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Research Report

Solving the annuity puzzle: The role of mortality salience in retirement savings decumulation decisions ☆

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Available online xxx**Abstract**

We propose mortality salience – increased accessibility of death-related thoughts – as one previously unexplored explanation for the annuity puzzle, the low rate at which retirees buy annuities even though economists recommend annuities as an optimal decision. Across four studies we show that mortality salience decreases how likely individuals are to put savings into an annuity. By forcing consumers to consider their own death, the annuity decision makes mortality salient, motivating them to avoid the annuity option as a proximal defense against the death-related thoughts triggered by considering an annuity. Moreover, we demonstrate the robustness of the mortality salience effect through measurement and manipulation of the underlying process, and we estimate an overall mean effect size using meta-analysis. With this research, psychological theory can inform economic theory by helping to explain the annuity puzzle phenomenon that has challenged economists for decades. This research also has important implications for consumer welfare by offering insights into annuity choice and helping to inform the increasingly complex financial decisions facing individuals as they navigate the retirement savings decumulation process.

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Introduction

Consumers reaching retirement age face the difficult task of deciding how and when to spend the money they have saved for retirement. For five decades economists have examined this “decumulation” problem and have argued that purchasing annuity products is an optimal decision strategy for most people when they reach retirement (Benartzi, Previtore, & Thaler, 2011; Yaari, 1965). Annuities are financial instruments designed to provide individuals with a steady stream of income during retirement by allowing them to exchange a lump-sum of savings for an income stream guaranteed to last for the rest of the individual’s life or for a fixed period of time. Economic

theory argues that annuities are attractive as they reduce the risk of outliving one’s income, a critical concern given warnings that a large number of consumers are expected to run out of money during retirement (VanDerhei, 2014). Yet very few individuals facing retirement choose to annuitize a substantial portion of their retirement savings (Benartzi et al., 2011). Economists refer to this as the *annuity puzzle*. In June 2015, U.S. retirement assets totaled \$24.8 trillion, with only 8.6% of assets held as annuity reserves (Investment Company Institute, 2015).

The economic literature has examined the annuity puzzle within a rational choice framework. Several explanations for the annuity puzzle have been proposed, yet none have been shown to fully account for it. For example, low retirement savings (Dushi & Webb, 2004), unfair annuity pricing (Mitchell, Poterba, & Warshawsky, 2000), annuitization framing (Agnew, Anderson, Gerlach, & Szykman, 2008), decreased flexibility accessing one’s money (Poterba, 2006), possibility of default by the financial company (Babel &

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Merrill, 2006), and the foregone opportunity to bequeath one's assets (Lockwood, 2012) have all been examined. Further, companies offering annuities have adjusted their products in an effort to accommodate proposed explanations and make annuities more attractive by introducing options such as fixed terms, bequeath features, and deferred start dates, with little effect on the rate of annuitization. As a result, researchers have called for more work that moves beyond the fully rational paradigm and instead offers behavioral explanations for the annuity puzzle (Brown, 2007).

This research offers one such novel explanation of the psychological underpinnings of the annuity puzzle. We propose that the task of choosing whether or not to buy an annuity is anxiety-provoking and aversive for consumers because it evokes thoughts of death. A key aspect of the annuity decision process is considering when one is likely to die (Brown, 2007). We argue that, by forcing people to think about dying, the annuity decision makes people's mortality salient, motivating them to defend against this threat by avoiding the annuity option to remove death-related thoughts from consciousness. The current research uses psychological theory to inform economic theory and help explain the annuity puzzle phenomenon that has baffled economists for decades (Yaari, 1965), and more broadly, provides insight into savings decumulation – a topic that has been largely ignored outside of the economics and finance literature.

Mortality salience (MS), defined as the increased accessibility of thoughts related to one's death, affects a broad range of behaviors, including interpersonal evaluations, moral judgments, stereotyping, in-group bias, conformity, materialism, and self-regulation (see Burke, Martens, & Faucher, 2010; Greenberg, Solomon, & Pyszczynski, 1997). According to terror management theory (TMT; Greenberg et al., 1997) awareness of one's own mortality creates the potential for paralyzing terror, which could undermine individuals' functioning. Since MS engenders potentially overwhelming existential anxiety, it triggers defensive responses that help people avoid or minimize emotional distress (DeWall & Baumeister, 2007).

