

Awareness and Athanasia:  
Evidence for an immortality hypothesis  
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## **Abstract**

Terror management theory proposes that the awareness of death conflicts with our desperate desire to live and that humans have attempted to resolve the problem of death by inventing and sustaining cultural worldviews that provide hope for literal or symbolic immortality. The present studies focus on deathlessness derived from symbolically infusing the self into the greater whole of a cultural worldview that promises to outlast the individual's finite existence. The goal of the current research was to test an immortality hypothesis – if cultural worldviews are existentially useful because they provide avenues to symbolic immortality, then people should be motivated to believe these psychological constructs will continue to exist into the distant future. Study 1 used a novel measure of cultural longevity estimates to demonstrate that participants who were strongly invested in Canadian culture believed their nation would continue to exist longer after a death reminder (vs. control). Study 2 extended these findings and showed that highly identified Americans made greater cultural longevity estimates for the USA following a death reminder but only if they had low beliefs in literal immortality. Study 2 thus demonstrated that only those who do not have a route to literal immortality increased their longevity estimates for a worldview that provided symbolic immortality. Lastly, I discuss the theoretical implications and the potential future utility of the findings and paradigm.

## **Preface**

This thesis is an original work by Andy Scott. The research projects, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, “Prolongation of Estimated Cultural Longevity After Mortality Saliience”, No. Pro00070665, 1/6/2018, and “Prolongation of Estimated Cultural Longevity After Mortality Saliience (Online)”, No. Pro00075031, 2/8/2018.

## Epigraph

Why is it we want so badly to memorialize ourselves? Even while we're still alive. We wish to assert our existence, like dogs peeing on fire hydrants.

-Margaret Atwood, "*The Blind Assassin*"

If life is going to exist in a universe of this size, then the one thing it cannot afford to have is a sense of proportion.

-Douglas Adams, "*The Restaurant at the End of the Universe*"

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At some unknown but critical juncture in our distant evolutionary past, we caught on to the fact of our mortal fate. Moreover, given the preponderance of documented attempts throughout history to indefinitely delay or dodge death, it seems that shortly thereafter we began devising ways to avoid it altogether. The ancient Egyptians believed they were on the verge of finding freedom from death while they were busy erecting the great pyramids; today, modern scientists inform us that we are about to reach “longevity escape velocity”, claiming that soon we will develop medicine and bioengineering technologies that will allow us to maintain our earthly forms forever (De Grey & Rea, 2007). Since the invention of fiction, we have been imagining immortality, of overcoming our creaturely bodies. The oldest existing written story, the Sumerian Epic of Gilgamesh, chronicles a quest for eternal life; in the present day, novels, Netflix, and film keep this longstanding narrative tradition alive. It seems that our great awakening into self-awareness (and a concomitant capacity for self-deception) has thrown us into a frantic “rebellion against human existence as it has been given” (Arendt, 1998, p. 2).

Indeed, human ingenuity has created countless ways of upending the reality of our mortal situation through myths, creations and nations. Most, if not all, cultures throughout history have promised some form of life after physical death and some scholars have claimed that civilizations are founded upon promises of immortality (Cave, 2012; Neocleous, 2005). It appears that we are willing to pursue any avenue to immortality available to us in the service of conquering our fear of death. These avenues to immortality take at least three forms: literal immortality (i.e., an afterlife), amortality (i.e., staying alive), and symbolic immortality (i.e., leaving a legacy). The third and least direct route is ubiquitous across time and cultures, perhaps because only people’s symbolically immortal legacies have verifiably achieved this ancient aim; the undying memories of Gilgamesh, Nefertiti, Achilles and Tupac evince the possibility of

symbolic immortality, whereas the other two avenues remain in the realms of speculation and faith. Our pervasive desire to live on in the minds of others suggests that symbolic immortality (Lifton, 1979) serves as a psychologically effective evasion of our ephemerality. The present studies provide evidence that individuals – especially those who forego literal immortalization – perceive reality in such a way that confirms the possible persistence of their symbolic-selves post-death.

### **Terror Management Theory**

Terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; for a recent review see Schimel, Hayes & Sharp, in press) is derived from the writings of the late cultural anthropologist Ernest Becker's (1971, 1973, 1975) analysis of the process through which humans, starting at birth, develop character armor against an existential reality that would otherwise be incapacitating. Our lived reality is existentially overwhelming because of what Becker (1971) called our *individuality within finitude*: we have a symbolic existence that seems to categorically partition us from the natural world, yet we have the smarts to realize that we, as bodied beings, are still destined to roll over and rot like rodents and all other living things. To reconcile this abhorrent contradiction, we develop ways to ignore and cover it up. The resulting culturally derived character shields are the accumulation of the anxiety-buffering self-esteem accrued by adhering to culturally sanctioned ways of being.

Building on Becker's analysis of the human condition, TMT likewise posits that our awareness of death conflicts with our desperate and evolved desire to live, thus creating the potential for debilitating existential terror. Furthermore, it proposes that humans have attempted to resolve the problem of death by inventing and sustaining self-esteem-yielding systems of meaning that help to manage this terror. These cultural systems enable people to curtail death

related anxiety by providing hope for immortality. According to TMT, immortality can be literal, such as a belief in an afterlife (e.g., heaven). However, we can also attain symbolic immortality through a cultural system (e.g., one's country) that allows its adherents to construe themselves as valuable members whose memory and contributions will persist posthumously through that culture's permanency.

TMT goes on to postulate that facing this existential terror without cultural systems of death transcendence would interfere with effective everyday functioning. These defensive psychological systems keep rumination about death at a functional minimum in order to regulate an otherwise devastating anxiety. Self-esteem, seen through the lens of TMT, is the overall sense that one is a valuable and memorable contributor to a cultural system of meaning. More directly, self-esteem is the sense that one is successfully navigating an avenue to immortality by living up to the specific standards of value prescribed by their culture; it serves as immortality credits in the cultural arcade – we strive to earn enough for a “continue”.

TMT has been a wildly fruitful experimental paradigm from which researchers have published hundreds of studies to support and refine its three core hypotheses (Schimel, Hayes & Sharp, in press): the mortality salience hypothesis, the death thought accessibility hypothesis, and the anxiety-buffering hypothesis.

### **The Mortality Salience Hypothesis**

The mortality salience hypothesis posits that reminders of death should increase people's motivation to defend and uphold their existentially protective cultural worldviews as well as seek anxiety-buffering self-esteem through culturally ratified pursuits. Put simply, if cultural worldviews and the self-esteem extracted from them function to reduce the terror of mortality, then death reminders should increase the necessity for these psychologically protective

structures. Hundreds of studies have shown that exposing individuals to death reminders causes higher levels of worldview defense and self-esteem striving (for a review see Burke, Martens & Faucher, 2010). Various ways of inducing MS have produced increased worldview defense and self-esteem striving in over 25 countries (for a review see Greenberg, Vail, & Pyszczynski, 2014). These methods include answering open ended questions about one's personal death (e.g., Greenberg, Pyszczynski, & Solomon, 1986), conducting studies in front of a funeral home (e.g., Pyszczynski et al., 1996), rating commercial products with embedded death reminders (e.g., Lifshin, Greenberg, Zestcott, & Sullivan, 2017), and implicit death primes (e.g., Arndt, Greenberg, Pyszczynski, & Solomon, 1997). These effects seem to be specific to MS as the induction of other aversive topics (e.g., uncertainty, ostracism, physical pain) has failed to find the same level and time course of defensive reactions (see Martens, Burke, Schimel & Faucher, 2011).

Researchers typically operationalize worldview defense as increased favourability toward a worldview adherent (versus disparager, or outsider) or, conversely, as a severe devaluation or punishment of a person who has violated cultural standards. For example, in an early test of the MS hypothesis, reminding real judges of death caused an average penalty for a worldview violator (a prostitute) that was more than nine times higher than that of judges in the control condition (Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Other studies using behavioral measures showed that MS leads to hesitation in desecrating cultural symbols representative of one's own worldview (e.g., an American flag; Greenberg, Porteus, Simon, Pyszczynski, & Solomon, 1995), and increased aggression against individuals who opposed their worldview (McGregor et al., 1998). In its most disturbing manifestations, existential

defensiveness causes a desire for or comfort in the death of worldview violators and detractors (Hayes, Schimel, & Williams, 2008; Pyszczynski et al., 2006).

