filled out a “Reactions to Study” form to gauge suspiciousness and find out age, ethnicity, gender and GPA. They were then debriefed and thanked for their participation. During the debrief, participants were told that if their basketball score was in the top 50 percent of all participants, they would be entered into a raffle to win 50 dollars.

### **Results**

The current study predicted that high self-esteem individuals, when primed with MS and under the influence of competition, would be most likely to choose the riskiest option in a basketball task. A three-way regression analysis was performed predicting risk-taking from priming condition (MS/Dental), competition (Comp/Non-Comp), and self-esteem (High/Low) to analyze this hypothesis. Standardized scores were computed for the continuous variables (self-esteem, competitiveness, and athleticism).

Total risk was computed based on how many times participants chose to shoot the basketball from each line. Their total at each line was multiplied by the point value (either one, three or five) then summed. Thus, possible scores ranged from 10 to 50, with higher scores indicating more risk. Performance equaled the total amount of points participants accumulated during the task (possible range: 0 to 50).

A correlation matrix (see Table 1) of all potentially relevant variables in the study revealed, unexpectedly, that gender was correlated with performance, ( $r = .40, p < .01$ ; men performed better) and risk, ( $r = .37, p < .01$ ; men took more risk). This made it necessary to split the file by gender and perform analyses for men and women separately (otherwise, I would have been faced with potential 4-way interactions that I did not have the statistical power to examine). Furthermore, I found that athleticism was correlated with both risk and performance, so I performed exploratory analyses substituting athleticism for self-esteem.

### **Women**

Regression analyses were performed in for each dependent variable. A dummy coded variable was first entered for MS (MS = 1, D = 0), along with a dummy variable for competition (COMP = 1, NON = 0), and standardized self-esteem scores. All two-way interactions were entered in the second step, followed by the three-way interaction in the third step.

**Risk.** As proposed by the original hypothesis, self-esteem positively predicted risk for women,  $t(69) = 2.29, \beta = .34, p < .05$ . Thus, females with high self-esteem were significantly more likely than those with low self-esteem to take risks by shooting from the 5-point line during the basketball task. The predicted MS x COMP x self-esteem interaction predicting risk did not emerge.

**Performance.** One outlier was removed from the performance analysis because her performance was three standard deviations away from the mean for performance ( $n = 73$ ). No significant effects for performance were found for female participants.

**Exploratory Analyses.** When I examined self-reported athleticism instead of self-esteem as a moderating variable, for risk-taking, there was a significant three-way interaction between priming condition (MS/Dental), competition (Competition/Non-competition), and

athleticism (High/Low),  $t(65) = 2.14, \beta = .53, p < .05$ . An inspection of the interaction shows that athleticism, like self-esteem, generally predicts greater risk-taking (see Figure 1). However, this effect was entirely due to the fact that women who reported being low in athleticism, with no added motivation of competition or MS, took the least amount of risk compared to all other groups. But, with the added element of *either* MS or competition, these same women were more risky (although these variables did not combine additively). While athletic women took slightly more risk than non-athletic women in the non-competition condition, MS also had no effect on risk taking. Interestingly, athletic women primed with MS were slightly more risk averse than athletic women primed with dental pain in the non-competition conditions. Thus, MS may actually inhibit athletic women's risk taking tendencies.

Exploratory analyses were also performed to examine whether there were any effects on performance when athleticism was included as a variable. For women, there was a significant two-way interaction between priming condition and athleticism  $t(65) = -2.48, \beta = -.38, p < .05$ . The interaction (Figure 2) revealed that athletic women performed better than non-athletic women. For non-athletic women, performance increased if they were primed with MS. Thus, MS seems to play a potential role as a motivational factor to focus on performance among women who do not view themselves as athletic.

## Men

**Risk.** No significant effects were found. While there was a hint of a three-way interaction between on priming condition (MS/Dental), competition (Comp/Non-Comp), and self esteem (High/Low), lack of power due to such a small sample size prohibited exploratory analyses.



