Terror management theory upside down: Prosocial behavior following immortality priming

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Social Psychology

by

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May, 2014
THE GRADUATE SCHOOL

We recommend that the dissertation
prepared under our supervision by

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entitled

Terror Management Theory Upside Down: Prosocial Behavior Following
Existential Security Priming

be accepted in partial fulfillment of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

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Abstract

Based upon Terror Management Theory, the present study tested whether subliminally priming notions of immortality would tend to cause individuals to increase their generosity and reduce their in-group bias, as measured by monetary donations to racial in-group vs. out-group members, and to what degree that effect was positively associated with individuals’ spiritual beliefs and level of collectivism.

As part of the study’s paradigm, participants had the chance to win $200 in a lottery-style drawing, and were given the chance to indicate what amount, if they were to win that drawing, they would like to donate (the dependent variable) to a (fictional) scholarship recipient. Prior to allocating that donation, participants were randomly assigned to be subliminally primed with words related to symbolic immortality (vs. controls). Additionally, participants were randomly assigned to condition whereby the donation recipient was of the same vs. different race as the participant. Measures of collectivism and religion also were collected during a survey component of the study.

Immortality priming did not significantly reduce in-group bias. However, it strongly interacted with spiritual beliefs such that spiritual believers gave more when primed with immortality. Collectivism was positively associated with amount donated, which tended to be more pronounced both when individuals gave to racial in-group members.

*Keywords:* meaning maintenance model, terror management theory, collectivism, religion, in-group bias, priming, immortality
Dedication

To my favorite editor: the one who birthed me. I love you mom.
Acknowledgment

This research was supported in part by the National Science Foundation Graduate Research Fellowship under grant 1320-123-0053.
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Chapter 1: Introduction

The Phenomenon of Intergroup Prejudice/Discrimination/Intergroup Hostility

Call it prejudice; call it discrimination; call it intergroup hostility; call it favoritism; call it war. These are a few of the many forms that in-group bias can take (see Hewstone, Rubin, & Willis, 2002), and it takes surprisingly little for such biases to emerge. Specifically, social identity theory (Tajfel, Flament, Billig, & Bundy, 1971; Tajfel, 1974) was inspired by the finding that assigning research participants into one of two groups on an arbitrary basis, such as a coin flip, produced favoritism toward others who shared the same group membership (i.e., the in-group) compared with those who did not (i.e., the out-group; see Tajfel, Flament, Billig, & Bundy, 1971). Simply put, in-group members are those whom individuals perceive to be “like themselves” on a given dimension (e.g., race); whereas, out-group members are those perceived to be dissimilar on such a dimension (see Hewstone et al., 2002).

Not only the work of Tajfel and colleagues, but an abundance of research on intergroup behavior has shown that humans tend to favor members of their in-group over those of out-groups: the aforementioned phenomenon referred to as in-group bias (Emswiller, Deaux, & Willits, 1971; see Hewstone et al., 2002; see Pratkanis, 2007; Suedfeld, Bochner, & Matas, 1971). Given the universal tendency among humans, and other social species, to manifest in-group bias, it is theorized to have served an evolutionarily adaptive function as humans favored those closest to themselves (e.g., their offspring and members of their tribe), which would increase the chance that carriers of their genes would survive long enough to propagate (Huang, Ackerman, & Bargh, 2013;
see Pratkanis, 2007). Indeed, in support of that theory, research has shown that the in-group bias is endemic to all human groups in which it has been studied (see Pratkanis, 2007).

**Forms of In-group Bias**

However, it should be noted that in-group bias can take two forms. One form is out-group derogation, or disadvantaging which can involve behavior (e.g., discrimination), attitudes (e.g., prejudice), or cognition (e.g., stereotyping; see Burke et al., 2010; Hall, Matz, & Wood, 2010; see Hewstone et al., 2002; Mackie & Smith, 1998). Additionally, in-group bias can take the form of favoring one’s in-group, without necessarily disparaging, or disadvantaging the out-group (see Hewstone et al., 2002; Jonas, Schimel, Greenberg, & Pyszczynski, 2002). For example, such in-group favoritism encompasses extensions of trust, positive regard, cooperation, empathy, and charitable donations to in-group members over out-group members (see Hewstone et al., 2002; Jonas et al., 2002; see Galen, 2012).

**Factors That Affect In-group Bias and Related Behaviors**

Given the many socially undesirable manifestations of in-group bias, it should come as no surprise that social psychologists have sought to identify factors that tend to give rise to it. An implicit, if not explicit, mission of such research is that identifications of those factors can pave the way for interventions oriented toward minimizing undesirable manifestations of in-group bias. In that pursuit, research has identified that in-group bias tends to arise as a function of three factors: salience, status, and relevance (see Mullen, Brown, & Smith, 1992). Congruent with the salience factor, the aforementioned work by Tajfel and colleagues (1971) highlighted that in-group bias
tends not to occur unless participants are aware that they identified with one group vs. another (however trivial that identification might be). As mentioned, assigning individuals to one of two groups on an arbitrary basis is enough to activate the in-group bias, but those individuals must be aware of their group membership for that to occur (Tajfel et al., 1971).

Regarding the other two factors—status and relevance—a meta-analysis of 137 tests of in-group bias has found that these factors tend to interact. The first premise of that interaction is that individuals, who are among a relatively high-status group, will tend to exhibit greater bias on attributes that are directly relevant to that identity (Mullen et al., 1992). Relevance, in this context, is defined as those attributes which are considered most important to their group: those attributes that are closely associated with their high-status (Mullen et al., 1992). For example, those whose in-group is defined by scoring highly on a test are likely to favor others who are also among the high-scorers (Mullen et al., 1992), and such individuals tend to exhibit less in-group bias on irrelevant attributes (e.g., one’s ethnic group). In contrast, those who are of low status (e.g., those who score low on such a test) are likely to demonstrate greater in-group bias on relatively unrelated dimensions (e.g., one’s ethnicity): presumably because they cannot claim legitimate in-group superiority on the relevant attributes on which they have relatively low status. Additionally, research has demonstrated that the effects of in-group are especially likely to emerge when one’s group identity is literally or symbolically/ideologically threatened on group-valued attributes (Jetten, Postmes, & McAuliffe, 2002; Jonas et al., 2002).

Social/Situational Variables Matter
Regarding the aforementioned factors that contribute to ingroup bias, and
germane to the present study, those factors demonstrate the power of social/situational
variables to affect individuals’ level of in-group bias. Additionally, it is noteworthy that
such situations can be experimentally manipulated either to increase, or decrease, such
biases. A poignant example is Sherif and colleagues’ classic Robber’s Cave field
experiment (Sherif, Harvey, White, Hood, & Sherif, 1961), the finding of which were a
demonstration of realistic conflict theory: that putting groups in competition with one
another tends to increase intergroup hostility. Additionally, that study can be interpreted
as being in accord with the work of Tajfel et al. (1971), whereby boys—labeled as
belonging to one team vs. another—resulted in intense in-group bias: taking the form of
in-group favoritism, out-group derogation, and intergroup competition (Sherif et al.,
1961).

**Social/Situational Variables Can Be Manipulated**

Importantly, the work by Sherif and colleagues also highlighted that situational
factors could be manipulated to reduce in-group bias (i.e., bringing disparate groups
together, in collaboration on a common/superordinate goal; 1961). Subsequent work by
scholars such as Aronson and colleagues, who experimentally developed the so-called
jigsaw classroom, reaffirmed that situational factors matter in promoting or reducing
intergroup cooperation (i.e., mutual interdependence, a common goal, equal status,
informal interpersonal contact, multiple contacts, and social norms of equality, Aronson
& Bridgeman, 1979; Cook, 1984; Riordan, 1978). Again, the experimental nature of
Aronson and colleagues work demonstrates that situational factors can be manipulated to
reduce in-group bias and promote intergroup cooperation.
Individual Difference Variables Matter

In addition to the power of situational variables, and again pertinent to the present study, is that individual difference variables have been found to affect in-group bias. For example, in-group bias has been studied along the personality dimension of authoritarianism (Sibley & Duckitt, 2009). Those who are relatively high in authoritarianism tend to have heightened concerns for security and group cohesion, and as one might expect with such heightened concern, comes an increased tendency to demonstrate greater in-group bias than those who are relatively low in authoritarianism (Sibley & Duckitt, 2009). By no means is authoritarianism the only individual difference variable to have been found to affect in-group bias. Indeed, the present study tested the effects of another such variable: collectivism (more on this to follow).

In-group Bias Can Be Affected Indirectly

Finally, it should be noted that—in addition to factors that directly affect individuals’ level of in-group bias (e.g., situational factors such as competition, and individual factors such as authoritarianism)—factors have been identified that indirectly amplify or diminish individuals’ in-group bias. For example, experimental research has demonstrated that priming attachment security has been found to reduce in-group bias in the form of reduced derogation of out-group members (Cox et al., 2008; Florian & Mikulincer, 1998; see Tritt, Inzlicht, & Harmon-Jones, 2012). On its face, the connection between a secure relationship with one’s attachment figure(s) would seem to have little, if any, direct relation to one’s proclivity to engage in in-group bias. However, insofar as one’s caregivers afford the individual a sense of security, in turn, that sense of security tends to diminish the need to enhance one’s sense of security through alternate means,
including through manifestations of in-group bias. Congruent with the aforementioned research on attachment security priming, increases in intergroup bias tend to vary as a function of both external and attachment related threats, which tend to vary as a function of attachment styles (Mikulincer, & Shaver, 2001; see Mikulincer & Shaver, 2007). Likewise, mortality priming, which will be discussed at length to follow, entails unconsciously affecting individuals’ sense of security, which in turn affects their proclivity to engage in behaviors indicative of in-group bias as a means to restore a sense of security (see Burke et al., 2010).

**Interim Summary**

The discussion to this point bears simple messages. The first of those is that the phenomenon of in-group bias is both ubiquitous, and easily triggered, among humans. Additionally, both social/situational variables, and individual difference variables can affect individuals’ tendency to engage in behaviors indicative of in-group bias. Furthermore, such variables can be experimentally manipulated, and in-group bias can be affected through indirect means. The tenets of this message represent the underlying assumptions that were the springboard for the present study. Specifically, the present study was designed to test an indirect, situational approach to reducing individuals’ in-group biased behavior: through priming notions of symbolic immortality, as will be described in detail to follow. Additionally, the present study tested the effects of two individual difference variables—collectivism, and spiritual belief—expected to moderate individuals’ in-group biased behavior.

**Research question.** Though nearly a foregone conclusion, given the abundance of research on in-group bias, one question asked by the present study is this. Might
individuals tend to be more generous in sharing something of value with an in-group (vs. out-group) member?

**Experimental expectation.** Individuals will tend to be more generous in sharing something of value with an in-group (vs. out-group) member.
Chapter 2: Terror Management Theory

Overview

Terror management theory (TMT) posits that humans’ instinctual desire for survival is uniquely complicated by our awareness of the inevitability of death: which creates potential for paralyzing terror (see Burke et al., 2010; Greenberg et al., 1990; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Additionally, more than two decades of research on TMT has found that when individuals are reminded of their own mortality (i.e., thoughts of death, a.k.a. “mortality salience” [MS]), that they tend to engage unconsciously in activities to assuage that terror (see Burke et al., 2010). Among those terror-assuaging activities are thoughts and behaviors that defend individuals’ “worldviews,” and/or build their personal legacy (a.k.a. their “symbolic immortality”).

Worldview Defense

Regarding individuals’ worldview defenses, it is posited that humans crave security, including their sense of certainty about what will become of them after death (see Burke et al., 2010; Greenberg et al., 1990). From this perspective, it is possible to see that alternative worldviews (e.g., those espoused by out-group members) are potentially aversive, because they call into question whether the individual is correct about how the universe works (see Burke et al., 2010; Greenberg et al., 1990). Such uncertainty has implications both for whether individuals are indeed correct about their safety in the here-and-now, and whether the individual is correct regarding what will become of them in the here-after (see Burke et al., 2010; Greenberg et al., 1990). Consequently, given that alternative worldviews represent threatening notions, TMT research finds that one way individuals cope with that threat is to reinforce their sense of
righteousness by favoring their in-group (i.e., those who are ostensibly like-minded to themselves) and—under certain conditions (to be discussed later)—disfavoring the out-group (i.e., disadvantage those who are differently-minded from themselves; see Burke et al., 2010; Greenberg et al., 1990). A poignant illustration of the worldview defense comes from Greenberg et al. (1990), whereby participants with a Christian background were randomly assigned to mortality salience (vs. control) conditions, then asked to form impressions of both Christian and Jewish target individuals. As predicted by TMT, mortality salience led participants to evaluate the in-group member (the Christian) more favorably, and to evaluate the out-group member (the Jew) more negatively.

Although the aforementioned finding implies that the mortality salience-induced negative reactions to out-groups tends to occur because out-groups are perceived as having worldviews that differ from one’s own, there is another way in which worldview defense processes are thought to occur. Specifically, that one’s worldviews include preconceived notions about out-groups members, including not only notions about their worldviews, but (for example) about their stereotypical traits (see Burke et al., 2010; Schimel et al. 1999). Those preconceived notions are a part of one’s worldviews, which, as mentioned, tend to become amplified, or more strongly defended, following mortality salience. This helps to explain why, following mortality salience, individuals tend to favor stereotypically congruent out-group members vs. out-group members who are stereotypically incongruent (Schimel et al. 1999).