### **The Death Thought Accessibility Hypothesis**

The death thought accessibility (DTA) hypothesis is the theoretical inverse of the MS hypothesis; it proposes that if individuals avoid cognitions about death by adopting and adhering to self-esteem granting worldviews, then threatening these psychological constructs should increase the accessibility of death related thoughts. Over one hundred studies have supported the DTA hypothesis since its incorporation into the terror management framework (Hayes, Schimel, Arndt, & Faucher, 2010). DTA is traditionally measured using a word-fragment completion task that, as the name implies, has participants complete word fragments with the first word that comes to mind. Fragments can be completed as either death-related or non-death-related words (e.g., “D E \_ \_” can be completed as either “DEAD” or “DEER”); a higher proportion of these words being completed as death-related indicates that the semantic concept of death is more cognitively accessible in that moment. Alternative methods for measuring DTA include measuring reaction times to death-related stimuli (e.g. Vail, Arndt, Motyl, & Pyszczynski, 2012), or the use of a free-writing tasks in which death related references are tallied (e.g. Gailliot, Schmeichel, & Maner, 2007).

The DTA hypothesis has been useful in expanding and refining TMT, especially in its ability to demonstrate the existential utility of cultural worldviews and self-esteem; TMT proposes that these psychological constructions are protective only insofar as they provide credible routes to immortality. When the validity or worth of one’s cultural worldview is questioned, it can no longer keep thoughts of death at bay.

In a landmark study in support of the DTA hypothesis, Schimel, Hayes, Williams, and Jahrig (2007) demonstrated that this is indeed the case. Participants who reported being highly invested in the Canadian worldview read one of two articles. In the worldview threat condition, participants read an article disparaging a range of deeply held Canadian values such as sports (e.g., hockey), governmental systems (e.g., universal healthcare), and diet (e.g., poutine). In the control condition, participants read a similar article that disparaged analogous Australian values. Participants then completed the word completion task to measure DTA. In support of the DTA hypothesis, highly identified Canadian participants who read the anti-Canada article (versus the anti-Australia article) completed more of the word fragments as death-related words. Of import is that the article did not physically threaten the survival of Canada or imply that it was doomed to fail as a nation, it simply threatened the validity of the participants' existential buffers. Subsequent studies have threatened self-esteem and a variety of other cultural worldviews, producing the same pattern of increased DTA (for a review see Hayes et al., 2010).

### **The Anxiety Buffering Hypothesis**

TMT describes, in a theoretically grounded way, the reasons that people seem to universally desire and benefit from self-esteem (Greenberg, Pyszczynski, & Solomon, 1986). The anxiety buffering hypothesis states that self-esteem functions to buffer individuals from general anxiety. As we have seen, the basic premise of TMT is that self-esteem serves, at least in part, to buffer a specific type of anxiety, that is, existential anxiety. If TMT is correct in claiming that self-esteem functions as a gauge of one's worthiness of culturally granted immortality, then self-esteem should be directly protective against thoughts and concerns about death. In an early test of this hypothesis (Greenberg et al., 1992), participants received false personality feedback that was either mildly positive or extremely positive. Participants then watched a video depicting

graphic images of death (versus a neutral video). Following the video, participants completed a state anxiety scale. Participants who received only mildly positive feedback reported very high anxiety after watching the death video but not the neutral video. Participants who received the overwhelmingly positive feedback, on the other hand, reported equivalent anxiety whether they had watched the anxiety provoking death video or the neutral video. Accompanying studies demonstrated that self-esteem acts as a general-purpose anxiety buffer and is effective at abating both death-related and non-death-related anxiety.

Experimental and quasi-experimental investigations have shown that, after a death reminder, individuals with chronically high self-esteem or who receive a temporary boost to their self-esteem do not engage in worldview defense to the same extent as their low self-esteem peers (e.g., Greenberg et al., 1993; Harmon-Jones et al., 1997). Likewise, high trait self-esteem and momentary increases in self-esteem help to mitigate DTA in response to death reminders (Harmon-Jones et al., 1997) and worldview threats (Hayes, Schimel, Faucher, & Williams, 2008).

TMT makes the more specific claim that cultural worldviews, and the anxiety buffering self-esteem they confer, enable us to avoid existential anxiety because self-esteem acts as a gauge of how successfully we are accumulating literal or symbolic immortality. As we have seen, death seems to be a special type of threat, and thus, may require a special kind of self-esteem solution beyond those designed for general anxiety; the solution proposed by TMT is culturally derived, self-esteem contingent immortality.

### **The Immortality Hypothesis**

Extant terror management studies can only inferentially hint at whether people are actually using their worldviews as immortality projects. It also remains unclear whether self-



esteem acts as a gauge of one's immortality or if it is simply an all-purpose anxiety buffer that serves to diminish, among other anxieties, the dread of dying. The theory's assertion that death is a psychologically unique threat continues to hinge in part on validating the assumption nested in the architecture of TMT that self-esteem serves as an indicator of personal immortalization. Recently, Schimel, Hayes and Sharp (in press) noted the dearth of direct evidence in support of the immortality motive and advanced seven untested immortality postulates. The studies reported below tested the first, most basic hypothesis: if cultural worldviews alleviate death anxiety by providing avenues to immortality, then reminders of death should increase people's belief that their culture (or other sources of immortality) will last long into the future.

Consistent with the immortality hypothesis, Hayes (2016) found that people evaluated a target person more positively after thinking about that person's death. The author argued that this positive eulogizing tendency is an attempt to endow the dead with symbolic immortality, presumably because we hope to have the favor returned when we die. Likewise, McCabe, Spina, and Arndt (2016) found that participants ascribed more value to a series of old (versus new) objects when reminded of death. The authors suggest that this is because old objects (e.g., antiques) are ways through which their creators live on. Both studies show that people recognize and support the immortality motive for others, but they do not draw clear conclusions about whether people use these methods to vie for their own freedom from finitude.

In another series of studies, Greenberg, Kosloff, Solomon, Cohen, and Landau (2010) found that death reminders increased people's desire for personal fame, naming long-lasting celestial objects after oneself, and associating oneself with celebrities (who have presumably achieved a robust legacy). Likewise, people report a higher desire for offspring under mortality salience (Wisman & Goldenberg, 2005). Creativity can also leave behind a legacy and death

reminders appear to increase creativity under the right conditions. Specifically, MS seems to increase creativity when people view the artistic object as having the potential to last beyond their own corporeal existence (Sligte, Nijstad, & De Dreu, 2013). These studies indicate a desire to live on through legacies, objects and others but are conflated with potentially non-death-transcendent self-esteem striving in the face of one's finitude and do not directly speak to whether cultural worldviews are defended because of their ability to serve as vessels for vestiges of ourselves.

In a more direct assessment of the immortality hypothesis, Sani, Herrera and Bowe (2009) found that MS increased perceived cultural continuity. Perceived cultural continuity is the perception that one's cultural norms and traditions transfer from generation to generation. This lends preliminary support to the hypothesis advanced above because, presumably, in order to glean symbolic immortality from a culture, that culture must maintain a reasonably consistent and recognizable character over time. However, this measure of cultural continuity also contains confounding affirmatory beliefs about the participants' culture (e.g., structure, meaning) that could explain the increase in perceived cultural continuity after MS.

Most recently, Lifshin, Greenberg, Soenke, Darrel, and Pyszczynski (2018) provided evidence that amortality is, for some, a valid alternative to literal immortality. MS increased positive attitudes toward indefinite life extension technologies among participants who did not have a strong belief in an afterlife. Furthermore, mediational analyses revealed that participants reduced their afterlife beliefs when espousing positive attitudes toward indefinite life extension technologies, indicating that amortality (i.e., never dying) may diminish the need for avenues to literal immortality. However, it is unclear from this study whether symbolic immortality is a psychologically attractive alternative to these other forms of death transcendence.

From this brief review, it appears that we willingly co-sign others' ambitions for immortality and that striving to gain self-esteem through meeting and surpassing cultural standards increases when people ponder the inevitability of death. However, the initial question remains: do people simply gain existentially protective self-esteem from meeting and exceeding cultural standards or do they, as TMT claims, use this culturally derived self-esteem as a gauge for their personalized immortalization? If the latter is true, then people should be motivated to believe that their cultural worldview, through which they hope to live on, will persist long after their bodies expire.

### **Overview of the Current Research**

The goal of the current research is to test the immortality hypothesis which suggests that if personal legacies and cultural worldviews are existentially useful (insofar as they provide avenues to symbolic immortality), then people should be motivated not only to protect their legacies and worldviews, but also project these psychological constructs far into the future (Schimel, Hayes & Sharp, in press). Direct evidence for this hypothesis would strongly support Becker's original thesis and the as of yet untested but critical assumption in TMT that worldviews provide death transcendence; put differently, worldviews are existentially protective because they provide symbolic (or literal) routes to immortality. Study 1 assessed whether death reminders lead to increased estimations of how long a specific cultural worldview (their country) would last. Study 2 aimed to extend the findings to show that individuals who have an alternate route to immortality may be less prone to projecting their symbolic immortality ventures into the future after a death reminder. This would differentiate the paradigm set forth here to test the immortality hypothesis from previous tests of the MS hypothesis.