**Performance.** One outlier male participant was removed from the performance analysis because his performance was three standard deviations away from the mean ( $n = 33$ ). A significant main effect was found for priming condition,  $t(30) = 2.41, \beta = .37, p < .05$ , and competition  $t(30) = 3.15, \beta = .48, p < .05$ . Thus, if men were primed with either MS or under the illusion of competition, their overall basketball performance increased. There was also a significant interaction between priming condition and self-esteem,  $t(28) = 2.22, \beta = .43, p < .05$ . This interaction was deconstructed based on the recommendations of Aiken and West (1991). As seen in Figure 3, male participants with high self-esteem performed significantly better if they were primed with MS. For high self-esteem males who are likely naturally more focused on performance level, MS might have acted as intense motivation increaser during the basketball task while possibly increasing focus on the overall task.

**Exploratory Analyses.** For risk, results revealed significant main effects for priming condition  $t(31) = 2.58, \beta = .37, p < .05$ , and athleticism  $t(31) = 4.21, \beta = .63, p < .01$ . Athletic men were riskier than non-athletic men. But, athletic men became riskier once primed with MS, which seemed to increase motivation and perceived importance of the athletic task (Figure 4).

In regards to male performance, there was a significant main effect for athleticism  $t(28) = 3.01, \beta = .51, p < .05$  (Figure 5). Thus, athletic men performed significantly better than non-athletic men (consistent with performance and athleticism in women).

## Discussion

The current research was designed to examine the relationship between MS, risk taking, competition and self-esteem in a sports related setting. Previous research has shown that death thoughts arouse high self-esteem individuals to significantly seek high risk when given high and low risk self-esteem relevant alternatives to choose from (Landau & Greenberg, 2006). I

therefore hypothesized that high self-esteem individuals, when primed with both MS and under the illusion of competition, would be most risk seeking of all participants.

Based on this prediction, this study was designed to assess risky decision making in sports by including a basketball task with three lines of increasing risk and point value to choose from. While the entire original hypothesis was unconfirmed, some findings were consistent with the hypothesis, and exploratory analyses revealed other relevant (though unpredicted) results.

First, a significant gender effect was found such that high self-esteem women took significantly more risk than low self-esteem women. This result is consistent with my hypothesis, and also previous research on the relationship between self-esteem and risk-taking (Landau & Greenberg, 2006). Although self-esteem did not interact with the experimental conditions as I had predicted, exploratory analyses for both men and women revealed that self-reported athleticism did interact with the experimental conditions to influence both risk-taking and performance. This may suggest that athleticism, here, served as a domain-specific self-esteem measure, or measure of confidence, that provided individuals with varying levels of a psychological “resource” akin to self-esteem.

If athleticism is taken as a proxy for self-esteem, the hypotheses of the current study are better supported, at least for male participants. For men, athleticism predicted both risk and performance; moreover, highly athletic men primed with mortality salience took more risks and performed better than highly athletic men primed with dental pain. These results are generally consistent with predictions except that athleticism, not self-esteem, was the key (dispositional) moderating variable. (Additionally, that the competition manipulation did not interact with the other factors; it may be that the sports task was sufficient to elicit competitiveness among men.) In other words, it appears that in the present study, men used their athleticism as a psychological

resource allowing them to “go for the gold” when mortality had been made salient, presumably because implicit death concerns motivated them to enhance their performance (cf. attaining symbolic immortality, albeit on a very small scale).

Women, on the other hand, behaved oppositely. That is, non-athletic women (who generally performed worse than athletic women) primed with MS performed better than non-athletic women primed with dental pain; whereas athletic women showed the opposite trend. Future research could explore the possible reasons why women showed the opposite results as men in regards to MS and athleticism.

So, is athleticism a substitute, in the present context, for self-esteem? Athletic men were both riskier and better performers during the basketball task than non-athletic men. Because there were no significant effects with men using self-esteem as a moderator, athleticism seemed to replace self-esteem. Thus, during this specific task, athleticism level was a better predictor of both risk and performance than self-esteem (although only in men). It would be beneficial in further research to measure domain-specific, rather than global, self-esteem in both men and women, because these results hint that self-esteem (or confidence) related to athleticism may be more important to men than women, and thus will play a larger role in the decisions they make during a sports-related task.