TMT research proposes a dual-process theory of proximal and distal mortality salience defenses and posits that distinctive tactics are used to cope with conscious and unconscious aspects of the problem of death (Greenberg, Arndt, Simon, Pyszczynski, & Solomon, 2000; Pyszczynski, Greenberg, & Solomon, 1999). Accessible unconscious thoughts of death are defended against with *distal defenses* that have no direct rational relationship to the problem of death, but enable one to construe oneself as a valuable participant in a meaningful universe (i.e., pursuit of self-esteem and faith in one's cultural worldview; Greenberg et al., 1997). Distal defenses are active whenever the individual is awake and conscious; they serve to keep death-related thoughts out of consciousness and have been explored widely in the literature.

When the problem of death enters current focal attention and death-related thoughts enter consciousness, *proximal defenses* that serve to remove death-related thoughts from consciousness are activated (Greenberg et al., 2000). Proximal defenses are

relatively rational cognitive maneuvers that serve to push the problem of death off into the future by removing death-related thoughts from consciousness through thought suppression or by denying one's vulnerability to threats of dying (Pyszczynski et al., 1999).

Drawing upon this literature, we argue that the annuity choice task triggers conscious thoughts of dying, which activate proximal defenses that push the problem of death out of consciousness (Greenberg et al., 2000). A common proximal defense used to remove death-related thoughts from focal attention is thought suppression (Greenberg et al., 2000; Pyszczynski et al., 1999). One way to suppress the death-related thoughts triggered by the annuity task is to avoid the annuity product, as buying an annuity necessitates thought and effort likely to keep death-related thoughts in consciousness. As such, people avoid annuities in an effort to suppress the death-related thoughts triggered by an annuity purchase.

We test this proposition in four studies. In Study 1, we show that the task of choosing an annuity triggers spontaneous thoughts of dying to a greater extent than the task of choosing an Individual Retirement Account (IRA), and these thoughts mediate the effect of financial product condition on choice. In Study 2, we provide evidence for our proposed process by priming MS and show that as MS increases, annuity choice rate further declines. In Study 3, we test a more subtle and practical MS manipulation by varying the annuity stimuli and measure the underlying process. In Study 4, we replicate our findings with a sample of older consumers closer to retirement and with realistic promotional materials. Finally, we conduct a meta-analysis combining the results across our studies to estimate the overall mean effect of MS on annuity choice rates.

Study 1

This first study was designed to test whether the annuity choice task is more likely to spontaneously evoke death-related thoughts, as compared to other relevant financial decisions made upon retirement. When consumers near retirement, they need to decide what to do with the savings they have accumulated through their employer retirement plan. Two financial products commonly considered for retirement savings are annuities and Individual Retirement Accounts (CNN Money, 2015). IRAs are tax-deferred savings plans from which retirees can draw down their accumulated savings. We examined whether the annuity decision task is more likely to trigger thoughts of death as compared to the IRA decision task (whose evaluation is less likely to entail consideration of one's time of death). Moreover, we also assessed whether levels of death-related thoughts drive participants' choice probability in each of the two different choice tasks. Lastly, we ruled out decreased life expectancy as a possible alternative explanation for the effects of mortality salience on choice.

Method

One hundred sixty-one participants recruited from an online panel (43% females; age range: 18–63; $M_{\text{age}} = 33.4$; median

income, \$40,000–\$49,999) were randomly assigned to an annuity or an IRA condition. Participants were given a hypothetical scenario asking them to imagine that they are 65 years old and beginning retirement and have to consider whether to put savings they have accumulated in their employer retirement plan into an annuity (in the *annuity condition*) or an IRA (in the *IRA condition*). Participants were then given some information about annuities or IRAs, depending on condition (see Appendix A).