## Study 1

To gain comfort in living on through a system of beliefs, that system must continue for a satisfactory length of time after the individual's death or, preferably, indefinitely to preserve one's contributions forever. Therefore, when reminded of death, people should be extra-motivated to believe that their immortality granting cultures will persist long after they are gone. In Study 1, I tested the hypothesis that after a death reminder (versus control), people who are strongly identified with a specific cultural worldview will make larger cultural longevity estimates for that culture. Previous studies have found that those who strongly identify with a given culture are more defensive of it when presented with cultural worldview threats or death reminders. Individuals highly identified with their culture show this effect presumably because the culture under threat holds their path to immortality (e.g., Schimel, Hayes, Williams, & Jahrig, 2007). To test this prediction, I developed a new paradigm to measure perceived cultural longevity in which Canadians reported how long they believed Canada would last, either after a death reminder or not. I predicted that strong Canadian identifiers would significantly increase their cultural longevity estimates for Canada under conditions of mortality salience (vs. control). I further predicted that Canadian identification would positively correlate with cultural longevity estimates.

### Method

**Participants.** The participants were 103 Canadian students at the University of Alberta who completed the study for partial course credit. One participant was excluded from analysis because a pattern in their responses was evident (the participant selected the first possible response on the vast majority of items). An analysis including this individual yielded the same

results. This left 102 participants (50 females, 52 males) with an age range from 18 to 36 years and a median of 19 years for analyses.

**Design.** The study design included two predictor variables with Canadian identification as a measured predictor variable and the MS prime as a between-subjects factor. Cultural longevity estimates served as the dependent variable in a regression model to test the two-way interaction effect between Canadian identification and MS on cultural longevity estimates.

## **Materials**

**Canadian identification.** A Canadian identification scale was administered through an online mass-testing procedure at the start of the term. This previously utilized five-item measure (Schimmel et al., 2007) asks participants to rate the degree to which they disagree or agree with items regarding their identification with a given culture on a seven-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *slightly disagree*, 4 = *neither agree nor disagree*, 5 = *slightly agree*, 6 = *agree*, 7 = *strongly agree*). Items in the scale were “I am proud to be Canadian”, “I define myself as Canadian”, “I would proudly display the Canadian flag”, “Being Canadian is an important part of my self-worth”, and “I identify strongly as Canadian” ( $\alpha = .89$ ). TMT studies have traditionally recruited only those who strongly identify with a culture because the theory predicts that only such individuals will defend it. However, because this is a novel measure, I opted to recruit participants at all levels of identification and run regression analyses to demonstrate the theoretical assumption that MS will invoke increased longevity estimates only in highly identified participants. Without conducting the study in this way, it would be impossible to determine if strength of identification matters for compensatory immortality striving.

**MS induction.** Participants were randomly assigned to write about either their own death (MS) or about experiencing dental pain (control). The MS and control inductions (independent

variable) were presented as a personality assessment called “The Projective Life Attitudes Assessment” (Greenberg et al., 1990). In the MS condition participants were asked two open-ended questions regarding their mortality: “Please briefly describe the thoughts and 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 control condition, participants responded to identically worded questions about experiencing dental pain (“Please briefly describe the thoughts and emotions that the thought of dental pain arouses in you” and “Jot down, as specifically as you can, what you think will happen to you as you physically experience dental pain and once you have physically experienced dental pain.”). This control is also generally aversive and, therefore, accounts for the direction of emotional valence between conditions.

***Filler materials.*** To increase the believability of the cover story and to provide a delay between the MS induction and the dependent measure, participants completed the Brief Big-Five personality inventory (Saucier, 1994) prior to the MS induction and the 60-item PANAS-X (Watson & Clark, 1991) and the Morningness and Eveningness scale (Horne & Östberg, 1976) after completing the MS induction. Research demonstrates that the effect of MS manipulations emerges after a short delay between the MS induction and the dependent variable (e.g., Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Pyszczynski, Greenberg, & Solomon, 1999). As I hypothesized an underlying cause for these previous effects while using a newly developed DV, it was reasonable to expect a similar time course.

***Cultural longevity estimate.*** In a purported assessment of their scientific attitudes, participants read short descriptions about new advances in science and then answered related questions. Participants read that Cliodynamics (Turchin, 2008) attempts to predict the historical

trajectory of cultures as well as their downfalls. Then, they answered two questions regarding the short description (“How accurate do you think predictions based on historical data can be?” and “What do you think is the greatest risk to Canada’s survival?”). To measure cultural longevity estimates, which served as our main dependent variable, participants indicated on a 17-centimetre-long horizontal scale, ranging from 0 to 10,000 years, how long they believe Canada will continue to exist as a nation. During data entry, I used a ruler to measure participants’ cultural longevity estimates from the left (0 years) to the right (10,000 years +) and these measurements were then converted into an estimate in years such that each centimetre on the scale represented 588.24 years. I inserted a second scientific description after the DV to bolster the cover story and disguise our main dependent variable. For this filler description, participants read about a new air-based commuter system currently in development and answered three questions regarding their attitudes towards it.

## **Procedure**

Participants responded to the Canadian identification scale during a mass-testing survey completed at the beginning of the academic term. Only participants who responded to all five items were eligible for the study. Upon arriving to the lab in groups of up to four, participants learned that they were participating in a study investigating the relationship between personality and scientific attitudes. This cover story concealed the connection between the MS prime and the dependent variable. Before beginning, participants heard a procedural description of the study and gave written consent.

Participants completed the study in separate rooms in order to provide privacy. They first completed the Big-Five personality trait questionnaire and then answered the two open-ended MS induction questions. These were followed by two filler personality questionnaires serving as

a delay between the death reminder and our main DV. After completing the “personality phase” of the study, they filled out the scientific attitudes survey containing the measure of cultural longevity estimates.

Upon completion of the study, the researcher conducted a verbal suspicion probe to ensure that participants were not overly suspicious and had not guessed the hypothesis. The researcher then fully debriefed the participants and thanked them for their participation.

## **Results**

Data were screened for outliers and checked for adherence to statistical assumptions. To test for a moderating effect of Canadian identification on the relationship between mortality salience and cultural longevity estimates, I conducted a moderation analysis using model one in Hayes’ (2012) PROCESS MACRO for SPSS, which conducts a single regression with all main effects and interactions in one step. Participant responses to the Canadian identity items were averaged to form a Canadian identification composite and entered as the moderator variable. Prime (control = 0, MS = 1) was entered as the independent variable and cultural longevity estimate (in years) was entered as the dependent variable. The regression model for predicting cultural longevity estimates was not statistically significant,  $F(3, 98) = 1.45, p = .23, R^2 = 0.04$ . Canadian identity did not predict participant’s longevity estimates,  $\beta = .05, t = .42, p = .67$ , nor did MS,  $\beta = .32, t = 1.57, p = .12$ . The MS x Canadian identification interaction was in the predicted direction but not significant,  $\beta = .27, t = 1.22, p = .22; \Delta R^2 = .01, F(1, 98) = 1.50, p = .23$ . No significant effects were found for either of the other two questions in the scientific attitudes survey (i.e., “How accurate do you think predictions based on historical data can be?” and “What do you think is the greatest risk to Canada's survival?”), ANOVA’s revealed  $ps > .26$ . Due to time constraints, I was unable to collect the sample size aimed for and, as a result,



statistical power was low; data collection was started in the winter term and, therefore, would not have been completed until the following fall semester which would have introduced a potentially problematic difference between data collection periods.

The vast majority of TMT studies recruit only those who strongly identify with a given worldview. This practice is based on the assumption that only those who invest strongly in a worldview use it to transcend death. In light of the failure to find a significant result using a regression analysis, I conducted further exploratory analyses using the extreme-groups procedure, which mirrors the method of only recruiting high identifiers used in the majority of TMT studies but maintains a comparison group to test for identity. I split participants into low (those falling in the lowest 33 percent; 5.6 or below on the seven-point scale) and high (66<sup>th</sup> percentile; 6.8 or above on the seven-point scale) groups using the extreme groups method. Data were then analyzed with a 2(prime: MS vs. control) x 2(Canadian identity: Low vs. High) ANOVA with prime as a between subject factor and Canadian identification as a dichotomized person variable. This left 67 participants for this analysis. It should be noted that dichotomizing continuous variables has fallen out of favor among social scientists in recent years; doing so has been demonstrated to decrease power, increase spurious significance findings, overestimate effect sizes, and overlook non-linear relationships (MacCallum et al., 2002). Thus, while using this method can be useful in informing future studies, results obtained should be interpreted cautiously and replicated, ideally while maintaining the continuous nature of the variable of interest (see Study 2).