According to TMT, the sense of protection gleaned from worldview defense is first instilled within individuals during early childhood, as children are positively reinforced by their parents for conforming to parental expectations (see Burke et al.,
2010, see Dechesne et al., 2003). Given this positive reinforcement, it should come as no surprise that a byproduct of the worldview defense process is enhanced self-esteem (see Burke et al., 2010). In this way, self-esteem serves as kind of personal barometer for how well one is living up to parental expectations (see Burke et al., 2010; Cox et al., 2008). Therefore, given that a child’s parents serve as both their providers and protectors, from a TMT perspective, this self-esteem also becomes a personal barometer for one’s safety and security (see Burke et al., 2010; Cox et al., 2008). This sense of security is reinforced across the life span as one conforms to the salient norms and expectations of one’s culture (see Burke et al., 2010, see Dechesne et al., 2003; Gailliot, Stillman, Schmeichel, Maner, & Plant, 2008).

Consequently, research on TMT has found that individuals’ sense of self-esteem moderates the extent to which they tend to engage in worldview defense, following mortality salience (see Burke et al., 2010). In short, from a TMT perspective, given that self-esteem serves as a personal barometer for one’s sense of security, those with relatively high self-esteem also have a relatively high sense of personal security (see Burke et al., 2010; Cox et al., 2008). Therefore, following mortality salience, those with high self-esteem have a lesser need to establish their sense of security by favoring those who share their worldviews or derogating those who challenge their worldview (see Burke et al., 2010). To be clear, self-esteem is not the mechanism underlying the effects of mortality salience, but is merely a byproduct of affirming one’s worldview (Schmeichel & Martens, 2005). This highlights that individual difference variables can be expected to moderate the effects of mortality salience.

**Mortality Salience Easily Provokes In-Group Bias**
It seems to take very little for mortality salience to provoke in-group bias. Indeed, mortality salience has been found to increase bias against out-groups in the aforementioned minimal group paradigms, whereby group membership is assigned to research participants by trivial or random criteria (Barnum & Markovsky, 2007; Harmon-Jones et al., 1997). This demonstrates that mortality salience induced in-group bias does not entirely, or necessarily, result from individuals expecting others to contradict/threaten their worldview. Indeed, research by Rosenblatt, Greenberg, Solomon, Pyszczynski, and Lyon (1989), has shown that out-group derogation may arise when individuals hold preexisting negative attitudes toward the out-group. Specifically, they demonstrated that judges tended to recommend harsher bail bonds for prostitutes, but only among those judges who held relatively negative attitudes toward prostitution (Rosenblatt et al., 1989). Again highlighting that individual difference variables can be expected to moderate the effects of mortality salience, this study demonstrated that the effects of mortality salience are not necessarily uniform, but that individuals can be expected to react differently to others, following mortality salience, based on their preexisting mental associations of those others.

Other TMT research corroborates this finding, and clarifies that although in-group favoritism is common following mortality salience, out-group derogation or disadvantaging tends to occur only when the out-group represents a literal or symbolic threat to the in-group (Jonas et al., 2002). Specifically, Jonas et al. (2002) found that individuals who were asked to think and write about their own death (the mortality salience induction) tended to give more money to a charity supporting an in-group (American) cause than those who had been asked to think and write about dental pain
(the control condition). However, that manipulation did not significantly reduce the amount of money donated to a foreign charity. In short, in contrast to the aforementioned study by Greenberg et al. (1990; whereby mortality salience tended to cause Christians to form relatively negative impressions of Jews, who presumably symbolically threaten the Christian worldview) the foreign charity of Jonas et al. (2002) presumably posed insufficient literal or symbolic threat that might otherwise have resulted in reduced donations following mortality salience (relative to controls).

**Mortality Salience Can Be Primed Subliminally**

It is germane to the present study to note that the aforementioned in-group biasing effect of mortality salience has been demonstrated even when mortality salience is primed subliminally (Arndt, Greenberg, Pyszczynski, & Solomon, 1997). Such subliminal reminders of death have included interacting with participants in front of funeral homes, to merely subliminally flashing death-related words on a screen presented to individuals (Arndt, Greenberg, Pyszczynski, & Solomon, 1997; see Burke et al, 2010). Furthermore, when mortality is primed subliminally, thoughts of mortality remain beneath conscious awareness, which renders it psychologically unnecessary for individuals to engage in suppression of thoughts of their mortality (see Burke et al., 2010; Hayes, Schimel, Arndt, & Faucher, 2010). Therefore, death thought accessibility (DTA) is aroused immediately following subliminal reminders of mortality, which prompts individuals to begin immediately engaging in thoughts and behaviors intended to restore their sense of security (see Hayes, Schimel, Arndt, & Faucher, 2010).

**TMT as a Subset of the Meaning Maintenance Model**
Although terror management theory research has enjoyed widespread acclaim, some scholars advance the notion that TMT is merely a subset of a broader “Meaning Maintenance Model” (Meaning Maintenance Model; Heine, Proulx, & Vohs, 2006). From the perspective of the Meaning Maintenance Model, humans have an innate need for meaning: to perceive events as a series of expected relations that organize their perceptions of the world (Heine et al., 2006). When individuals’ sense of meaning is threatened, they tend to reaffirm alternative sense-making representations as a way to regain meaning and a sense of control (Heine et al., 2006). In short, individuals are motivated to make sense of reality, and to establish a reality that works for them (Higgins, 2011). In that sense-making process, accuracy is not the essential ingredient for assuaging psychological distress but, rather, establishing a structural pattern of beliefs that is consistent or coherent to the individual (Higgins, 2011). Therefore, according to this model, individuals can reaffirm meaning in domains other than the domain in which the meaning-related threat occurred (a process termed fluid compensation; see Heine et al., 2006). Indeed, such fluid compensation has been observed in studies following several types of psychological threats, including threats to self-esteem, feelings of uncertainty, interpersonal rejection, and mortality salience (see Heine et al., 2006), which supports the notion that TMT is a subset of the Meaning Maintenance Model. In summary, individuals have been found to respond to these diverse threats in very similar ways (e.g., punitive responses towards a prostitute, disliking toward those who criticize one’s country, and preference for stereotypical targets), and that the effects from non-death related meaning threats were equivalent to those of mortality salience manipulations (see Heine et al., 2006). Therefore, this suggests that responses to a wide
range of psychological threats are expressions of a common impulse to generate and maintain a sense of meaning (see Heine et al., 2006).

Also included among those responses to violations of one’s meaning system is in-group bias. Research by Grieve and Hogg (1999) demonstrated that individuals showed stronger in-group bias in a minimal group paradigm after engaging in a task that had no obvious solution, leading individuals to feel uncertain, compared to those who had not experienced induced uncertainty (see also Heine et al., 2006). Similarly, a heightened need for closure (i.e., a predilection for certainty or finality) is associated with pronounced in-group biases (see Heine et al., 2006; Shah, Kruglanski, & Thompson, 1998). Also, McGregor, Zanna, Holmes, and Spencer (2001), found that individuals who experienced a temporal discontinuity manipulation tended to respond with similar in-group bias relative to those exposed to a mortality salience manipulation (see also Heine et al., 2006).

**Symbolic Immortality**

Symbolic immortality is any product, social group, or institution that represents to the individual the building of a legacy: something that will live beyond them (see Burke et al., 2010; Dechesne et al., 2003). Such activities can range, for example, from raising a family, to any creative endeavor such as what one produces at work or play, to contributing to the cause of an enduring institution (see Burke et al., 2010; Greenberg et al., 1990; Routledge & Arndt, 2008). By building a legacy (however small) individuals can secure for themselves a sense of existential meaning: that they matter, that the world is somehow different because of them (see Burke et al., 2010; Greenberg et al., 1990). Therefore, according to TMT, the building of a legacy serves an existential terror-
assuaging function, such that individuals can feel that something about them (e.g., their works, or the groups to which they belong) will live beyond one’s physical death (see Burke et al., 2010; Greenberg et al., 1990).

**Terror Management Theory Upside-Down**

Given that research on TMT demonstrates that priming individuals with notions of mortality tends to increase their in-group bias, the present study questioned whether the reverse might hold. Specifically, might priming individuals with notions of immortality tend to cause them to decrease their in-group bias? Scant research has been conducted on the effects of immortality priming, though the following studies suggest the plausibility of the aforementioned premise.

**Immortality Priming**

Previous work by Dechesne and colleagues (2003) found that priming notions of the plausibility (vs. implausibility) of an afterlife led participants to judge moral transgressors (i.e., out-group members) less punitively, and reduced male participants’ greed in the form of harvesting less from a hypothetical commons. Those findings suggest that priming notions of spiritual immortality can reduce both the tendency to engage in worldview defense, and the need to pursue symbolic immortality in the form of amassing wealth (Dechesne et al., 2003). Additionally, these findings suggest that spiritual and symbolic forms of immortality serve similar/redundant functions: that belief in spiritual immortality may reduce individuals’ need to strive for symbolic forms of immortality (Dechesne et al., 2003). In short, belief in spiritual immortality may make striving for symbolic immortality a redundant, hence psychologically unnecessary, endeavor (Dechesne et al., 2003).
From a TMT perspective, attachment-related reductions of in-group bias may arise as individuals—made relatively secure in their sense of immortality—feel a lesser need either to demonstrate the righteousness of their worldview (e.g., through out-group derogation; see Burke et al., 2010; Dechesne et al., 2003) or to greedily build a symbolic legacy (e.g., amass wealth; see Burke et al., 2010; Dechesne et al., 2003). Additionally, the reduction in greed could be interpreted as indicative of a lesser need to subscribe to (i.e., defend) a culturally reinforced norm of self-interest (see Burke et al., 2010; Miller, 1999).

However, though theoretically plausible, it is uncertain whether the prevailing norm(s), present in work of Deschesne et al., (2013) indeed favored self-interest vs. other norms. Additionally, despite that Deschesne et al. (2013) found that immortality priming tended to reduce greed, congruent with the notion that participants might also have felt a lesser need to demonstrate the righteousness of their worldview, it remains possible that direct or conceptual replications could find that participants might behave less generously. Specifically, insofar as immortality salience may result in effects opposite of those resulting from mortality salience, individuals primed with immortality might feel a lesser need to adhere to salient norms in favor of generosity and/or personal standards as being a “good” (i.e., generous) person. The present study expands upon the work of Dechesne and colleagues (2003). Whereas Dechesne et al. (2003) employed supraliminal priming of spiritual immortality, and a hypothetical greed-related paradigm, the present study employed subliminal priming of symbolic immortality, and a “real-life” behavioral test of greed/generosity.
Similarly, Florian and Mikulincer (1998), found that those who scored high (vs. low) on Mathews and Kling’s Symbolic Immortality Scale (1988), were less punitive to an out-group member (i.e., a social transgressor), following mortality salience. In addition, Florian and Mikulincer (1998) theorized, and found, that secure (vs. insecure) attachment contributed to individuals’ sense of symbolic immortality. Specifically, that hypothesis is based on the notion that secure attachment tends to enable individuals to deal constructively with adversities, and to feel capable of overcoming obstacles that impede goal fulfillment (Dechesne et al., 2003). Therefore, such a constructive attitude lends itself toward enabling individuals to engage in endeavors that enhance their sense of symbolic immortality (Florian & Mikulincer, 1998). In turn, that sense of immortality assuages individuals’ need to engage in thoughts and behaviors indicative of in-group bias (Florian & Mikulincer, 1998). In addition, attachment security has been associated with both compassion and altruism (Mikulincer & Shaver, 2005; Mikulincer, Shaver, Gillath, & Nitzberg, 2005). Similarly, Mikulincer et al. (2005) found that attachment security provided a foundation for care-oriented feelings and behaviors. Like the aforementioned work of Dechesne et al. (2003), these findings suggest that a sense of immortality, including symbolic immortality, can reduce the tendency of individuals to adopt in-group biased attitudes and behaviors (Dechesne et al., 2003). As discussed, based upon the aforementioned work of both Dechesne et al. (2003), and Florian and Mikulincer (1998), priming either spiritual or symbolic immortality tends to reduce individuals’ level of in-group bias.

Work by Huang, Ackerman, and Bargh (2013) found that, relative to controls, supraliminally priming individuals with notions of literal immortality (i.e., superhero-like
invulnerability to physical harm) reduced negative attitudes toward stigmatized groups (i.e., out-groups). Therefore, the aim of the present study is consistent with that finding, and—as mentioned—extends it beyond attitudinal measures, into the behavioral realm of real-life monetary donations. Furthermore, Huang et al. (2013) posited that notions of immortality assuage evolutionarily adaptive survival instincts (see also Barnum & Markovsky, 2007). This reinforces the notion that the present study should find an increase in monetary donations, resulting from immortality priming, given that participants primed with immortality (vs. controls) might tend not to feel as strongly the evolutionary need to horde their resources (Barnum & Markovsky, 2007; Huang et al., 2013).

