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# Does our fear of death stem from threatened belongingness?

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Does our fear of death stem from threatened belongingness?

A Doctoral Dissertation

Presented to the Department of Psychology in  
Partial Fulfillment of the Requirements for the Degree  
of Doctor of Philosophy

By Stanislav Treger

June 1, 2015

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## **Biography**

Stanislav Treger was born in Kiev, Ukraine, on October 9th, 1987. In 2005, he graduated Vernon Hills High School in Vernon Hills, IL. He received his BA (*Cum Laude*) in Psychology from Northern Illinois University in 2009 and a dual sequence MA in Social Psychology and Quantitative Psychology at Illinois State University in 2011.

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## Abstract

In this dissertation, I examine the relative contribution to worldview defense (i.e., upholding one's cultural worldviews) provided by the thoughts of one's death and perceptions of curbed close relationships.

The need to belong, to form meaningful and strong ties with others, is what many social psychologists believe to be one of the most fundamental and strongest motivations that humans possess (Baumeister, 2012; Baumeister & Leary, 1995; Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Tomasello, 2014). The human brain is “hard-wired” to be around others (Beckes & Coan, 2011). In fact, large social group sizes of humans' evolutionary past may have contributed to the large brain that modern humans possess today—a large brain with high cognitive ability is required to solve complex social problems such as attributing others' mental states (Dunbar, 1998, 2003, 2009). Terror Management Theory (Greenberg & Arndt, 2012; Greenberg, Pyszczynski, & Solomon, 1986), however, suggests that humans' high cognitive ability also allows for knowledge that death will inevitably arrive one day. This knowledge creates a state of “paralyzing” anxiety and drives what Terror Management Theorists believe to be the most fundamental of human motives: avoiding death. To overcome this anxiety, persons turn to their cultural worldviews to boost their self-esteem and assuage the existential crisis evoked by the thought of death.

Although Terror Management Theory has received an impressive array of empirical support since its introduction, it has left one particular and important question unaddressed: *why* is it that humans fear death? Rather, Terror Management Theory simply assumes that humans do so. One possible reason behind this fear reflects the human need to belong. Being ostracized or

excluded by others may be one of the most painful experiences humans may face, physically and cognitively. For example, being ostracized can decrease one's sense of meaning (Stillman, Baumeister, Lambert, Crescioni, DeWall, & Fincham, 2009). Distress following social exclusion may even equate to experiencing physical pain (e.g., DeWall & Baumeister, 2006; MacDonald & Leary, 2005). The negative effects of ostracism may extend to simply observing others being excluded (Wesselman, Bagg, & Williams, 2009). Collectively, the physical, emotional, and cognitive distress following ostracism is strong enough for some to call ostracism "social death" (Case & Williams, 2004; Williams, 2007a).

In this dissertation, I propose that "social" and "actual" death may not be too different. More specifically, death may perhaps be conceptualized as permanent social exclusion, or an everlasting threat to the fundamental need to belong (Leary, 2004). Upholding one's cultural worldviews, as consistently documented in Terror Management Theory research (Greenberg & Arndt, 2012), may reflect persons attempting a re-establishment of social connectedness and to assuage their threatened need to belong.

I tested these ideas in five studies. The results of a qualitative analysis of persons' stream of consciousness on their own death revealed social themes. A second survey study suggested that social loss is indeed a dimension of death-related fears. In Experiments 1 and 3, I replicated the worldview defense effects of mortality salience (MS; i.e., more negative evaluations of anti-American essays). Still, I was unable to find evidence for increased death thought accessibility following MS (Experiment 2). Experiment 1 revealed that thinking about both the loss of relationships and the end of the world (where all humans cease to be) lead to worldview defense. Experiment 2 suggested that belongingness hindered the accessibility of death-related thoughts.

Finally, a mediation analysis in Experiment 3 suggested that the link between MS and worldview defense may be grounded in belongingness.

I discuss these findings in the framework of theories reflecting humans' strong need to belong, and consider possible alternative explanations grounded in TMT.

*It will happen to all of us; that at some point you get tapped on the shoulder and told, not just that the party's over, but slightly worse—the party's going on, but you have to leave; and it's going on without you. That's the reflection that I think most upsets people about their demise.*

-Christopher Hitchens

## **Introduction**

The term “death” is often conceptualized as a physical biological phenomenon—when an organism ceases cellular function. Death, however, may come in another form. When one’s social ties wane, such as through social exclusion or loneliness, they experience “social” death (Baumeister, Brewer, Tice, & Twenge, 2007; Cacioppo & Patrick, 2008; Case & Williams, 2004; Williams, 2007a). Although seemingly discrepant, “actual” and “social” death may be similar to one another. Whereas in “actual” death, one ceases to be; in social death, one’s social relationships cease to be, threatening the fundamental need to belong (i.e., form meaningful ties with others; Baumeister, 2012; Beckes & Coan, 2011; Tomasello, 2014) and inducing a myriad of negative outcomes on mental and physical stress, which may in and of itself lead to “actual” death (e.g., Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015).

Although there may be possible similarities between death of the “actual” and “social” kind (specifically, thinking about actual death versus experiencing or thinking about social death), researchers have not examined them side-by-side. Still, two different theories have offered perspectives to each type of death. The first theory, the *Need to Belong Theory* (NTB; Baumeister & Leary, 1995), suggests that the most fundamental of human motivations is to form meaningful ties with others. When this motivation cannot

be met, a person would experience what some call “social” death (Williams, 2004). The second theory, *Terror Management Theory* (TMT; Greenberg, Pyszczynski, & Solomon, 1986), targets actual death. TMT suggests that humans possess an innate powerful fear of death. This fear leads to the strongest motivation of all: avoiding death and unconsciously suppress any thoughts of it.

The purpose of this research is to compare and contrast why people fear death in accordance to NTB and TMT. Specifically, I propose is that thinking of “actual” death may evoke psychological distress and anxiety because “actual” death signals a *permanent* end of all of the social relationships one has formed and maintained throughout life—actual death signals social death that cannot be prevented or assuaged. I begin with a discussion of “actual” death and TMT.

### **A Brief History of (Actual) Death**

Perhaps one of the most influential accounts of human’s fear of death was that of philosopher and anthropologist Ernest Becker (1973/1997). Becker believed that the most fundamental and strongest fear that humans possess is the fear of death. Based psychoanalytic theory, Becker proposed that human constructed culture to aid in assuaging that innate strong fear of death that we have as self-aware animals. At first glance, Becker's idea is relatively simple. Death is certainly not a pleasant thing about which to think; and people may not ponder about it often. Yet, the details behind his reasoning are fairly complex. Becker’s approach to death was philosophically dualistic. On one level is the physical body, which will inevitably perish once life ends; and on the other level is the symbolic self, which strives for *symbolic* immortality through its



adhesion to culture, which was constructed by humans to alleviate the fear of death.

Becker believed that the physicality of the human body acts as a reminder of their inevitable demise, as the body eventually ceases function. Thus, thinking about the body may equate to thinking about death, which evokes strong fear and anxiety. His account of death and why humans fear it influenced one of the most prominent social psychological theories of the last two decades: TMT.

### **Terror Management Theory: Managing the Fear of Our Inevitable Demise.**

Greenberg, Pyszczynski, and Solomon (1986) originally introduced their Terror Management Theory (TMT) as a way to explain the need for high self-esteem. This theory suggests that humans' (unique) ability to be self-aware allows for knowledge of the inevitability of death. The "animalistic" motivation for self-preservation, combined with the "intellectual" awareness of death, creates an existential dilemma for humans: every action, desire, possession, or idea they may contribute will perish and be forgotten. In turn, when the thought of death is salient, it creates a potential for paralyzing anxiety and terror (for reviews, see Greenberg & Arndt, 2012; Pyszczynski, Greenberg, & Solomon, 1997; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004). Because death is perhaps the only unavoidable fate that humans have, these theorists believe that TMT may account for "...most, if not all, significant domains of human behavior" (Greenberg & Arndt, 2012, p. 406).

TMT suggests that the thought of death is unconsciously suppressed as a defense mechanism; yet, thoughts of death may be highly consciously accessible. To solve this problem, humans, being adaptive creatures, constructed culture: a system of standards and values that provide the promise of immortality that is both literal (i.e., cultural

constructs that promise some sort of an afterlife—e.g., religion) and symbolic (i.e., feeling as if the self is part of something larger and more significant than their own life—e.g., familial connections), should its standards be met (Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004).

The central construct to TMT is *self-esteem* (Greenberg et al., 1986; Pyszczynski et al., 2004). According to TMT, self-esteem is a personal value that is reflective of the belief that one's cultural worldview is valid; and that one is living by the standards of said worldview. In other words, abiding by one's cultural worldview promotes high self-esteem (Pyszczynski et al., 2004). Low self-esteem, on the other hand, motivates one to uphold one's cultural worldviews to reach desired high level. Thus, high self-esteem is a product of (successfully) upholding one's cultural worldviews, and low self-esteem serves as a motivator to uphold said worldviews (Greenberg & Arndt, 2012; Pyszczynski et al., 2004).

**Soliciting thoughts of death.** According to TMT, albeit suppressed unconsciously, rousing conscious thoughts of death is relatively simple. In other words, to bring about death from the unconscious to the conscious, one must simply be reminded that they will one day die (i.e., mortality salience [MS]; Greenberg & Arndt, 2012). This claim led to the creation of the standard manipulation of MS that is widely used in TMT research. Specifically, participants write about two things: (1) the thoughts on what will happen to them as they die; and (2) the emotions they will feel as they are dying (e.g., Rosenblatt, Greenberg, Solomon, & Pyszczynski, 1989). As a control condition, people

are presented with similar primes that focus on other topics that are either neutral (e.g., a visit to the grocery store) or unpleasant yet not deadly (e.g., dental pain).

**The existential crisis of death.** Since its inception, an ample amount of evidence has accumulated to support the claim that MS induces worldview defense and related concepts (for a meta-analysis, see Burke, Martens, & Faucher, 2010). One example of a violation of worldviews, at least for Americans, is prostitution. This is seen as immoral to many in the United States and thus, it threatens cultural worldviews (Brehman, 2010). Rosenblatt et al. (1989) demonstrated that following MS (using the writing prime), participants (court judges and college students alike) placed higher bonds for arrested prostitutes compared to those who did not write about anything. Attitudes about prostitution moderated this effect. MS led to higher bonds only for those who possess negative views towards prostitution (for those viewing it non-negatively, prostitution does not challenge their worldviews and thus, is not affected by MS).

The effects of MS on worldview defense are not limited to bonds for arrested prostitutes. Other studies have shown that MS may lead persons to: deride outgroups (who may challenge worldviews) such as those of different religions (Cohen, Soenke, Solomon, & Greenberg, 2013; Greenberg, Pyszczynski, Solomon, & Rosenblatt, 1990); support attacks on foreign martyrs (Pyszczynski, Abdollahi, Solomon, Greenberg, Cohen & Weise, 2006); put more hot sauce on a cracker that would supposedly be given to a person of an opposing political orientation (McGregor et al., 1998); and praise others who uphold one's cultural worldviews (Greenberg et al., 1990). Similarly, when Americans thought about death, they supported the re-election of then President George W. Bush in 2004 (Cohen, Ogilvie, Solomon, Greenberg, & Pyszczynski, 2005); and when

Americans thought about the September 11, 2001 attacks on the World Trade Center (vs. the control topic of an upcoming exam), they supported (then) President George W. Bush to a greater degree (Landau et al., 2004).

Following MS, people uphold other facets of worldviews as well, including Americans donating less to foreign charities (Jonas, Sullivan, & Greenberg, 2013) and upholding salient social norms (Jonas & Fritsche, 2012; Jonas, Martens, Niesta Kaiser, Fritsche, & Greenberg, 2008). Reflecting these findings, having one's worldview challenged may lead to increased thoughts of death (Friedman & Rholes, 2006). Likewise, those who have relatively high (vs. low) trait symbolic immortality (i.e., anticipatory response to the inevitability of death) tend to fear death less (Florian & Mikulincer, 1998).

Interestingly, the effects of MS may extend beyond facets of worldview defense and into some dimensions of daily life. Researchers have observed that MS can lead persons to avoid any stimuli that may induce self-awareness (Arndt, Greenberg, Simon, Pyszczynski, & Solomon, 1998); evaluate wilderness (and nature) less favorably (Koole & Van den Berg, 2005); report greater degrees of endorsement of religion and belief in the supernatural (Norenzayan & Hansen, 2006); increase desire for children (Fritsche, Jonas, Fischer, Koranyi, Berger, & Fleischmann, 2007); increase attachment to one's parents (Cox, Arndt, Pyszczynski, Greenberg, & Abdollahi, 2008); evoke parenting-related cognitions (Yaakobi, Mikulincer, & Shaver, 2014); evaluate local foods more favorably (Friese & Hofmann, 2008); evaluate expensive objects more favorably (Mandel & Heine, 1999); increase the will to exercise (Arndt, Schimel, & Goldenberg, 2003); and even prefer television programs about law and justice (Taylor, 2006).

Reflecting Becker's (1973/1997) philosophy, TMT theorists have proposed that any thoughts about one's physical body promote death-related anxiety, as one's body is a physical object that will surely perish one day. Reminders of one's physical body can be achieved via several routes. For example, thinking about physical aspects of sexuality and reproduction, such as pregnant women (Goldenberg, Goplen, Cox, & Arndt, 2007), breastfeeding (Cox, Goldenberg, Arndt, & Pyszczynski, 2007), or sex itself (Goldenberg, Cox, Pyszczynski, Greenberg, & Solomon, 2002) can induce existential anxiety and worldview defense. Likewise, thinking about death can induce disgust to body products and animals and preferences for essays about discrepancies between animals and humans (Goldenberg, Pyszczynski, Greenberg, Solomon, Kluck, & Cornwell, 2001). Thus, one's body appears to serve as a "natural" or "consistent" reminder of mortality.

**Buffering the anxiety of death.** Just as MS may lead to a myriad of negative outcomes, certain variables can aid in buffering persons' reactions to thinking about death. As TMT suggests, (high) self-esteem can buffer death-evoked existential anxiety (Greenbert et al., 1986). Indeed, several studies have documented that persons with high self-esteem do not succumb to the worldview defense reactivity following MS (Harmon-Jones, Simon, Greenberg, Pyszczynski, Solomon, & McGregor, 1997; Koole, Sin, & Schneider, 2014). Conversely, low self-esteem can increase one's death anxiety, leading to increased worldview defense and other negative psychological outcomes. For example, MS may lead to those with low self-esteem to experience more anxiety and negative affect versus those with high self-esteem (Routledge, Ostafin, Juhl, Sedikides, Cathey, & Liao, 2010).

Another route to buffer negative outcomes stemming from MS is through persons' close relationships, as TMT suggests that close relationships can promote symbolic immortality (e.g., being remembered by loved ones) as well as provide a basic route of anxiety reduction (Mikulincer, Florian, & Hirschberger, 2003). For example, when a relationship is threatened, such as when thinking about a romantic partner leaving said relationship (Mikulincer, Florian, Birnbaum, & Malishkevich, 2002) or having problems in the relationship (Florian, Mikulincer, & Hirschberger, 2002), persons experience heightened death thought accessibility (i.e., they complete ambiguous word fragments with death-related words) and worldview defense. The inverse also appears to hold—thinking about one's relationships reduces worldview defense (Florian et al., 2002).

**A lingering question.** As prolific as the work on TMT has been, researchers have left open one particular question central to the theory: just *why* is it that we are afraid of death? The answer to this question may begin with human evolution itself. Stemming from millennia of group living and problem solving, our highly-social nature (Baumeister & Leary, 1995; Tomasello, 2014) has left us especially vulnerable to social cues and influences; especially cues of social cohesion and connectedness (and lack thereof). Thus, losing one's relationships can lead to a myriad of detrimental effects as the brain would not be able to do what it was "designed" to do (Beckes & Coan, 2011). The prospect of losing our relationships may be a key contributor to why we fear death—one cannot fulfill the basic yet strong motivation to form and maintain social bonds (Baumeister & Leary, 1995) after death.