This analysis revealed a main effect of MS; participants in the MS condition ( $M = 5332$  years,  $SD = 3150$ ) differed significantly in their longevity estimates compared to those in the control condition ( $M = 3922$  years,  $SD = 2728$ ),  $F(1, 63) = 5.38, p = .02, \eta_p^2 = .08$ . The main

effect of Canadian Identity was non-significant; participants in the high Canadian identification group ( $M = 4911$  years,  $SD = 2967$ ) did not differ significantly from those low in Canadian identification ( $M = 4467$  years,  $SD = 3083$ ) in their longevity estimates,  $F(1, 63) = .30, p = .59, \eta_p^2 = .01$ .

A significant interaction between prime condition and Canadian identification was observed,  $F(1, 63) = 5.72, p = .02, \eta_p^2 = .08$  (see Figure 1). LSD pairwise comparisons revealed that individuals who strongly identified as Canadian made larger cultural longevity estimates in the MS condition ( $M = 6520$  years,  $SD = 2840$ ) compared to the control condition ( $M = 3187$  years,  $SD = 2021$ ),  $F(1, 63) = 9.79, p < .01, \eta_p^2 = .13$ . No difference was found between the MS ( $M = 4443$  years,  $SD = 3141$ ) and control ( $M = 4493$  years,  $SD = 3106$ ) conditions for those in the low Canadian identification group,  $F(1, 63) = .00, p = .96, \eta_p^2 < .01$  (see Table 1).<sup>1</sup>

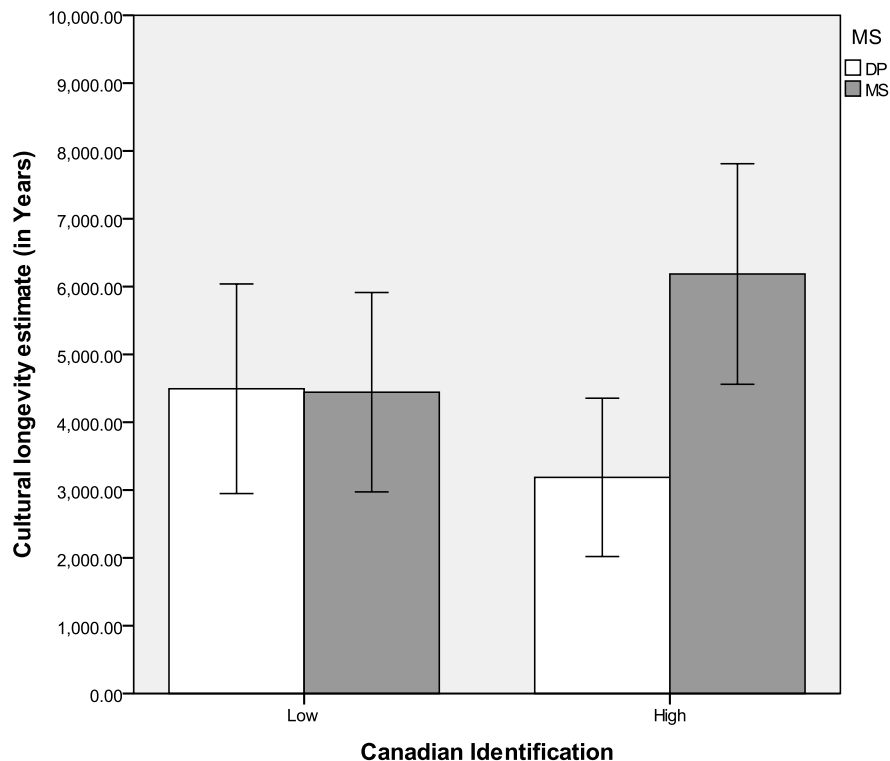
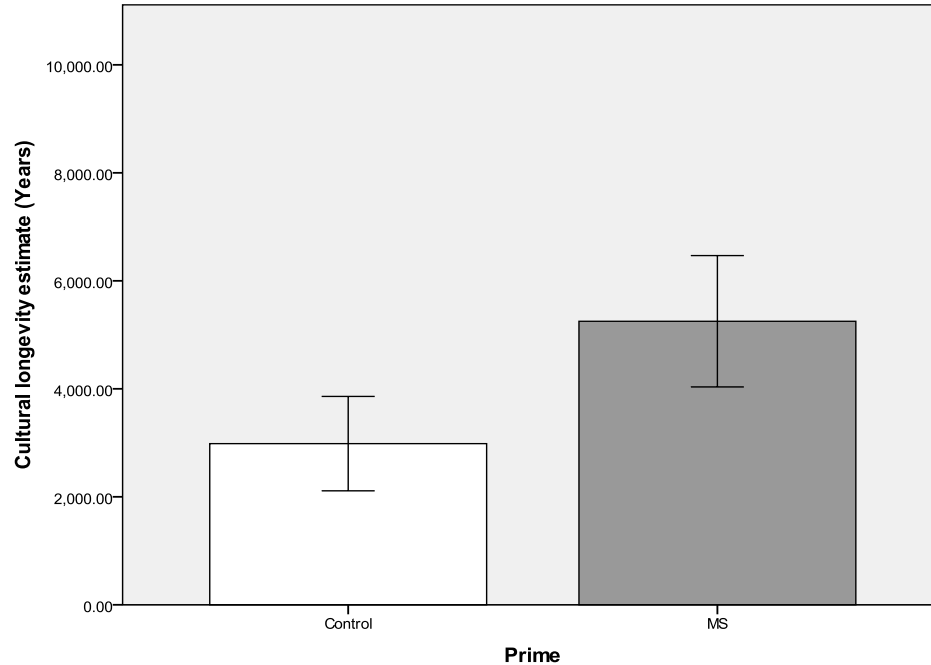


Figure 1. Effect of prime and Canadian identification on cultural longevity estimates (with 95% CIs)

Table 1. Cultural longevity estimates as a Function of Mortality and Control Primes and Canadian identification

Canadian identification	Mortality Saliience		Prime	
	M	SD	M	SD
Low	4442.65	3141.22	4493.46	3106.80
High	6519.60	2840.04	3186.97	2021.70

As mentioned above, a common way of conducting TMT studies with cultures where members vary in their intensity of investment (e.g., countries, some religions) is to recruit only those who strongly identify with the cultural worldview of interest. Based on a previous study examining the existential buffering properties of the Canadian worldview, I also looked at the effect of MS on cultural longevity estimates for participants who scored at least a 6 on the Canadian identification scale (the recruitment cut-off score used by Schimel et al., 2007). A t-test was conducted on these 57 participants (27 participants in the control condition) with prime (control = 0, MS = 1) as the independent variable and cultural longevity estimates as the dependent variable. Results revealed the predicted effect of MS on cultural longevity estimates such that those in the MS condition (M = 5251, SD = 3258) reported greater cultural longevity estimates than those in the control condition (M = 2985, SD = 2210),  $t(51.28) = -3.10, p < .01, d = .81$ . That is, strongly identified Canadians increased their estimate for the duration of Canada by 2266 years on average. Levene's test for homogeneity of variance was significant ( $F = 3.56, p < .01$ ), therefore, degrees of freedom were adjusted from 55 to 51.28. A separate analysis using a log transformation also corrected this issue while maintaining the significant result.



*Figure 2 Effect of prime on cultural longevity estimates for those scoring 6 or above on the Canadian identification (with 95% CIs)*

## Discussion

Though I failed to find the predicted results using Canadian identification as a continuous moderator, follow up analyses offer preliminary support for the immortality hypothesis. These secondary analyses mirror previous research demonstrating that Canada is a worldview that provides only its most enthusiastic supporters with a sense of self-perpetuity; those who reported strong identification with the Canadian cultural worldview reported believing that it will be around longer to suspend them in deathlessness after thinking about their personal annihilation. However, one limitation of the paradigm as it currently stands is that it could be viewed as simply a newly-minted measure of worldview defense, and not of immortality per se. Indeed, thinking about one's culture as lasting a long time may be a proxy of Canadian participants'

general positivity toward Canada after thinking about death. The design of Study 2 aimed to address this rebuttal as well as the statistical limitations of Study 1.

## **Study 2**

Study 2 examined the interplay between two different but overlapping cultural immortality avenues – God and country. I posit here an effectiveness hierarchy of the three routes to immortality. It is reasonable to suggest that amortality (i.e., simply not dying) is the most appealing, at least in the moment and for the average person, because it is the only one that does not depend on faith or the forgetful and fallible memory of (often short-lived) cultures. Except in extremis – heroic wars that promise a place in history (e.g., Achilles) or suicide bombings that offer eternal life – most people opt for continued life on earth over achieving symbolic or literal immortality. However, we also seem to recognize that “on a long enough time line, the survival rate for everyone will drop to zero” (Palahniuk, 1996, p. 17). Therefore, average, non-transhumanists often settle for the next best thing: death followed by a new, better life in a post-death paradise. At the bottom of the immortalization hierarchy is the symbolic infusion of self into the lives and minds of others. This path is built on shaky ground because when we are no longer here to sustain our legacy, it depends not on us or a benevolent God, but on other equally fated humans. However, if done with enough vigor and conviction, maintaining any single path to immortality may be psychologically satisfactory.