After reading the hypothetical scenario participants were asked to list the thoughts going through their mind as they were deciding whether to put their savings into an annuity (IRA) or not. Two independent coders, blind to the study hypothesis, coded the listed thoughts for any mention of death, dying, mortality, or synonyms (e.g., end of life, deceased, pass away, pass on). Inter-rater agreement was 93.8%. To assess the possibility that mortality salience affects participants' perceived life expectancy, two additional independent judges coded the thoughts for mentions of relatively short life expectancy (e.g., "I am not going to live very long"). Inter-rater agreement was 93.2%.

Participants in the annuity (IRA) condition next indicated their likelihood of putting their retirement savings into an annuity (IRA), measured using a sliding scale with endpoints, 0% = "Definitely No" and 100% = "Definitely Yes" (Payne, Sagara, Shu, Appelt, & Johnson, 2013). We predicted that participants would be *more* likely to list thoughts of death, and *less* likely to choose the financial product, in the annuity condition as compared to the IRA condition. Further, we predicted that thoughts of death would mediate the effects of financial product condition on choice likelihood.

Participants next responded to a mood assessment (abbreviated PANAS; four 7-point semantic differential items: *sad/happy*, *depressed/cheerful*, *irritable/pleased*, *in a bad/good mood*, $\alpha = .94$; Watson, Clark, & Tellegen, 1988), a reduced version of Burger and Cooper's (1979) desire for control scale (six of their 19 items; $\alpha = .83$), and a 6-item measure of trust in the financial company offering the annuity or IRA (adapted from Kumar, Scheer, & Steenkamp, 1995; $\alpha = .94$). All items were measured using 7-point scales. We also measured self-reported subjective life expectancy (SLE) with a set of four questions following Payne et al. (2013). Finally, we measured participants' gender, age, and income.

Results

Participants in the annuity condition were far more likely to list death-related thoughts about their decision than participants in the IRA condition ($M_{\text{annuity}} = 40.00\%$, $M_{\text{IRA}} = 1.23\%$, $\chi^2(1) = 37.12$, $p < .001$). Participants also reported a significantly lower choice likelihood in the annuity condition versus the IRA condition ($M_{\text{annuity}} = 38.56\%$, $M_{\text{IRA}} = 63.38\%$, Mann–Whitney test $z = 5.44$, $p < .001$). We also regressed choice probability on product type, while controlling for trust, desire for control, mood, SLE, and age, and found a significant effect of product type ($b_{\text{type}} = -0.52$; $z = -5.37$, $p < .001$; see Table 1). Lastly, a mediation analysis (Preacher & Hayes,

2008) revealed both a significant direct effect of product type on choice ($b_{\text{direct}} = -0.20$; 95% CI, $[-.34, -.02]$) and a significant indirect effect of product type on choice mediated by death-related thoughts ($b_{\text{indirect}} = -0.17$; 95% CI $[-.32, .00]$). We found no evidence that lower life expectancy influenced choice probabilities. Only one of the 161 study participants (in the annuity condition) listed thoughts of lower life expectancy, and the effect of self-reported SLE on choice probability was not significant ($b_{\text{SLE}} = -0.004$; $z = -0.44$; $p = .66$; see Table 1).

The evidence supports our contention that the task of choosing an annuity spontaneously evokes thoughts related to death and dying, and those death-related thoughts in turn decrease choice likelihood.

Study 2

This study builds on Study 1 by manipulating the proposed psychological process of mortality salience and providing evidence that as mortality salience increases, annuity choice rate declines further. Following the most commonly used approach to manipulating mortality salience (Greenberg et al., 1997), we asked participants in the *high MS condition* to write about their own death. Participants in the *low MS condition* wrote essays about dental pain instead.

After completing the essays, participants were given a hypothetical scenario where they considered whether or not to put their retirement savings into an annuity. We predicted that participants who wrote essays about death would be less likely to choose the annuity than participants who wrote about dental pain.

Method

One hundred fifty-six participants recruited from an online panel (50% females; age range: 18–63; $M_{\text{age}} = 36.4$; median income, \$40,000–\$49,999) were randomly assigned to one of two conditions. In the *high MS condition*, participants first responded to two open-ended questions: "Please briefly describe the emotions that the thought of your own death arouses in you," and "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead." In the *low MS condition*, participants responded to parallel questions regarding dental pain.