### **The Story of Our Social Life**

Evolutionary theorists have long acknowledged the importance of human bonds to the origin and development of the species. In fact, these social bonds may be the reason behind humans' large brain and the advanced cognitive abilities that it affords. According to the *Social Brain Hypothesis* (Adolphs, 2009; Dunbar, 1998, 2009; Dunbar & Shultz, 2008), a strong positive relation exists between the size of apes' and monkeys' social group and their neocortex ratio (i.e., ratio between neocortex and the rest of the brain). In other words, with a bigger social group comes a bigger brain and in turn, more sophisticated cognitive abilities (early humans' group size is estimated to be approximately 150; Dunbar, 1993). Within these groups, the neocortex ratio is also positively correlated with social variables such as the number of females in the group, the rate of deception, and the frequency of social learning (Dunbar, 2009; Dunbar & Shultz, 2007).

Humans (as well as many of their simian relatives) evolved and live in a complex social world. This social world entails many responsibilities, from play, to grooming, to hunting. Managing these duties requires elaborate cognitive skills that beget the development of a larger brain. As much as playing and grooming require complex cognitive skills, one of the most important of the factors that shaped the development of our large brain, however, is the lifelong pair bond in mating (Dunbar, 2009). The pair bond, especially when offspring are present, requires one to solve numerous problems. Both parents must exhibit behavioral coordination to ensure that their young survive. This necessary coordination may have led to the rise of important social-cognitive phenomena such as theory of mind—inferences of others' mental states, such as wants and needs (Dunbar, 2009).

Our social relationships undoubtedly affect numerous facets of our every day life—so much so that some proposed that the need to belong, to form meaningful ties with others, is at the epicenter of human psychology (Baumeister & Leary, 1995; Tomasello, 2014). The brain may be “hard-wired” to be in a social environment (Beckes & Coan, 2011). Evolutionary psychologists have long acknowledged the importance of relationships, of both coalition and pair-bonds, as they are vital to the survival and proliferation of the human species (Buss, 1995, Buss & Schmitt, 1993; Confer et al., 2010; Navarrete, Kurzban, Fessler, & Kirkpatrick, 2004). Some of these relationships are required for evolution to progress. Evolution cannot advance without reproduction (which entails the pair-bond social relationship). Sex is required to pass one’s genes down to the next generation. This (reproductory) pair-bond may very well be another one of the basic needs of human life (Kenrick, Griskevicius, Neuberg, & Schaller, 2010). Likewise, coalition is necessary to provide resources such as food and protection (Navarrete et al., 2004).

**From the brain to the society.** The Social Brain Hypothesis (e.g., Dunbar, 1998) highlights the importance of social groups and bonds to the development of our large brain. Indeed, this notion is reflected by the discovery of the *human mirror system*: a system of neurons in the brain which activates when a person executes a behavior or observes another execute said behavior; Rizzolatti & Craighero, 2004), suggested that the self and other neuronal representations in the brain overlap—humans do not perceive others too differently than they perceive the self (Decety & Sommerville, 2003). As animal evolution is shaped by their environment, they become representations of said environment (e.g., birds’ ability to fly is a representations of the constrains in the



trajectory of their evolution). Humans, evolving in a social environment, are thus a representation of sociality; they are *about* their relationships (Jordan, 2008). Indeed, “clicking” between two persons may be the norm of social interaction. Behavioral coordination appears to emerge spontaneously social during interaction (e.g., Chartrand & Bargh, 1999; Richardson, Marsh, Isenhower, Goodman, & Schmidt, 2007), which facilitates interpersonal connectedness (Hove & Risen, 2009; Wheatley, Kang, Parkinson, & Looser, 2012). Likewise, even briefly interacting with a stranger can evoke interpersonal (psychological) closeness and liking between the two persons (e.g., Sprecher, Treger, Wondra, Hilaire, & Wallpe, 2013).

Close relationships are present since birth, and continue to influence persons throughout their entire lifespan. The first relationship that people form is one to their caregivers in infancy. According to *attachment theory* (Bowlby, 1969, 1973), people have evolved a psychological system that maintains bonds with attachment figures, which, early in life, are the caregivers of an infant. The dynamics of the interactions between infants and their caregivers shapes the infant’s *mental representations* of the caregiver and the relationship, which in turn facilitates the formation of a certain *attachment style* (Fraley & Shaver, 2000; Shaver & Mikulincer, 2006). Attachment styles are characterized particularly by the orthogonal dimensions of attachment *avoidance*, or variability in comfort of being close to and depending on others; and attachment *anxiety*, or variability in fears of being abandoned by their attachment figure (Pietromonaco & Barrett, 2000). In adulthood, when persons begin forming romantic relationships, their partner becomes their primary attachment figure, and the attachment style they developed

during infancy continues to influence these relationships (Hazan & Shaver, 1987; Mickelson, Kessler, & Shaver, 1997; Shaver & Mikulincer, 2006).

Relationships' importance in development does not stop with attachment. The self (itself) may be a product of people's close relationships. Throughout development, infants initially appear to automatically imitate others' (basic) behavior, such as facial gestures (e.g., Meltzoff & Moore, 1977, 1983; Meltzoff & Decety, 2003). These interactions not only lead the infant to be able to differentiate the other from the self and thus begin to form a self-concept (Kinsbourne, 2002), but also to the development of theory of mind (i.e., attribution of mental states such as beliefs in others) and empathy (i.e., the ability to attain insights into others' mental states, such as "feeling" one's pain; Meltzoff & Decety, 2003). Even after the emergence of the self, the mental representation of the self and the other (especially a close other, such as a romantic partner) continues to overlap (Aron, Aron, Tudor, & Nelson, 1991; Decety & Sommerville, 2003). For example, persons who viewed a close friend make errors in a Stroop task (i.e., a task in which one is instructed to name the color of the letters which spell a word of a different color; e.g., saying "green" when the word "blue" is written with green letters) neurally responded as if they themselves were making the observed errors, as measured via EEG (Kang, Hirsh, & Chasteen, 2010). Furthermore, people's self may depend on the others with whom they are interacting. The idea of the *relational self* (Andersen & Chen, 2002) suggests that the self is fluid. Persons possess "multiple" selves; each tied to a different close other. Each of these ties entails different "if-then" statements which affect the dynamics of one's self

and self-concept—one's self-concept when interacting with Brad may be different than one's self-concept when interacting with Greg.

Culture, a general spread of ideas, values, technology, *etc.* between and across generations (Norenzayan, 2006), may also be tied to our social brain and our close relationships. As a construct, culture is very broad and may entail a number of aspects. Likewise, it may be difficult to distinguish whether the relationships shape culture, or whether it is culture that shapes relationships. Certain theoretical and empirical accounts, however, appear to provide evidence for the idea that culture may be a bottom-up process which begins with small-scale social relationships and interactions and eventually emerges into a general web of ideas, beliefs, and customs which reciprocally shape people's social relationships.

Plausibly one of the most central constructs to cross-cultural research, if not social psychology in general, is *self-construal*: one's perception of the self in relation to others (Cross, Bacon, & Morris, 2000; Cross, Hardin, & Gercek-Swing, 2011; Markus & Kitayama, 1991). Approached broadly, people may possess a self-construal that may emphasize either the self over the other and the social group (i.e., the *independent* self) or vice versa, where the self is viewed as being embedded within a group (i.e., the *interdependent* self). Since the introduction of the construct of self-construal into social psychology, researchers have amassed a large body of evidence that shows self-construal to be both a cause and a consequence of a number of facets of relationships. For example, when American persons (who are on average, independent in their self-construal) were primed with an interdependent self-construal, they not only reported more relationally-oriented self-descriptions ("I'm advised by Ralph Erber") than those with an independent

self-construal prime (“I’m a social psychology graduate student”) but also endorsed interdependent values (e.g., friendship) to a greater degree (Gardner, Gabriel, & Lee, 1999).

Research on culture has clearly demonstrated that self-construal does affect the relationships we form and maintain. Still, this research suggests that culture is the usher of social relationships—culture “causes” the dynamics of social relationships. Alternative theoretical accounts, however, suggest a bidirectional approach. Specifically, culture may begin with small-scale social relationships, constrained by the persons’ physical environment. Over time, these social interactions build and expand on one another with population growths, leading up to the general set of ideas that is the conceptualization of culture today (Adolphs, 2009; Dunbar, 2003; Kenrick, Li, & Butner, 2003; Kenrick, Maner, Butner, Li, Becker, & Schaller, 2002; Latané, 1996; Latané & Bourgeois, 1996).

Aside from explaining the origins of humans’ large brain size, the Social Brain Hypothesis has also given insight into the formation and development of culture stemming from the large (social) human brain. One of the foundations of culture is language. Language is both the primary route of communication (and thus, social interaction) between humans and an important part of many cultures (Baumeister et al., 2007). In his review, Dunbar (2003) suggested that incremental group sizes required more sophisticated routes of communication. Specifically, Dunbar believed that language emerged in steps, starting with social grooming, continuing to increased use of vocal chorusing to facilitate cohesion, and the necessity to expand a system of communication in a larger group. Indeed, some empirical evidence suggests that the emergence of language may be inevitable. When persons were assigned to play video games with one

another while being physically separated and constrained to not using symbols of standard language (i.e., letters), they developed some system of communication automatically throughout the course of their interaction (Galantucci, 2005).

The Social Brain Hypothesis also ties the emergence of modern culture with early social interactions with growing groups (Dunbar, 2003). Culture requires sophisticated social cognition, including theory of mind and empathy that play a large role in social learning (Adolphs, 2009). Religion, a culture in and of itself, for example, entails some inferences of mental states (such as wants and needs) to some non-human (or even non-biological) phenomena. Seemingly simple cosmetically, religions (which constitute culture that may be independent of or a facet of larger cultures) require a number of mental inferences, from *believing* that someone (or something) *intends* to do some action or *feels* some emotion or *wants* something. Indeed, mentalizing (i.e., perception of others as having a mind), a product of our large brain, is a phenomenon important for culture, such as religion (Adolphs, 2009; Norenzayan, Gervais, & Trzesniewski, 2012).

In a series of simulation experiments, Kenrick et al. (2002) demonstrated that global and stable culture emerges over time as a product of social interactions constrained by a set of decision rules (which may stem from environmental challenges, as decisions in Siberia would differ than decisions in the Sahara)—“The very existence of culture...depends crucially on the dynamic social influence processes precipitated by interpersonal communication across social landscapes” (Kenrick et al., 2002, p. 354).

Culture and close relationships may very well constitute the chicken-or-the-egg problem—what caused what? This question may never fully be resolved. Still, the Social Brain Hypothesis, as well as empirical explorations of the development of language and

systems of rules from environmentally-constrained interactions suggest that culture is epiphenomenal to pair bonding. In other words, culture began with simple social interactions in social groups—pair bonds, whether they be friendships or romances. As the groups expanded, so did culture (Wright, 2000). The large social brain that humans evolved allowed for the growth of complex culture with abilities to mentalize and learn from others. Without our social brain and the abilities it affords us, we would have no culture.

The emergence of culture, of course, in turn reciprocally shapes social relationships. Computers are an example of the bidirectional relation between relationships and culture. Computers began at the level of the person (i.e., developed by a group of persons). Over time, they began to be an important facet of culture in many countries, and even have subcultures that are centered around them (e.g., “gamers”). With the rise in importance of computers, they began to reciprocally influence the relationships that people form, perhaps especially demonstrated by social media websites such as *Facebook* (and perhaps our ultrasocial nature is a reason behind this website’s overwhelming popularity) and dating websites such as *OkCupid*. Thus, small-scale interpersonal relationship dynamics led to the emergence of culture. This culture reciprocally governed facets of not only human interactions, but human life in general—which reinforces the idea that human life is centered around close relationships.

### **The Social (and Happy) Life**

The strong and fundamental need to form ties with others as a result of the need to belong (NTB) suggests that they may be just as vital to a person’s well-being like food, water, and other basic physical needs; Beckes & Coan, 2011; Kenrick et al., 2010).

Indeed, when inquired into the factors that lead to happiness, the answer that persons often report is having satisfying close relationships (Berscheid, 1985). Likewise, some of people's most commonly-endorsed fears reflect relationships, such as losing their loved ones (interestingly, these fears were more commonly endorsed than were fears about death; Miller & Hewgill, 1966).

Our relationships have tremendous impact on our psychological well-being and health. A wide body of work converges on the idea that having quality close relationships, whether they are friendships or romantic bonds, facilitate happiness (Demir, 2008; 2010; Demir, Özdemir, & Weitekamp, 2007; Demir, Özen, Dogan, Bilyk, & Tyrell, 2011), life satisfaction (Kang, Shaver, Sue, Min, & Jing, 2003), and subjective general well-being (Lucas & Dyrenforth, 2006; Trzcinski & Holst, 2008). Even during a stressful situation, having a responsive romantic partner or a close other by one's side can reduce stress (Kane, McCall, Collins, & Blascovich, 2010). Should one lack or relationships or perceive to lack meaningful social ties, however, contrasting effects arise.

### **An Absence of Ties**

Lacking social ties, whether it is from social rejection or ostracism (terms that I will be using interchangeably) or loneliness (i.e., a discrepancy between current and desired social ties; Cacioppo & Patrick, 2008) promotes an array of negative outcomes (Cacioppo, Hawkley, & Berntson, 2003; Cacioppo & Patrick, 2008), both psychological and physiological.

**Poor ties, poor health.** When people believe that they are lonely or socially rejected, they report lower degrees of self-reported (perceived) quality of health (Luo, Hawkley, Waite, & Cacioppo, 2012). This relation also goes beyond perceived health

into actual risks to health. For example, chronic loneliness may diminish physical health to a relatively comparable degree as smoking (Cacioppo & Patrick, 2008). Similarly, lacking (or perceiving to lack) social ties may disturb sleep (Cacioppo et al., 2002), increase blood pressure (Hawkley, Burleson, Berntson, & Cacioppo, 2003), promote stress (Cacioppo et al., 2000), and promote inflammation (Jaremka et al., 2013).

Loneliness and social isolation also impact mental health. Poor social ties predict low self-esteem (Brage, Meredith, & Woodward, 1993); anxiety (Baumeister & Tice, 1990); poor executive functioning (Cacioppo & Hawkley, 2009; Hawkley & Cacioppo, 2003); depression (Alpass & Neville, 2003; Cacioppo & Hawkley, 2009); poor daytime functioning (Hawkley, Preacher, & Cacioppo, 2010); and even mortality itself (between 26% and 32% increased likelihood of mortality; Holt-Lunstad et al., 2015). Similarly, solitary confinement as a punishment in the penal system is associated with a number of negative and perhaps even surprising psychological outcomes such as hallucinations, paranoia, and self-mutilation (Haney, 2003).

In the laboratory, social psychologists have documented a number of effects that (temporary) states of ostracism and social exclusion may evoke. Being rejected by others can lead to increased blood pressure (Zadro, 2004, as cited in Williams, 2007b); aggression (Leary, Twenge, & Quinlivan, 2006; Warburton, Williams, & Cairns, 2006); increased numbness to physical pain (DeWall & Baumeister, 2006); decreased prosocial behavior (Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007); decreased self-regulatory abilities (Baumeister, DeWall, Ciarocco, & Twenge, 2005); decreased sense of meaning (Stillman, Baumeister, Lambert, Crescioni, DeWall, & Fincham, 2009); decreased intelligent thought (conceptualized as test performance; Baumeister, Twenge,



& Nuss, 2002); amongst others (for reviews, see Gerber & Wheeler, 2009; Williams, 2007a, 2007b; Williams & Nida, 2011). The ostracism-evoked decreased need (to belong) threat may even emerge when people merely *observe* another get ostracized, including on television (Coyne, Nelson, Robinson, & Gundersen, 2011; Wesselman, Bagg, & Williams, 2009). People may even negative respond to ostracism by a member of a disliked outgroup (the KKK; Gonsalkorale & Williams, 2007). Interestingly, these negative outcomes of ostracism are not constrained to being ostracized by another person. Persons experience distress even if they are being (knowingly) ostracized by a computer (Zadro, Williams, & Richardson, 2004).