Given our condition as evolved cognitive misers who choose psychological simplicity whenever possible (Fiske & Taylor, 1991), it is likely that the average person invests only strongly in one route to deathlessness, and recent research hints at this possibility. Lifshin et al. (2018) demonstrated that participants reduced afterlife beliefs after being convinced of the appeal and plausibility of indefinite life extension technologies. It remains unclear from this

study, though, whether symbolic immortality can act as an alternative to the other forms of death transcendence for people who aren't convinced of their viability. I conducted Study 2 as a replication of Study 1 and as an examination of whether the results would hold for people with strong convictions of literal immortality. If literal immortality is higher on the immortalization hierarchy, then people invested strongly in their country but who also believe in a literal afterlife shouldn't demonstrate an increased inclination to pursue symbolic immortality through nationalism, even after a death reminder.

Study 2 replicated the first study within a different culture and proposed a parallel primary hypothesis: after a death reminder (versus control), strongly identified Americans would significantly increase their cultural longevity estimates. However, I also proposed that this should only be the case for those who do not strongly endorse a literal afterlife (e.g., Heaven). I aimed for a sufficient sample size to test both variables as continuous to examine how strongly individuals must invest in a worldview for it to be functionally incorporated into one's existential character shield. If supported, Study 2 would provide the first evidence for the foundational claim put forth by TMT that cultural worldviews that do not promise literal immortality serve the same existential function by allowing their adherents to strive for symbolic immortality. Finally, assessing participants' belief in their literal immortality as a potential moderating variable can also shed light on whether participants' cultural longevity estimates truly reflect a desire for symbolic immortality, or merely worldview positivity. If participants' belief in the immortality of their soul eliminates their need to enhance cultural longevity in response to MS, then such a pattern would suggest that enhanced cultural longevity estimates following MS do indeed reflect a desire for symbolic immortality.

## Method

**Participants.** American citizens on Amazon's Mechanical Turk (MTurk) online crowdsourcing service received \$0.30 to complete the study through the internet based Qualtrics survey software. MTurk data have been demonstrated to be at least as reliable as data collected from more traditional sources (Buhrmester, Kwang, & Gosling, 2011; Horton, Rand, & Zeckhauser, 2011; Paolacci, Chandler, & Ipeirotis, 2010). We collected 280 unique responses. We decided a-priori on a minimum completion time of 2 minutes and a maximum completion time of 1 hour. A total of 8 participants were excluded due to suspicion (2 guessed the hypothesis), time spent completing the survey (3 were under the a priori minimum), or self-reports of not having paid attention (3 participants). This left 272 participants (156 females, 114 males) with an age range from 19 to 76 years and a median of 34 years.

**Design.** The design of the study was an American identification x afterlife beliefs (AB) x 2(prime: MS vs. control) design with American identification and AB as subject variables and prime as a between-subjects factor. The dependent variable was participants' cultural longevity estimates. Based on the finding of Lifshin et al. (2018) that the plausibility of one form of immortality can decrease the need for another, analyses also examined the effect of MS on AB across levels of American identification. This served both to test whether the manipulation placed at the beginning of the survey had a problematic downstream effect on our moderator as well as to test for theoretically important shifts in worldview identification.

## Materials

**American identification.** The same scale (Schimel et al., 2007) used in Study 1 was adapted for use with American participants. The five-item measure asked participants to rate the degree to which they agree or disagree with items regarding their identification with the USA on

a seven-point scale (1 = *strongly disagree*, 2 = *disagree*, 3 = *slightly disagree*, 4 = *neither agree nor disagree*, 5 = *slightly agree*, 6 = *strongly agree*, 7 = *strongly agree*). Items in the scale were “I am proud to be American”, “I define myself as American”, “I would proudly display the American flag”, “Being American is an important part of my self-worth”, and “I identify strongly as American”. Items were averaged to form a composite for each participant ( $\alpha = .92$ ).

***MS induction.*** Participants were assigned through the randomization feature in Qualtrics to write about either their own death (MS) or about experiencing dental pain (control). In the MS condition participants responded to two open-ended questions regarding their mortality. In the control condition, participants responded to identically worded questions about experiencing dental pain (see Materials section of Study 1 for details).

***Filler materials.*** As in Study 1, participants completed the Brief Big-Five personality inventory (Saucier, 1994) prior to the MS induction, which was followed by the 60-item PANAS-X (Watson & Clark, 1991) and the Morningness and Eveningness scale (Horne & Östberg, 1976).

***Cultural longevity estimates.*** Participants then read the description of Cliodynamics (Turchin, 2008) which stated that it attempts to predict the trajectory and downfall of cultures. Then they answered the same two questions regarding the short description (“How accurate do you think predictions based on historical data can be?” and “What do you think is the greatest risk to America's survival?”). To measure cultural longevity estimates, which served as our main dependent variable, participants indicated on a sliding horizontal scale, ranging from 0 to 10,000 years (or longer), how long they believe America will continue to exist as a nation. After providing their longevity estimates, participants read a description of a new air-based commuter



system currently in development and answered three questions with regard to their attitudes towards it. This served to bolster the cover story and disguise our main dependent variable.

***Afterlife beliefs.*** The 10-item belief-in-afterlife scale (Osarchuk & Tatz, 1973) measured afterlife beliefs. Participants rated, on a scale ranging from 1 (*completely disagree*) to 9 (*completely agree*), the degree to which they agree or disagree with items concerning the existence of life after death (e.g., “Earthly existence is the only existence we have”; “There must be an afterlife of some sort”; see Appendix). Reverse coded items were recoded so that higher scores indicate higher afterlife beliefs and then all items were averaged to form a composite ( $\alpha = .90$ ).

***Suspicion probe.*** Participants answered three open-ended questions to check for suspicion (“What do you think the study was investigating?”; “Did you think any of the tasks you did were related in any way? If yes, in what way were they related?; and “Do you have any comments for the researcher?”). I informed them that I was interested in assessing participants’ perceptions of the study in order to get information to ensure the design of the study is sound. Participants read that their answers to these questions would not affect the research compensation they would receive or how I would use their data.

## **Procedure**

Participants signed up for the study through Amazon’s Mechanical Turk (MTurk) online crowdsourcing website and followed a link to the Qualtrics survey. They read that the study was investigating personality and scientific attitudes. This cover story hid the connection between the MS prime, the measured variables, and the dependent variable. Before beginning the study, participants read a consent form describing what their participation would entail. They had to consent prior to beginning the study.

After consenting, participants answered a demographics questionnaire in which the same cultural identification scale from Study 1 was embedded but modified to gauge identification with the USA. In this section we collected information on participant gender, age, American citizenship status, and political orientation (on a single-item 11-point scale ranging from “*Extremely Liberal*” to “*Extremely Conservative*”). Participants then wrote about either their own death or about dental pain. This was followed by the filler personality questionnaires serving as a delay and to disguise the manipulation.

Finally, participants answered three open-ended questions to assess suspicion followed by a thorough debriefing. They were then thanked, given the code required to claim their compensation, and provided with an opportunity to either re-consent or withdraw their data from analyses.

## **Results**

**Cultural longevity estimates.** Moderator variables were mean-centred and submitted to a test of moderation (i.e., three-way interaction) using model 3 of Andrew Hayes’ (2012) Process for SPSS. Prime (control = 0, MS = 1) served as the independent variable (X), American identification was the first moderator variable (W), afterlife beliefs were the second moderator variable (Z) and participants’ cultural longevity estimates (in years) were the dependent variable (Y). This model allows the moderation of X’s effect on Y by W to depend on Z and is thus appropriate for the current analysis because I predicted that afterlife beliefs would moderate the interaction between MS and American identification. Gender was included as a covariate since it was found to correlate with cultural longevity estimates,  $r = .14, p = .02$ .

The regression model for predicting cultural longevity estimates was statistically significant,  $F(8, 262) = 7.01, p < .0001, R^2 = 0.16$ . The effect of American identification was

statistically significant,  $\beta = .37, t = 5.59, p < .0001$ ; the more strongly participants identified with the US, the longer they believed it would last. The effect of MS was not significant,  $\beta = .12, t = 1.01, p = .31$ , nor was the effect of afterlife beliefs,  $\beta = .06, t = 0.54, p = .59$ . None of the two-way interactions were statistically significant (all  $ps > .18$ ; see Table 2). Gender emerged as a significant covariate such that men made larger cultural longevity estimates,  $\beta = .22, t = .54, p = .04$ .<sup>2</sup> Gender did not interact with any other variables and is therefore not discussed further. No significant effects were found for either of the other two questions in the scientific attitudes survey (“How accurate do you think predictions based on historical data can be?” and “What do you think is the greatest risk to America's survival?”), all  $ps > .40$ .