One final consideration is that in this particular task, performance and risk were related, but imperfectly and inconsistently, which complicates interpretation of the performance outcomes, in particular. This is because exceptionally good scores always reflected some high degree of risk-taking, but exceptionally bad scores could have occurred because of high risk-taking or low athleticism. For example, Participant 1 and Participant 2 could both choose to

shoot 10 times from the high-risk line – thus being equal in terms of risk-taking – but if Participant 1 were to score twice and Participant 2 once, Participant 1 would have double the performance score. Similarly, if a participant were to take all of her shots from the one-point line, making them all, she would have the same performance score as a participant who took all her shots from the five-point line, making only two. Arguably, though, the lower-risk participant could have actually been the better performer (making all 10 shots, compared to two).

Additional studies along these lines should attempt to disentangle risk-taking from performance, perhaps by collecting a baseline measure of performance before allowing participants to make choices about risk.

### **Broader Theoretical Implications**

The traditional theories of risk (prospect theory and regret theory) appear to be unsuccessful predictors of risk taking behaviors in a sports-related setting. Studies examining prospect theory show that humans are more likely to take risk in the presence of a certain loss than a certain gain. In the current study, COMP participants are presented with an uncertain gain (to win 50 dollars in a raffle) versus no certain loss. So if prospect theory is relevant to a sports setting, competition should have actually increased risk-taking. Regret theory, which proposes that humans make decisions based on the regrets we think we may experience after weighing each available option, is simply too time-consuming in the fast-paced setting that is a sport. The sport environment is not conducive to weighing options or calculating regret for every possible decision we are confronted with, and therefore is not a practical model of risk for sports.

TMT, which suggests that high self-esteem individuals are more likely to take risks than low-self esteem individuals in an effort to enhance self-esteem when mortality is made salient, is consistent with some results of the current study, though not all. This suggests at least some role

for TMT in understanding risk-taking in sports. However, most TMT research focuses on global, rather than domain-specific, self-esteem. In this type of sports study, though, where athleticism predicted both risk-taking and performance, domain-specific self-esteem measures might be more relevant. In other words, TMT might be better at predicting risk-taking in sports related tasks if domain-specific self-esteem were examined.

### **Limitations and Future Directions**

There were some obvious limitations to the current study. One is the small sample size obtained. With just over 100 participants, there was simply not enough statistical power to test the predicted 3-way interactions. It is possible that such interactions would have emerged if more participants had been recruited. Also, the clear evidence of an unpredicted gender effect, which might yield interesting implications about coaching men's and women's sports teams differently, must be regarded cautiously, as there were only 34 total male participants.

One strength of the study was its use of a behavioral measure of risk (whereas most studies use questionnaire methods and hypothetical scenarios). However, it is not clear that shooting a basketball in a laboratory in the context of a psychology experiment would generalize to a real game of basketball or another sport: many elements, such as team members, a noisy crowd, and a coach in the background were missing from this manipulation; while many others (the presence of a psychology experimenter!) would not be present in more naturalistic scenarios.

Future research should consider further researching the relationship between self-esteem, risk-taking, mortality salience, and competition in order to create healthier, more successful coaching tactics. The results of this study are promising in that they may be applicable to real-life sports settings. With self-esteem (or self-reported athleticism) as a clear predictor of risk-taking, coaches could aim to increase their players' self-esteem levels, both on and off the

playing field. At the same time, coaches may seek to create similar levels of self-esteem for all players to rid the team of those select few “overconfident” team members whose risk taking tendencies may be too high for the team’s benefit. This might include more positive feedback for sports performance done right rather than harsh punishment for performance done wrong. Instead of reprimanding players by using degrading terms, coaches may see an increase in risk-taking and performance on their teams with the use of constructive criticism. These self-esteem boosting tactics might benefit players outside of a sports setting as well, and increase team spirit.