These detrimental effects of isolation and exclusion led some scholars to call them "social death" (Williams, 2007a)—“...it seems fair to say that being socially excluded prevents the human psyche from doing what it was designed to do” (Baumeister et al., 2007, p. 507). There is, however, no social isolation that is as permanent as death. In other words, death may be the “ultimate social exclusion” (Leary, 2004, p. 479). It is this everlasting social exclusion that may contribute to our fear of death.

A recent investigation into this idea provided some compelling results. Steele, Kidd, and Castano (2015) manipulated social exclusion and measured participants' death thought accessibility, which they operationalized as the number of word strings completed with death-related words (e.g., Trafimow & Hughes, 2012). Steele and her colleagues' results suggested that ostracized (vs. included) persons indeed experienced greater degrees of death thought accessibility. That is, those who were ostracized completed sizably more word strings with death-related than non-death-related words (*d*

= 0.79). These results open another window to the possibility that the effects of thinking about death may indeed stem from social causes (Leary, 2004).

### **Rationale**

Why are we so afraid of death? Undoubtedly, few want to die, and the thought of death itself often evokes negative reactivity in persons. Although TMT acknowledges this fear, it does not directly address *why* people fear death—rather, TMT assumes that we have this fear, and explains *how* people manage this fear. NTB, however, would suggest that there is a reason behind why a number of studies have demonstrated a relation between social death (e.g., loneliness), poor mental health (e.g., depression), and actual death (e.g., suicide). Specifically, if social death can bring about actual death, then perhaps thinking about actual death evokes the thought of social death. Thus, we are afraid of death because death is the “ultimate” social isolation. Nobody wants to be lonely, and nothing is lonelier than death.

Social ties are not necessarily central to TMT. Should one be able to reach self-preservation, then they have met their most fundamental of needs (i.e., the need to avoid death). Meeting self-preservation does not require the presence of others, as one may live a (self-preserved) life with no social ties whatsoever and be “fine.” Still, TMT does acknowledge the influences of social relationships, although they believe that relationships are simply one of many routes of death-fear alleviation (e.g., Mikulincer et al., 2002). According to TMT, to assuage death, we must fit in our culture—the gauge of goodness of this cultural fit is, according to TMT, is self-esteem.

Culture itself, however, may be rooted in simple social relationships (e.g., Dunbar, 2003; Latané, 1996), and NTB’s conceptualization of self-esteem (i.e., a monitor

of the quality of one's social interactions) may not only fit with that of TMT, but be *extended* to capture the phenomena predicted by TMT. In other words, NTB would suggest that we turn to our culture following MS (Greenberg & Arndt, 2012) for the same reason we turn to social relationships (Williams, 2007) in times of social rejection: to restore our need to belong. The need to belong may thus *precede* the need for self-preservation.

Similarities in predictions of TMT and NTB, however, open the door to *equifinality*—when two routes lead to the same path (e.g., Kruglanski, Pierro, & Sheveland, 2011). In this case, both NTB and TMT would take different routes to reach the same outcome (i.e., worldview defense). The purpose of this research is to examine and connect both of these routes in examining exactly why people are afraid of death. Thinking of death may very well lead to worldview defense, but this link may be due to the cue of actual death evoking a cue of social death. In other words, thinking about actual death evokes thoughts of social death, which one assuages by reconnecting to their relationships. Death may thus be scary because it is permanent solitary confinement.

## Method

### Preliminary Study 1

**Overview and Statement of Hypotheses.** The first preliminary study aimed to explore the thoughts that come to people's minds as they think about their own death. I asked the following research question:

Research Question I. What themes emerge when people think about their own death?

**Research Participants.** 20 persons (6 men) from the United States recruited from Amazon.com's MTurk with a mean age of 36.15 ( $SD = 12.05$ ) participated in the study. Participants received \$0.10 for their time.

**Procedure.** I examined participants' thoughts regarding their own death using a written stream of consciousness procedure (Pope, 1978). This procedure involves participants thinking about a particular target and freely writing about anything that comes to mind as they think about the target (e.g., Wegner, Wenzlaff, & Kozak, 2004).

Participants were specifically asked to freely think about their own death for a total of five minutes as guided by the following instructions derived from Pope (1978):

"This study is concerned with what and how people think about their own death. For the next 5 minutes, we will ask you to describe your stream of consciousness—to indicate what is going through your mind as you think about your own death. When asked to write on your thoughts about your own death, please convey whatever information you can on your stream of consciousness at the moment. Your report might include (but is not limited to) descriptions of: images, ideas, memories, feelings, fantasies, plans, sensations, observations, daydreams, objects which catch your attention, effort to solve a problem. There are no restrictions, qualifications, conventions, or expectations. Simply write about whatever is going through your mind (whatever you are conscious of and aware of) as you think about your own death."

Following completion of the task, I assessed participants' basic demographic information (e.g., age, sex). The study took approximately 3-5 minutes to complete.

**Results and Analyses.** I analyzed the text using two routes. First, two coders blind to the purposes of this study examined the text and coded for themes that emerge in participants'

narratives (see Appendix A for directions given to the two coders). Overall, the coders displayed relatively high agreement on the themes that emerged in the narratives. In any case of disagreement, I analyzed the narrative to reach a decision.

In my second set of analyses, I analyzed the text via the Linguistic Inquiry and Word Count (LIWC) software (Tausczik & Pennebaker, 2010). LIWC allows researchers to examine a number of word categories (e.g., personal pronouns) in text files. Thus, I was able to examine the categories of words people use when their stream of consciousness runs through the thoughts of death.

***Coding for content.*** See Table 1 for counts of the general themes that emerged within the narratives. The participants' passages entailed both positive and negative themes. The modal theme was acceptance: people acknowledged that death is an inevitable fate but did not display negative affectivity towards it. The second most common positive theme that emerged was curiosity. People were indeed curious as to what will happen following their demise. Some participants also reported feeling peaceful (i.e., death brings peace and rest) as well as hopeful (i.e., hope for the well-being of loved ones).

The most common negative theme that emerged in the narratives was fear. This fear consisted of not only the direct fear of death, but also fear of the unknown that is associated with death, fear of missing out on experiences, and fear of leaving loved ones behind. Similarly, participants reported feelings of anxiety and depression, although to a lesser extent. The final theme that emerged was regret, which reflected one's general question of whether he or she will regret anything prior to death. Appendix B contains all participants' narratives.

Theme	Count
Acceptance	7
Fear	6
Curiosity	5
Anxiety	3
Peace	2
Hope	2
Depression	1
Regret	1

*Table 1.* Counts of themes that emerged in the participants' narratives.

***Linguistic content analysis.*** I examined the degree to which participants used the following in their narratives: (a) uses of “I,” “you,” and “we;” (b) the degree of uses of social words (e.g., talk) and words referring to family and friends; (c) the degree of general positive and negative affect, and anxiety and sadness; (d) and death. Higher values indicate greater degrees of use. See Table 2 for the correlation table between all analyzed items.

The average word count of the narratives was 144.45 ( $SD = 63.77$ , range: 69-320). Overall, participants appeared to have used “I” ( $M = 11.30$ ,  $SD = 5.20$ ) to a greater degree than they used “you” ( $M = 0.52$ ,  $SD = 1.39$ ) and “we” ( $M = 0.97$ ,  $SD = 1.58$ )—the large prevalence of “I,” however, was unsurprising given that the participants wrote narratives in first person (i.e., how *they* would react and feel), making the use of the word “I” inevitable. Albeit statistically non-significant (due to the low sample size), uses of “I” were negatively correlated with uses of both “you.” Uses of “you” and “we” were uncorrelated. Participants also used social words to a

relatively great degree ( $M = 5.17$ ,  $SD = 3.47$ ). Their use of words pertaining to family, however, was low ( $M = 0.85$ ;  $SD = 1.25$ ); and their use of words pertaining to friends was almost zero ( $M = 0.06$ ,  $SD = 0.22$ ). Social- and family-related words were strongly positively correlated, and positively yet non-significantly correlated with friend-related words. The use of friend- and family-related words was unrelated ( $r = -.01$ ).

	Variable									
	(1) Death	(2) "I"	(3) "We"	(4) "You"	(5) Social	(6) Family	(7) Friend	(8) Positive	(9) Negative	(10) Anxiety
(1)	—									
(2)	-.01	—								
(3)	.01	-.35	—							
(4)	-.36	-.26	.04	—						
(5)	-.19	.00	.34	.19	—					
(6)	.07	.52**	-.17	-.27	.58**	—				
(7)	-.21	-.05	.24	-.11	.30	-.01	—			
(8)	-.32	.18	-.04	-.03	.25	.30	.26	—		
(9)	.32	.25	-.40 <sup>+</sup>	-.03	.06	.11	.10	-.04	—	
(10)	.30	.27	-.30	.14	-.25	-.16	-.16	.02	.70***	—

Table 2. Correlation table of text analyses in Preliminary Study 1.

Note. \*\*\*  $p < .001$ ; \*\*  $p < .01$ ; \*  $p < .05$ ; +  $p = .08$ .

Positive emotions ( $M = 3.31$ ,  $SD = 1.92$ ) were mentioned more frequently than were negative emotions ( $M = 2.72$ ,  $SD = 1.99$ ), although the two were uncorrelated. Themes of anxiety ( $M = 1.38$ ,  $SD = 1.57$ ) and sadness ( $M = 0.81$ ,  $SD = 1.20$ ) were also somewhat present in the narratives, although they were also uncorrelated. Finally, themes of death indeed emerged in the narratives ( $M = 2.66$ ,  $SD = 1.79$ ). Interestingly, participants used death-related words to a much *lesser* extent than they used socially-related words (which were the second highest emerging theme in the passages, after the inevitable "I"),  $t(19) = -2.67$ ,  $p = .015$ ,  $d = -0.92$ .

**Summary of Preliminary Study 1.** The results of Preliminary Study 1 suggest that death evokes a diverse array of reactions. Multiple themes emerged in participants' streams of consciousness, including both close relationships and fear. Still, a few participants approached death through a scientific lens, and reported no fear of their demise. These passages suggest that fear of death may be relative, and stem from sources other than general anxiety or fear. Text analyses of the passages further supported this idea. The types of (non-"I") words that emerged to the greatest degree in the themes were social words, suggesting that reactions to death may not be rooted in fear or anxiety for all persons. Rather, a number of authors reported relationships, and lack thereof (following death), as one of the frightening aspects of this phenomenon.

The second preliminary study attempted to quantitatively examine possible reasons for people's fear of death.

## **Preliminary Study 2**

**Overview and Statement of Hypotheses.** The goal of the second preliminary study was to examine people's specific fears associated with death. I constructed a questionnaire purposed to account for four possible factors of death-related anxiety: (1) fear of death; (2) desire for symbolic immortality; (3) fear of losing one's relationships; (4) fear of missing out on novel experiences; to a different degree. Specifically, I explored the following research question:

Research Question I. Do people endorse possible fears associated with death to a different degree?

**Research participants.** 210 United States residents (82 men; one person did not disclose his or her gender) recruited from Amazon.com's MTurk participated in this study. The mean age of the sample was 36.37 ( $SD = 11.85$ ; one participant did not report his or her age). Participants were compensated \$0.10 for their time.

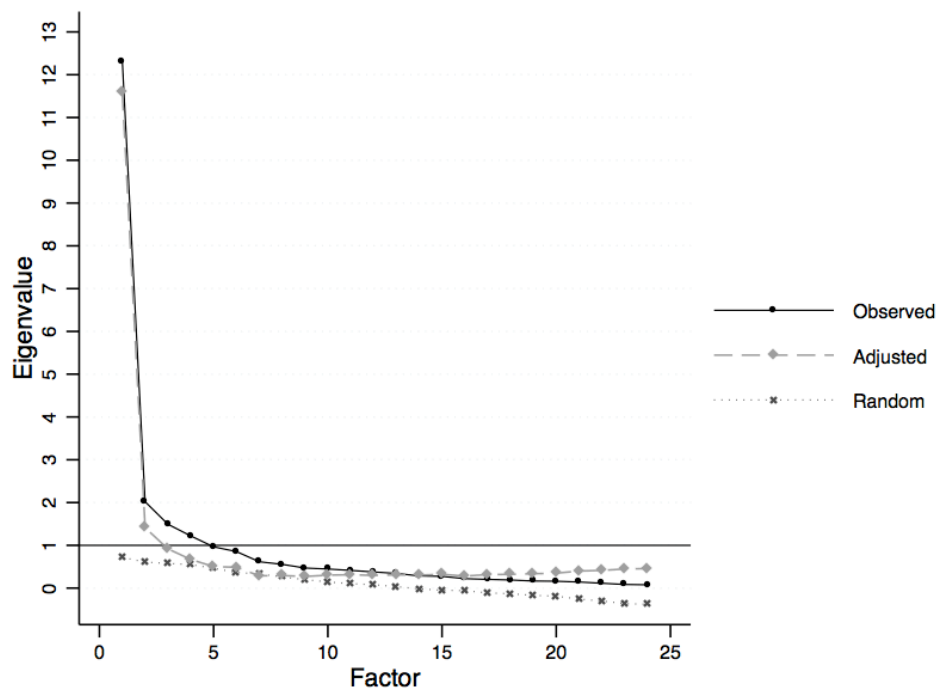


**Procedure.** Participants provided self-reported scores on a number of items developed for the purposes of this study (see Appendix C). Each item was measured on a scale 1 = *Not true at all*; 3 = *Somewhat true*; 5 = *Quite true*; 7 = *Very true*. The study took approximately 3-5 minutes to complete.

**Results and Analyses.** The analysis consisted of two parts. First, I conducted an Exploratory Factor Analysis (EFA) with oblique rotation (to allow for correlation between factors) on all of the items to examine the number of factors that emerge. To decide how many factors to retain, I performed a *parallel analysis* (PA; Horn, 1965). A PA computes eigenvalues derived from a random sample of uncorrelated normal data of an equal sample size and number of variables from a *Monte Carlo* simulation (for this analysis, I generated 1,000 simulations). The number of factors to retain is based on the discrepancy between the actual and simulated eigenvalues—any factor whose extracted eigenvalue exceeds its corresponding simulated eigenvalue is retained (Hayton, Allen, & Scarpello, 2004). This technique is optimal compared to other widely-used factor analysis extraction techniques (e.g., Kaiser’s criterion; Zwick & Velicer, 1986). For each factor, I retained items that loaded at or above .30 (Costello & Osborne, 2005). Once I identified the factors, I conducted a one-way repeated-measures ANOVA to answer the research question of whether participants endorsed the facets of fear to differential degrees.

**Exploratory factor analysis.** An initial EFA yielded 13 factors; which prohibited parsimony in the items’ interpretation. Thus, I examined the scree plot of the results to locate the extracted eigenvalues with the largest differences from the simulated eigenvalues (see Figure 1). The results of the PA and the examination of the scree plot suggested a two-factor solution, as the adjusted eigenvalues fell below one after the second factor (see Figure 1). I labeled the two factors “Fear of Death Outcomes” ( $\alpha = .94$ ) and “Fear of Death” ( $\alpha = .86$ ; see Table 3 for the

factor loadings of each items). The items “Death is a natural part of life” did not load on any factors; and the item “Dying will make me miss out on experiences” loaded on both factors to a relatively equal degree (.39 and .40 on factors 1 and 2, respectively). Given the large number of items in the questionnaire, I dropped these items when computing overall indices of the factors.