Table 2. Moderation model summary for study 2

	<i>b</i>	SE	<i>t</i>	<i>p</i>	95% CI	
					LL	UL
Constant	1711.09	553.37	3.09	< .01	621.46	2800.72
MS	364.30	360.84	1.01	.31	-346.22	1074.81
American identification	713.14	127.50	5.59	< .0001**	462.08	964.19
Afterlife beliefs	45.48	83.61	0.54	.59	-119.16	210.12
MS x American identification	286.38	245.97	1.16	.25	-197.94	770.70
MS x Afterlife beliefs	-148.43	168.56	-0.88	.38	-480.33	183.47
American identification x Afterlife beliefs	-79.55	52.22	-1.52	.13	-182.38	23.27
MS x American identification x Afterlife beliefs	-225.03	102.72	-2.19	.03*	-427.23	-22.77
Gender	705.61	347.03	2.03	.04*	22.29	1388.93

The predicted three-way interaction between MS, US identification and afterlife beliefs was statistically significant,  $\beta = .27, p = 0.03; \Delta R^2 = .02, F(1, 262) = 4.80, p = .03$ . Simple slopes analyses on the MS  $\times$  US identification  $\times$  afterlife beliefs interaction revealed only the predicted conditional effect: participants high (+1 SD) in US identification reported greater cultural longevity estimates after a death reminder, but only if they reported low (-1 SD) beliefs in an afterlife,  $\beta = .61, t = 2.08, p = .04$ ; no other conditional effects were significant (all  $ps > .17$ ; see Table 3).

Table 3. Conditional effect of MS (vs. control) on longevity estimates at values of afterlife beliefs

US identification	Afterlife beliefs	<i>b</i>	SE	<i>t</i>	<i>p</i>	95% CI	
						LL	UL
Low	Low	-576.99	607.65	-0.95	.34	-1773.50	619.53
	High	380.45	641.25	0.59	.55	-882.21	1643.12
High	Low	1966.49	944.69	2.08	.04*	106.34	3826.64
	High	-312.77	766.99	-0.41	.68	-1823.02	1197.48

\*\*Low = -1SD, High = +1SD

Slope difference tests (Dawson, 2006) were conducted through Hayes' (2012) PROCESS for SPSS. They revealed only the predicted significant contrast whereby the effect of MS on low afterlife believers who were high in US identification compared to low in US identification was marked by a difference in cultural longevity estimates of 2543 years, 95% CI [-4874, -213],  $p = .03$ . Put differently, non-believers who were low in US identification decrease their longevity estimates for their country by a predicted 577 years ( $p = .34$ ) after contemplating their death, whereas non-believers who were high US identifiers increased their estimates by a predicted

1966 years ( $p = .04$ ). Thus, while the increase in predictive capability added to the model from the three-way interaction is statistically modest, the effect reflected a nearly 2000-year increase in the believed longevity of one's culture.

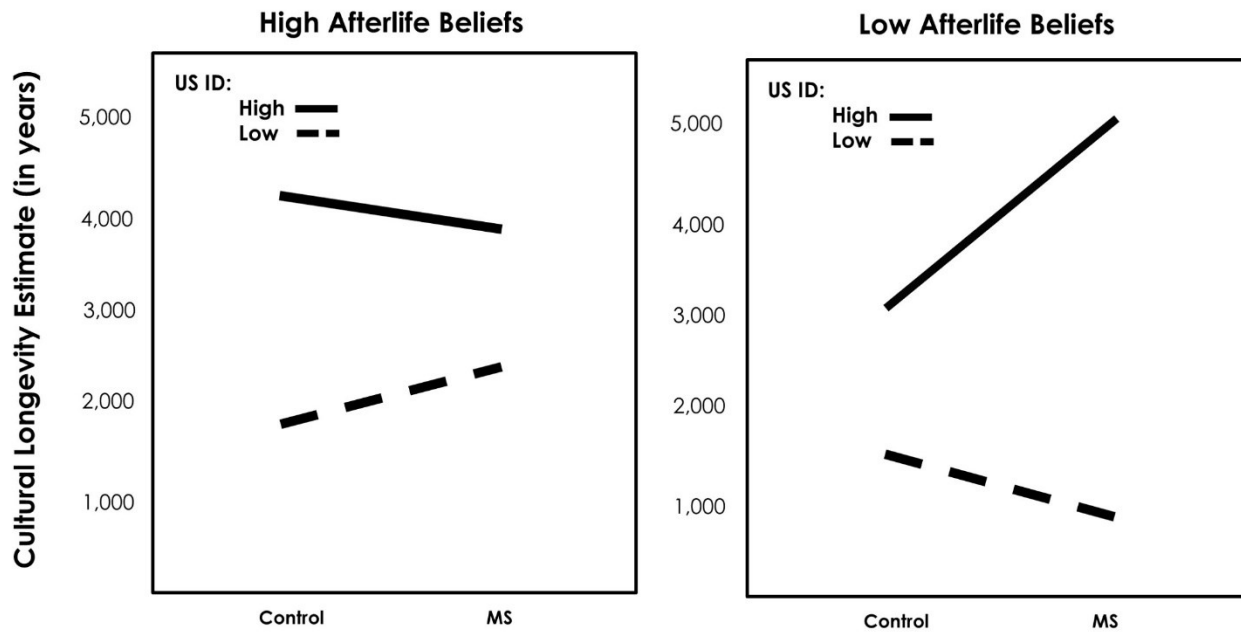


Figure 3. Conditional effects of MS by American identification on cultural longevity estimates at values of afterlife beliefs

Table 4. Descriptive statistics for Study 2

	M	SD	Range
Cultural longevity estimate (years)	2851.57	2.23	9986
American identification	5.29	1.62	6
Afterlife beliefs	5.55	2.23	8

As the second moderator variable (afterlife beliefs) was continuous, I conducted a second analysis using the Johnson–Neyman technique (Hayes, 2018; Johnson & Fay, 1950) to determine where the conditional interaction between MS and American identification transitioned between statistical significance and non-significance along the distribution of afterlife beliefs. The interaction between MS and American identification was only statistically significant among participants who are low (4 or below on the 9-point scale; the bottom 26% of the sample) in afterlife beliefs. As afterlife beliefs increase, the interaction is no longer statistically significant. Above this level of afterlife beliefs, American identification did not moderate the effect of MS on cultural longevity estimates. To my knowledge, this is the first quantification of how strongly an individual must endorse a particular worldview for it to play a part in their personal terror management strategy.

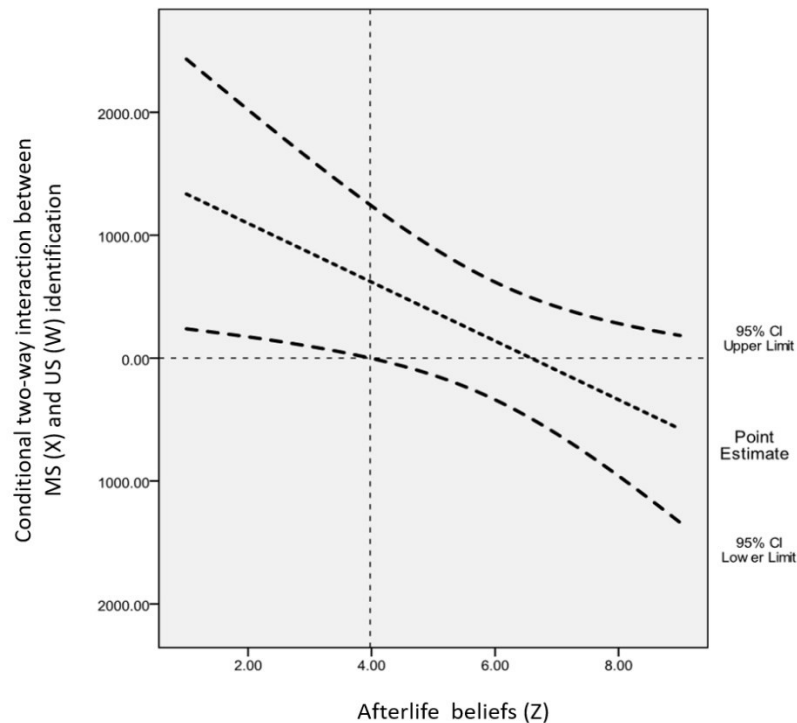


Figure 4. The conditional two-way interaction between MS and American identification as a function of afterlife beliefs (Z).

**Afterlife beliefs.** Because I necessarily placed afterlife beliefs at the end of the survey to avoid priming death thoughts among both MS and control participants, I conducted analyses using this measure as a dependent variable. I first tested for a three-way interaction between MS (X), American identification (W) and cultural longevity estimates (Z). The three-way interaction was non-significant ( $p = .87$ ) as was the effect of cultural longevity estimates on afterlife beliefs ( $p = .52$ ), thus, this variable was dropped from further analyses and I submitted MS (X), American identification (M) to a test of moderation using Hayes' (2012) PROCESS model 1 with afterlife beliefs as the dependent variable (X).