The football coach in upstate New York took controversial measures by having his players lay down on graves after a loss, but he might have been on to something regarding the effect MS can have on risk-taking in sports. If coaches performed a less-drastic measure before games, which encouraged players to think about what little time they have to perform their best, this might simulate the risk-taking influence of MS.

In sum, the present results suggest that, in a competitive sports setting, ideal conditions for risk-taking and performance include high self-esteem (or self-perceived athleticism) and some form of reflection on mortality. It appears that these factors combine to create high motivation to excel, at least among men. Encouraging these factors in real-life coaching situations may lead to more impressive performance, better records, and happier players overall.

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Table 1. Correlation Matrix of Potentially Relevant Variables.

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	Perf.	Gender	Risk	Self-Esteem	Comp	Athleticism	Basketball
Perf,	1	.396**	.610**	.148	.227*	.448**	.315**
Gender	.396**						
Risk	.610**	.369**					
Self-Esteem	.148	.045	.217*				
Comp	.227*	.072	.107	.018			
Athleticism	.448**	.229*	.407**	.241*	.233*		
Basketball	.315**	.259**	.261**	-.186	.172	.217*	

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\*\* . Correlation is significant at the .01 level (2-tailed.)

\* . Correlation is significant at the .05 level (2-tailed).

Note. Perf. = Performance.

Figure 1. Women's Risk in Each Condition as Moderated by Athleticism.

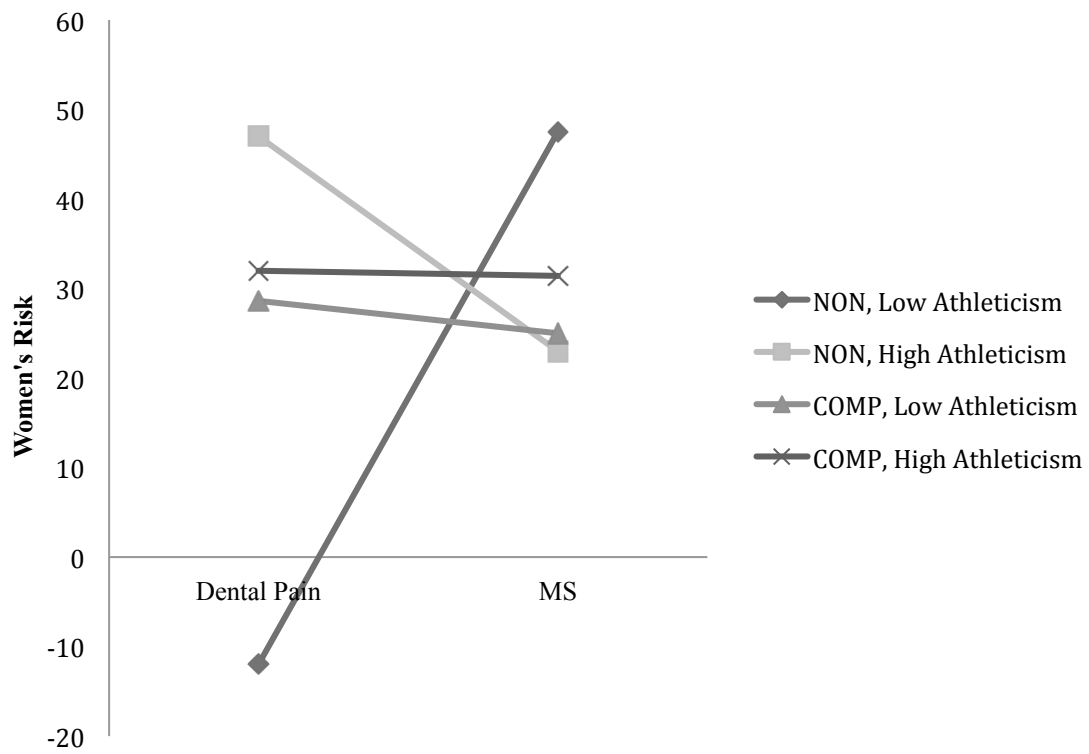


Figure 2. Women's Performance in Each Condition as Moderated by Athleticism.