*Figure 1.* Plot of the parallel analysis of the 24 generated items in Preliminary Study 2. An eigenvalue of one serves as a reference point. Adjusted eigenvalues equate to the difference between observed and random eigenvalues.

**Test of Between-Factor Differences.** Given that two factors emerged, I conducted a repeated-measures *t*-test to examine the potential difference between the two factors. As an initial analysis, I saw that the two factors were highly positively correlated with one another ( $r = .92$ ), which may further suggest a one-factor solution for the items. Still, a *t*-test did reveal that participants endorsed the “Fear of Death” factor ( $M = 4.36$ ,  $SD = 1.11$ ) to a greater extent than the “Fear of Death Outcomes” factor ( $M = 3.48$ ,  $SD = 1.64$ ;  $M_{\text{difference}} = 0.88$  [95% *CI*: 0.77, 0.98]),  $t(209) = 16.70$ ,  $d = 1.60$ ,  $p < .001$ .

Item	Factor	
	Fear of Death Outcomes	Fear of Death
I am afraid of death and dying		0.75
Thinking of death makes me anxious		0.78
Death is a natural part of life	—	—
Death is my biggest fear		0.82
Thinking of death scares me		0.65
Thinking of death makes me feel uneasy		0.77
Death does not frighten me as it is a graduation to a higher existence		0.62
I am not afraid of death because I know my culture will continue after I die		0.56
It bothers me to think about death because after I die, I won't be able to contribute anything to the world	0.49	
I fear that I won't be able to leave a legacy before I die	0.48	
Death is not frightening, as my ideas will live on after I die		0.69
It bothers me to think that after I die, I will not have my place in this world anymore		0.53
Death is like being alone forever	0.86	
I think that death is like being permanently ostracized by others	0.85	
To me, death is like never having a close relationship ever again	0.84	
Death is like leaving my loved ones behind	0.46	
Dying is like being lonely forever	0.91	
Death is like losing all of my close relationships	0.73	
Dying will make me miss out on experiences	—	—
Death is like leaving everything I have behind	0.48	
All my goals and accomplishments will be lost after death	0.49	
To me, death is like losing everything I strived for	0.61	
I am afraid I won't accomplish all I wanted to do in life after I die	0.43	
One of the things that scares me about death is never knowing what my friends and family will be doing	0.47	

Table 3. *Factor loadings of the 24 items in Preliminary Study 2.*

**Summary of Preliminary Study 2.** The factor analysis exploration of the items generated to examine death-related fears (see Appendix C) suggested that people are indeed afraid of death. This fear (of death) appears to exceed the notion that death equates to loss of others and of experiences. Still, a problem with this study was within the comparison itself. That is, the factors that emerged appeared to capture the *fear* of death, and the *outcomes* of death. Albeit similar, the two concepts may not necessarily be parallel. This may perhaps be further highlighted by the very strong positive correlation between the two factors. In light of the findings of Preliminary Study 1, this correlation suggests that death is a diverse, multifaceted construct that captures a variety of reactions and associations. In the three experiments below, I delved further into whether and why it is that people are afraid of death by exploring people's reactions to leaving the party that will be going on without them.

### **Experiment 1**

**Overview and Statement of Hypotheses.** The goal of Experiment 1 was to examine whether worldview defense stems solely from mortality salience, or whether it can be also result from alternative ways of thinking about death. That is, when everyone in the world dies, or thinking about relationship loss.

I used two indices of worldview defense in Experiment 1. The first index of worldview defense was the amount of money (in U.S. dollars) participants suggest for bail of a prostitute (Rosenblatt et al., 1989). Although the United States has generally liberalized in sexual attitudes over the last seven decades (Brooke & Twenge, 2005), prostitution is still illegal (although there are exceptions in certain states) and seen as immoral and a violation of American cultural standards, even amongst college students (Brehman, 2010). Thus, prostitution is a challenge to American cultural norms and worldviews. The second index of worldview defense was

evaluations of an anti-American essay ostensibly written by an immigrant to the United States (Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992; see Appendix F). This essay is a direct challenge to the American culture and lifestyle, and thus, a challenge to American worldviews. I tested the following hypotheses:

Hypothesis I. As a replication of TMT research, evoking mortality salience (vs. the control condition) will lead to worldview defense (i.e., larger amounts of money for bail of prostitutes; and more negative evaluations of a person who ostensibly wrote an anti-American essay), as thinking about death evokes anxiety, leading participants to turn to their worldview to buffer the fear of death. Mortality salience was operationalized as a writing prime in which participants will think about what will happen to their body, and what their emotions will be, as they die.

Hypothesis II. Reminders of losing one's social bonds will lead to worldview defense (vs. the control condition), as thinking about relationship loss threatens the need to belong which may lead participants to attempt to connect to their milieu. Reminders of losing one's bonds was operationalized as a writing prime in which participants will think about what will happen to them, and what their emotions will be, as they lose all of their social bonds. Worldview defense was operationalized as the number of dollars participants suggest for bail of a prostitute and the evaluation of the author of an anti-American essay.

Research Question I. Will thinking about the end of the world, where all humans die and the Earth ceases to exist (vs. the control condition) evoke worldview defense? As the end

of the world entails not only death, but also the inability to form new ties (which affords neither culture nor social ties to buffer any anxiety over death itself or threatened relationships), it may not lead to worldview defense (though this is an empirical question). Thinking about the end of the world was operationalized as a writing prime in which participants think about what will happen to them, and what their emotions will be, as the world ends. Worldview defense was operationalized as the number of dollars participants suggest for bail of a prostitute and the evaluation of the author of an anti-American essay.

**Research Participants.** The participants were 260 United States residents recruited from Amazon.com's MTurk. The final sample consisted of 211 participants (93 men;  $M_{\text{age}} = 37.93$ ;  $SD_{\text{age}} = 13.75$ ; one participant did not report his or her age) that provided reports for variables central to this study. Participants were compensated \$0.35 for their time.

**Procedure.** Prior to the start of the study participants were informed that the research consists of three separate studies: a study on a novel method of personality assessment; a study on the United States legal system, and a study on person perception. Participants were randomly assigned to one of four conditions: MS prime; a sudden end of all human life prime; losing all of one's friends and family prime; or a control prime of an unpleasant yet non-death-related experience (dental pain). Per the procedure of TMT research, participants were told that this study was an examination of a novel way of measuring personality. Participants first completed demographic measures (e.g., sex, age) and several neutral personality measures, such as Rosenberg's (1965) Self-Esteem Scale, the Ten-Item Personality Inventory (TIPI; Gosling, Rentforw, & Swann, 2003), the General Belongingness Scale (GBS; Malone, Pillow, & Osman, 2012), six items that assess positive and negative mood (good, happy, cheerful [positive], sad,

gloomy, depressed [negative]), and the Fear of Missing Out Scale (FMOS; Przybylski, Murayama, DeHaan, & Gladwell, 2013).

After completing these measures, participants were presented with the writing prime. This standard TMT prime entails two open-ended questions in which participants freely write about the thought of their own death. Following the procedure of TMT research, in all four conditions, participants read the following instructions:

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

In the *MS* condition, participants were presented with the following writing prime:

“Please briefly describe the emotions that the thought of your own death arouses in you.”

“Write 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 *end of the world* condition, participants were presented with the following prime, also derived from the standard MS prime used in TMT:

“Please briefly describe the emotions that the thought of all human life suddenly coming to an end arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as all human life is ending and once all human life has ended.”

In the *losing bonds* condition, participants were presented with the following primes, derived from the standard MS prime used in TMT:

“Please briefly describe the emotions that the thought of losing all your friends and family arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you lose all your friends and family and once you have lost all your friends and family.”

Finally, in the *control* condition, participants wrote about an unpleasant yet non-death-related prime that has been used in TMT research: dental pain (e.g., Arndt, Greenberg, & Cook, 2002):

“Please briefly describe the emotions that the thought of dental pain arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you experience dental pain and once you have experienced dental pain.”

Given that TMT emphasizes the importance of a waiting period between MS and worldview defense for the purposes of cognitive resources depleting in suppressing the thought of death (Greenberg & Arndt, 2012), participants completed a distractor task of reading a neutral "Growing Stone" short story (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994) between the writing prime and the worldview defense measure (see Appendix D).

Following the distractor task, participants completed an index of worldview defense used by Rosenblatt et al. (1989): suggested monetary bail for an arrested



prostitute (range of options for bail: \$0-\$1000). Per Rosenblatt and colleagues' procedure, I presented to the participants information the legal terminology of the bond process (see Appendix E). Following the worldview defense task, completed a measure of attitudes towards prostitution using three items from Sawyer, Metz, Hinds, and Brucker's (2001) Social/Legal Support for Prostitution factor of their Attitudes Toward Prostitution Scale (the items are: "Prostitution should be decriminalized;" "Prostitution should be legalized;" and "There is nothing wrong with prostitution";  $\alpha = .92$ ), as it may serve as a moderator to the link between MS and the amount of bail suggested by the participants (Rosenblatt et al., 1989).

As a second measure of worldview defense (which the participants were informed as being a study on person perception), participants read and evaluated an anti-American essay ostensibly written by a person who immigrated to the United States (Greenberg et al., 1992;  $\alpha = .95$ ). I reverse coded the essay evaluations items—thus, higher values indicate more negative evaluations of the essay author.

Participants also provided information, again for the purposes of maintaining the study's cover story, on whether they were born in the United States, whether they are a citizen of the United States, the degree to which they endorse American values (see Appendix G;  $\alpha = .80$ ), their political orientation (liberal, conservative, and independent), and their religiosity.

The study took approximately 15-20 minutes to complete.

**Results and Analyses.** The first hypothesis proposed that the death (vs. dental pain) prime would lead to more worldview defense (i.e., higher bail for a prostitute and

more negative evaluation of an anti-American essay;  $r$  between the two outcome variables = .38,  $p < .001$ ). Similarly, in my second hypothesis, I proposed that the loss of all relationships prime condition would lead to more worldview defense than would the control prime. Finally, the research question explored whether the end of the world prime would affect worldview defense compared to the control prime.

I tested the hypotheses and research question in two one-way ANOVAs (prime condition: death vs. end of the world vs. loss of relationships vs. dental pain)—one test per index of worldview defense (bail set for prostitutes and evaluation of the anti-American essay). Both tests yielded null findings. That is, the prime condition affected neither the bail set for a prostitute nor the evaluations of the anti-American essay.

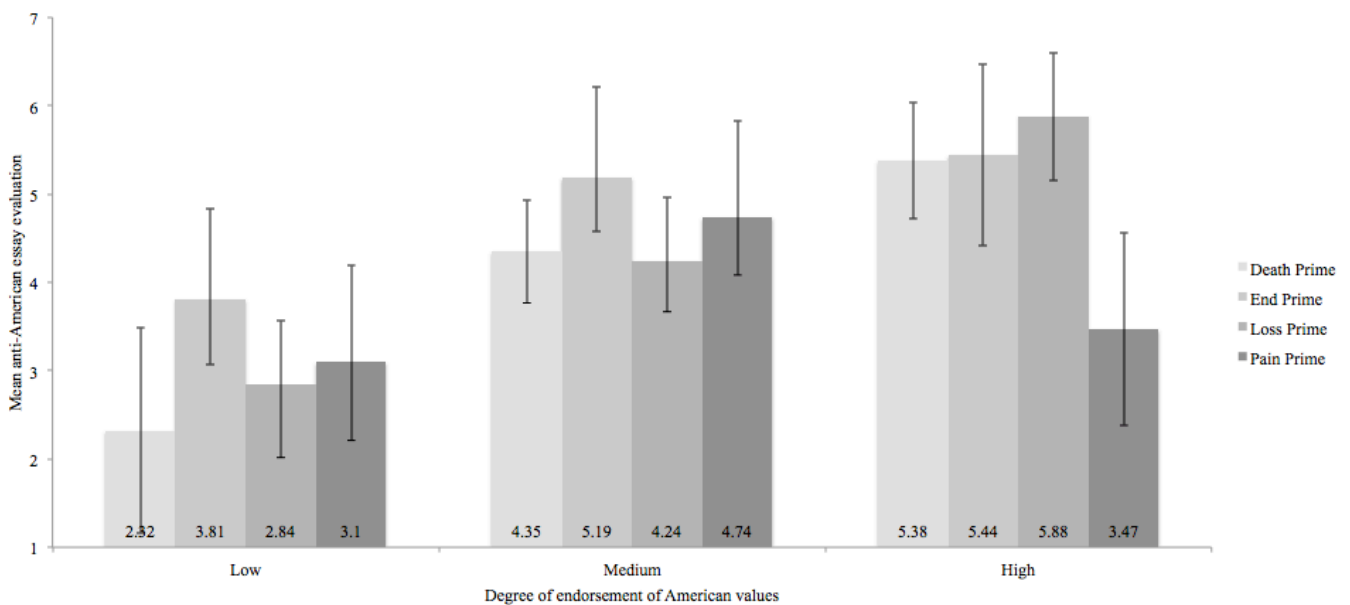
Still, it is possible that the effects of MS on worldview defense are relative, as prostitution or the anti-American essay may not be proximal to one's worldview. For example, Rosenblatt et al. (1989) found that MS led to increased bail for prostitutes *only* for those who opposed prostitution. Thus, attitudes towards prostitution may moderate the relation between the prime condition and bail set for prostitutes; and endorsement of American values may moderate the relation between the prime condition and evaluations of the anti-American essay. To explore this possibility, I performed a pair of ANCOVAs, one for each index of worldview defense, in which the prime condition interacted with the continuous moderator variables. Both of these tests yielded non-significant interactions.

A nonsignificant interaction term in an ANOVA may not necessarily suggest a null effect—focused contrasts can still be performed appropriately following nonsignificant interactions, especially if a researcher is interested in differences between

group means (Rosnow & Rosenthal, 1995). As there is theoretical reason to predict that worldview defense should occur only in those whose worldview is violated by prostitution or criticism of America (i.e., those who disapprove of prostitution and those who endorse American values to a relatively high extent), I performed further follow-up tests to the ANCOVAs. An examination of this prediction requires comparisons between groups. To categorize participants for the purposes of this analysis, I divided them into three independent groups via a quartile split (i.e., relatively low = at or below 25%, relatively medium = above 25% and below 75%, and relatively high = at or above 75%).

The 4 (prime condition: death vs. end of the world vs. loss of all relationships vs. dental pain) x 3 degree of support for prostitution (low vs. medium vs. high) ANOVA yielded no effects. Thus, I was unable to replicate Rosenblatt et al.'s (1989) finding that a death prime leads participants to report greater monetary bail for prostitutes if they disapprove of prostitution. Still, a 4 (prime condition: death vs. end of the world vs. loss of all relationships vs. dental pain) x 3 endorsements of American values (low vs. medium vs. high) ANOVA revealed an interaction effect,  $F(6, 199) = 2.74, p = .01$ , partial  $\eta^2 = .08$ . This interaction revealed several intriguing findings. For those who endorsed American values to a relatively low degree, the end of the world prime led to more worldview defense compared to the death ( $d = 0.95$  [95%  $CI_d = -0.03, 1.92$ ],  $p = .036$ ) and the relationship loss primes ( $d = 0.62$ , [95%  $CI_d = -0.14, 1.37$ ],  $p = .09$ ). I saw similar differences for those of moderate endorsement of American values. That is, the end of the world prime again led to more worldview defense than primes of death ( $d = 0.54$  [95%  $CI_d = -0.03, 1.10$ ],  $p = .05$ ) and loss of relationships ( $d = 0.61$  [95%  $CI_d = 0.05, 1.17$ ],  $p = .05$ ). See Figure 2.