The regression model testing the two-way interaction between MS and US identification was significant,  $F(3,268) = 5.16, p < .01, R^2 = .06$ . In line with the prediction that increased beliefs in one avenue to immortality would coincide with decreased beliefs in other avenues, I found a significant two-way interaction between MS and American identification,  $\beta = -.38, t = -3.00, p < .01$ . Follow-up analyses revealed that participants high in US identification significantly decreased their afterlife beliefs after a death reminder,  $\beta = -.40, t = -2.41, p = .02$ . Those low in US identification marginally increased afterlife beliefs after a death reminder,  $\beta = .35, t = 1.96, p = .05$ . This finding suggests that not only can the possibility of indefinite life extension (i.e., amortality; Lifshin et al., 2018), decrease one's need for literal immortality, but symbolic immortality can likewise substitute the need for literal immortality and vice versa. The only other significant main effect or interaction was a main effect of US identification on afterlife beliefs indicative of a positive correlation between the two,  $\beta = .16, t = 2.11, p = .01$ . Participants scoring average on both measures showed no fluctuation in their beliefs,  $\beta = -.02, t = -0.19, p = .85$ . This balance of moderate investment in two different cultures seems then to negate the need to double down or diminish beliefs in peripheral worldviews and may hint at a

more stable basis for anxiety buffering. I discuss the problematic nature of this finding for the main analyses below.

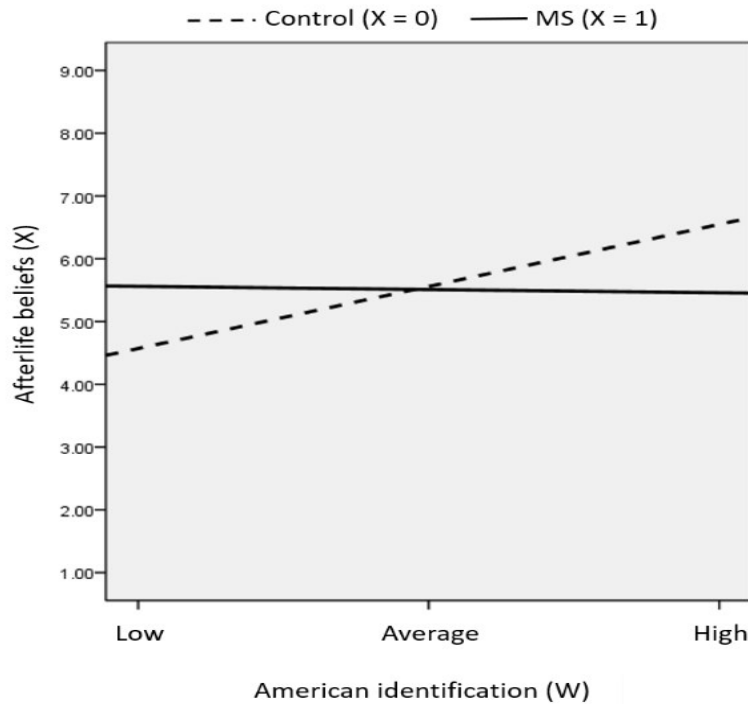


Figure 5. Moderation of the effect of MS on afterlife beliefs by American identification.

## Discussion

Study 2 attempted to demonstrate and refine the immortality hypothesis with increased methodological and statistical rigor. Using continuous variables in a test of moderation, I found that those scoring high on a measure of worldview identification engaged in projecting it into the future after a death reminder but only if they did not have strong convictions that they were literally immortal. Perhaps more importantly, this study provided the first evidence that there may be an “immortality quota.” It appears that, so long as we heavily invest in one route to immortality, we need and want only that single avenue. This finding supports the cognitive miser view of human cognition but not the suggestion that there is an immortalization hierarchy. It seems that, for some reason, we forsake other routes to immortality in the face of death, perhaps



because we must be fully committed to a worldview in order to reap the existential benefits of membership. This study suggests that people seem to abandon secondary immortality projects after a death reminder because strongly investing in only one avenue may be more anxiety buffering than dissipating our character shield weakly across an array of projects. This idea of spreading our immortality eggs across baskets has been advanced by the founders of TMT (Solomon, Greenberg & Pyszczynski, 2015) but this and the recent study by Lifshin et al. (2018) provide the first preliminary evidence of its potential as a topic of research and eventual application.

To avoid inadvertently reminding participants in the control condition of death, Study 2 necessarily placed the afterlife beliefs measure at the end of the survey. The online nature of the study required the use of a post-treatment variable as a moderator – a practice that can cause problems for analyses if the treatment had an impact on the moderator. There was no main effect of MS on afterlife beliefs. However, there was a significant two-way interaction between MS and American identification on afterlife beliefs such that those low in American identification increased afterlife beliefs after MS, whereas those high in American identification decreased their belief in an afterlife after MS. The effect was opposite but of nearly identical strength for high ( $b = -.89$ ) and low ( $b = .79$ ) American identifiers. As a result, this interaction effectively flattened the positive relationship between American identification and afterlife beliefs for those in the MS condition (see Figure 4). Due to the impact of the independent variable in conjunction with American identification, we should be cautious when making claims based on the analysis using afterlife beliefs as a moderator. Ideally, the study should be replicated with participants completing the afterlife beliefs scale in advance of the study in order to avoid this issue and verify the findings.

## **General Discussion**

In his final work, Ernest Becker (1975) admitted to an intellectual omission present in his previous efforts and explicitly added the organizing concept of cultural immortality striving to his synthesis of thought on the human condition. He saw that the drive to maintain self-esteem was too abstract and that its existential utility, really, was rooted in its signifying one's immortalization through culturally constituted heroism. The present program of research offers the first direct empirical support of this immortality hypothesis and quasi-experimentally bridges the gap between cultural worldviews and symbolic death transcendence.

Across two studies, reminders of death led to an increased belief in the temporal persistence of our founts of immortality. In Study 1, highly identified Canadian participants believed their country would last longer under conditions of mortality salience, presumably because they believe that a piece of themselves will live on through their nations. Study 2 utilized a different worldview (the USA) to refine this finding by showing that there is a complex relationship between the worldview components that make up our character shields: only those who reported low faith in literally living on after death showed an increase in their cultural longevity estimates for America. Together, these studies add important insights to the TMT literature while offering a promising paradigm to test further theoretical intricacies.

### **Limitations**

Study 1, due to sample size limitations, utilized an outdated and outmoded statistical method for analyses. This proved useful in informing the design of Study 2 but rendered the results preliminary. Second, given that Study 2 failed to replicate the two-way interaction between cultural identification and MS, there appears to have been a difference in sample composition between Study 1 and Study 2. Indeed, this was likely the case due to another

unrelated study concurrently running within the same subject pool, which necessitated the restriction of those high in religiosity from participating in Study 1. I restricted highly religious participants from signing up for Study 1 in order to collect enough data for the unrelated study as these participants are in high demand in university research. As a result, I effectively recruited only those with low afterlife beliefs, thus, explaining the significant effect of MS that emerged through the secondary analyses. The result of this, as it turns out fortuitous, oversight supports the claim that increased cultural longevity estimates are not simply a product of classical worldview defense. Previous studies show that MS increases worldview defense (e.g., Rosenblatt et al., 1989) without including afterlife beliefs as a moderator. Therefore, the apparent need to select only non-religious participants to detect an MS effect on cultural longevity estimates suggests that they measure immortality striving specifically and not worldview defense generally. Further to this point, the finding of Study 2 that only low (vs. high) afterlife believers increase cultural longevity after MS, suggests that enhanced cultural longevity estimates in response to MS likely reflects a symbolic immortality motive rather than a general tendency to enhance the positivity of the worldview.

TMT interprets worldview defense as indirect immortality striving due to the necessity of one's immortality project to survive during and beyond our lives in order for it to provide death transcendence (Greenberg, Pyszczynski, & Solomon, 1986). We defend our worldviews against external and internal forces because, if it is discredited or destroyed, so to is the road to immortality on which we stand. As such, any attempt to disentangle immortality striving entirely from worldview defense will prove difficult. Yet it must be attempted and hopefully approximated if we are to show that cultures grant psychologically beneficial promises of self-perpetuity – that they are more than meaning making machines.

Insofar as I have potentially measured an, albeit novel, form of worldview defense, is it possible that those with strong afterlife beliefs are simply less defensive in the face of death? Perhaps, but it is exceedingly unlikely given humanity's grim history of killing each other to prove the existence of a particular God or gods. Several TMT studies support this refutation by showing extreme defense of literal-immortality-based worldviews by their adherents under threat conditions (e.g., Hayes et al., 2008; Pyszczynski et al., 2006; Harmon-Jones et al., 1997). The most plausible explanation for the results of Study 2 seems to be that individuals high in afterlife beliefs already have an alternate, potentially more effective, avenue to immortality that negates the existential need for symbolical alternatives.