After participants completed the essay tasks in both conditions, they were given an ostensibly unrelated questionnaire where they had to respond to a hypothetical scenario involving annuities. They were given the same information about annuities as in the Study 1 annuity condition. They were then asked to imagine that they are 65 years old, beginning retirement with some retirement savings, and are deciding how to manage that money in the coming years. Participants were then presented with a binary choice, which was our dependent variable: putting their retirement savings into an annuity that will give them monthly payments each year they live (1 = yes) or not putting their savings in an annuity (0 = no).

Table 1
Summary of estimated effects on annuity choice.

	Study 1		Study 2		Study 3		Study 4	
Annuity (IRA) indicator	-0.52	($p < .01$)						
MS (Dental pain) prime			-0.36	($p = .09$)	-0.30	($p = .04$)		
High (Low) MS annuity description					-0.35	($p = .02$)	-0.74	($p = .02$)
MS prime \times MS annuity description					-0.10	($p = .49$)		
Desire for flexibility			-0.28	($p = .02$)	-0.34	($p < .01$)	-0.63	($p < .01$)
Desire for control	-0.06	($p = .46$)	-0.06	($p = .78$)	-0.01	($p = .93$)	0.41	($p = .26$)
Trust in financial institution	0.28	($p < .01$)	0.78	($p < .01$)	0.68	($p < .01$)	0.08	($p = .83$)
Mood	0.06	($p = .45$)	-0.21	($p = .23$)	-0.01	($p = .92$)		
Subjective life expectancy	-0.004	($p = .66$)	0.001	($p = .96$)	-0.01	($p = .45$)		
Age	0.004	($p = .69$)	-0.05	($p = .01$)	-0.02	($p = .16$)	-0.002	($p = .93$)
Intercept	-0.86	($p = .42$)	0.38	($p = .85$)	-0.49	($p = .72$)	0.29	($p = .92$)

Note: In Study 1, we use a fractional logit generalized linear model with robust standard errors to ensure that the predicted values of choice probability lie in the [0,1] interval (Papke & Wooldridge, 1996). In Studies 2–4, we use a binary logit regression model with a discrete 0–1 dependent variable. In all study conditions, the dependent variable is probability of choosing the annuity, except for the IRA condition in Study 1, in which the probability of choosing the IRA is the dependent variable.

We also collected a 3-item measure of mortality salience, adapted from prior literature ($\alpha = .92$; Van den Bos & Miedema, 2000), to verify the effectiveness of the MS prime (e.g., “To what extent have you been thinking about death in the past several minutes?”). Participants in the high MS condition reported significantly higher values than those in the low MS condition ($M_{\text{highMS}} = 5.53$, $M_{\text{lowMS}} = 3.44$, $t(154) = -7.55$, $p < .001$). Finally, we measured the same psychological and demographic variables as in Study 1, as well as desire for flexibility (“In the annuity scenario you just completed, to what extent did a desire for having flexibility in accessing your money influence your choice of whether to put your retirement savings into an annuity?”). All items were measured using 7-point scales.

Results

As expected, subjects were less likely to choose the annuity option when MS was primed ($M_{\text{highMS}} = 22.67\%$) versus when it was not ($M_{\text{lowMS}} = 40.74\%$; $\chi^2(1) = 5.84$, $p < .02$). We further tested the robustness of the effect with a logit regression predicting annuity choice while controlling for trust in the financial company, desire for control, desire for flexibility, mood, age, and SLE. Consistent with the simple mean difference between conditions, we found a significant negative effect of MS on the probability of choosing an annuity ($b_{\text{MS}} = -0.36$; $z = -1.66$, $p = .09$). This supports our hypothesis that increasing MS further decreases the probability of choosing an annuity product.

Study 3

We next developed and tested a more “real world” and subtle approach to influencing mortality salience during annuity decisions to test the robustness, and enhance the practicality, of our findings from Study 2. We altered the description of the annuity product itself to make mortality more or less salient by including or excluding a direct reference to

one’s own death. Participants were shown annuity descriptions that contained information commonly included by annuity companies in their marketing communications, with minor wording changes made across conditions to influence mortality salience. The goal was to test the effectiveness of this MS manipulation and determine whether its effects on death-related thoughts and subsequent choice are similar to the effects of the classic MS prime.