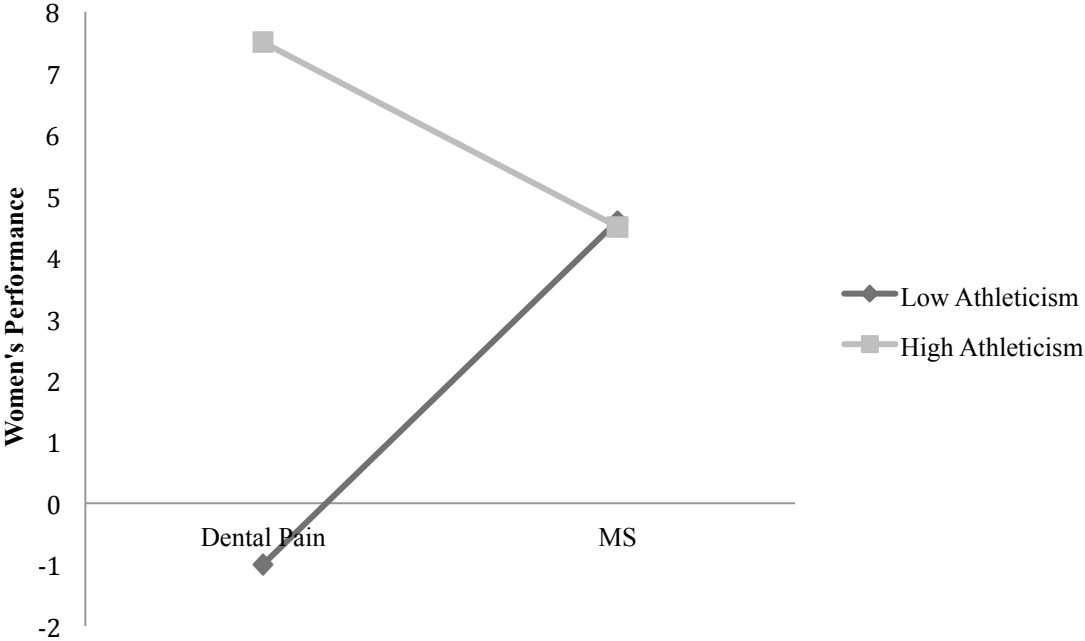


Figure 3. Men's Performance in Each Condition as Moderated by Self-Esteem.