In Study 2, afterlife beliefs were measured at the end of the survey to avoid inadvertently priming participants in the control condition with mortality. Problematically, the interaction between MS and American identification impacted the moderator. While this necessitates replication efforts of Study 2 in order to demonstrate that the three way interaction holds when afterlife beliefs are measured pre-manipulation, it offers a glimpse into the process of fluid compensatory responses to MS and hints at differential reactions between those with high and low worldview complexity.

### **Theoretical Implications**

This research provides important support for the previously unstudied assumption in TMT that secular worldviews that cannot grant its members access to a post-mortem paradise nevertheless provide existential comfort by promising endless life elsewhere. The reported studies demonstrate that individuals psychologically extend their worldviews into the future but they do not directly demonstrate that this provides equanimity. However, in conjunction with the larger body of TMT research, these studies begin to form a clearer picture of an existential

psychology. If we combine the insights from Schimel et al. (2007) with the current findings, we see that individuals defend their nationalistic worldview, make larger cultural longevity estimates in response to MS, and show detectable increases in death thought accessibility when their nation is threatened. Together, these studies hint strongly at an immortality drive that we have caught glimpses of over the past three decades of TMT research.

The interaction between worldview components is not well understood as most studies have recruited only those scoring in the extreme on measures of worldview investment. Or alternatively, studies often examine worldviews that are supported strongly by the vast majority of its members and who are thus less likely to invest simultaneously in peripheral worldviews. The shift in psychology toward continuous variables as opposed to dichotomized or preselected groups will help to shed light on how worldview complexity determines defensive compensatory reactions to death (e.g., see Study 2). The existing literature implies that only those who are highly invested in a worldview utilize it in their endeavour for deathlessness. In other words, TMT makes the prediction that only those who have aimed vigorously to live on through a particular worldview will bother to defend it and project it into the future after a death reminder. Researchers have, for the most part, limited the scope of our studies to these individuals and it is therefore difficult to fully support this claim. Study 2 provides some of the first evidence that this taken-for-granted assumption is warranted and pinpoints the level of commitment to a worldview (afterlife beliefs) at which it is detectably important for one's existentially crucial character armor.

Due to the file drawer problem in psychology, it is difficult to know if researchers have attempted to study individuals at lower levels of worldview investment and failed to find terror management consistent effects, or if this has been a practical artefact of the classical TMT

paradigm. Given that selecting only those reporting high investment is theoretically consistent and empirically sensible, it is quite likely that there is not a large undisclosed pile of failed studies in this area; psychological researchers are necessarily pragmatic and, until recently, motivation to include the entire spectrum of scores on any given scale has been low.

### **Future Directions**

With the above limitations in mind, these studies pave the way to answering two important questions that investigators should explore if we are to move beyond a traditionally descriptive existential psychology toward prescriptive applications of TMT. First, to the extent that we have limited cognitive resources, and that the investment in belief systems is taxing, is it generally more existentially beneficial to commit strongly to one avenue to immortality or to invest simultaneously in two or more forms less intensely? Second, is it possible that investing in several avenues to immortality, that is, increased worldview complexity, is a more balanced and less destructive way to engage with our shared precariousness? In other words, those with highly complex worldviews may be less prone to the detrimental terror management reactions that have been thoroughly documented; individuals who have several avenues to immortality might not react as defensively when one is threatened because their sole route to self-permanency has not been questioned or blocked. However, it may be the case that worldview complexity inhibits outward destruction while simultaneously being more easily destroyed. Nevertheless, if the aim of TMT has been to advance Becker's "science of man", then the end goal of the project should be to take our data concerning the human condition and make something useful of them.

Furthermore, this study provides a novel paradigm that may prove fruitful for other theoretically important topics of study. Namely, it is as of yet unclear in TMT if self-esteem simply acts as a general anxiety buffer that serves double duty as an existential shield or if, in

addition to this general use, it is existentially protective because of its immortality signifying properties (Greenberg et al., 1992). Self-esteem does not necessarily need to act as a gauge for one's immortality for it to be existentially useful. Both underlying functions likely coexist; however, they may manifest themselves in different ways and under different conditions. Future studies using a modified paradigm from the one presented here could test this and related hypotheses by stripping the immortalizing functions of worldviews (i.e., their cultural longevity) before measuring defense of, and self-esteem striving within, those worldviews.

### **Conclusion**

*We can conclude that a project as grand as the scientific-mythical construction of victory over human limitation is not something that can be programmed by science. Even more, it comes from the vital energies of masses of men sweating within the nightmare of creation – and it is not even in man's hands to program. Who knows what form the forward momentum of life will take in the time ahead or what use it will make of our anguished searching. The most that any one of us can seem to do is to fashion something – an object or ourselves – and drop it into the confusion, make an offering of it, so to speak, to the life force.*

- Ernest Becker “The Denial of Death”

We humans have, in ignorance of our pursuit of immortality, caused great destruction across epochs. Of course, there are also monumental feats of death denial that we can point to and claim that they balance the scale of creation and destruction. But perhaps, through the anti-entropic evolution of the mind and the resultant self-reflectivity that make up human psychology, we can – while always falling short of the impossible goal of institutionalized authenticity – tip the scale ever so slightly toward the constructive and away from the destructive. At the risk of

stretching the available data too far, the present findings regarding immortality striving and worldview complexity set the scene for some interesting and important possibilities of what we can make of a terror management theory.

Homer's Iliad describes Achilles as a man of abnormally low worldview complexity; he was obsessed with legacy and knowingly turned his back on the Gods and all other forms of immortality. Achilles was famously and fiercely destructive in this project. On the other hand, his rival, Hector, is portrayed as a man high in worldview complexity and self-awareness; he was a deeply patriotic, father, who respected the Gods, and was destined to leave behind a legacy of peace and caring had he not been forced into war and then killed by Achilles. These divergent outcomes are tellingly reflected in a common etymological theory of their names: Achilles means "he who has the people distressed" whereas Hector means "he who holds everything together" (Palmer, 1963). This insight may be key to a more peaceful coexistence in our increasingly globalized world. On the other hand, it might be equally informative that Achilles' single-minded pursuit of eternal glory lead to victory for the Greeks while Hector's dispersal of death defiance strategies was unable to protect him or his culture.

A highly complex worldview, while theoretically less outwardly destructive, may simultaneously be less protective when gazing into the abyss or staving off conquerors. As seems to be so often the case, a more peaceful human existence may come at the cost of some personal equanimity. But perhaps if we can devise ways to foster an awareness of our immortality projects and increase worldview complexity without sacrificing too much stability, we may discover that we have done something useful with Becker's offering to the life force, and "perhaps it will introduce just that minute measure of reason to balance destruction" (Becker, 1975, p. 170).



Notes.

<sup>1</sup> Another analysis maintained the average group to form a 2(MS vs. control) x 3(Canadian identification: Low vs. Average vs. High) ANOVA and revealed the same pattern of statistically significant and non-significant results.

<sup>2</sup> While this gender difference was simply used as a covariate here, it could be followed up in future studies to shed light on the controversial issue of gender differences in immortality striving. In recent years, Ernest Becker has been criticized for having invoked “regressive patriarchal ideologies that reinforce the institutionalized pattern of male dominance in society.” (Ernest Becker Foundation, 2015). Much of this criticism is directed at his use of language (e.g., “Man” in its original etymological sense to refer to humanity in general) but he also, on a few occasions (e.g., Becker 1973), made the claim that men, due to paternity uncertainty and the inability to personally give birth, may pursue forms of symbolic immortality more intensely. Study 2 hints at the possibility that if what Becker was saying was that men invest more in non-child-bearing forms of symbolic immortality, he may have been onto something. Of course, this study does not demonstrate that women invest less because they are capable of having children and thus future studies would need to be conducted before making that leap.

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## **Appendix: Scales used in Study 1 and Study 2**

### Canadian identification

I am proud to be Canadian.

I define myself as Canadian.

I would proudly display the Canadian flag.

Being Canadian is an important part of my self-worth.

I identify strongly as a Canadian.

### Afterlife beliefs

Earthly existence is the only existence we have.

In the premature death of someone close, comfort may be found in knowing that the deceased still exist.

Humans die in the sense of “ceasing to exist.”

The idea of there existing somewhere some sort of afterlife is beyond my comprehension.

We will never be united with those deceased whom we knew and loved.

There must be an afterlife of some sort.

Some existentialists claim that when a person dies they cease to exist: I agree.

The following statement is True: “There is no such thing as a life after death.

Millions of people believe in a life after death: they are correct in so believing.

Enjoy yourself on earth, for death signals the end of all existence.