Method

Three hundred fifty-eight participants recruited from an online panel (53% females; age range: 19–66; $M_{\text{age}} = 34.2$; median income \$40,000–\$49,999) were randomly assigned to one of four conditions in a 2 (Priming: MS vs. Dental pain) \times 2 (Annuity description: High MS vs. Low MS) between-subjects design. As in Study 2, in the MS (dental) prime condition participants were asked to write an essay about their death (dental pain).

Participants were then given the same hypothetical scenario involving annuities as in Study 2, where they had to choose how to manage their retirement savings in the coming years. However, in this study, participants were randomly assigned to one of two annuity description conditions that varied mortality salience by including or excluding a direct reference to one’s own death. In the low MS description condition participants were first given the same annuity description as in Studies 1 and 2, accompanied with a hypothetical example of total monthly annuity payments received each year when a 65 year old person puts \$100,000 of retirement savings into a life annuity adjusted 2% annually for inflation. The high MS description condition included the same text, with explicit references to death added (see Appendix A). Participants were then asked whether or not they would choose to put their retirement savings into an annuity that will give them monthly payments “each year you live” [with “until you die” added in the high MS description condition]. Participants were asked to list the thoughts that went through their mind as they were

making their decision. The thoughts were coded for mentions of death (88.9% inter-rater agreement) and for mentions of lower life expectancy (88.6% agreement), as in Study 1. Finally, we measured the same psychological and demographic variables as in Study 2.

Results

The proportion of participants reporting death-related thoughts during the choice task was significantly higher in the high MS annuity description condition versus the low MS annuity description condition ($M_{\text{highMS}} = 54.70\%$, $M_{\text{lowMS}} = 39.77\%$, $z = 2.82$, $p < .01$; see Table 2). Similarly, the proportion was higher in the MS priming condition versus the dental pain priming condition ($M_{\text{MS prime}} = 51.83\%$, $M_{\text{Dental prime}} = 43.52\%$, $z = 1.57$, $p < .06$ one-tailed).

Both the MS priming manipulation and the high MS annuity description decreased the proportion of people choosing the annuity option. A binary logistic regression analysis revealed significant negative effects of both the MS priming ($b_{\text{prime}} = -0.30$; $z = -2.08$, $p < .04$) and annuity description ($b_{\text{description}} = -0.35$; $z = -2.43$, $p < .02$) manipulations, even after controlling for trust in the company, desire for flexibility, desire for control, mood, age, and SLE. The interaction effect was not significant ($b_{\text{prime} \times \text{description}} = -0.10$; $z = -0.68$, $p = .50$). Increasing MS via the annuity description decreased the proportion of people choosing the annuity option ($M_{\text{highMS}} = 25.82\%$, $M_{\text{lowMS}} = 35.80\%$, $z = -2.04$, $p < .05$; see Table 2). Increasing MS using the priming technique decreased the proportion of people choosing the annuity, with an effect size very similar to the annuity description manipulation ($M_{\text{MS prime}} = 26.22\%$, $M_{\text{Dental prime}} = 34.54\%$, $z = -1.70$, $p < .09$), replicating the effects from Study 2. Mediation analysis (Preacher & Hayes, 2008) indicated a significant indirect effect of the annuity description on choice, fully mediated by death related thoughts ($b_{\text{indirect}} = -0.10$; 95% CI, $[-.18, -.03]$), with a non-significant direct effect

($b_{\text{direct}} = -0.09$; 95% CI, $[-.23, .06]$). We found no evidence of differences across conditions in the very small proportion of participants listing thoughts of lower life expectancy ($M_{\text{overall}} = 2.5\%$; see Table 2), and the effect of SLE on choice was not statistically significant ($b_{\text{SLE}} = -0.01$; $z = -0.76$, $p = .45$), replicating Studies 1 and 2.

Study 4

The purpose of Study 4 was to replicate our findings in a realistic, in-person setting using stimuli that reflect what consumers are likely to encounter in the marketplace (i.e., an annuity brochure similar to those distributed by financial companies) and an older sample of consumers nearer to retirement age.