Relatedly, Routledge and Arndt (2008) found that priming notions of symbolic immortality, in the form of asking individuals to imagine themselves a part of an enduring vs. temporary organization, tended to cause them to express less willingness to sacrifice for their nationalistic in-group. Specifically, participants, who were English, responded with significantly lower agreement to composite scale that consisted of the statements, “I would die for England,” “It is worth making personal sacrifices to protect the British way of life,” and “My personal safety is not as important as the continuation of the British way of life” (Routledge & Arndt, 2008). From an evolutionary perspective, this suggests a lesser felt need to support, or otherwise rely upon, one’s in-group for safety (Huang et al., 2013). From a TMT perspective, by enhancing participants’ sense of symbolic immortality, they were able to imagine an alternative way to transcend death, reducing their need to invest in/sacrifice for the symbolic immortality offered by nationalism (Routledge & Arndt, 2008). Again, another plausible explanation is that
insofar as immortality salience effects run opposite of those resulting from mortality salience, following immortality priming, participants might have tended to feel a lesser need to demonstrate the righteousness of their worldview. Therefore, it might be that participants would behave less generously toward in-group members insofar as they might feel a lesser need to adhere to other cultural standards, such as the welfare of in-group members. Both of these reasons suggests that the present study would find a similar reduction in willingness to sacrifice for one’s in-group among those primed with immortality, and that this might hold when extended beyond the realm of attitudes (as demonstrated by Routledge & Arndt, 2008), into the realm of behavior.

**Interim Summary**

These findings suggest that spiritual and symbolic forms of immortality serve similar and redundant functions. Consequently, priming notions of immortality—either spiritually or symbolically—has been shown to reduce both the tendency to engage in worldview defense, and the need to pursue symbolic forms of immortality (Dechesne et al., 2003; Florian & Mikulincer, 1998; Routledge & Arndt, 2008). Therefore, it appears that a sense of immortality—either spiritual or symbolic—assuages individuals’ need to engage in thoughts and behaviors indicative of both in-group bias and greed in general (Dechesne et al., 2003).

From an evolutionary perspective, the mechanism underlying this phenomenon may be that those primed with a sense of immortality might not tend not to feel as strongly the evolutionary need to horde their resources (Barnum & Markovsky, 2007; Huang et al., 2013), or to ingratiate oneself to an in-group thereby gaining the protections provided by ensconcing oneself amid an in-group (Huang et al., 2013; Routledge &
Arndt, 2008). Relatedly, from a TMT perspective, the sense of security provided by notions of immortality—which may reduce the sense of need for in-group protection, or in-group verification of one’s worldview—may reduce individuals’ need to adhere to salient norms (Huang et al., 2013; Routledge & Arndt, 2008). From the perspective of the Meaning Maintenance Model, a sense of immortality may afford individuals a means to avoid disruptions to their meaning-making frameworks that tend to occur following mortality salience (Heine et al., 2006).

**Research questions.** The aforementioned literature, which demonstrated that immortality priming tends to result in a) lesser greed, b) lesser need to sacrifice for a symbolic legacy, and c) perhaps a lesser need to sacrifice for in-group. Therefore, these findings suggest that immortality priming may promote generosity, and—perhaps—lesser in-group bias in that giving. Therefore, this raises the following two questions. Might individuals, who have been subliminally primed with immortality (vs. controls), demonstrate significantly greater generosity, and—in so doing—demonstrate less in-group bias in behavioral outcomes? Also, might those who have been subliminally primed with words related to immortality (vs. controls) demonstrate significantly reduced death-thought accessibility?

**Experimental expectations.** Individuals who have been subliminally primed with immortality (vs. controls) will demonstrate significantly greater generosity and significantly less in-group bias pertinent to behavioral outcome measure (e.g., monetary donation to in-group vs. out-group members). Also, those who have been subliminally primed with words related to immortality (vs. controls) will demonstrate significantly reduced death-thought accessibility.
Chapter 3: Responses to Priming

Subliminal vs. Supraliminal Priming

Despite the previously discussed effects of immortality priming, there is reason to believe that priming such concepts—indeed, perhaps any concept—might not function similarly for all individuals (Cesario, 2014; Klatzky & Creswell, 2014). From one perspective, when concepts are primed subliminally, one could argue that primes would not affect individuals differently due to individuals’ idiosyncratic elaborations and inferences associated with the stimuli (see Dijksterhuis, Aarts, & Smith, 2005). Specifically, given that subliminal stimuli are, by definition, perceived below conscious thresholds, such stimuli circumvent individuals’ conscious ability to elaborate upon, and psychologically adjust to, the stimuli (see Dijksterhuis et al., 2005). For example, when presented with a supraliminal stimulus, individuals may consciously choose to respond in calculated, perhaps socially-desirable ways. However, if a stimulus is presented subliminally, individuals tend to react in ways that have not been self-censored (see Dijksterhuis et al., 2005). Indeed, such elaboration is cited as one of the causes for priming effects to fail to replicate (Klatzky & Creswell, 2014). In this respect, it might be possible to prime notions of immortality, without inadvertently raising the flipside of the coin in individuals’ minds: notions of mortality.

Spreading Activation

However, a preponderance of evidence suggests that, although subliminal priming may eliminate conscious elaboration/inferences associated with stimuli, the priming modality cannot circumvent unconscious associations (Cesario, 2014; see Dijksterhuis et
al., 2005; Klatzky & Creswell, 2014). Indeed, one should expect that primes will affect individuals differently, based upon their self-relevant associations with the stimuli (Klatzky & Creswell, 2014). This is congruent with an evolutionary understanding of the brain as an apparatus that integrates incoming information—that accounts for information about a stimulus, one’s self, and the context of a given interaction—from which (for example) threat is assessed, and from which behavioral outcomes emerge (Klatzky & Creswell, 2014; see Tooby & Cosmides, 2005). This is also congruent, more generally with the phenomenon of spreading activation whereby neurological energy from the activation of brain cells spreads from an activated node to other associated nodes (see Reisberg, 2007). In sum, individuals respond to stimuli based on information broader than the mere features of a stimulus, including other self-relevant and mentally-associated concepts (Klatzky & Creswell; see Reisberg, 2007).

From this perspective, even if it is possible to prime immortality, without priming mortality, immortality priming seems destined to prime concepts that the individual closely associates with immortality (Cox et al., 2008; Klatzky & Creswell; see Reisberg, 2007). Nevertheless, without theories that specify the specific contingencies that lead to variations in individuals’ responses to stimuli, priming results necessarily will be ambiguous regarding inferences that can be made about such variation (Cesario, 2014). Presently, the state of priming research has no theories upon which a priori predictions can be made regarding idiosyncratic inferences and subsequent responses to primed stimuli (Cesario, 2014).

**Sensitization to Primes**
In addition to the question of what might be activated by a given primed stimulus is the question regarding whether much, if anything, beyond the features of the stimulus will be primed. At an extreme, if one is primed with something for which one has no prior association (e.g., a character from a foreign alphabet), one would expect no additional constructs to be primed; the only likely effect might be a general increased liking for the prime, based on the mere exposure effect (see Dijksterhuis et al., 2005; Zajonc, 1968). Similarly, when priming immortality, individuals might have little to no response to it, depending upon the strength of association they have between the stimuli and related concepts (see Reisberg, 2007). In this respect, some (e.g., believers vs. unbelievers in a spiritual afterlife) might have stronger associations between concepts associated with immortality, and—therefore—might be pre-sensitized such that even subtle manipulations of existential constructs may exert an influence upon them.

This is not to suggest that spiritual unbelievers have no associations with the concept of immortality. It seems reasonable to assume that most individuals have been exposed to notions of immortality in popular culture. Therefore, it may be that all individuals will be sufficiently sensitized such that immortality primes might exert an influence upon them.

Activations Based on the Meaning Maintenance Model

Although recent priming literature explicitly states that we have no theories to guide idiosyncratic differences in responding to primed stimuli, the previously discussed literature on the Meaning Maintenance Model suggests two fundamental differences in ways that individuals may respond to immortality primes. For those for whom notions of immortality are congruent with their meaning-making framework (again, their view of
the world, and expectations for how it operates) notions of immortality could have a comforting effect (Heine et al., 2006; Schmeichel & Martens, 2005).

Conversely, those for whom notions of immortality run counter to their meaning-making framework priming notions of immortality may lead them to reaffirm a sense of meaning and concomitant security by alternative means (Heine et al., 2006). As mentioned, based on the Meaning Maintenance Model, such alternative means may bear little, if any resemblance to the threatened domain (i.e., fluid compensation; Heine et al., 2006). However, given that the heart of the Meaning Maintenance Model is that individuals seek a sense of meaning, not for its own sake, but for the sense of security that it provides, one could plausibly predict that individuals who engage in fluid compensation will do so in ways that enable them to restore a sense of order/security (Heine et al., 2006).

**Activations Based on Terror Management Theory**

The previously discussed TMT research also suggests two basic differences in ways that individuals may respond to immortality primes, based upon the norms or values that are salient to them. As mentioned, mortality salience tends to heighten individuals’ security-related concerns, which in turn tends to heighten their tendency to adhere to salient cultural norms or salient cultural values, and often this will be expressed in the form of in-group bias (see Burke et al., 2010; Gailliot et al. 2008). Therefore, if immortality priming inadvertently primes mortality, one would expect that to result in greater adherence to whatever norms or values are salient to the individual. For example, if norms of self-interest are salient, one would expect increased self-interested behavior to follow mortality priming (Gailliot et al. 2008). Conversely, if norms of generosity are
salient, one would expect increases in generous behavior to follow mortality priming.

Additionally, if no such norms or values are made salient, as mentioned, one would expect mortality salience to result in thoughts or behaviors indicative of intensified in-group bias: at least among Western cultures (see Burke et al., 2010; Miller, 1999). This is based on the aforementioned findings that mortality salience tends to intensify in-group bias in research paradigms, conducted in Western universities, where no particular norms are intentionally made salient (see Burke et al., 2010; Gailliot et al., 2008). However, in keeping with the notion that salient norms tend to drive individuals’ responses following mortality salience, it is plausible that this might not hold for those whose identities as egalitarians are sufficiently salient to themselves.

Conversely, if immortality priming indeed primes notions of immortality (i.e., without inadvertently priming mortality) the previously discussed TMT research on immortality suggests that one could predict outcomes in the opposite direction of those produced by mortality salience. Specifically, immortality priming should tend to decrease individuals’ security-related concerns, which in turn would tend to decrease their tendency to adhere to salient cultural norms or salient cultural values, and this may also be expressed through a reduction of behavior indicative of in-group bias (Dechesne et al., 2003; Florian & Mikulincer, 1998; Gailliot et al. 2008; Huang et al., 2013; Routledge & Arndt, 2008). Therefore, following immortality priming, one would expect individuals to adhere less to whatever norms or values are salient to the individual. Therefore, in terms of the above example, if norms of self-interest are salient, one would expect decreased self-interested behavior to follow mortality priming. Conversely, if norms of generosity are salient, one would expect decreases in generous behavior to
follow mortality priming. Furthermore, if no such norms or values are made salient, as mentioned, one would generally expect immortality salience to result in thoughts or behaviors indicative of attenuated in-group bias (Dechesne et al., 2003; Florian & Mikulincer, 1998; Huang et al., 2013; Routledge & Arndt, 2008). Though again, in keeping with the notion that immortality salience might relax individuals’ adherence to cultural norms, it seems plausible that this might not hold for those whose identities as egalitarians are sufficiently salient to themselves. Ironically, following immortality priming, such individuals might demonstrate an increase of in-group bias.

**Interpreting Responses to Immortality Primes**

The complication in priming an existential construct such as immortality, is that a given behavioral outcome could be interpreted multiple ways, based on what construct is primed, and—perhaps—what norms or values are salient to the individual. For example, relatively ungenerous behavior toward others could plausibly result from mortality salience, if norms or values of self-interest are made salient (Gailliot et al. 2008). However, research suggests there still would be a tendency toward in-group biased behavior, following mortality salience (Gailliot et al. 2008). Conversely, relatively ungenerous behavior toward others also could plausibly result from immortality salience, if individuals are less motivated to adhere to salient norms of generosity (Gailliot et al. 2008). Though, research suggests that there would tend to be a decrease of in-group bias following immortality priming (Dechesne et al., 2003; Florian & Mikulincer, 1998; Huang et al., 2013; Routledge & Arndt, 2008).

Therefore, to guide the interpretation of effects following immortality priming, it is important to take note of three features of the priming situation. First, manipulation
checks should be in place to test for whether mortality vs. immortality have been made salient to participants. Second, norms and values salient in the situation should be identified. Third, one should note tendencies toward, or away from, in-group bias that could serve as tell-tale signs of whether participants are motivated by thoughts of mortality (i.e., suggested by increased in-group bias) vs. immortality (i.e., suggested by decreased in-group bias). Based on the foregoing discussion regarding individuals’ responses to primes—that individuals may respond differently to primes, based upon their self-relevant processing of the stimuli—the present study investigated two prospective moderators of the effects of immortality priming: spiritual belief and collectivism.
Chapter 4: Spiritual Belief as a Moderator of Immortality Priming

Sensitization Reprised

As mentioned above, aside from the question of what might be activated by a given primed stimulus, a fundamental question is whether much, if anything, beyond the features of the stimulus would be primed. Specifically, when priming notions of immortality, some individuals might have little to no response to it, depending upon the strength of association they have between the stimulus and related concepts (see Reisberg, 2007). As mentioned, this is congruent with the phenomenon of spreading activation (see Reisberg, 2007), and on this basis, spiritual believers might have stronger associations between concepts associated with immortality. Therefore, believers, more so than unbelievers, might be pre-sensitized such that even subtle manipulations of immortality-related constructs may exert an influence upon them. Therefore, it seems plausible that immortality priming may affect believers, but not unbelievers.