Perhaps the most important set of findings was partial support for Hypotheses I and II and an answer to my research question. Compared to the dental pain prime, the death prime ( $d = 0.83$  [95%  $CI_d = 0.25, 1.41$ ],  $p = .004$ ), the end of the world prime ( $d = 0.95$  [95%  $CI_d = 0.16, 1.74$ ],  $p = .01$ ), and the loss of all relationships prime, which produced the largest difference ( $d = 1.16$  [95%  $CI_d = 0.46, 1.87$ ],  $p < .001$ ), led to more worldview defense only for those with relatively *high* endorsement of American values (see Figure 2).



*Figure 2.* Between-condition differences in worldview defense by degree of endorsement of American values in Experiment 1. End prime = End of the world Prime. Loss prime = Relationship loss prime. Pain prime = Dental pain control prime. Numbers at the bottom of each bar represent cell means. Error bars represent the 95% Confidence Interval of each mean.

**Summary of Experiment 1.** The results of Experiment 1 revealed that death anxiety might not be the sole reason for worldview defense. Although the data did not reveal direct support for my hypotheses, some evidence did emerge that thinking about losing one's relationships, or the end of the world and all human life, can evoke worldview defense (i.e., negative evaluations of an anti-American essay) for those who endorse American values to a

relatively high degree. These findings suggest that the effects of MS are relative, as some people may be more affected by thoughts of their own death than do others. Perhaps anxiety is not the only variable at the core of worldview defense that death begets. Fear of death may stem in part from the thought of losing our social bonds. I tested this idea further in Experiment 2, using death thought accessibility as an outcome measure rather than worldview defense.

## **Experiment 2**

**Overview and Hypotheses.** Experiment 2 further examined the relationship between worldview defense and threatened belongingness following mortality salience. The purpose of Experiment 2 was twofold: (1) to replicate TMT research which suggests that MS evokes death thought accessibility (DTA); and (2) to see whether curbed belongingness mediates the link between MS and DTA. I operationalized MS through a writing prime that asked participants to write about what will happen to them, and what their emotions will be as they die. I defined belongingness as scores on the self-reported General Belongingness Scale (GBS). DTA was defined as reaction times in a lexical decision task (i.e., a task in which participants make quick judgments on whether a string of letters presented to them is or is not a word). This task has been used as a measure of DTA in prior TMT research (e.g., Schimel, Hayes, Williams, & Jahrig, 2007).

Hypothesis I. MS (vs. the control condition) will lead to DTA. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be, as they die. DTA was conceptualized as reaction times to correct “word” responses to death-related words in a lexical decision task.

Hypothesis II. MS (vs. the control condition) will lead to curbed belongingness. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. Belongingness was conceptualized as scores on the GBS.

Hypothesis III. Curbed belongingness will predict DTA, as reminders of death should signal a permanent loss of relationships and thus threaten one's need to belong.

Belongingness was conceptualized as scores on the GBS. DTA was conceptualized as reaction times to correct “word” responses to death-related words in a lexical decision task.

Hypothesis IV. Curbed belongingness will mediate the relation between MS and DTA.

Belongingness was conceptualized as scores on the GBS. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be, as they die. DTA was conceptualized as reaction times to correct “word” responses to death-related words in a lexical decision task.

**Research Participants.** 127 DePaul University undergraduate students recruited from the Psychology Department subject pool participated in this study. I dropped 20 participants for the following reasons: (1) their reaction time was above or below 2.5 standard deviations from the mean (RT outliers = 141); (2) computer error in data output.

The response error rate was 5 percent. The final sample thus consisted of 107 students (35 men; 1 participant did not disclose his or her gender;  $M_{\text{age}} = 19.67$ ;  $SD_{\text{age}} = 2.19$ ).

**Procedure.** Upon arrival, participants were greeted by the experimenter, given informed consent, and provided demographic data (e.g., sex, age).

Following the completion of the demographic measures, participants were randomly assigned to either the MS condition ( $n = 48$ ) or the control condition ( $n = 59$ ). For those in the MS condition, I presented participants with instructions to the standard TMT morality salience manipulation:

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

In the *MS* condition, participants were presented with the following writing prime:

“Please briefly describe the emotions that the thought of your own death arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you physically die and once you are physically dead.”

As in Experiment 1, participants in the *control* condition wrote about experiencing dental pain:

“Please briefly describe the emotions that the thought of dental pain arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you experience dental pain and once you have experienced dental pain.”

There is evidence to suggest that death thought accessibility might be stronger without a delay (Trafimow & Hughes, 2012). Thus, following the MS prime, participants completed the mediator measure: Malone et al.’s (2012) GBS. The GBS was measured on a scale 1 = *Not true at all*; 3 = *Somewhat true*; 5 = *Quite true*; 7 = *Very true*.

Following the completion of the mediator measure, participants engaged in the death thought accessibility task. Specifically, participants were assigned to quickly respond whether a presented string of letters is a word or a non-word by pressing one of two buttons on a computer (one button for “word” and another for “non-word”). There were four groups of letter strings: (1) nine death-related words (e.g., “coffin”, “grave”); (2) nine non-death related negative words (e.g., “suffer”, “punish”); (3) Thirty neutral words (e.g., string, magnet) (4) forty non-words, created by scrambling letters of words to serve as controls (e.g., “pulg” [plug], “erpect” [carpet]). Non-words consisted of 30 scrambled neutral words, five scrambled death words, and five scrambled negative words. A pilot examination revealed that the death-related and negative words did not differ in their valence (i.e., negative to positive). None of the four types of words differed in their length. Quicker “word” decisions to death-related words constitute DTA.

Upon completion of the experiment, participants were debriefed and thanked for their participation.



**Results and Analyses.** My index of reaction times (RTs) consisted of aggregates of correct “word” judgments (i.e., reporting *word* when viewing an word [vs. nonword]). I also eliminated outlier reaction times (i.e., above 2.5 standard deviations). Furthermore, I transformed the RT data using a log transformation to normalize them for OLS analyses (see Schimel et al., 2007).

My hypothesis of mediation required several steps. One must first establish the *c* path (i.e., the main effect of the IV on the DV—the direct effect of MS on DTA), then establish the *a* path (i.e., the main effect of IV on the mediator—MS predicting belongingness) and *b* path (i.e., the direct effect of the mediator on the DV controlling for the IV—belongingness predicting DTA while controlling for the MS condition) paths. To examine the statistical significance of the mediation, I used a *Monte Carlo* (MC) simulation method in which the *ab* path (indirect effect) is simulated *k* number of times (in this study, *k* = 50,000) using the values obtained from the data, to build a distribution of the indirect effect—should zero be absent from the 95% Confidence Interval (CI) of the simulated *ab* distribution, the mediation effect can be considered statistically significant (Preacher & Selig, 2012; for an online utility for computing distributions of *ab* paths from MC simulations, see Selig & Preacher, 2008).

To test simple effects of *a-priori* hypotheses, I used one-tailed tests to preserve statistical power. Furthermore, some methodologists suggest that equality of variances should not be assumed when conducting tests of differences between two means, as this assumption can increase Type 1 error rates (Moser & Stevens, 1992; Ruxton, 2006).

Thus, I used a Welch's (vs. Student's) *t*-test, which does not assume equality of variance and thus corrects the degrees of freedom of the *t* statistic, per recommendation

**Testing Hypothesis I.** The first hypothesis predicted that MS (vs. control) condition would lead to greater degrees of DTA (i.e., lower RTs for death-related words). As discussed above, I examined the log transformed reaction time means in these analyses (Schimel et al., 2007). To examine this hypothesis, I conducted a 2 (prime condition: MS vs. Dental pain) x 3 (Word type: Death vs. Unpleasant vs. Neutral) mixed ANOVA, with word type being a within-subjects factor. Support for Hypothesis I will be reflected by quicker RTs to death related words (vs. unpleasant and neutral) in the MS condition (i.e., interaction effect). The condition x word type interaction was nonsignificant. Still, I conducted a follow-up contrast of the effect predicted in Hypothesis I (see Rosnow & Rosenthal, 1995). Across both conditions, participants displayed the fastest RTs for negative words than to death-related and neutral words (the latter two did not differ from one another). For the MS condition, the mean RTs for death-related, negative, and neutral words, respectively, were 586.01 ( $SE = 16.31$ ), 554.65 ( $SE = 11.19$ ), and 605.64 ( $SE = 16.56$ ). For the control condition, the mean RTs for death-related, negative, and neutral words, respectively, were 583.99 ( $SE = 16.20$ ), 550.34 ( $SE = 9.18$ ), and 591.82 ( $SE = 13.46$ ).

**Testing Hypothesis II.** The second hypothesis predicted that MS (vs. control) would lead to curbed belongingness. To test this hypothesis, I used a Welch's independent samples *t*-test in which belongingness was the outcome and condition (MS vs. control) was the predictor. The results revealed that the MS ( $M = 5.34$ ,  $SD = 1.09$ ) and control groups ( $M = 5.35$ ,  $SD = 0.99$ ,  $M_{\text{difference}} = -0.01$  [95% CI  $M_{\text{difference}} = -0.41, 0.40$ ])

reported similar degrees of belongingness,  $t(98.07) = -0.04$ , one-tailed  $p = .52$ ,  $d = -0.01$  (95%  $CI_d = -0.39, 0.37$ ). Thus, the results did not support Hypothesis II.

**Testing Hypothesis III.** The third hypothesis predicted that belongingness will be negatively associated with DTA, such that the more belongingness one experiences, the less DTA he or she will demonstrate. Given that lower RT values (i.e., quicker to respond to death-related words) represent greater degrees of DTA, a *positive* correlation would support this hypothesis. To test this idea, I correlated participants' self-reported levels of belongingness with their log-transformed RTs to death-related words. The correlation yielded support for my hypothesis: belongingness was *positively* correlated with RTs to the death-related words,  $r(107) = .16$ , one-tailed  $p = .05$ . In other words, the more belongingness one reported, the longer the RT was for death-related words. The correlation was identical when controlling for prime condition.

**Testing Hypothesis IV.** Because there was no support for hypotheses I and II, the *a* and *c* paths necessary for mediation could not be established. Thus, Hypothesis IV was also unsupported by the data.

**Summary of Experiment 2.** In the second experiment, I took an alternative route in examining the effects of MS by exploring DTA. The index of DTA was a average RTs for correct "word" responses to death-related words in a lexical decision task. In the first test, I was unable to replicate prior TMT research (Schimmel et al., 2007), as I saw no differences in RTs between the MS and control (dental pain) groups. Furthermore, I saw no support for my second hypothesis, as I saw no differences in self-reported belongingness between these two groups. Still, a positive correlation between belongingness and RTs yielded support for my third hypothesis. In other words, the more

one feels that they belong with others, the less DTA they have (i.e., the longer their RT for death-related words). Given the lack of support for the first two hypotheses, I was unable to establish a mediation model and thus saw no support for Hypothesis 4.

In the third and final experiment, I aimed to complement Experiment 2 by examining potential contributions of both belongingness and anxiety on worldview defense through a mediation analysis.

### **Experiment 3**

**Overview and Hypotheses.** I examined whether *anxiety* and *curbed belongingness* each uniquely mediated the link between MS and worldview defense. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. Worldview defense was operationalized as monetary bail set for a prostitute and evaluations of the author of an ostensible anti-American essay. Anxiety was operationalized as scores on a self-reported single-item anxiety measure. Belongingness was defined as scores on the self-reported GBS (Malone et al., 2012). I tested the following hypotheses:

Hypothesis I. MS (vs. the control condition) will lead to worldview defense, as worldview defense assuages death-related anxiety. MS was operationalized through a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. I conceptualized worldview defense as bail set for a prostitute and evaluations of an anti-American essay.

Hypothesis II. MS (vs. the control condition) will predict anxiety, as according to TMT, thinking about death leads to strong anxiety, which participants relieve by upholding their worldviews. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. I conceptualized anxiety as a self-reported degree of anxiety.

Hypothesis III. MS (vs. the control condition) will predict curbed belongingness, as death reminders should signal a permanent threat to one's relationships. MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. I conceptualized belongingness as self-reported scores on Malone et al.'s (2012) GBS.

Research Question I. Will curbed belongingness and anxiety mediate the link between MS and worldview defense? MS was conceptualized as a writing prime in which participants write about what will happen to them, and what their emotions will be as they die. I conceptualized belongingness as self-reported scores on Malone et al.'s (2012) GBS. I conceptualized anxiety as a self-reported degree of anxiety I conceptualized worldview defense as bail set for a prostitute and evaluations of an anti-American essay.

**Research Participants.** 124 United States residents recruited from Amazon.com's MTurk participated in this study. I retained 104 (47 men) participants who provided reports on the variables central to this study ( $M_{\text{age}} = 39.03$ ,  $SD_{\text{age}} = 14.20$ ). The participants were compensated \$0.35 for their time.

**Procedure.** After agreeing to participate in the study by providing informed consent, participants completed demographic measures (e.g., sex, age). Participants then completed a set of neutral personality measures: Rosenberg's (1965) Self-Esteem Scale, the TIPI (Gosling et al., 2003), and the FMOS (Przybylski et al., 2013).

Following the completion of the initial measures, participants were presented with instructions to the standard TMT morality salience manipulation:

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

In the mortality salience condition, participants were presented with the following writing prime:

“Please briefly describe the emotions that the thought of your own death arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you physically die and once you are physically dead.”

As in Experiments 1 and 2, in the *control* condition, participants wrote about experiencing dental pain via the following prime:

“Please briefly describe the emotions that the thought of dental pain arouses in you.”

“Write down, as specifically as you can, what you think will happen to *you* as you experience dental pain and once you have experienced dental pain.”

TMT suggests that following mortality salience, people exert greater degrees of cognitive recourses to suppress the thoughts of death. Thus, after the writing primes, participants completed the "Growing Stone" task in which they read a neutral passage and answer two questions about the passage (Greenberg et al., 1994).

Following the "Growing Stone" task, participants completed the primary mediator and dependent measures. They first completed measures of the two mediator variables: Malone et al.'s (2011) GBS ( $\alpha = .94$ ); and select items that assess the degree to which participants are experiencing various emotions (via items used by Lambert, Eadeh, Peak, Scherer, Schott, & Slochower, 2014), which included the hypothesized mediator of anxiety (for a list of the emotions to be assessed, see Appendix H). Identical to Experiment 1, as a first measure of worldview defense, participants set bond for an arrested prostitute as well as completed the three-item attitudes towards prostitution scale ( $\alpha = .91$ ). Participants also evaluated an anti-American essay (higher values indicate more negative evaluations;  $\alpha = .94$ ; see Appendix F) and provided information, again for the purposes of maintaining the study's cover story, on the degree to which they endorse American values (the moderator for analyses of evaluations of the anti-American essay; higher values indicate more negative evaluations;  $\alpha = .81$ ; see Appendix G), their political orientation, whether they were born in the United States, whether they are a citizen of the United States, and their religiosity.

The study took approximately 15-20 minutes to complete.

**Results and Analyses.** As in Experiment 1, I obtained two indices of worldview defense: bail for an arrested prostitute and evaluations of an anti-American essay ( $r = .37$ ,  $p < .001$ ). Given that each index of worldview defense was compared between a dichotomous predictor variable (MS prime vs. dental pain prime), I conducted two Welch's  $t$ -tests, one for each index of worldview defense, to test the two hypotheses.