Method

A community sample of 73 adults were recruited at a major airport and on a university campus (44% females; $M_{\text{age}} = 48.2$; 79% between 40 and 65 years; 79% have a 401 k type of retirement plan). Participants were randomly assigned to one of two conditions that manipulated MS via the annuity description (high vs. low), as in Study 3. Participants were shown an annuity informational brochure and were given the same hypothetical scenario involving annuities as in prior studies. The brochures were modeled after actual annuity promotional materials distributed by a major annuity provider (see Appendix B). Participants' choice of whether to put their savings into an annuity was our dependent variable. We also measured desire for control, desire for flexibility, trust in financial company, gender, age, and whether one has a 401 k type plan, using the same measures as in prior studies.

Results

The results replicated the negative effect of mortality salience found in Studies 2 and 3. A binary logistic regression analysis indicated a significant negative effect of increasing MS vis-à-vis the annuity description ($b_{\text{description}} = -0.74$; $z = -2.38$, $p < .02$), after controlling for trust in the financial company, desire for control, desire for flexibility, and age. Specifically, increasing MS by including explicit references to one's own death in the annuity description *decreased* the proportion of people choosing to put retirement savings into an annuity ($M_{\text{highMS}} = 26.32$, $M_{\text{lowMS}} = 50.00$, $z = -2.07$, $p < .04$).

Meta-analysis

We performed a meta-analysis to integrate the findings across Studies 2, 3, and 4 to derive an overall estimated effect size (Cummings, 2014). We included six estimated mortality salience effects in a fixed effects meta-analysis, shown in Fig. 1. The overall estimated mean effect of increasing MS on annuity choice rate was -11.53% , ($z = 3.87$, $p < .001$, 95% CI $[-17.4\%, -5.7\%]$), and the mean effect sizes were remarkably similar across the two MS manipulation techniques

Table 2
Annuity choice rate and mortality salience in Study 3.

Annuity description condition	Priming condition		Total
	Dental pain	Mortality	
<i>Proportion choosing the annuity</i>			
Low mortality salience ("live")	37.76%	33.33%	35.80%
High mortality salience ("die")	31.25%	19.77%	25.82%
Total	34.54%	26.22%	30.73%
<i>Proportion listing death-related thoughts</i>			
Low mortality salience ("live")	37.76%	42.31%	39.77%
High mortality salience ("die")	49.47%	60.47%	54.70%
Total	43.52%	51.83%	47.34%
<i>Proportion listing lower life expectancy thoughts</i>			
Low mortality salience ("live")	3.1%	1.3%	2.3%
High mortality salience ("die")	2.1%	3.5%	2.7%
Total	2.6%	2.4%	2.5%

Note: $n = 358$.

Meta-analysis results: annuity choice differences across studies.