Alternatively, it seems plausible that believers might simply have different associations with notions of immortality than unbelievers. If so, immortality priming might affect both believers and unbelievers, but that their reactions may differ due to their differing associations. Again, the state of priming research has no theories upon which a priori predictions could be made regarding such idiosyncratic inferences and subsequent responses to primed stimuli (Cesario, 2014).

Responses Based on the Meaning Maintenance Model

Assuming that, indeed, both believers and unbelievers are affected by primes related to immortality, the aforementioned Meaning Maintenance Model suggests two
differences in ways that individuals may respond to immortality primes, based on whether they are spiritual believers vs. unbelievers. For those for whom notions of immortality are congruent with their meaning-making framework—namely, believers— notions of immortality could have a comforting, expectation-affirming effect (see Heine et al., 2006).

Conversely, those for whom notions of immortality run counter to their meaning-making framework—namely, unbelievers—priming notions of immortality may cause them to reaffirm a sense of meaning and concomitant security through alternate means (i.e., the process of fluid compensation; see Heine et al., 2006). As mentioned, based on the Meaning Maintenance Model, such alternative means need not directly pertain to the threatened domain (Heine et al., 2006). In short, those whose meaning systems are challenged by notions of immortality may attempt to re-establish a sense of meaning through an activity that seems unrelated to spirituality.

On this point—that the Meaning Maintenance Model predicts different outcomes for believers vs. unbelievers, in responses to immortality primes, based on whether they are spiritual believers vs. unbelievers—it is important to distinguish religion/religious belief from religiosity. A given religion or religious belief merely denotes that adherents subscribes to a given belief system. In comparison, religiosity is a continuum of piety or devotion, commonly operationalized to include frequency of church attendance, membership in other religious groups such as youth groups, and subjective personal importance of religion (Abbott-Chapman & Denholm, 2001; Sinha, Cnaan, & Gelles, 2007; Steinman & Zimmerman, 2004). Therefore, from a Meaning Maintenance Model perspective, that believers vs. unbelievers may respond differently to immortality primes
is not a matter of their religiosity (e.g., their piety, or involvement in organized religious groups), but that they have (vs. have not) a belief system that results in notions of immortality being congruent with, vs. disruptive of, their existential beliefs.

**Research questions.** Might individuals react differently to subliminal immortality primes, based on whether they are spiritual believers vs. unbelievers? If so, given that the essence of the Meaning Maintenance Model posits that when individuals’ sense of meaning is threatened, they tend to reaffirm alternative sense-making representations to regain meaning and a sense of control (Heine et al., 2006), might unbelievers (more so than believers) tend to hoard their resources more, following immortality priming? As mentioned, such hoarding might be due to an evolutionarily adaptive desire to conserve one’s resources when threatened (Huang et al., 2013), and/or to behave in accord with the predominant Western cultural norm of self-interest (Miller, 1999). Also, following immortality priming (vs. controls), might believers, whose meaning system presumably has not been threatened by such primes, tend to demonstrate through their giving, the reduction of in-group bias that the previously reviewed immortality priming research has demonstrated?

**Experimental expectations.** Spiritual believers (vs. unbelievers), who have been subliminally primed with immortality (vs. controls) will demonstrate relatively greater generosity following immortality priming (vs. controls), and such giving will demonstrate significantly less in-group bias.

**Responses Based on Terror Management Theory**

As mentioned, the previously discussed TMT research also suggests two basic differences in the ways that individuals may respond to immortality primes, based upon
salient norms or values. Specifically, if immortality primes inadvertently prime notions of mortality, one would expect that to tend to heighten individuals’ security-related concerns, which in turn would heighten their tendency to adhere to salient cultural norms or salient cultural values (Gailliot et al. 2008). Likely, such adherence would also will be expressed through behavior indicative of in-group bias (Gailliot et al. 2008). For believers, it is plausible that mortality salience might tend to cause them to adhere more strongly to values associated with their religion. Specifically, they might behave in ways indicative of egalitarian and humanitarian values, given that all major religions subscribe to those values (Duck & Hunsberger, 1999; see Hall et al., 2010). That believers (vs. unbelievers) might demonstrate such behavior, following mortality salience, makes sense insofar as believers (vs. unbelievers) might tend to subscribe more whole-heartedly to norms in favor of egalitarian giving.

**Religious Prosociality**

However, it is important to note that religious norms toward egalitarianism should not be mistaken for heightened levels of prosociality among the religiously identified. Although sociological surveys have revealed an association between self-reports of religiosity and prosociality, studies measuring religiosity and prosocial behavior suggest that this association arises primarily in contexts where individuals’ reputational concerns are heightened (see Norenzayan, & Shariff, 2008). Concordantly, even everyday behavioral interactions with strangers such as financial transactions, tipping, and anonymous payments via the “honor system” do not show a religious prosociality effect (see Galen, 2012; Grossman & Parrett, 2011; Pruckner & Sausgruber, 2008).
The notion that the religious are more charitable is often inferred either from the increased levels of planned charitable giving that can be found among the religious, or from studies in which activation of religious schema have demonstrated increases in prosocial behavior (see Galen, 2012; Norenzayan & Shariff, 2008; Randolph-Seng & Nielsen, 2007; Shariff & Norenzayan, 2007). However, studies reporting such effects often rely upon self-reports, finding that prosociality tends to be extended in the form of planned (vs. spontaneous) giving, which tends to be directed toward in-group familiars (e.g., friends and families), or otherwise serve an in-group solidarity function (see Galen, 2012; Graham & Haidt, 2010). In contrast, studies that test for prosociality in spontaneous contexts (e.g., bystander helping), and those where religious cues are not directly pertinent to the context, or where the prospective beneficiary is not familiar to the benefactor, the association between religiosity and prosociality is virtually zero, if not negative (see Galen, 2012).

**Interim Summary**

In summary, contrary to what one might assume, the few rigorous studies on this topic (e.g., those that experimentally prime religious concepts/schema) have found no connection between religiosity and pro-social behavior (see Galen, 2012). Congruent with the power of in-group bias, as mentioned, when religious prosociality is expressed, it tends to be extended only to in-group members (see Galen, 2012). Indeed, activation of religious concepts via priming tends to promote prosociality only with in-group familiars (see Galen, 2012). Therefore, following if immortality primes inadvertently prime mortality, believers might respond by in ways indicative of greater in-group bias.
In the case of unbelievers, should immortality primes inadvertently prime mortality, research suggests that—at least among unbelievers in the Western world—they would adhere more strongly to the norm of self-interest (Miller, 1999). Additionally, as mentioned, TMT research suggests that even if unbelievers demonstrate greater self-interest, they likely would behave in ways that also demonstrate some degree of in-group bias (Gailliot et al., 2008). This is in accord with the notion that mortality salience tends lead individuals to favor their in-group (see Burke et al., 2010).

Conversely, if immortality priming indeed successfully primes notions of immortality (i.e., without inadvertently priming mortality), as mentioned, the previously discussed TMT research on immortality priming suggests that one would predict outcomes in the opposite direction of those produced by mortality salience. Specifically, immortality priming should tend to decrease individuals’ security-related concerns, which in turn would tend to decrease their tendency to adhere to salient cultural norms or salient cultural values, and this may also be expressed through a reduction of behavior indicative of both greed and in-group bias (Dechesne et al., 2003; Florian & Mikulincer, 1998; Gailliot et al. 2008; Huang et al., 2013; Routledge & Arndt, 2008). Therefore, following immortality priming, one would expect individuals to adhere less to whatever norms or values are salient to the individual. In the case of believers, they might adhere less strongly to the values of generosity and egalitarianism associated with their religion. Consequently, perhaps ironically, one might expect believers to demonstrate less generosity, and greater in-group bias, following immortality priming (vs. control primes). Conversely, among unbelievers primed with immortality (at least those in the Western world) the norm to which they might adhere less strongly is the norm of self-interest
(Miller, 1999). Therefore, one might expect unbelievers to demonstrate greater
generosity, and less in-group bias, following immortality priming (vs. control primes).

**Research questions.** Given that religions are associated with norms and values
of generosity and egalitarianism, and that immortality priming is associated with a
reduced tendency to adhere to salient norms and values, might believers (vs. unbelievers)
demonstrate less adherence to norms of generosity and egalitarianism following
immortality priming (vs. control primes; i.e., might believers be less inclined to give
something of value, and—in so doing—also demonstrate increased in-group bias)?

Given that Western societies are associated with the norm of self-interest, and—
again—that immortality priming is associated with a reduced tendency to adhere to
salient norms, might unbelievers (vs. believers) demonstrate less adherence to norms of
self-interest following immortality priming (vs. control primes; i.e., might unbelievers be
more inclined to give something of value, and—in so doing—also demonstrate increased
in-group bias)?

**Experimental expectations.** Spiritual believers (vs. unbelievers), who have
been subliminally primed with immortality (vs. control primes), will adhere less to the
norms of generosity and egalitarianism, as demonstrated by reduced voluntary donations,
and that such giving will demonstrate significantly greater in-group bias. Conversely,
following immortality priming (vs. control primes), unbelievers (vs. believers) will
adhere less to the norm of self-interest as demonstrated by their increased voluntary
donations, and that such giving will demonstrate significantly less in-group bias.

It is important to note that these two experimental expectations (based upon
individuals adhering less to salient norms or values following immortality priming, which
are derived from a Terror Management Theory perspective), are diametrically opposed to
the preceding predictions based on the Meaning Maintenance Model. Therefore, the
outcome of the present study will suggest which theoretical account is more compelling.
As mentioned, there is evidence that the Meaning Maintenance Model is the
superordinate theory to Terror Management Theory (i.e., that Terror Management Theory
is a subset of the Meaning Maintenance Model). From the perspective of the Meaning
Maintenance Model the crucial matter, following immortality priming, is not whether
individuals’ fear of death is assuaged, but whether the notion of immortality is congruent
or disruptive with individuals’ belief systems. Therefore, if the Meaning Maintenance
Model is indeed the superordinate theory of Terror Management Theory, and if it is
correct that the crucial matter is whether or not individuals belief system are disrupted,
there is reason to believe that the predictions based upon individuals’ belief systems (i.e.,
the Meaning Maintenance Model account) will hold instead of those based upon
individuals’ salient norms/values (i.e., the Terror Management Theory account).

Caveat: Thou Shalt Not Appear Racist

It bears mentioning that, despite the foregoing discussion regarding the
likelihood of in-group biased behavior being manifest among either believers or
unbelievers, there may be rather narrow limits to the extent to which that bias might be
manifest along racial in-group/out-group boundaries in contemporary, civil society.
Specifically, given contemporary mores against racism, individuals may be cautious to
avoid behaving in ways that could be interpreted by others, or oneself, as reflecting racial
bias (see Dovidio & Gaertner, 1993). Consequently, effects of in-group bias are generally
not found in studies when participants are forced either to rate targets of out-groups on
negative (vs. positive) scales, or to make negative (vs. positive) allocations to out-group members (see Hewstone et al., 2002). Indeed, racial prejudice is proscribed (at least to some extent), by all mainstream religions, given that racism conflicts with religious teachings of egalitarian and humanitarian values (Duck & Hunsberger, 1999; see Hall et al., 2010).
Chapter 5: Collectivism

Definition of Collectivism

The essential element of a collectivistic mindset is the belief that group members are fundamentally mutually obligated to one another (see Oyserman, Coon, & Kemmelmeier, 2002). According to Schwartz (1990), those relatively high in their sense of collectivism (hereafter “collectivists”) tend to feel they share common goals and common fate with their group members. From the collectivistic perspective, the needs and wishes of the group tend to take priority over those of the individual who is but a component of the social makeup of the group (see Oyserman et al., 2002). Consequently, collectivism has been described as the tendency for individuals to be “other-oriented” in both their thinking and social relations (Kitayama, Duffy, & Uchida, 2007, p. 144). Indeed, research has shown that those who endorse relatively more collective values tend to behave more cooperatively (see Oyserman et al., 2002; Parks & Vu, 1994; Utz, 2004).