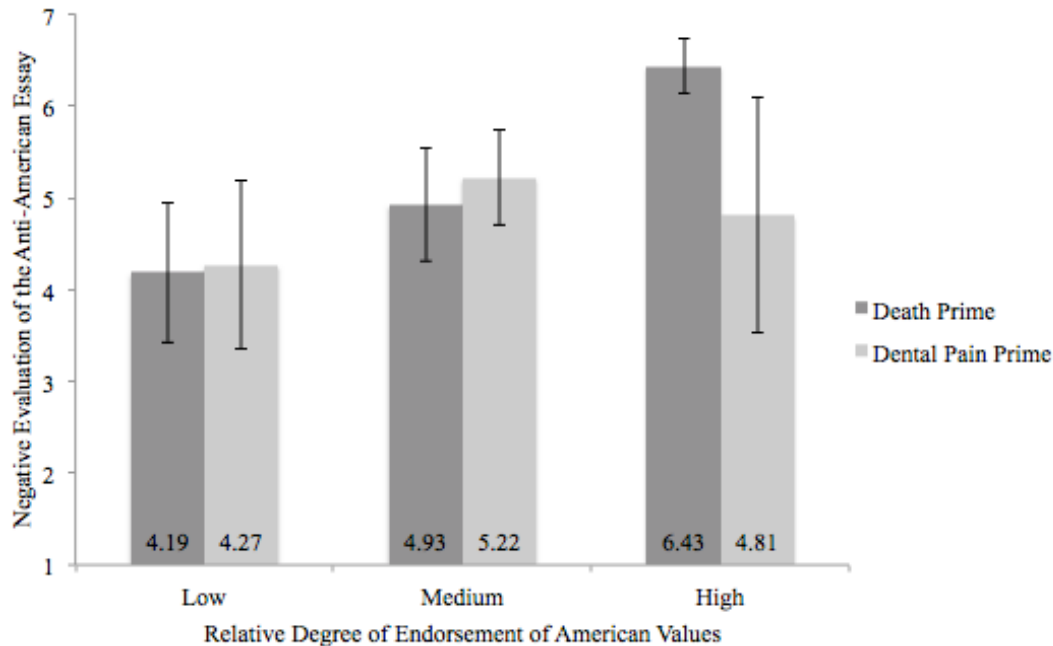
**Testing Hypothesis I.** I found no between-condition differences in bail set for an arrested prostitute and evaluations of an anti-American essay. Thus, the results yielded no support for Hypothesis I.

As in Experiment 1, I followed up these tests by exploring the possibility that a difference between the prime conditions may be qualified by the potential moderator variables. Initial ANCOVAs did not yield a condition x (continuous) moderator variable interaction for both indices of worldview defense. Still, given that there was a theoretical reason to examine differences between group means despite the nonsignificant interaction terms (Rosnow & Rosenthal, 1995), I categorized both continuous moderator variables using a quartile split (i.e., low = at or below 25%, medium = above 25% and below 75%, and high = at or above 75%).

A 2 (prime condition: MS vs. dental pain) x 3 (disapproval of prostitution: low vs. medium vs. high) ANOVA revealed no effects. Thus, the bail set for an arrested prostitute was unaffected by the MS condition, even for those who generally disapprove of prostitution. Replicating Experiment 1, however, I found a writing prime x endorsement of American values interaction in predicting evaluations of the anti-American essay,  $F(2, 98) = 3.56$ ,  $p = .03$ , partial  $\eta^2 = .07$ . The death (vs. dental pain) prime led to more negative evaluations of the anti-American



essay only for those of relatively *high* endorsement of American values ( $d = 0.94$  [95%  $CI_d = 0.09, 1.80$ ],  $p = .008$ ). See Figure 3.



*Figure 3.* Between-condition differences in worldview defense by degree of endorsement of American values in Experiment 3. Numbers at the bottom of each bar represent cell means. Error bars represent the 95% Confidence Interval of each cell mean.

**Testing Hypotheses II and III.** Hypotheses II and III, respectively, predicted that the death (vs. dental pain) prime will lead to greater anxiety and a greater desire to belong with others. I tested these hypotheses with a pair of Welch's  $t$ -tests in participants, using the subsample of participants who endorse American values to a relatively high degree (given that worldview defense emerged solely in these participants). As the number of participants who endorsed American values to a relatively high extent was small, I used one-tailed tests to examine *a-priori* hypotheses to retain statistical power.

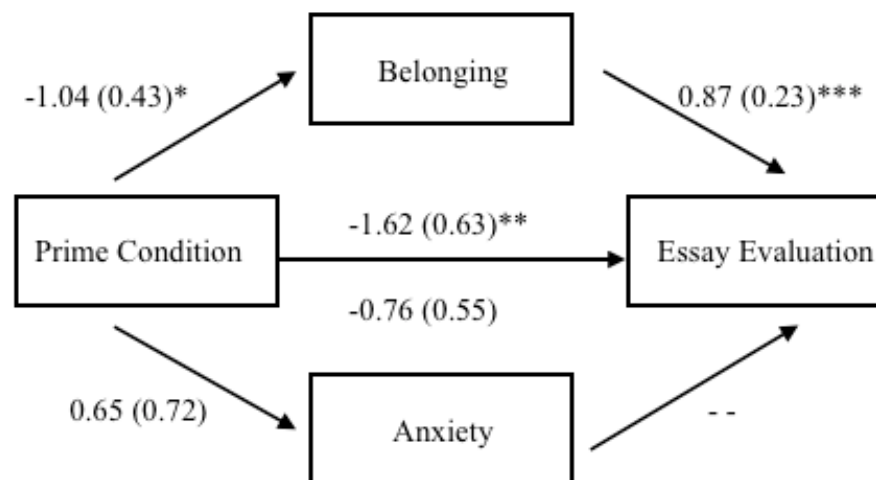
The prime condition did not affect self-reported anxiety,  $t(22.65) = -0.88$ , one-tailed  $p = .81$ . In fact, although the difference was nonsignificant, participants in the death

prime condition ( $M = 1.93$ ,  $SD = 1.67$ ) reported less anxiety compared to participants in the dental pain prime condition ( $M = 2.58$ ,  $SD = 2.07$ ;  $d = -0.35$  [95%  $CI_d = -1.11, 0.42$ ]). I did, however, find some support for Hypothesis II,  $t(23.35) = 2.34$ , one-tailed  $p = .01$ . Participants in the death prime condition ( $M = 6.07$ ,  $SD = 1.03$ ) reported a significantly greater degree of belongingness than did participants in the dental pain prime condition ( $M = 5.03$ ,  $SD = 1.22$ ;  $d = 0.93$  [95%  $CI_d = 0.11, 1.72$ ]).

***Test of the Research Question.*** I asked whether belongingness and anxiety each mediate the link between the writing prime and worldview defense (evaluation of anti-American essay). Because I saw no support for Hypothesis II, I could not establish the  $a$  path in anxiety as a mediator. Thus, I analyzed solely belongingness as a mediator, again only for participants with high endorsement of American values. The results of Hypothesis III established the  $a$  path in the mediation model (i.e., writing prime predicting belongingness). To establish the  $b$  path, I examined whether belongingness and evaluation of the anti-American essay were related while controlling for the prime condition. This test yielded a positive correlation,  $r_{\text{partial}}(26) = .62$ ,  $p < .001$ . As in Experiment 2, I tested the indirect effect using Preacher and Selig's (2012) *Monte Carlo* simulation method ( $k = 50,000$ ). The analysis of the indirect effect revealed that belongingness indeed mediated the link between the writing prime and evaluation of the anti-American essay (95%  $CI = -1.96, -0.14$ ; see Figure 4). Thus, thinking about death leads us to want to belong more, which in turn leads to more worldview defense.

***Alternative Mediation Analysis.*** It is plausible that a reverse relation may exist between the mediator (belongingness) and the worldview defense outcome (evaluations of the anti-American essay). Thus, I ran a second mediation model (again using participants who endorsed

American values to a relatively high extent) treating belongingness as an outcome and evaluations of the anti-American essay as the mediator. This mediation model also held (95% CI: -1.47, -0.14). In other words, differences between conditions in worldview defense ( $a$  path:  $\beta = -0.47, p = .02$ ) led to increased levels of belongingness ( $a$  path:  $\beta = 0.64, p = .001$ ), which in turn, eliminated the main effect of MS on belongingness ( $c'$  path:  $\beta = -0.11, p = .51$ ). Thus, it is possible that MS indeed threatens belongingness, but worldview defense, rather than being an outcome, may be a mechanism that people use to restore that threatened belongingness.



*Figure 4.* Mediation analysis of Research Question I.  $*p = .025$ ;  $**p = .017$ ;  $***p = .001$ . The values represent raw slopes (standard errors of the slopes are in parentheses). Essay Evaluation = evaluation of the anti-American essay. Negative slopes in prime condition as a predictor indicates the death prime scoring higher than the dental pain prime. The mediation analysis was performed for those of relatively high endorsement of American values ( $\geq 75\%$ ).

**Summary of Experiment 3.** In the third and final experiment, I saw no support for the hypothesis that MS would evoke worldview defense (i.e., bail set for an arrested prostitute and evaluations of an anti-American essay). Still, as in the first experiment, worldview defense did emerge for some persons. Specifically, a follow-up analysis revealed that the MS (vs. control) condition led to more negative evaluations of the anti-American essay for those who endorse American values to a relatively high extent. Importantly, I found that for those who endorse

American values to a relatively high degree, the prime of death (vs. dental pain) led to a greater need to belong, but not a greater degree of anxiety. This effect of belongingness in turn predicted evaluations of the anti-American essay. Thus, these data suggest that worldview defense may be a strategy some people take to restore their sense of belongingness after thinking about death. The party is going on without us, and we respond to this sudden expulsion as if we were ostracized by others (cf. Steele et al., 2015; Warburton et al., 2006). Alternatively, however, a second mediation analysis revealed that worldview defense also mediated the relation between MS and belongingness. In other words, this finding suggests that people uphold their cultural worldviews to restore their need to belong following thoughts of death.

### **General Discussion**

The purpose of this research was to study the underpinnings and mechanisms of the fear of death and its effects on cultural worldview defense. I examined the relative contribution of anxiety and belongingness on worldview defense and death thought accessibility following thinking about death. The general question I asked was whether death is scary because it signals to us that we are simply “leaving the party,” or that we are “leaving the party” that will go on without us. The principles of TMT dictate that death leads to worldview defense (and anxiety) by threatening the most fundamental of our needs: the need to stay alive (Greenberg & Arndt, 2012). Still, a complement to this approach is spearheaded by collective ideas targeting the importance of human relationships (e.g., Baumeister & Leary, 1995; Beckes & Coan, 2011; Dunbar, 1998; Leary, 2004; Tomasello, 2014) suggest that death may be scary because it signifies the ultimate social isolation. Indeed, some scholars have conceptualized ostracism and social rejection, or threats to our social ties (which can be highly painful both mentally and

physically; e.g., MacDonald & Leary, 2005; Stillman et al., 2009), as constituting a particular type of death: “social death” (Case & Williams, 2004; Williams, 2007a).

The first two studies served as general explorations of this idea. The three experiments that followed used standard procedures of TMT research to examine the extent to which belongingness may facilitate worldview defense.

### **Exploring the Fear of Death**

There may be many thoughts that run through our minds as we think about death. These thoughts have the potential to provide insight into why it is that people may (or may not) fear death. Thus, in my initial investigation, I used a stream of consciousness procedure (Pope, 1978) to explore the thoughts that emerge when people think about their own death.

Participants’ streams of consciousness yielded a diverse array of themes when thinking about death. For example, participants reported both positive (curiosity, gratitude, peace) and negative (e.g., depression, worry, anxiety) emotions. Some reported that they do not fear death, yet others reported that their negative reactions to death stemmed from losing or missing loved ones. Linguistic content analyses demonstrated that aside from first-person pronouns, people used social words the most in their narrative. Interestingly, the more social words (as well as “you” and friend-related words [e.g., friend]) people used, the fewer death words they used in their narratives.

Overall, the initial exploration suggested that death is a very diverse concept that entails both negative and positive themes. Importantly, it appears that social themes are some of the most prevalent, more so than negative affectivity such as anxiety and fear (though these emotions were also present in the narratives). These findings lend some initial support for the idea that death people fear death because it permanently cuts one’s social ties.

A second exploratory study was grounded in a questionnaire designed specifically for this study. Although I originally constructed the items to fit into four factors, an exploratory factor analysis suggested that a two-factor model best fit the data. These two general factors were: (1) “loss,” which encompasses the loss of both others and experiences; and (2) “fright,” which reflects general fear associated with death and related constructs (e.g., not having a place in the world). Participants endorsed fright to a greater extent than loss. Still, a particular question arises from these findings: are these two factors parallel to allow direct comparisons? Based on the findings, the answer may be “no.” A difference in endorsement of these two factors may not necessarily imply that people fear death, but not associate it with relationship loss. Likewise, these findings may not imply that people fear death more so than they fear losing relationships or experiences (including experiences with others). Rather, the results: (a) corroborate the notion that death is scary—an unsurprising finding (although given its mean degree of endorsement, persons’ fear of death may not be as strong as TMT may suggest); and (b) people’s associations with death are multifaceted—many factors are at play in evoking death-related fear. Thus, comparing those two factors may not necessarily be a proper route of analyses.

### **Summarizing the Experiments**

Most TMT research uses a priming paradigm to induce mortality salience (MS). In this paradigm, participants write two brief essays: (1) how they would feel as they die; and (2) what would happen to them as they die. As a control condition, participants write an essay that may be either neutral (e.g., going to the grocery store), or negative yet non-death-related (e.g., dental pain; the choice for the control condition in this research).

In two of the three experiments I will discuss below (Experiments 1 and 3), I included two indices of worldview defense: (1) bail set for prostitutes; and (2) evaluations of an anti-

American essay. In both of these experiments, however, I did not see that MS led to worldview defense. Thinking about death (vs. dental pain) led to neither higher bail for arrested prostitutes of more negative evaluations of an anti-American essay. Still, cultural worldview is relative—“Although most individuals within a culture are likely to share many basic assumptions and values...each individual invests in a unique version of the cultural worldview” (Rosenblatt et al., 1989, p. 683). A particular stimulus may induce worldview defense for one person, but not for another. For example, in Rosenblatt et al.’s (1989) investigation, MS led to higher set bail for prostitutes *only* for those who had negative views of prostitution. If one has a generally positive view of prostitution, there is nothing to defend when it comes to a worldview. For this reason, I included measures of attitudes towards prostitution and endorsements of American values in these two experiments as moderators to the effect of MS on worldview defense. In both experiments, when taking the moderator variables into account, MS did lead to more negative evaluations of the anti-American essay for those who endorse American values to a relatively high degree. Bail set for an arrested prostitute, however, was still unaffected by MS, regardless of one’s attitudes towards prostitution. Thus, any references to worldview defense below reflect negative evaluations of the anti-American essay.

The null effect of MS on bail set for prostitutes may have stemmed from relatively liberal attitudes participants had towards prostitution in general. The mean attitudes for acceptance of prostitution for Experiments 1 and 3, respectively, were 3.60 and 3.85, which were between the options “Somewhat true” and “Quite true” in terms of legalization, decriminalization, and acceptance of prostitution. Similarly, the bail that participants set for prostitutes was relatively low—the medians were \$226 and \$200 (from a range of \$0-\$1000) for Experiments 1 and 3, respectively.

There may be several reasons as to why MS affected the evaluations of anti-American essay but not bail for prostitutes. According to Burke et al.'s (2010) meta-analysis, the effect of MS on bail set for prostitutes ( $r = .33$ ) is sizably weaker than the effect of MS on evaluations of factors such as essays targeting one's country, which in this research was the U.S. ( $r = .42$ ). This is also the most commonly used outcome measure in TMT research according to Burke and colleagues' analysis. Furthermore, American values are central to the evaluation of an anti-American essay (i.e., both center around particular American attitudes). It is thus possible that this proximity between the moderator variable (American values endorsement) and the evaluation of an anti-American essay was behind why only this index of worldview defense was affected by MS. Any reference to worldview defense below reflects evaluations of the anti-American essay.