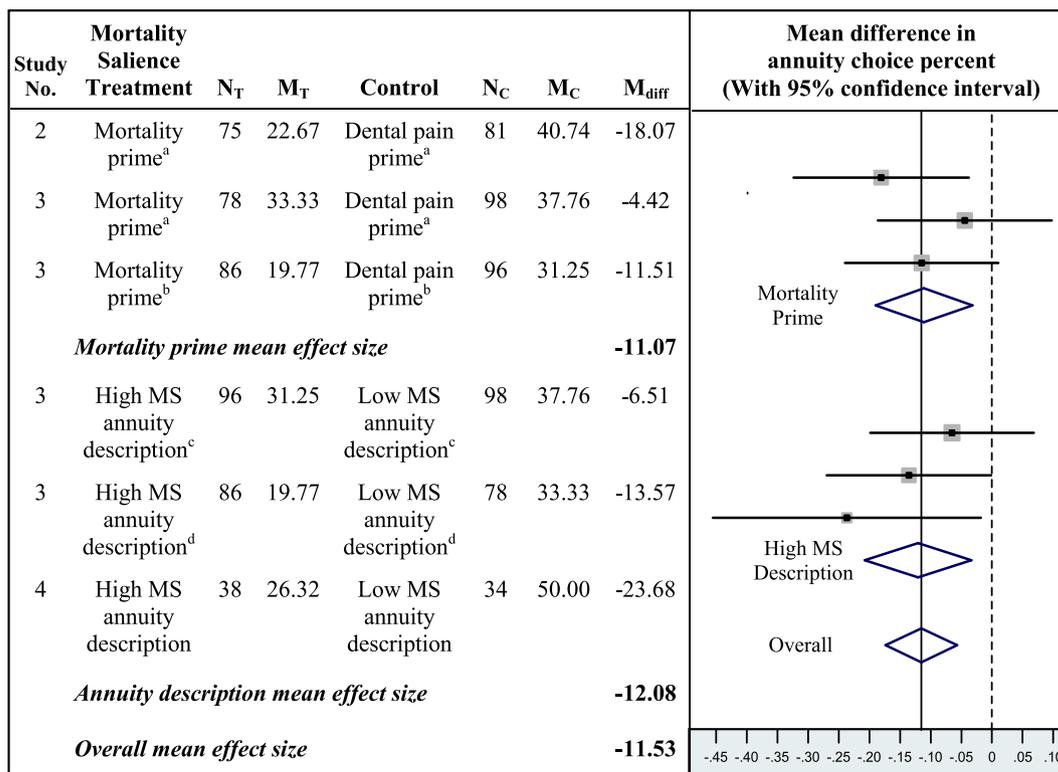


Fig. 1. Meta-analysis results, including a forest plot of mean difference in annuity choice rates, with 95% confidence intervals and mean overall effect sizes for each type of MS manipulation. In the column headings, the subscript “T” indicates treatment condition and “C” indicates control condition. A superscript “a” indicates the condition includes the low MS annuity description; “b” indicates the high MS annuity description; “c” indicates the dental pain prime; and “d” indicates the mortality prime. The black boxes in the forest plot indicate the mean effect size and relative weighting of each effect in the analysis; the diamonds indicate the over mean effect sizes for each of the MS manipulation techniques as well as the overall mean effect size across both techniques. A test of heterogeneity indicated no significant heterogeneity in outcomes across the effects examined ($Q = 3.59, df = 5, I^2 = 0.0\%, p = .610$).

($M_{Prime} = -11.07\%, z = 2.76, p < .007, CI = [-19.0\%, -3.2\%]$; $M_{Description} = -12.08\%, z = 2.71, p < .008, CI [-20.8\%, -5.7\%]$). These results illustrate the consistency and robustness of our findings.

General discussion

Results from four studies show that mortality saliency plays an important role in resolving the annuity puzzle, which has perplexed economists for decades (Yaari, 1965). We present consistent evidence that the task of choosing an annuity increases MS by forcing people to consider their own death and motivates consumers to escape thinking about their mortality by avoiding the annuity option. We identify mortality saliency as a reason why so few consumers buy annuities, complementing previous explanations examined in the economic literature. While doing so, we control for a number of relevant factors, including subjective life expectancy, mood, desire for flexibility and control, trust, and age. If decreasing MS, and thus increasing annuity investments, could lead to increased consumer well-being (Thaler, 2011), it compels policy makers and annuity providers to develop practical approaches to decreasing MS during the decision process, such

as altering the annuity description as we did in Studies 3 and 4. Our studies yielded an average 11.53% point decline in annuity choice rate when MS increased.

This research contributes to understanding the annuity puzzle by moving beyond the prevalent economic explanations proposed for this phenomenon and instead offering a novel psychological explanation. It also adds to terror management theory (Greenberg et al., 1997), which has linked MS to a broad range of behaviors (Cai & Wyer, 2014; Ferraro, Shiv, & Bettman, 2005; Maheswaran & Agrawal, 2004; Shehryar & Hunt, 2005), but has not examined its effects on financial decisions like retirement savings. Retirement savings decumulation is an increasingly important topic as 401(k)s and similar plans replace traditional defined benefit pensions, threatening the financial health and independence of older consumers (Goldberg, 2009; Yoon, Coleb, & Lee, 2009).

Although our results are provocative, they beg additional questions, and pave the way for future research. One limitation of our studies is that they tested only immediate lifetime annuities and only gave participants a single annuity option to consider. Future research can test the robustness of the mortality saliency effect when offering varying annuity types or multiple available options. Future research could also

explore more deeply the role of inaction in MS and annuity choice as a *proximal* strategy of avoidance. Another proximal defense strategy to explore is denying one's vulnerability to mortality, as TMT posits. Perhaps providing consumers with opportunities to deny their vulnerability to an early death (e.g., emphasizing US consumers' increasing life expectancies), could increase annuity choice rates.