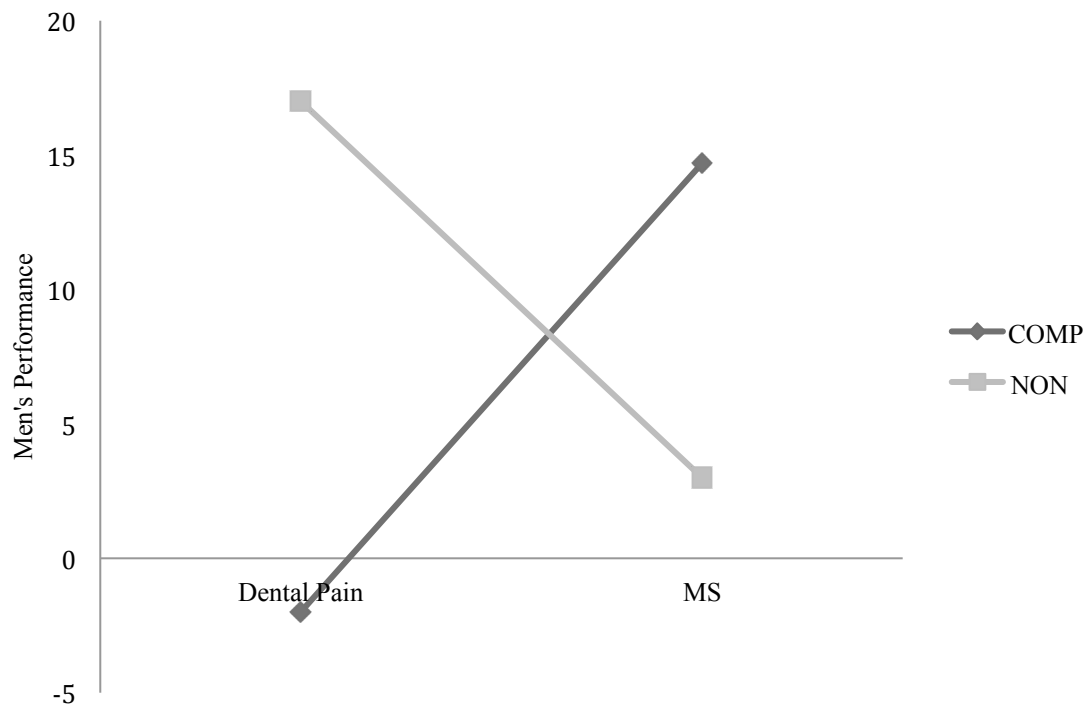


Figure 4. Men's Risk in Each Condition as Moderated by Athleticism.

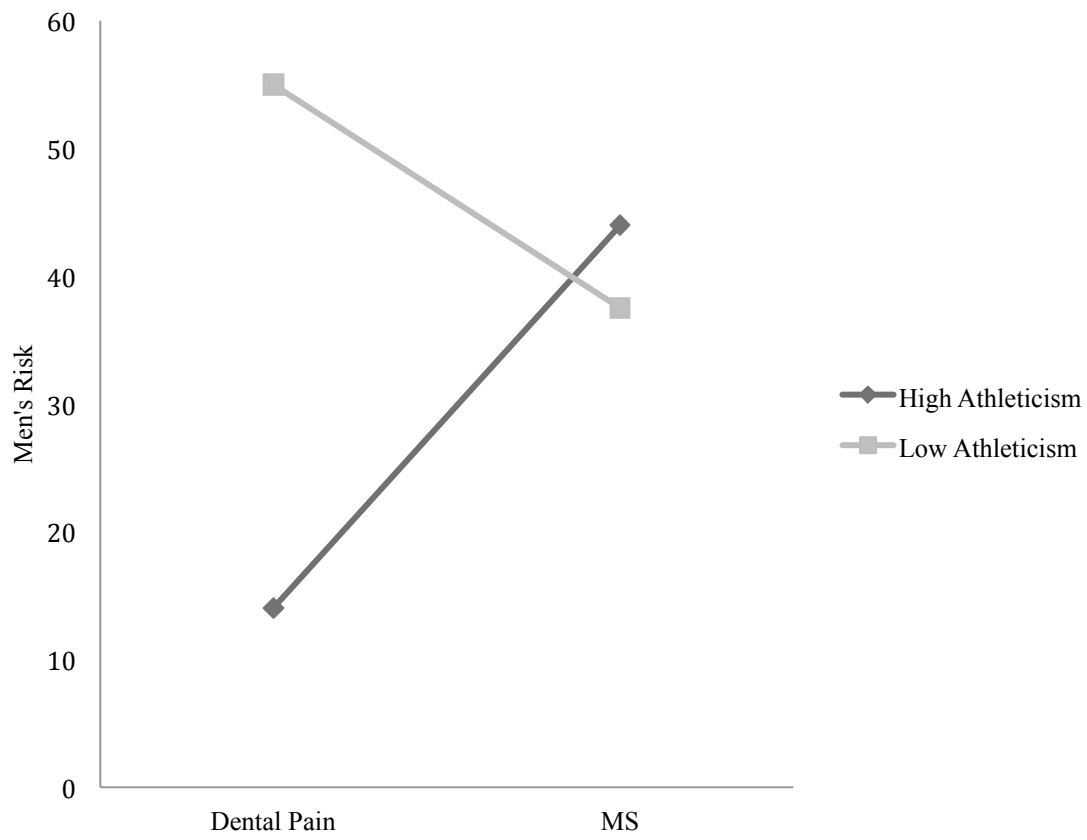


Figure 5. Men's Performance in Each Condition as Moderated by Athleticism.