Association Between Collectivism and In-Group Bias

However, despite this positive association between collectivism and cooperation, research also has found that collectivism is positively associated with in-group bias (see Kitayama et al., 2007). This boost of in-group favoritism is in accord with the notion that collectivism is positively associated with stronger mental distinctions between in-group and out-group members (see Oyserman et al., 2002). Therefore, given that those who are relatively high in collectivism tend to have what could be considered a relatively large in-group bias factor, the effect of immortality priming, which is expected to target (i.e., reduce) such in-group biases, could be expected to be more pronounced among those who are relatively collectivistic.
Conceptually, to the extent that collectivism is a hinge, upon which in-group bias swings, one would expect greater movement (i.e., reduction) of in-group bias following immortality priming among those higher (vs. lower) in collectivism. Additionally, such bias-reducing effects might be more difficult to detect among those lower in collectivism, insofar as there may be less room to change before reaching a measurement floor effect. However, it might also be the case that immortality priming could be less effective among those higher in collectivism, in the same way that stronger (vs. weaker) attitudes tend to be more difficult to change (see Albarracin, Johnson, & Zanna, 2005).

**Intersection of Collectivism and Terror Management**

Given that the present study involves an intersection of collectivism with terror management theory, it is worth noting that the scant research on this intersection suggests that mortality salience does not necessarily increase or decrease collectivism. Specifically, research by Halloran and Kashima (2000) found that, following mortality salience, Australian Aboriginals became more collectivistic when their Aboriginee identity was made salient. However, they became more individualistic when their Australian identity was made salient (as cited in Hong, Wan, No, & Chiu, 2007). That finding is congruent with other research on TMT that finds mortality salience does not lead individuals to adhere more closely to a specific type of cultural norm, but merely to cultural norms that are salient (Gailliot et al., 2008).

**Research question.** If in-group bias tends to be reduced following immortality priming (vs. control primes), will that effect be positively associated with individuals’ level of collectivism?
**Experimental expectation.** The in-group bias-reducing effect of immortality priming will be positively associated with individuals’ level of collectivism.
Chapter 6: Method and Procedures

Overview of Design and Procedure

Participants were informed of a cover story that the study was designed to investigate how individuals tend to think about similar and contrasting ideas, and the relationship of that process to how individuals tend to form word associations. Additionally, as one of the incentives for participating in the study, they had the chance to win $200 in a lottery-style drawing (adapted from Ferraro, Shiv, & Bettman, 2005). Near the end of each session, participants were given the chance to indicate what amount, if they were to win that drawing, they would like to donate (the dependent variable) to a (fictional) scholarship recipient. Prior to allocating that donation, participants were randomly assigned to be subliminally primed with words related to immortality (vs. controls—affectively-positive or affectively-neutral words—adapted from Arndt et al., 1997). Additionally, participants were randomly assigned to condition whereby the donation recipient was of the same vs. different race as the participant. Also, measures of collectivism and religion were collected during a survey component of the study.

Overview of Hypotheses

1. There will be a main effect for immortality priming on death-thought accessibility, such that those primed with words related to immortality (vs. controls) will tend to make significantly fewer death-related word completions on a fill-in-the-blank word completion task.

2. There will be a main effect of the racial status of the recipient, such that participants will share more of their prospective winnings with racial in-group members than with those of a racial out-group.
3. (Based on the Meaning Maintenance Model) Priming will interact with participants’ spiritual beliefs and the racial in-group/out-group status of the recipient, such that spiritual believers (vs. unbelievers), will tend to share more of their prospective winnings when primed with immortality words than when primed with positive control or neutral words, and such sharing will demonstrate a reduction of in-group bias.

4. (Based upon Terror Management Theory). Priming will interact with participants’ spiritual beliefs and the racial in-group/out-group status of the recipient, such that spiritual believers (vs. unbelievers), will tend to share less of their prospective winnings when primed with immortality words than when primed with positive control or neutral words, and such sharing will demonstrate an increase of in-group bias.

5. The in-group bias-reducing effect of immortality priming (stated in hypothesis 3) will tend to be larger for those who are relatively collectivistic.

**Design**

The present study was a 3 (subliminal priming: immortality words vs. affectively-positive control words, vs. affectively-neutral control words) x 2 (racial in-group vs. racial out-group of the prospective donation recipient) x 2 (spiritual belief: believers vs. unbelievers), between-participants experimental design, with one continuous covariate (collectivism).

**Power Analysis**

To detect a medium effect size ($d = .25$), with conventional 80% power, at the conventional alpha level of .95, with 6 conditions (per the study design) plus one
continuous covariate (collectivism), the total estimated sample size (to detect all main effects and interactions) equals 158 (Faul, Erdfelder, Buchner, & Lang, 2009; see Appendix A for this power analysis). That estimated effect size is commensurate with those found in other terror management theory studies that employed the subliminal presentation of mortality-related words (Arndt et al., 1997; see Burke et al., 2010). Additionally, that sample size is sufficient to detect the proposed effects, based upon previous studies that have primed immortality (Dechesne et al., 2003; Huang et al., 2013; Van Tilburg & Igou, 2011). During the pilot phase of the data collection, a total of approximately 29% of participants failed either to complete the dependent measure or failed the race-related manipulation check. Therefore, in expectation of similar failures, the above estimated sample size was divided by .71, resulting in a target sample size of 223.

**Participants**

Adults who spoke English as their first language were recruited from Reno, NV. All were offered $20 for participating. The sample consisted of 223 individuals, none of whom withdrew, or were dismissed, mid-study, and all of whom were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 2002). Of those 223, ten participants were excluded for procedural error (e.g., failing to fill out the donation form, which was the dependent measure). It seems highly unlikely that the failure to complete this form could be interpreted as participants not wishing to donate, because the form also served the purpose of giving participants the chance to indicate how much they wished to allocate to themselves, should they win the drawing (see Appendix B for an example of the drawing
form). Additionally, completion of the drawing entry form was integrated into the study’s instructions: that they were not to continue to subsequent sections until they had completed the drawing entry form. Therefore, failure to complete the drawing entry/donation form represents a failure to follow the study’s instructions. However unlikely, it remains possible that participants who failed to complete the drawing entry/donation form might have exercised refusal of both the opportunity to win and donate money, though such refusals remain in defiance of the study’s instructions.

Two participants were excluded due to experimenter error (i.e., failing to match the donation recipient’s sex with that of the participant). Two were excluded for failing to speak English as their first language, which was an explicit prerequisite for participation to rule out the possibility that participants might not have subliminally comprehend the stimuli, due to lack of English fluency. Ten were excluded for suspicion. Such suspicion took several forms: wondering whether the word association task was intended to prime participants in some way; wondering if the drawing/donation form was a way to test participants’ greed; and wondering if the student of the month donation was genuine.

Thirty seven were excluded for failing the race manipulation check. This is in keeping with findings of empirical research that inattentive respondents provide data of poorer quality, sufficient to obscure tests based upon the generalized linear model (such as the present study), including the effects of experimental manipulations (Maniaci & Rogge, 2014). This is congruent with other research that finds, when participants fail to follow instructions, noise in the data tends to increase, and the validity of the data tends to decrease (Oppenheimer, Meyvis, & Davidenko, 2009).
None were excluded for having identified the subliminal stimuli; indeed, none correctly identified them. Finally, one was excluded for admitting both to having Alzheimer’s disease and to being confused throughout the study. This left 161 participants, remaining above the 158 required according to the power analysis. The final sample was 58% female and 42% male, ranging in age from 18 to 68 (interquartile range 20 – 30).

**Dependent Variable**

The dependent variable was the amount of money (ranging from $0.00 to $200.00) that participants could opt to donate to a (fictitious) scholarship recipient.

**Independent Variables/Stimuli**

Following the procedure of Andt et al. (1997), the priming stimuli, across conditions, were matched both for word length and usage/frequency within American English, according to the Corpus of Contemporary American English (Davies, 2008). Additionally, the a priori criteria for matching affectively-positive control words with their immortality counterparts was that they should be within one standard deviation on affective valence and arousal, according to the psychometrically-normed “Affective Norms for English Words” (ANEW), developed by Bradley and Lang (2010).

**Immortality primes.** The following ten words were intended to refer to immortality, without direct reference to religion. Those words were: ALIVE, ENDURE, EXIST, HEALTH, LEGEND, THRIVE, CONTINUATION, FAMOUS, SUCCESS, and ADMIRE. Given that research on immortality priming has never been done via priming with subliminal words, this set of words was novel, and were chosen on the basis of face validity by the author. Specifically, on their face, these words seem to be
consistent with notions of feeling well and meaningful/significant: both of which, though subjective, seem central to a present-moment sense of existential security.

It should be noted that a potential drawback of this set of words is that, arguably, they straddle both spiritual and symbolic notions of immortality. Therefore, these words might not represent a purely symbolic, or purely spiritual, manipulation of immortality. However, as discussed, spiritual and symbolic forms of immortality are thought to serve similar and redundant functions (Dechesne et al., 2003); therefore, this point may be relatively immaterial with respect to its impact on the outcomes.

**Affectively-positive control primes.** The affectively-positive control primes also were intended to avoid reference both to immortality and religion. Those words were: SUITE, REFINE, PASTA, CASINO, FOREST, ELATED, CHECKERBOARD, PRINCE, DELIGHT, and PLEASED. The mean valence of these words was within .02 of the mean valence of the immortality words; well within the tolerance of 0.87 SD on this attribute. Additionally, the mean arousal of these words was within .14 of the mean arousal of the immortality words; well within the tolerance of .81 SD on this attribute.

**Affectively-neutral control primes.** The affectively-positive control primes also were intended to avoid reference both to immortality and religion, and were within .01 of the mean, on both affective valence and arousal, from the ANEW word list; well within the aforementioned standard deviations for these attributes. Those words were: TABLE, BUTTON, BROTH, CLOSET, KETTLE, PENCIL, EXASPERATION, STREET, COMPLEX, and HAIRPIN.

**Immortality priming manipulation check.** Participants completed a fill-in-the-blank word completion task (modeled after Greenberg et al., 1994; see procedure section)
to assess the extent to which thoughts of immortality had been primed via subliminal exposure to words related to immortality /symbolic immortality (hereafter immortality-thought accessibility, or “ITA”). The task consists of a set of 33 word fragments whereby each word is missing one to two letters. Seven of those fragments were the manipulation check target words, and they could be completed in ways related either to immortality or to something else. For example, “L_STING” can be completed either as “Lasting,” or “Listing.” The seven word fragments were as follows: F__TH (Faith or Fifth), BE_ _ ND (Beyond or Behind), DESCEND_ N (Descendant or Descending), S_R_ NG (Strong or String), L_ STING (Lasting or Listing), DIV_ _E (Divine or Divide), ST_ _ING (Staying or Staring). If, as intended, thoughts of immortality have been primed by the subliminal priming procedure, one would expect that participants primed with words related to immortality (vs. controls) will complete a significantly greater number of immortality-related word completion (Arndt, Cook, & Routeledge, 2004). The present study ITA measure was novel for the simple reason that none of the handful of previous studies that have explored effects of immortality priming included ITA manipulation checks that could otherwise have been adopted by the present study.

**Death-thought accessibility manipulation check.** Additionally, seven of the 33 word fragments were chosen as target items that could be completed as either neutral or mortality-related words. This tested whether, compared to control conditions, those primed with immortality had been inadvertently primed with thoughts of mortality (i.e., so-called death-thought accessibility [DTA]). The seven word fragments were those used in Greenberg et al. (1994): BUR_ED (Burned or Buried), KI_ _ED (Kicked or Killed), SK_LL (Skill or Skull), GR_VE (Grove or Grave), DE_D (Deed or Dead), COFF_ _
(Coffee or Coffin), ST_FF (Stuff or Stiff). If, as intended, mortality-related thoughts have not been raised by the subliminal priming procedure, one would expect that participants in different priming conditions would not make significantly more mortality-related word completions (Arndt, Cook, & Routledge, 2004). As hypothesized, if they vary at all, one would expect those primed with immortality to make fewer mortality-related word completions, due to inhibition of mortality-related thoughts. Consequently, the DTA manipulation check offers a test of a posited mechanism of the effects of immortality priming: that it reduces death through accessibility (Schmeichel & Martens, 2005).

All words fragments were presented randomly, though the block of ITA word fragments always preceded those of the DTA, to eliminate the possibility that effects on the ITA measure could be attributed to completion of the DTA measure. It is important to recall that subliminal manipulations of mortality do not require delays between the manipulation and assessment of DTA (see Hayes et al., 2010). Therefore, by placing the DTA measure after that of the ITA, the DTA measure also can verify that DTA was aroused neither by the immortality manipulation nor by completion of the ITA measure.

It is noteworthy that the words in this fill-in-the-blank task can be completed in ways other than mentioned above. However, this is true both for words in the ITA check (e.g., in addition to “Faith,” F__TH could be completed as Fifth, or Forth), and for words in the DTA check (e.g., in addition to “Stiff,” ST_FF could be completed as Stuff or Staff). However, the diagnostic value of these measures remains, in accord with their underlying logic, that individuals would tend to complete the task with words congruent
with concepts that are most readily accessible to them at the moment, and that this should vary by condition, based upon the concepts that are primed.

**In-group/out-group race manipulation.** The race of the donation recipient was varied by altering the name of an individual to whom participants are given the chance to donate part of their prospective winnings from the lottery-style drawing. The name of the would-be recipient was fictitious, and was a name stereotypically associated either with the participant’s racial in-group or a racial out-group. Specifically, the names were the following: (Asian) Ken/Kim Yang; (Black/African American) Tyrone/Tyra Jackson; (Latino) Miguel/Maria Cruz; (White/Caucasian) Jim/Jane Anderson. Always, the sex of the donation recipient was matched to the participant.