In the first experiment, I expanded the MS manipulation by adding two conditions to the standard MS and control (experiencing dental pain) primes. They were (1) thinking about losing all of one's relationships; and (2) thinking about the end of the world in which all humanity ceases to be. The relationship loss condition was a direct test of whether thinking about losing all of one's bonds would induce worldview defense. The purpose of the end of the world condition was to combine the relationship loss and death condition. That is, when the world comes to an end and all humanity ceases to be, not only will one die, but he or she will also not be leaving behind any relationships as well (as everyone else perishes too). I tested two hypotheses and explored a research question. I predicted that both MS and Relationship Loss conditions (vs. the control [dental pain] condition) would lead to worldview defense. Furthermore, I asked whether the end of the world condition would lead to worldview defense.



A test of the hypothesis that thinking about relationship loss would evoke worldview defense also revealed qualified support. The Relationship Loss condition both led to more worldview defense compared to the control condition in those who endorsed American values to a relatively high extent. The finding that thinking about relationship loss led to worldview defense offered some support for the social death hypothesis. That is, just as thinking about actual death can motivate some to turn to their culture, so can thinking about relationship loss. Actual and social death may indeed be on par with one another.

The answer to my research question was that thinking about the end of the world, where all of humanity ceases to be, also led to worldview defense in comparison to the control condition. Interestingly, the effects of this prime were generally stronger than both the MS and Relationship Loss primes. Unlike the MS and Relationship Loss conditions, regardless of one's endorsement of American values, thinking about the end of the world and humanity generally elicited worldview defense. Again, this difference was especially salient for those who endorsed American values to a relatively high extent. This finding can prompt two interpretations. First, MS and losing one's bonds may have unique routes leading to worldview defense. When combined, they may lead to a particularly high degree of worldview defense regardless of one's connection to the worldview. A second interpretation is that if the MS and belongingness primes are indeed equal (i.e., death can signal social isolation [social death] just as can thinking about actual relationship loss), thinking about actual death bolsters the distress of thinking about social death—the "best of both worlds," actual and social death, add up to produce especially strong effects.

In the second experiment, I took a different approach to examine the question of *why* death can lead to worldview defense. Rather than examining worldview defense directly, I

explored the strength of accessibility of death-related thoughts in one's mind (i.e., death thought accessibility; DTA), as an outcome (Schimel et al., 2007; Trafimow & Hughes, 2012). I conceptualized DTA as reaction times for correct "word" decisions for death-related words in a lexical decision task (Schimel et al., 2007). The quicker participants provided a correct "word" response to a death-related word, the more DTA is observed. With this methodology, I tested four hypotheses. One set of hypotheses predicted that the MS and the Relationship Loss conditions, compared to the control condition (dental pain), would evoke DTA. A second set of hypotheses predicted that MS (vs. control) would lead to threatened belongingness and greater degrees in self-reported anxiety (a variable which TMT predicts to be a mediator of the link between MS and both DTA and worldview defense; Greenberg & Arndt, 2012), which would in turn mediate the link between MS and DTA.

The findings of Experiment 2 yielded no support for my four hypotheses. I was unable to replicate the DTA effects of MS as found in prior research (Schimel et al., 2007): the RTs in both the MS and the control (dental pain) conditions were identical. Furthermore, the prime condition affected neither anxiety nor belongingness. Still, one finding that offered some support for my social death hypothesis did emerge. Across both priming conditions, belongingness was positively correlated with RT—the more belongingness one reported, the longer it took for him or her to respond correctly to death-related words. This correlation thus suggests that our social ties may indeed play a role in death-induced negative outcomes, beginning with DTA. The more we feel that we belong, the more we are shielded from any thought related to death.

Notwithstanding the null findings between MS and RTs, a TMT perspective can offer an alternative interpretation of the findings of Experiment 2. Some scholars believe that relationships are one of several vehicles of symbolic immortality (e.g., Mikulincer et al., 2002),

assuaging the terror of death. It may thus not be that little threat of social death inhibits any possible negative outcome resulting from MS due to the belongingness one perceives. Rather, our relationships simply offer us a protective blanket that may shield us from the terror associated with death. TMT, however, does not necessarily consider the perception of belongingness in general and its effects on DTA and worldview defense. Belongingness is a rich construct that encompasses numerous types of relationships, not just romantic relationships, which have been the focus of prior TMT research (e.g., Mikulincer et al., 2002). It is still difficult, however, to completely rule out one explanation over the other with these data.

Perhaps the most important question I asked was *why* MS leads to worldview defense. I sought to answer this question directly in Experiment 3. It examined three hypotheses and a research question. I again predicted that the MS (vs. the control dental pain) condition would evoke worldview defense. Furthermore, I also expected to see that the MS (vs. control) condition would lead to greater degrees of self-reported anxiety. My final hypothesis was that the MS (vs. control) condition would predict curbed belongingness. As a research question, I asked whether curbed belongingness and anxiety would each mediate the possible link between MS and worldview defense.

The data revealed qualified support for my first hypothesis. As in Experiment 1, I saw no main effect of prime condition on worldview defense. Still, further analyses suggested that the MS (vs. control) condition led to more negative evaluations of the anti-American essay for those who endorsed American values to a relatively high extent. There was no support for my second hypothesis. That is, self-reported anxiety was unaffected by the MS manipulation. Still, I saw some support for my final hypothesis: the MS (vs. control) prime led to greater degrees of self-reported belongingness. This difference, however, emerged only for those who endorsed

American values to a relatively high degree. This finding paved the way to an answer for the research question I posed—belongingness indeed mediated the link between MS and worldview defense.

An alternative mediation model also emerged. In this model, worldview defense mediated the link between MS and belongingness. The results of this analysis offer interesting insights into the role of the need to belong in the fear of death. Rather than suggesting that threatened belongingness is the reason behind worldview defense, these findings show that people may also uphold their worldviews to *restore* their need to belong. In other words, thinking about mortality may indeed threaten belongingness, and people uphold their cultural worldviews to restore that sense of belongingness. The structure of Malone et al.'s (2012) GBS may further reflect this idea. Although it can be conceptualized as capturing one's motivation to form bonds, it also assesses *state* belongingness (i.e., how much belongingness do I feel now?). The alternative mediation model, rather than the initial model, may thus better explain the positive relation between worldview defense and the GBS. This model, however, does not downplay the role of belongingness in worldview defense and death. It is simply the *placement* of belongingness that differs. Rather than serving as a mediator, belongingness may very well be a product of worldview defense, as culture can be conceptualized as grounded in relationships (Kenrick et al., 2002). I will discuss further limitations of the GBS below.

### **Putting the Pieces Together**

Reactions to death are complex. The reactions that it may elicit in people are multifaceted, entailing both negative and positive themes. This research has demonstrated that death is not necessarily frightful “just because” (i.e., death is scary because it is death). Rather, people associate it with themes that range from loss of loved ones and experiences to finding

peace after life. Although I proposed that the fear that death may evoke is grounded in our social relationships, this view is not the full story either. For example, thinking about the world coming to an end, and all of humanity ceasing to be (in Experiment 1), was an especially strong trigger of worldview defense. If relationship loss was indeed behind the negative reactions to death, then the “end of the world” manipulation should have elicited less worldview defense given that the prospect of having relationships would not exist, as there would be no humans left with whom to form ties. When combined, both death and the prospect of relationship loss contribute to worldview defense, which may suggest parallel though separate routes of evoking worldview defense.

Belongingness did not serve as a consistent mediator of the proposed link between MS and worldview defense. In other words, death was not necessarily evoking worldview defense because it had threatened one’s need to belong. Still, a link between belongingness and worldview defense did emerge in Experiment 3 (and similarly, a link between belongingness and DTA emerged in Experiment 2), which suggests that our strong need to belong does play a role in our reactions to death, yet it does not provide the entire picture.

The findings of this research suggest that neither the TMT perspective nor the social death perspective offers a stronger explanation for why we fear death. Rather, both perspectives provide unique insights to offer into studying this complex phenomenon. Death is indeed scary—the reason why it is scary is not found in solely one factor. Death is mysterious; it forces us to miss out on many of life’s experiences, from relationships to vacations to novel foods. Each one of these dimensions contributes to our reactions to death, which is perhaps why some people may be more afraid of death than may others. Still, at this point, it is unfitting to conclude that one sole factor is responsible for all of the reactions to this inevitable fate.

## Limitations, Strengths, and Future Directions

**The Limitations of This Research.** This research entailed several limitations. One potential limitation may be the participant samples. MTurk samples afford numerous advantages, including an availability of an older and more diverse sample (Buhrmester, Kwang, & Gosling, 2011). Still, with an MTurk sample, researchers do not know the environment under which a participant partakes in a survey (for example, some participants may have listened to music or watched television as they completed the surveys). Thus, there is potential for high error variance in such samples (still, the large MTurk samples I collected may overcome this limitation). Another potential limitation of this sample is that the participants were all residents of the United States. Previous research has demonstrated that the effects of MS may be culture-dependent—Yen and Cheng (2010), for example, saw that MS did not induce worldview defense in East Asian samples. Thus, these findings may have differed if non-American, and especially, non-Western samples were used.

Some of the materials I used in this research may also serve as limitations. Malone et al.'s (2012) General Belongingness Scale captures one's immediate perception of belongingness by assessing two highly-related factors: acceptance and rejection. The GBS was selected because it has demonstrated strong psychometric properties; and it directly assesses the construct, rather than measuring it indirectly via assessments of lack of belongingness of other measures (Malone et al., 2012). One limitation of the GBS, however, is that it does not necessarily capture one's motivation to form ties. Given that TMT can be conceptualized as a motivational theory (i.e., one is motivated to avoid death), this limitation offers a potential future direction. A feasible instrument that researchers can use is Leary, Kelly, Cottrell, and Schreindorfer's (2013) Need to Belong Scale (NBS), which assesses the degree to which one *desires* to belong with others.

Should the social death hypothesis hold, MS should strengthen one's need (or desire) to belong, which may in turn evoke worldview defense.

**The Strengths of This Research.** Despite the limitations, this research also contained a number of important strengths. One of the primary strengths of this research is its use of diverse samples that included both college students and (older) non-students, and methodologies of investigating the hypotheses and research questions. I used not only experiments (both online and in the laboratory), but also qualitative analyses that directly target persons' associations with death as well. Another strength of this research was the use of various dependent measures. Experimentally, I examined two different indices of worldview defense (bail for prostitutes and evaluations of an anti-American essay) as well as RTs to death-related words. Qualitatively, I examined people's streams of consciousness in terms of thinking about death and reports of various fears that may reflect death. This diversity in outcome measures provided a stronger and more robust examination of the questions I sought to answer.

**Where To Go Next.** This research was only a single step in a journey to explore the psychology of death and its link to our social lives. Although some evidence in support of the social death hypothesis emerged, it fell short of providing a solid conclusion. Several lines of future directions may aid in overcoming the limitations of this research. Should the social death hypothesis hold, then ostracism should induce worldview defense, an effect potentially mediated by DTA. One initial step for future research is to extend Steele et al.'s (2015) exploration of ostracism on DTA and worldview defense.

Another direction is to examine the relation between loneliness, DTA, and worldview defense. Unlike ostracism (in which one may have few immediate actual social ties; Williams, 2007a), loneliness is the *perception* that one has few or none meaningful social ties (Cacioppo &

Patrick, 2008). Both loneliness and ostracism have similar psychological effects on people. For example, both ostracism and loneliness contribute to perceptions of lower meaning in life (Stillman et al., 2009). Per Holt-Lunstad et al.'s (2015) meta-analytic findings that loneliness is positively associated with mortality, it is possible that lonely persons may uphold worldview defense and demonstrate DTA to a higher degree than do non-lonely persons. This question can be answered through multiple methods. A cross-sectional investigation would provide insight into whether a general positive relation between loneliness and worldview defense exists between persons (e.g., a positive relation between loneliness and negative evaluations of an anti-American essay). A longitudinal examination of this potential relation would demonstrate that changes in loneliness may be associated with changes in worldview defense within persons—during periods of time where people feel lonely, they may uphold their worldviews to a greater extent than when they do not feel lonely.

Collectively, these studies would allow for a direct test of the main effect of belongingness and worldview defense, both experimentally (as belongingness was not experimentally induced in this research) and through correlational investigations. Furthermore, these studies would also provide insight into whether actual (ostracism) and perceived (loneliness) threats to social ties affect worldview defense to similar or different degrees. Should both induce worldview defense to a similar degree, then there is a basis to conclude that any type of threat to belongingness can induce worldview defense. However, if one type of threat leads to worldview defense whereas the other does not, then there will be evidence to suggest that the relation between belongingness and worldview defense is relative—people either have to directly experience threats to belongingness in their immediate environment (through ostracism), or



perceive a general threat to belongingness (through loneliness) to experience worldview defense and DTA.

### **Conclusion**

Are we as strongly afraid of death as Becker (1973) believed? Is people's view of death completely filled with fear, anxiety, and dread? The answer to these questions, according to this research, is perhaps not. For some, death indeed stirs fear; yet for others, death also evokes feelings of peace. The reasons behind why death may evoke positive and negative reactions are diverse—for many people, death may be scary because they will miss out on novel experiences and never see their loved ones again. Although our strong need to belong is indeed related to how we react to death, it is only a part of a larger picture on this complex phenomenon. It is true that few want to leave the party. For now, however, the party is not yet over. Go out and celebrate—especially with the company of close others.

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## Appendix A: Instructions given to coders in Preliminary Study 1

Go through each paragraph and code for the themes that emerge within each passage.

For example, the following (made up) sentence may contain themes of social isolation, and negative affect: "It makes me sad to think about this because I feel that I will be alone."

This one contains themes of excitement and motivation: "I was so stoked to get an A in the test, which now makes me want to study more and do well in other classes."

As there are twenty short paragraphs, it won't take long to do this. Do not communicate with one another about doing this task or what you found.



## Appendix B: Narratives written by participants in Preliminary Study 1

Female (46)

I think about my death quite a bit. I imagine it to be a relief from all the stress and chaos of life. I wouldn't want to take my own life, and as an atheist, I'm actually a little put off by dying, as it's final. I envy people who can believe that they will be resurrected in a happy place up in the sky. Unfortunately, that is not the case for me, so while I am so tired and filled with anxiety every day, and I think about putting a gun in my mouth and pulling the trigger, I won't...one because I don't have a gun and wouldn't buy one, and two, because there still is a tiny glimmer out in the future somewhere where it may get better, and I wouldn't want to miss out on that.

Female (21)

When I think of my own death it terrifies me. What truly scares me is what will really happen after I die. Will i just die and its like I'm asleep will I go to heaven? I am just not 100% sure so it terrifies it. I don't want to leave any of my family behind and have to live without me. I hope I do die peacefully. I constantly have nightmares of people trying to murder me. I always wonder if I will die at a young age or will I live until I'm 100 years old. I try not to think about it because, it stresses me out way too much.

Male (33)

I am trying hard to let go of the specter of death, but I find that it is a concept that still frightens me. It is one of the only certain things in life, the one thing we should accept as an inevitability, yet the thought of it haunts me. When you can learn to conquer your fear of it, I believe you can truly live an authentic life.

Male (53)

This is an interesting survey. Also an interesting television show on in the background. Death is the end of a reality. Death is the ending of the unique individual as its relationship to the idea prototype on which the unique individual is based becomes more disparate. As the ability to remain a close representation of the prototype on which it is based becomes less possible death (ending) of the unique individual becomes more probable and eventually become inevitable. As identification with the idea prototype lessens the actual nature of death becomes clearer until the concept death evaporates. No longer living and rather being Life, death no longer holds threat nor worry. Death becomes and element of being life and not the ending of life.