TMT posits that symbolic immortality (e.g., transcending one's finite existence through one's children) can serve as a *distal* MS defense (Burke et al., 2010). Some annuities available in the market include a feature allowing the annuity holder to bequeath her annuity when she dies. Future research should explore the possibility that incorporating the option of bequeathing one's annuity may serve as a distal defense strategy for consumers and reduce the negative effects of MS on annuity choice.

This research highlights the importance of de-emphasizing death or dying when promoting annuities. More broadly, it suggests that mortality salience may play a role in other late-in-life financial decisions, such as creating a will, buying life insurance, and estate planning – tasks often avoided by consumers. Future research examining the extent to which these important decisions trigger death-related thoughts could offer new insights and increase consumers' engagement.

Appendix A

IRA description used in Study 1 (IRA condition):

An IRA is a financial product offered by financial companies. When you put your savings into an IRA, it will not be taxed until you withdraw money from your account. You

can begin taking money out of your IRA account without penalty as early as age 59.5, but at age 70.5 you must begin making mandatory withdrawals, also known as minimum required distributions.

Annuity description used in Study 1 (annuity condition) and Study 2:

An annuity is a financial product offered by financial companies. When you put your savings into an annuity, you pay a lump sum of money upfront. In return for that lump-sum investment, you receive a series of regular monthly payments each year you live, after which any remaining amount stays with the financial company.

Low [High] mortality salience annuity description used in Study 3:

An annuity is a financial product offered by financial companies. When you put your savings into an annuity, you pay a lump sum of money upfront. In return for that lump-sum investment, you receive a series of regular monthly payments each year you live, **[until you die]**, after which any remaining amount stays with the financial company.

Here is a hypothetical example of annuity payments received when a 65 year old person puts \$100,000 of retirement savings into a life annuity that is adjusted 2% annually for inflation.

The total amount received each year, **if the annuity holder lives up to different ages [vs. depending on the age when the annuity holder dies]**, is as follows:

At age 65, amount received is \$5304.00; at age 70, \$5856.04; at age 75, \$6465.55; at age 80, \$7138.49; at age 85, \$7881.46; at age 90, \$8701.77; and at age 95, \$9607.46.

Each number represents the amount received per year at that age. The annual amount is split across 12 monthly payments.

Appendix B. Brochure used in Study 4

Low mortality salience condition



**FINANCIAL PLANNING:
Annuities**

Informational Brochure

What is an Annuity?

An annuity is a financial product offered by financial companies.

When you put your savings into an annuity, you pay a lump sum of money upfront. In return for that lump-sum investment, you receive a series of regular monthly payments each year you live, after which any remaining amount stays with the financial company.



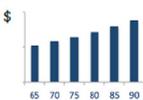
Hypothetical annuity example

The amount received from the annuity depends on how long you live.

Suppose a 65 year old person puts his or her retirement savings into a life annuity that is adjusted 2% annually for inflation.

The total amount received increases 2% each year, as long as the annuity holder lives.

Annual amount paid at different ages:



*Each bar represents the amount received per year at that age. The annual amount is split across 12 monthly payments that continue as long as the annuity holder lives.

High mortality salience condition



**FINANCIAL PLANNING:
Annuities**

Informational Brochure

What is an Annuity?

An annuity is a financial product offered by financial companies.

When you put your savings into an annuity, you pay a lump sum of money upfront. In return for that lump-sum investment, you receive a series of regular monthly payments each year you live, until you die, after which any remaining amount stays with the financial company.



Hypothetical annuity example

The amount received from the annuity depends on when you die.

Suppose a 65 year old person puts his or her retirement savings into a life annuity that is adjusted 2% annually for inflation.

The total amount received increases 2% each year, until the annuity holder dies.

Annual amount paid at different ages:



*Each number represents the amount received per year at that age. The annual amount is split across 12 monthly payments that continue until the annuity holder dies.

Appendix C. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.jcps.2015.10.001>.

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