Additionally, these words were attached to the drawing entry/donation form in two different fields, using transparent address labels. This served the following two purposes. First, the labels made the names of the recipients relatively noticeable against an otherwise pre-printed form (see Appendix B ). Second, the recipient’s name remained attached to the portion of the drawing entry/donation form that participants retained even after depositing the detachable portion in the drawing entry form dropbox. Therefore, participants did not need to rely upon their memory when asked about the name of the donation recipient (i.e., the race manipulation check).

**In-group/out-group race manipulation check.** An exit survey contained an item asking participants to indicate their assumption regarding the race of the individual to whom they were given the chance to donate part of their prospective winnings from a lottery-style drawing. Specifically, that item stated “To fulfill our reporting requirements to the Ford Foundation, regarding the scholarship recipient to whom you could donate a
portion of your prospective winnings from the upcoming drawing, what race was that scholarship recipient? If you're unsure, please take your best guess.” As mentioned, participants retained a portion of the drawing entry/donation form that included the name of the donation recipient, even after depositing the detachable portion of the form dropbox. Therefore, participants did not need to rely upon their memory when asked about this survey item.

**Collectivism measure.** Participants’ level of collectivism was measured by their responses to items on the 16-item horizontal & vertical dimensions of collectivism measure developed by Singelis, Triandis, Bhawuk, and Gelfand (1995; see Appendix C for this collectivism measure). This is a frequently used measure of collectivism with reliabilities tending to range from .68 to .74 (Singelis et al., 1995).

**Mood and affect measure.** Participants’ mood and affect was measured by “The Positive and Negative Affect Schedule-Expanded Form” (PANAS-X; Watson & Clark, 1991; see Appendix D for this affect measure and its scoring key). This is a frequently used measure of mood and affect, with reliabilities tending to range from .85 to .88 (Watson & Clark, 1991).

**Demographics.** This questionnaire assesses participants’ demographic characteristics (i.e., sex, age, religion) so that these factors could be used to describe the sample, and to assess relationships between these factors and the dependent variable (see Appendix E for this demographic/exit survey). It is important to note that participants’ religiosity was not measured, but simply their religion. The religion item asked: “What is your religion? (Please select one).” Response options were the following: Agnostic; Atheist; Buddhist; Catholic; Jewish; Muslim; Protestant; Other (If other, please specify).
Procedure

During recruitment, participants were informed of the study’s cover story (that “we are investigating how individuals tend to think about similar and contrasting ideas and the relationship of that process to how individuals tend to form word associations”; see Appendix F for this recruitment post). Additionally, they were informed of the requirement that participants speak English as their first language, and that compensation was $20, plus an entry into a lottery style drawing, comprised of entries from those who participate in the study, to win a $200 Amazon gift card. Both this type of drawing, and the dollar amount, were the same as used in the TMT study by Ferraro, Shiv, & Bettman (2005).

At the lab, the experimenter greeted participants (run one per session), explaining that the session would begin momentarily, and asked participants to take a seat in a waiting area (see Appendix G for the experiment’s script). This encounter permitted the experimenter to assess the participants’ race, and input that into the software that controlled the experiment (MediaLab). The software randomly assigned the out-group race of the scholarship recipient. This was done both to increase the likelihood that effects might generalize to a broader array of racial out-groups, rather than to one out-group in particular, and to eliminate the possibility that one racial group’s responses were due to racial bias (or lack thereof) unique to a given racial dyad. Additionally, the software was programmed to run every other session as the same race as participants, to strive for a 50-50 balance of same vs. different race of scholarship recipient. In all cases, the software instructed the experimenter of the appropriate race of the scholarship recipient to affix to the donation form. Consequently, the experimenter placed the
corresponding matched-sex name label on the donation form, which was placed in an overhead cabinet located above a computer workstation.

In the event that an experimenter misjudged the race of a given participant, this was not problematic, due to the way in which the in-group vs. out-group donation recipient was assessed during data analysis. Specifically, participants’ self-reported race (collected on the exit survey) was cross-checked with participants’ response to the manipulation check asking about the race of the donation recipient. Cases where those races were the same were coded as in-group donation recipients; those that differed were coded as out-group donation recipients.

Once in the lab, participants were given an overview of the study that was congruent with the cover story, including an information sheet (see Appendix H for this information Sheet). Accordingly, participants were told they would be asked to complete a computer-administered word-relation test and fill out some questionnaires. The experimenter explained that for each trial of the word-relation test, two words would be flashed sequentially on the computer, and the participant’s task was to indicate whether the words were related or unrelated, by pressing either the “R” or the “U” key to signify that the words were related or unrelated, respectively. For example, if participants saw the words such as rose and flower, they should press the “R” key, but if they saw words such as sneaker and fajita, they should press the “U” key. This task was modeled from the one used in Arndt et al. (1997).

Additionally, participants were reminded that they would be entered in a drawing to win $200 that would be conducted at the conclusion of the study. They also were informed that our research lab was partnering with the Ford Foundation to raise money
for their student of the month scholarship fund (a real charitable foundation, but a fictitious fund). Consequently, at the end of their study participation, they were informed that they would have the option to decide how much, if any, of their potential winnings from the drawing they wished to donate to that charity.

Next, participants were seated at the computer workstation, and asked to begin the study by following instructions displayed on the monitor. The experimenter exited the room, leaving participants to complete the study that was administered entirely by computer.

The first task participants completed was the collectivism measure (Singelis et al., 1995). Next, participants completed the word association task that, in actuality, served as the priming task (again, modeled after the one used in Arndt et al., 1997). Specifically, participants were randomly assigned to be subliminally presented with one of the sets of priming stimuli (i.e., immortality-related vs. affectively-positive controls vs. affectively-neutral controls).

The priming procedure was executed as follows. After reading the task’s instructions, participants were presented with three practice items. Next, there were ten trials, each consisting of a sequential presentation of three stimuli centered on the screen. The first and third stimuli were irrelevant words that participants were asked to judge the presence or absence of a relationship between them. In actuality, the first irrelevant word served as a forward mask (and fixation point), and the second word served as a backward mask: each displayed for 429 ms. The critical subliminal primes were presented between the two masking words for 42 ms.
As mentioned, TMT studies that use subliminal primes do not use delays (see Hayes et al., 2010). Therefore, following the priming task, participants were administered the fill-in-the-blank task to assess whether immortality and/or mortality thoughts were accessible (Greenberg et al., 1994).

Then, participants were reminded of their opportunity to be entered in a drawing to win a $200 Amazon gift card. They were instructed to retrieve both an empty envelope and the lottery entry form from the overhead cabinet. That entry form included instructions reminding participants of their opportunity, if they were to win the lottery-style drawing, to make a donation to the Ford Foundation’s student of the month scholarship fund. The form instructed participants that they may (a) donate any amount, including $0.00, (b) that the gift card(s) will be issued by a university comptroller who will be unaware of the purpose of the gift cards, and (c) that they should seal the donation form in the envelope and deposit it in a covered drop-box in the lab room (i.e., that their donations are completely confidential). As mentioned, the name/race of the student of the month varied according to the race-related randomization schedule.

Next, participants were instructed to complete an exit survey. The first questions on that survey were modeled after Arndt et al (1997) that asked: "During the related-unrelated word game, how many words did you see in each display?" “Did you ever see more than two words flashed at a time?” “If yes, were they the same words or different words from the others you saw?” “If you think they were different words, list what you think they may have been?” A subsequent page asked participants “If you had to assume that there was an additional word flashed, and had to guess, which of these words did you
see (select one)?” One word from each of the priming conditions (“Endure,” “Elated,” “Exasperation”) and a fourth “Enforcement” were among the options presented.

As mentioned, the exit survey also stated, “To fulfill our reporting requirements to the Ford Foundation, regarding the scholarship recipient to whom you could donate a portion of your prospective winnings from the upcoming drawing, what race was that scholarship recipient? If you're unsure, please take your best guess;” Asian, Black/African American, Latino, and White/Caucasian were among the options presented. Last, participants were asked for their demographic information.

Next, participants were instructed to notify the experimenter of their completion. The experimenter probed for suspicion, then asked if participants wished to receive a full debriefing upon the study’s termination (see Appendix I for the full debriefing statement). Finally, participants were paid, thanked, and then dismissed.
Chapter 7: Results

Preliminary Analyses

Checks on Awareness of Subliminal Stimuli

No participants correctly identified the subliminal stimuli in response to the open ended question asking what words they thought they might have seen. Additionally, a Pearson chi-square test was conducted on the multiple-choice question in which participants were asked to guess what word was presented. That test revealed no statistically significant difference between conditions on those guesses: $\chi^2 (6, n = 161) = 9.36, p = 0.16$, affirming that there was no statistically discernable differences in awareness of the subliminally primed words.

Checks on Excluded Cases

Following the analysis procedure of Arndt at al. (1997), to assess whether excluded cases might have come from significantly different proportions of the priming manipulation, a Pearson chi-square test was conducted. That test revealed that the excluded cases were not disproportionately derived from any of the three priming conditions $\chi^2 (2, n = 62) = .81, p = 0.67$. Nevertheless, the full model, containing all of the predictors, was run both with, and without those who failed the manipulation check, and will be discussed in the primary analyses section (see Appendices K and M for tables of these tests of model effects). To assess whether excluded cases might have varied along participants’ levels of collectivism, a binary logistic regression was conducted with that factor as the predictor and whether cases were included vs. excluded as the binary outcome. That test revealed that the excluded cases did not significantly vary along with participants’ levels of collectivism $\chi^2 (1, n = 223) = .74, p = .39$. 
Additionally, to assess whether excluded cases might have come from significantly different proportions of believers vs. unbelievers, the in-group out-group status of the donation recipient, and the interaction between the two, a binary logistic regression was conducted with those factors as predictors and whether cases were included vs. excluded as the binary outcome. The omnibus test of those predictors was statistically significant $\chi^2 (3, n = 223) = 10.31, p = .02$. Although, the effect of participants’ beliefs was insignificant $\chi^2 (1, n = 223) = .36, p = .55$, the effect of the racial in-group/out-group status of the donation recipient was significant $\chi^2 (1, n = 223) = 8.63, p = < .01$. Specifically, compared to participants from the in-group donation recipient condition, those from the out-group recipient condition were more likely to have been included in the analyses, $b = 1.01$, Wald $\chi^2 (1) = 6.60, p = .01$. However, the two-way interaction between participants’ beliefs and in-group/out-group status of the donation recipient was insignificant $\chi^2 (1, n = 223) = .01, p = .94$ (see Appendix J for a table displaying these tests of effects).

That the effect of the racial in-group/out-group status of the donation recipient was significant is concerning, given that an unidentified variable—associated with whether participants passed the race-related manipulation check—might have influenced the results to follow. This will be addressed in greater detail in the upcoming “Limitations” section. Fortunately, as will be described in the “Primary Analysis” section, when analyses were re-conducted to include those who failed the race manipulation check, only

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1 This binary logistic regression could not include the factors from the previous two tests of excluded cases (priming condition and collectivism), due to quasi-complete separation in the data. This issue is discussed in greater detail in the upcoming “Primary Analysis” section.
two effects crossed over the .05 alpha significance level: neither of which were related to the race manipulation.

**Immortality-Thought Accessibility (ITA)**

To assess whether the subliminal priming conditions differentially increased the accessibility of immortality-related words, one-way between-participants analysis of variance (ANOVA) was conducted on the number of immortality-related fill-in-the-blank word completions. Prior to running the ANOVAs, the variable representing the sum of immortality-related words was assessed for normality. Although that variable did not meet the Shapiro-Wilks standard for normality $p < .05$, its skew and kurtosis were within tolerable limits ($> -1$ and $< 1$), indicating that ANOVA analysis was appropriate. However, in light of the fact that the presence of many extreme scores can render non-parametric analyses more powerful than their parametric counterparts, and to increase certainty in this test of immortality-thought accessibility, the variables also were analyzed via the non-parametric equivalent of one-way between-participants ANOVA: the Kruskal-Wallis test (see Keppel & Wickens, 2004). Contrary to expectations, both the ANOVA and Kruskal-Wallis tests revealed no sign that the subliminal priming conditions differentially increased the accessibility of immortality-related words. Even the more liberal of the two tests (in this case, the Kruskal-Wallis), was insignificant $\chi^2 (2, n = 161) = 1.03, p = .60$. By comparison, the result of the ANOVA was $F (2, 158) = .31, p = .74$.

**Death-Thought Accessibility (DTA)**

Additionally, to assess whether the subliminal priming conditions differentially increased the accessibility of death-related words, ANOVA was conducted on the number
of mortality-related fill-in-the-blank word completions. As with the ITA variable, DTA was assessed for normality, and it, too, did not meet the Shapiro-Wilks standard for normality $p < .05$. However, its square-root transformation was closer to normal, with respect to its skew and kurtosis: both of which were within tolerable limits, indicating that ANOVA analysis was appropriate. Again, to increase certainty in this test of death-thought accessibility, the variables also were analyzed via the Kruskal-Wallis test.