Female (57)

The first thing that comes to mind is that I hope it is far, far in the future. I want to live long enough to see Mia grow up. Can't wait to see what kind of young woman she becomes. I want to die at home. Comfortable. Loved ones all around me. Even if I'm unconscious i think i will still know they are there. It will help them too. I'm not afraid of what comes after. Right now I don't think anything really comes after, except absence of pain. I wonder if, when it comes to the end,

I will want to believe i'm moving on to a place where I will see loved ones who have already died. that sure is a nice thought. ha! i never even thought about whether I'd go to heaven or hell, meet god or anything like that. the only possible afterlife I can imagine is one where I can spend time with people and animals I've lost before. I do hope that I don't suffer too much. after Aunt Catherine died in her sleep, all the rest of the aunts wanted to "Go like Catherine". I think they think she just went to sleep and never woke up. I have to wonder whethe she had a heart attack and suffered immense pain before she died. Not too hard to think about my own death, partly because I believe it to be in the distant future. But if I were to die today, I think it would be OK. There are plenty of people left behind who can help each other here.

Female (38)

If I'm in a situation where I know I'm going to die, I imagine I'm going to think of my family. I'm going to think about my girls and my husband and how much of a happy life we've had, despite the rough experiences we've been through to get where we are. I will think about how I hope my husband knows how much I've loved him and how happy he has made me. I hope my girls know how much I've devoted my life to them and have only ever wanted the best. I know it will be difficult to go without me, but they are all very strong and I know my husband will be able to guide them into the best they can be. I won't look back with regret, but only with gratitude for the live I've been given.

Female (52)

I am afraid of death to a certain degree, how I will die, will it be painful, will it be lengthy because of illness. It makes me want to cry to think I may die young and miss my children and grandchildren growing up and getting married. I am curious about what happens after death though, is there an afterlife? Will I see the people who have died before me. I also feel peace when I hunk of death because I do believe there is an afterlife and it brings me joy to think I will see my beautiful son who was killed in an accident 7 years ago.

Male (28)

The only thing that really goes through my mind is how my daughter will be when i die. I just worry that she will be taken care of and hope that she will have had a great life with me and hope she continues to do so after i am gone. I am not worried about the great beyond or anything like that. I personally believe once were dead its over there is no higher power that is going to decide what happens after. I am not worried for myself just my daughter.

Female (21)

I would hope to simply die in my sleep, though some are not that lucky. I would probably have a flash of all my past memories. Honestly sometimes I feel like my life will just repeat itself in my mind, though I'll have no memory of what will happen. For example, what if we are already dead and just going through our past memories? In dreams, it can seem like days or even years even though it has only been a few hours of dreaming. So what if it is the same during death? I am honestly a bit afraid of dying, not because of death itself, just of the unknown. What really

happens to us after death? Do we simply go to another plane of existence, do we become reincarnated, or do our souls just float around on the earth where we died like memories of what once was or what happened to us? Death is a very confusing factor of life, but it happens to all of us whether we want it or not.

Female (22)

i hope I don't die alone. maybe someone will be with me. i dont have many people in my life and many of them are older, so im not sure. i hope my boyfriend is with me. i hope this is after we've been living together for a long time. i hope we had a good life and got to accomplish everything we wanted together. the only thing i know for certain is that this is the only life we have. the idea of an afterlife is nice, but i just dont believe in it. maybe our souls get scattered in the universe. or what about reincarnation? its a very interesting idea, but i dont really believe in that either. i hope that the world i leave is better than the one i arrived at. its sad to think that things could get worse. i dont want to die knowing that my friends and family will be left behind in an unkind world. i wonder if anything that i ever did will matter? i guess its not important at this stage. even though i dont believe in an afterlife, i know ill live on in the people i love. but eventually, theyll be gone too, and ill just be another female born in the us in 1991.

Female (46)

My own death is a mystery, a curiosity. There has never been a desire for a heavenly afterlife, sitting on clouds singing with angels. This type of afterlife doesn't make sense to me. My idea of afterlife is that we lose this body and then return in another form. Somehow our consciousness survives even if our bodies don't. It's also difficult for to accept that we are just gone completely. That idea goes against every thing we know and observe in nature. Scientifically, nothing dies or disappears. molecules form new objects. When I was younger I spend a lot of time contemplating the meaning of death because my mother died of cancer when I was 11. As a child I had to make sense of it all and spend hours and hours reading books about psychology and religion. Even though I consider myself agnostic and respect all religions I am fascinated and influenced most by Buddhism. Even before my mother died as a child I instinctively felt drawn to reincarnation and renewal. It doesn't seem crazy or blasphemous it seems natural.

Female (50)

When I think about my own death, I wonder if I will get to see my relatives who have gone before me. I think of the people, my children and grandchildren, that I would leave behind. I, for some reason, think of death often. Will anyone miss me? Will I be able to look down and really see whats going on. Will I be looking down or will I be looking up. / I picture my father, my wonderful father, being there to greet me..that is what I look forward to. Him hugging me again.

Male (40)

It scares me, i'm not ready to die and I try not to think about. I prefer to think of the things I want to do however... I prepare for my life and when I think about my death it scares me that I

am just preparing to die and not to live. I hope I die in my sleep however it scares me to think that could happen every night I go to bed. I don't "try" to be healthy but I don't do things that are unhealthy either so much. I actually worry about my dog's health more than my own.

Female (21)

My brother died a year ago. He was only 16. When I think about death, I wonder where we will go. What happens? Will I still exist? Will I regret? Does he regret putting a bullet in his head? How many people would i upset if I died and would it even be worth it? One day, when I do die, will I be ready or will I be scared? Will I be like my brother, waiting and hoping for death, or will I be like my grandmother, crying on her deathbed, feeling unaccomplished and unready to leave. / / There is so much death left within my lifetime. So many more opportunities to lose people and many moments to be sad. This scares me. I don't want to lose anyone and I dont want to die. I don't want to feel alone in this world and I don't want to leave it. I feel like there isn't enough time to just be with everyone together and to be happy. There isn't enough time to just experience everyone's company and love one another. I also worry about losing other people before their time. I have younger siblings who are only children. The thought of losing them terrifies me. The thought of losing my parents and friends and grandparents and pets terrifies me. I feel so lost when i think about these things. / / I feel a thick, heaviness in my chest right now. I feel sadness and it takes a lot of effort not to cry. my Brother's death took a toll on me. I wasn't ready to lose him. He was only a child. It was such a recent thing and I feel a lot of guilt and regret about it. I regret not spending more time with him. I regret not telling him that I love him more or having important conversations with him. It's really hard and it's really frustrating.

Female (39)

At this very moment what you are asking me about brings me great anxiety. Ever since I was a child I have had extreme fears about death. I am so terrified of the unknown. I fear of how it is going to happen and how it is going to feel. Am I going to suffer or will I go peacefully. I am afraid that when you die it is going to be be black and silent and just nothingness. Is there a heaven and am I going there. I don't want to die young I do not want to leave my children and the thought of that scares me to death. Will I still be able to see them and hear them? These are the things I think about and the things that terrify me.

Female (25)

I am trying to think about death. Death basically makes me think about the thing that I'll miss out on after I die. I'm thinking about My Chemical Romance, which is a band that has made quite a few songs about death and/or illness. I really enjoy listening to that band, but they are no longer together. When I found out that they had broken up, I felt that there was a lot of wasted potential. I guess that's what dying in general is about. I didn't think about what would happen afterwards. I just thought about what would have been accomplished if they had maybe taken another path. I don't really know why we are all so concerned about death. I know that it is something that happens to all of us in our lives, but I don't think that we should all be so consumed by it that we think about it as often as we do. It's always in the media these days.

Male (33)

I am falling for ever and ever and never stop and eventually become used to this feeling and feel ok about it and eventually totally calm and fine with it. I see everything i have ever thought about or seen fly in front of my eyes ranging from art to tribal dance to fast motorcycles. I am breathing easily as if there is an oxygen tank attached to my face so i feel euphoric and at peace.

Female (24)

I'm not worried about death since I have nearly died 3 times already. In high school I had a seizure and went into cardiac arrest. I was in a coma for a few days. I had a genetic heart condition and needed a pacemaker and defibrillator. At 21, I experienced heart failure and needed a transplant. That heart failed last year (at 23) and I had a second heart transplant. I was in awful shape and all of the doctors agree that if I didn't get the heart that day, I would not have made it through the weekend. I will need other transplants in my life if I live long enough. I hope to live for a long time, but I am not afraid to die.

Female (29)

When I think of my death I think of time, I think of black abyss, dream of nothingness. I am relentlessly falling into a cavern that never has a bottom, or, if it does, I never reach it I never open my eyes and I never feel my body dashed to bits on the rocks below. I never think of heaven or hell or god or saint peter or a pearly gate or a judge or a highlight reel by reel of my time on earth. I think of silence. I think IN silence. My ears open up and my eyes explode. My brain disintegrates. I think of how ai will die: earth air fire water, and I hope to god it goes fast, I'd rather be shot in the head than wait out some long term illness. One right between the eyes. The quick and the dead.

Male (45)

Sleep deep and come with me. We are going to take a trip that all will see. Leave the silver cord and put on your emerald tie. Sleep deep and come with me. Don't forget to say good-bye. Take a heavy breath with a lonely sigh. Remember there will be no surprise when you look into my eye. Sleep deep and come with me. For there is no time to make your plea. Come close let me put you at ease. Sleep deep and come with me.

## Appendix C: Items for the Questionnaire in Preliminary Study 2

Instructions: We are interested in people's perception of death. Please rate the degree to which each of the statements applies to you:

### **Fear**

I am afraid of death and dying.  
 Thinking of death makes me anxious.  
 Death is a natural part of life. (reverse-coded)  
 Death is my biggest fear.  
 Thinking of death scares me.  
 Thinking of death makes me feel uneasy.

### **Symbolic Immortality**

Death does not frighten me as it is a graduation to a higher existence. (reverse-coded)  
 I am not afraid of death because I know my culture will continue after I die. (reverse-coded)  
 It bothers me to think about death because after I die, I won't be able to contribute anything to the world.  
 I fear that I won't be able to leave a legacy before I die.  
 Death is not frightening, as my ideas will live on after I die.  
 It bothers me to think that after I die, I will not have my place in this world anymore.

### **Relationship Loss**

Death is like being alone forever.  
 I think that death is like being permanently ostracized by others.  
 To me, death is like never having a close relationship ever again.  
 Death is like leaving my loved ones behind.  
 Dying is like being lonely forever.  
 Death is like losing all of my close relationships .

### **Loss of Other Things**

Dying will make me miss out on experiences.  
 Death is like leaving everything I have behind.  
 All my goals and accomplishments will be lost after death.  
 To me, death is like losing everything I strived for.  
 I am afraid I won't accomplish all I wanted to do in life after I die.  
 One of the things that scares me about death is never knowing what my friends and family will be doing.

*Note.* Each question will be assessed using the scale 1 = *Not at all true*; 3 = *Somewhat true*; 5 = *Quite true*; and 7 = *Very true*

## Appendix D: “Growing Stone” Distractor Task

*Instructions:* The personality portion of the survey is over. Now, we would like you to complete a few different attitude tasks. As was stated earlier, research suggests that attitudes and perceptions about even very common everyday items may be related to basic personality characteristics. To further examine this idea, we would like you to complete the opinion questionnaires on the following pages with your most natural response. Please follow the instructions provided and complete the questionnaires in the order they are presented. That is, do not skip around.

Please read the following short passage from a novel and answer the questions below it.

The automobile swung clumsily around the curve in the red sandstone trail, now a mass of mud. The headlights suddenly picked out in the night—first on one side of the road, then on the other—two wooden huts with sheet metal roofs. On the right near the second one, a tower of course beams could be made out in the light fog. From the top of the tower a metal cable, invisible at its starting-point, shone as it sloped down into the light from the car before disappearing behind the embankment that blocked the road. The car slowed down and stopped a few yards from the huts.

The man who emerged from the seat to the right of the driver labored to extricate himself from the car. As he stood up, his huge, broad frame lurched a little. In the shadow beside the car, solidly planted on the ground and weighed down by fatigue, he seemed to be listening to the idling motor. Then he walked in the direction of the embankment and entered the cone of light from the headlights. He stopped at the top of the slope, his broad back outlined against the darkness. After a moment he turned around. In the light from the dashboard he could see the chauffeur’s black face, smiling. The man signaled and the chauffeur turned off the motor. At once a vast cool silence fell over the trail and the forest. Then the sound of the water could be heard.

The man looked at the river below him, visible solely as a broad dark motion flecked with occasional shimmers. A denser motionless darkness, far beyond, must be the other bank. By looking fixedly, however, one could see on that still bank a yellowish light like an oil lamp in the distance. The big man turned back toward the car and nodded. The chauffeur switched off the lights, turned them on again, then blinked them regularly. On the embankment the man appeared and disappeared, taller and more massive each time he came back to life. Suddenly, on the other bank of the river, a lantern held up by an invisible arm back and forth several times. At a final signal from the lookout, the man disappeared into the night. With the lights out, the river was shining intermittently. On each side of the road, the dark masses of forest foliage stood out against the sky and seemed very near. The fine rain that had soaked the trail an hour earlier was still hovering in the warm air, intensifying the silence and immobility of this broad clearing in the virgin forest. In the black sky misty stars flickered.

*Note.* Following the passage, participants will rate descriptive qualities of the story on the scale 0 = *Not at all descriptive*; 4 = *Somewhat descriptive*; 6 = *Very descriptive*. Participants will also report whether they think the author is male or female

## Appendix E: Legal Definition of a Bond

### What is Bail?

Bail is a process through which an arrested criminal suspect pays a set amount of money to obtain release from police custody, usually after booking. As a condition of release, the suspect promises to appear in court for all scheduled criminal proceedings—including arraignment, preliminary hearing, pre-trial motions, and the trial itself. If the suspect fails to appear in court as scheduled, he or she will be subject to immediate arrest, and any bail amount paid will be forfeited.

### How is Bail Set?

If the suspect does not obtain release by paying bail immediately after booking, a judge may make a bail decision at a separate hearing, or at the arraignment. Regardless of the timing, the bail amount may be pre-determined (through a "bail schedule"), or the judge may set a monetary figure based on:

- Seriousness of the crime, in terms of injury to others
- Suspect's criminal record;
- Danger that the suspect's release might pose to the community;
- Suspect's ties to family, community, and employment.

Information obtained from: <http://criminal.findlaw.com/criminal-legal-help/bail-bonds.html>



Appendix F. Anti-American Essay and Questions Measuring its Evaluations.

Instructions. In the final task, we are interested people's evaluations of and judgments about others based on minimal information. Please read the following essay written by an immigrant to the United States who participated in a prior study, and answer several questions about the author.

When I first came to this country, I believed it was the "land of opportunity" but I soon realized this was only true for the rich. The system here is set up for rich against the poor. All people care about here is money and trying to have more than other people. This no sympathy for people. Its all one group putting down others and nobody cares about the foreigners. The people only let foreigners have jobs like pick fruit or wash dishes because no American would do it. Americans are spoiled and lazy and want everything handed to them. America is a cold country that is unsensitive to needs and problems of foreigners. It thinks it's a great country but its not.

How much do you like this person?

How intelligent did you think this person was?

How much did you agree with this person's opinion of America?

From your perspective, how true do you think this person's opinion of America is?

*Note.* Each question will be evaluated on the scale 1 = *Not at all* to 7 = *Totally*

## Appendix G. Questions Assessing the Degree of Endorsement of American Values

I believe that...

I endorse the values of the United States.

I support the war in the Middle East.

I hold American values close to me.

The United States has too many immigrants.

Immigrants cannot be "true" Americans.

America is the greatest nation in the world.

Immigrants, even if they are U.S. citizens, have no right to criticize the U.S. government.

American values are inferior compared to those of some other countries.

## Appendix H. Emotions Assessed in Experiment 3

### *Negative affect:*

Anxious (hypothesized mediator)

Fearful

Nervous

Afraid

Upset

Distressed

Insecure

Angry

### *Positive affect:*

Excited

Confident

Determined

Inspired

Happy

Calm

Relaxed

Comforted

*Note.* Each item will be assessed using the scale 1 = *Not at all* to 7 = *Very much so*.