As hoped, both the ANOVA and Kruskal-Wallis tests revealed that none of the subliminal priming conditions differentially increased the accessibility of death-related words. Even the more liberal of the two tests (in this case, ANOVA), was insignificant $F(2, 158) = .02, p = .98$. By comparison, the result of the Kruskal-Wallis test was $\chi^2(2, n = 161) = .02, p = .99$. In other words, the subliminal immortality priming appears not to have caused participants to inadvertently think of mortality.

**Main effect for immortality priming on death-thought accessibility (hypothesis 1).** However, contrary to hypothesis 1 (i.e., that those primed with words related to immortality [vs. controls] will tend to make significantly fewer death-related word completions on the DTA measure), these same null findings on the DTA measure also indicate that those primed with words related to immortality (vs. controls) did not tend to make significantly fewer death-related word completions on this fill-in-the-blank word completion task.

**Collectivism Measure Reliability**

According to Singelis et al. (1995), their measure of collectivism demonstrates good internal consistency, with Cronbach’s alpha tending to range from .68 to .74. In the present study, Cronbach’s alpha was 0.74: indicating both good reliability, and
comportment with other samples upon which the scale was developed (see Appendices N and O for tables displaying the collectivism scale reliability statistics, and collectivism item-total statistics, respectively).

**Checks on Mood and Affect**

The 13 subscales of the PANAS-X were analyzed to assess whether the subliminal primes had significant (and inadvertent) effects on mood. First, each of the subscales was assessed for normality. Those that were sufficiently normal, and those that were abnormal, but whose transformations rendered them sufficiently normal, were subjected to one-way between-participants ANOVA. PANAS-X scales that were abnormal, and whose transformations could not render them sufficiently normal, were analyzed via the non-parametric equivalent of one-way between-participants ANOVA: the Kruskal-Wallis test. Congruent with the findings of Arndt et al. (1997), none of the mood scales came close to being statistically significant $p > .05$, demonstrating that the subliminal primes had no detectable, differential effects on participants’ moods (see Appendix P for a table of these tests of subliminal priming condition on the mood/affect measure).

**Primary Analyses**

**Distribution of Dependent Variable**

As commonly found with a monetary dependent variable related to money, the donation dependent measure for this study was not normally distributed. Additionally, it was tri-modal (many people donating 0, vs. approximately 50%, vs. the majority of their

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2 The Kruskal-Wallis test is appropriate for such an analysis of non-normally distributed, regardless of whether those distributions are skewed in the same direction (Keppel & Wickens, 2004).
prospective winnings to the fictitious donation recipient; see Appendices Q - T for figures
displaying the distribution of dependent across conditions vs. per condition). Therefore,
the dependent variable could not be transformed in any way that would render it
sufficiently normal for parametric statistical techniques. Consequently, the analyses were
performed using ordinal logistic regression: the appropriate statistical technique, capable
of analyzing interactions between independent variables measured at either categorical or
continuous levels, with an ordinal-level dependent variable, whereby there is no
assumption of normality among either the predictors or the outcome variable (Tabachnick
& Fidell, 2007). Furthermore, all computations were based on the robust (vs. model-
based) estimator covariance matrix, which enhances the likelihood that the present results
will generalize beyond the present sample.

**Overall Model Effect**

The ordinal regression was performed to assess the impact of priming, in-
group/out-group status of the donation recipient, participants’ level of collectivism
(centered at its mean), and participants’ spiritual beliefs (i.e., those self-identified as
theists or otherwise spiritual vs. atheists and agnostics; “believers” vs. “unbelievers,”
respectively) on the amount participants donated to the recipient. The full model,
containing all four predictors, was statistically significant $\chi^2 (23, n = 161) = 56.59, p <
.01$, indicating that the model was indeed capable of predicting levels of donation based
upon those predictors. The overall model explained 30% of the variance in donations
(according to both the Nagelkerke, and the Cox and Snell, pseudo R-square criteria).
Additionally, all four predictors significantly contributed to the overall predictive power
of the model as follows (see Appendix K for a table displaying these tests of model effects).

**Average Level of Donation**

Although the following primary analyses were performed with the most powerful non-parametric statistical technique capable of analyzing interactions of categorical and/or continuous predictors, whereby the dependent variable is measured at an ordinal level, the attempt also was made to analyze the results with binary logistic regression, whereby the dependent variable was dichotomized to reflect those who did (vs. did not) make a donation (Tabachnick & Fidell, 2007). However, by dichotomizing the dependent variable, the model encountered the problem of quasi-complete separation in the data, precluding both valid model estimation and valid parameter estimates. Nevertheless, an independent samples t-test was run which revealed that among those who donated \( (n = 120) \) vs. those who did not \( (n = 41) \), the mean level of donation was $59.14 (SD = 51.16; t (119) = -12.66, p < .01, \) two-tailed, equal variances not assumed, \( F = 67.77, p < .01 \).

**Effects of In-group/Out-group Status of the Donation Recipient, Priming, and Participants’ Spiritual Beliefs**

**Main effect of the racial status of the recipient (hypothesis 2).** Returning to analyses that employed ordinal logistic regression, contrary to expectations of hypothesis 2 (i.e., that participants will share more of their prospective winnings with racial in-group vs. out-group members), the effect of the racial in-group/out-group status of the donation recipient was insignificant \( \chi^2 (1, n = 161) = 3.15, p = .08 \). Additionally, the two-way
interaction between immortality priming and in-group/out-group status of the donation recipient was insignificant $\chi^2(2, n = 161) = 3.07, p = .22$.

**Interaction between priming, participants’ spiritual beliefs, and the in-group/out-group status of the recipient (hypotheses 3 and 4).** In support of the first tenet of hypothesis 3 (i.e., that spiritual believers [vs. unbelievers], will tend to share more of their prospective winnings when primed with immortality words [vs. controls]), immortality priming strongly interacted with spiritual beliefs $\chi^2(2, n = 161) = 16.62, p < .01$ (see Appendix U for a figure of this priming by spiritual belief interaction, which also displays the cell sizes of this interaction). Specifically, relative to control conditions, which did not differ from each other, Wald $\chi^2(1) = .21, p = .65$, spiritual believers gave more when primed with immortality, $b = 1.42$, Wald $\chi^2(1) = 12.73, p < .01$, (compared to neutral priming), $b = 1.23$, Wald $\chi^2(1) = 10.77, p < .01$, (compared to affectively-positive priming). Additionally, relative to control conditions, which did not differ from each other Wald $\chi^2(1) = .35, p = .55$, unbelievers gave less when primed with immortality, $b = -1.10$, Wald $\chi^2(1) = 3.80, p = .05$, (compared to neutral priming), though they did not give less relative to the affectively-positive priming condition, Wald $\chi^2(1) = .70, p = .40$.

However, the second test of hypothesis 3 (i.e., that believers’ increased donations, following immortality priming (vs. controls), will also demonstrate a reduction of in-group bias) was not supported, as evidenced by the insignificant three-way interaction between priming, spiritual belief, and in-group/out-group status of the donation recipient $\chi^2(2, n = 161) = .29, p = .87$ (see Appendix L for a table displaying this interaction).

Recalling that hypothesis 4 (i.e., that spiritual believers [vs. unbelievers], will tend to share less of their prospective winnings when primed with immortality words than when
primed with positive control or neutral words, and such sharing will demonstrate greater
in-group bias) runs diametrically opposed to hypothesis 3, these statistics demonstrate
that neither tenet of hypothesis 4 found support.

In-group vs. out-group giving also differed by theistic beliefs $\chi^2 (1, n = 161) = 3.84, p = .05$ (see Appendix V for a figure of this in-group status of donation recipient by
spiritual belief interaction, which also displays the cell sizes of this interaction).

Specifically, compared to believers, unbelievers gave less to their in-group, $b = -1.49,$
Wald $\chi^2 (1) = 7.77, p = .01$. In contrast, their giving to the out-group did not differ from
that of believers, Wald $\chi^2 (1) = .42, p = .52$, whose in-group/out-group giving did not
differ Wald $\chi^2 (1) = 1.00, p = .32$.

**Collectivism Effects**

As one might expect, collectivism was positively associated with amount donated
$\chi^2 (1, n = 161) = 6.31, p = .01, b = .04$ (see Appendix W for a figure displaying this main
effect for collectivism). Additionally, as one might expect, this effect was qualified by its
interaction with in-group/out-group status of the donation recipient $\chi^2 (1, n = 161) = 4.13,$
$p = .04$ (see Appendix X for a figure displaying this interaction of collectivism by in-
group status of donation recipient, which also displays the cell sizes of this interaction).

Specifically, when donating to a member of the out-group, there was no discernable
relationship between participant collectivism and their level of donations, $b = .01$, Wald
$\chi^2 (1) = 0.28, p = 0.60$. In contrast, when donating to the in-group, there was a significant
association with participant collectivism, $b = .06$, Wald $\chi^2 (1) = 9.50, p < .01$. For
illustration purposes only, Appendix X (Figure 8) displays the relationship between
collectivism and the probabilities of participants having donated $30 or more to in-group
vs. out-group donation recipients. As is evident, there is little association between collectivism and giving to out-group recipients, but a sizable association between collectivism and giving to in-group recipients. The positive association between collectivism and donations also was more pronounced among theistic unbelievers (vs. believers) $\chi^2 (1, n = 161) = 4.05, p = .04, b = .07$ (see Appendix Y for a figure displaying this interaction of collectivism by spiritual belief, which also displays the cell sizes of this interaction).

**Interaction between priming, in-group/out-group status of the donation recipient, and collectivism (hypothesis 5).** Finally, contrary to the expectations of hypothesis 5 (i.e., that the in-group bias-reducing effect of immortality priming will tend to be larger for those who are relatively collectivistic), the three-way interaction between priming, in-group/out-group status of the donation recipient, and collectivism was insignificant $\chi^2 (2, n = 161) = .62, p = .74$ (see Appendix Z for a table displaying this interaction). No other main effects or interactions were significant.

**Inclusion of Those Who Failed the Race-Related Manipulation Check**

However, as mentioned, the full model also was analyzed with inclusion of those who failed the manipulation check. Only two effects changed with respect to crossing the alpha statistical significance level: neither of which related to the in-group/out-group status of the donation recipient (see Appendices K and M for a comparison of these model effects). Specifically, the previously mentioned positive association between collectivism and donations, that was more pronounced among theistic unbelievers (vs. believers), fell into insignificance $\chi^2 (1, n = 198) = 2.13, p = .15$. Additionally, a main effect for spiritual beliefs became significant $\chi^2 (1, n = 198) = 6.54, p = .01$. Specifically,
unbelievers were less likely to give than believers $b = .67$, Wald $\chi^2 (1) = 5.31$, $p = .02$.

Both of these effects will be described in detail below, in their pertinent sections.
Chapter 8: Discussion

Immortality Priming Effects

This study was designed to test the moderating effect of priming immortality on individuals’ in-group bias, with respect to their voluntary giving of something of value. Support for that hypothesis was not found. However, a related, and somewhat more encouraging, finding was obtained. Specifically, immortality priming strongly increased voluntary giving—regardless of the in-group/out-group status of the donation recipient—among self-identified spiritual believers. Although this effect did not discriminate between in-group vs. out-group giving, it can be considered congruent with the underlying theory of the present study: that a sense of immortality will tend to promote generosity vs. hoarding for self-serving interests. That this effect did not hold for unbelievers is discussed below, though it bears mentioning that—despite the limitation of this effect to believers—it implies that immortality priming might encourage giving across racial boundaries among the majority of the world’s population, given that approximately 84% of the world’s population self-identify with some form of traditional or folk religion (Pew, 2010).

Priming Effects Comported with the Meaning Maintenance Model

It is noteworthy that this increased giving among believers, following immortality priming, does not comport with the notion that immortality priming will relax adherence to norms or values (i.e., the prediction based upon Terror Management Theory). Therefore, this suggests that such relaxed norm adherence is not the mechanism underlying this effect. Recalling that Terror Management Theory is considered but a subset of the Meaning Maintenance Model, the critical issue that tends to determine how
individuals respond to a given scenario is not whether individuals’ fear of death is assuaged, but whether that scenario violates one’s meaning-making framework (Heine et al., 2006). Therefore, it makes sense that for believers, notions of immortality would not cause a disruption to their belief system. Hence, they may feel psychologically validated/comforted by such priming. As discussed, previous research on immortality priming suggests that, from an evolutionary perspective, such existential comforting will tend to decrease individuals’ tendency to horde monetary resources (Dechesne et al., 2003; Huang et al., 2013). Additionally, from the perspective of the Meaning Maintenance Model, insofar as immortality is congruent with believers’ meaning-making framework, priming that concept does not seem to create the need for them to affirm a sense of meaning though alternate means, such as amassing wealth (Heine et al., 2006).

Additionally, there are at least two reasons to doubt that religion-associated normative prosociality, rather than believers’ affirmed meaning-making framework, and concomitant sense of security, was responsible for believers to give more when primed with the immortality words. First, as mentioned, the few rigorous studies on this topic have found no connection between religiosity and pro-social behavior, especially in contexts that call for spontaneous giving (see Galen, 2012). Second, when religious prosociality is activated, it tends to be extended only to in-group members (i.e., not to strangers; see Galen, 2012). Therefore, given that priming and religious beliefs did not interact with the in-group/out-group status of the donation recipient, it suggests that religion-associated normative prosociality was not responsible for believers’ heightened levels of giving following immortality priming.
**Possibility of differential priming effects, based on sensitivity to primes.**

Regardless of the extent to which concepts of immortality, vs. religious norms in favor of giving, might have been activated, that they might have been activated more so among believers vs. unbelievers might be due, at least in part, to chronically higher priming of such thoughts among believers. As discussed, believers (vs. unbelievers) may be somewhat pre-primed/sensitized in ways that enable even subtle manipulations of existential constructs to exert an influence on their behavior. However, the present study also found relatively weak evidence, discussed immediately below, that unbelievers also were affected by the immortality primes.

Compared to the neutral control condition (though not the affectively-positive control condition), unbelievers primed with immortality gave less to the donation recipient, regardless of the recipient’s in-group/out-group status. Given both that this effect was barely significant, and that it did not differ from the affectively-positive priming control condition, this effect should be interpreted cautiously. Nevertheless, this effect might be further evidence of the Meaning Maintenance Model in action (Heine et al., 2006). Specifically, unbelievers who were confronted with existential primes might have experienced a disruption to an aspect of their meaning-making framework (i.e., their conception/expectation of the nonexistence of spiritual immortality), which might have led them to reaffirm a sense of meaning and concomitant security by alternative means. The alternative means that they demonstrated (i.e., reduced donations) could be described as materialistic hoarding, which could be considered an evolutionarily adaptive response to threat (see Huang et al., 2013).
Alternatively, from a TMT perspective (which, as mentioned, evidence suggests is a sub-set of the Meaning Maintenance Model; see Heine et al., 2006), such hoarding could be interpreted as an alternative means of promoting one’s material legacy. Notably, according to this interpretation, efforts to reaffirm a sense of meaning need not be directed at the same domain of meaning that has been threatened. In short, futile as it may seem to attempt to bolster one’s sense of existential meaning through material (rather than spiritual) means, from the perspective of both the Meaning Maintenance Model, and TMT, any means will do: provided that it restores the individual’s sense of meaning/order, and concomitant security. Therefore, in light of the present findings, it would seem that the appropriate immortality priming strategy, to inspire giving among unbelievers, is to leave them alone. Priming them with affectively-positive words does not seem to help, and priming them with immortality-related words appears counterproductive.

Possibility that immortality priming was purely symbolic.

Much of the above discussion, regarding how the primes seemed to have differing effects on believers vs. unbelievers, is based on the premise that participants responded to the primes based on spiritual connotations of immortality. However, on their face the primes were both predominantly secular in nature, and related more directly to symbolic immortality than spiritual immortality. Therefore, one might reasonably assume that connotations of spiritual immortality would not be primed, which casts doubt on whether interpretations of the priming effects based on participants’ associations with notions of spiritual immortality are valid.
From one perspective, based on the aforementioned phenomenon of spreading activation (Klatzky & Creswell; see Reisberg, 2007), it might be that even thoughts of symbolic forms of immortality trigger thoughts of spiritual immortality. If so, then it would be unsurprising to find that primes of symbolic immortality have similar effects to primes based on spiritual immortality. Indeed, this is congruent with the previously reviewed research on immortality priming which maintains that spiritual and symbolic forms of immortality serve similar/redundant functions (Dechesne et al., 2003). Likewise, as mentioned, priming notions of immortality—either spiritual or symbolic—has been shown to reduce both the tendency to engage in worldview defense, and the need to pursue symbolic forms of immortality (Dechesne et al., 2003; Florian & Mikulincer, 1998; Routledge & Arndt, 2008). Therefore, it appears that a sense of immortality, whether spiritual or symbolic, tends to assuage individuals’ need to engage in thoughts and behaviors indicative of both in-group bias and greed in general (Dechesne et al., 2003).

Nevertheless, from another perspective, the question remains: what if such spreading activation did not occur in the way suggested above, and/or what if spiritual and symbolic forms of immortality are not functionally similar? In other words, what if both believers and unbelievers interpreted primes purely in terms of symbolic immortality, with no associations to spiritual immortality? Under such conditions, the mechanism underlying the phenomenon whereby believers and unbelievers responded differently to the immortality primes is less readily explainable.

Nevertheless, one possible line of reasoning is that believers (vs. unbelievers) may be more motivated/eager to respond to primes pertinent to symbolic immortality, by
whatever force also compels them to wish to belong to something bigger than themselves in the form of their spirituality. Though purely speculative, perhaps that desire to be a part of something bigger than themselves is also related to a willingness to contribute to a greater cause. Therefore, insofar as the immortality primes may have activated such a desire among believers, it could explain, at least in part, why spiritual believers (vs. unbelievers) tended to make greater donations to the donation recipient. Based on the present study, that motivational force is unclear. Therefore, given the ambiguity regarding whether symbolic vs. spiritual immortality was primed, it would be prudent to replicate the present findings before embracing any given interpretation of them (more on this in the following “Limitations” section).

A Values and Norms Account of Immortality Priming Effects

That believers (vs. unbelievers) increased their giving following immortality priming might be due, either wholly or in part, to religious concepts that might have been primed in the existential condition: despite that the immortality primes (i.e., alive, endure, exist, health, legend, thrive, continuation, famous, success, admired) were intended to avoid direct reference to religion. In short, activation of religious thoughts might have prompted participants to increase their giving, in accord with religious norms in favor of generosity and egalitarianism (i.e., generosity regardless of the racial in-group/out-group status of beneficiaries; Duck & Hunsberger, 1999; see Hall et al., 2010). Such religious egalitarianism makes sense insofar as self-identified believers (vs. unbelievers) might tend to subscribe more whole-heartedly to norms in favor of egalitarian giving.

How Priming Effects Did Not Comport with Terror Management Theory.

Conversely, another interpretation of the previously mentioned effect is that unbelievers,
who might otherwise adhere to norms of generosity, might simply adhere less to those norms following immortality priming: based on the premise, linked to Terror Management Theory, that those primed with immortality might adhere less strongly to salient norms (Dechesne et al., 253; Gailliot et al., 2006). However, this seems doubtful, for at least two reasons. First, research suggests that, at least in Western societies, the predominant norm is not generosity, but self-interest (Miller, 1999). In support of the notion that the norm self-interest prevailed among unbelievers in this sample, recall that the only effect that changed to become statistically significant, when the present sample size was increased to include those who failed the race manipulation check, was that unbelievers were inclined to give less than believers. Second, to accept the premise that unbelievers relaxed their adherence to salient norms or values in favor of giving, one would also have to accept either that the aforementioned effect—whereby believers increased their giving—was in response to believers’ relaxed adherence to some value of stinginess toward both in-group and out-group members, or that unbelievers were affected by the prime whereas the believers were not. The former premise is doubtful, because of religious norms of generosity (Duck & Hunsberger, 1999; see Hall et al., 2010). The latter is unlikely, if for no other reason, than because priming research suggests that, if believers’ sensitivity to primes related to spiritual concepts differs from that of unbelievers, it seems likely that they would be more, not less, sensitive to such primes (Klatzky, & Creswell, 2014; see Reisberg, 2007).

**Caveat Regarding Insignificant ITA Manipulation Check**

Although the aforementioned interaction of priming with spiritual beliefs makes sense theoretically (at least from the perspective of the Meaning Maintenance Model),
and despite that it was among the strongest, and by far the most statistically significant of all effects in the present study (indeed, $p < .001$), this effect also should be interpreted cautiously. Recalling that the immortality-thought accessibility (ITA) manipulation check was insignificant, it remains possible that the priming manipulation was ineffective, and—hence—that some other force(s) produced this effect. Alternatively, it is possible that immortality-thought accessibility was subconsciously in effect, but that such thoughts are not readily captured by the type of fill-in-the-blank manipulation check used in this study. For example, individuals’ conceptions of immortality might not be strongly associated with the words chosen for the ITA manipulation check.

Fortunately, it is even less plausible that this study’s priming related effects are due to death-thought accessibility. As mentioned, the DTA check was further from statistical significance than the ITA measure, indicating that thoughts of death were highly unlikely to be accessible to participants. Additionally, the DTA measure was adopted, verbatim, from numerous TMT studies that consistently reveal significant DTA effects when mortality is primed (see Burke et al., 2010). Therefore, it seems highly unlikely that DTA had been activated. Consequently, given that both the ITA and DTA measures were statistically insignificant, the present study cannot offer a confirmatory test of a posited mechanism of the effects of immortality priming: that it reduces death-thought accessibility (Schmeichel & Martens, 2005).

**Interim Summary**

In summary, if indeed the priming manipulation affected participants, the patterns of responding suggest that thoughts of immortality (or some unidentified concept[s]) had been activated, but that it affected believers and unbelievers differently and possibly for
different reasons. Specifically, among spiritual believers, immortality priming tended to inspire them to increase their donations, though the mechanism remains unclear. One explanation is that notions of immortality are congruent with spiritual believers’ belief systems, which permitted them to experience the intended sense of immortality (i.e., a sense of security that, as hypothesized, would increase their generosity or reduce their urge to horde or amass greater wealth). Another explanation, albeit less theoretically plausible, is that the immortality priming did not activate immortality, if at all, as much as thoughts of religion and associated religious norms in favor of egalitarianism and generosity: norms inadvertently implied by the study’s paradigm.

In contrast, among unbelievers, immortality priming tended to inspire them to decrease their donations slightly, relative to those in the neutral control condition. However, the mechanism of this weak and unexpected finding remains unclear. Nevertheless, a plausible explanation can be derived from the perspective of the Meaning Maintenance Model, whereby notions of immortality disrupted unbelievers’ cognitive schema of the finality of existence. Such a disruption to their meaning-making framework might have led them to reaffirm an alternate sense of meaning (i.e., an act of fluid compensation) through materialistic hoarding, congruent with the norm of self-interest. However, as previously discussed, this interpretation might not hold insofar as the immortality primes might have been processed by participants in a strictly secular/symbolic manner (more on this in the following “Limitations” section).

As mentioned, another interpretation of this effect is that unbelievers, who might otherwise adhere to norms of generosity, might simply adhere less to salient norms of generosity following immortality priming. Again, this seems doubtful, because of
findings from previous research that norms of self-interest predominate in Western societies (Miller, 1999), and that the present sample, when increased to include those who failed the race-related manipulation check, revealed that unbelievers indeed were inclined to give less than believers. Furthermore, to accept the premise that unbelievers relaxed their adherence to salient norms or values in favor of giving, one would also have to accept either that the aforementioned effect, whereby believers increased their giving—was in response to their relaxed adherence to some value of miserliness toward both in-group and out-group members, or that unbelievers were affected by the primes whereas the believers were not. As discussed, both of those premises seem doubtful.

**In-Group Bias Effects**

**A Normative Perspective**

Relatedly, though the main effect for in-group/out-group status of the donation recipient was insignificant, unbelievers tended to give less to their own race; whereas, believers tended to give the same to both in-group and out-group races. This finding comports with the previously mentioned finding that believers did not discriminate in their giving, between in-group vs. out-group, across each of the priming conditions. This suggests, perhaps, that believers (more so than unbelievers) might have held, and tended to act in accord with, religious norms in favor of egalitarianism. However, it bears repeating that this effect was unexpected, given that a great deal of research on religion suggests that religious individuals tend to exhibit greater in-group bias than the unreligious (see Galen, 2012).

In contrast, that unbelievers did not give equally to in-group vs. out-group members suggests, perhaps, that they might not have tended to feel norms in favor of
egalitarianism as acutely as believers. (Although unbelievers gave more to out-group members, by definition, that unequal generosity cannot be considered egalitarianism.) This makes sense insofar as unbelievers, who have not affirmed their faith in a religion that promotes egalitarianism norms, might not subscribe as whole-heartedly to those norms. Therefore, it would not be surprising to find unbelievers exhibiting behavior indicative, instead, of the norm of self-interest (see Miller, 1999): as evidenced by their decreased in-group giving. As mentioned, the notion that the unbelievers in the present study might have subscribed to the norm of self-interest (more so than the believers) found empirical support such that, when the present sample size was increased to include those who failed the race-related manipulation check, unbelievers were inclined to give less than believers.

That unbelievers gave racial out-group members, at levels similar to believers, suggests that the norm of self-interest, strong as it may be among unbelievers, was not as strong as their desire to avoid feeling, or appearing, racially biased were they to give meagerly, or not at all, to a racial out-group member (see Hall et al., 2010). Another interpretation of this effect is that unbelievers, more so than believers, felt an enhanced sense to do good deeds for out-groups, more so than for members of their own in-group. However, as discussed, research demonstrating the ubiquity of in-group bias—which in turn is founded, at least in part, on evolutionary theory—suggest this is highly unlikely (Emigswiller, Deaux, & Willits, 1971; see Hewstone et al., 2002; see Pratkanis, 2007; Suedfeld, Bochner, & Matas, 1971; Tajfel, Flament, Billig, & Bundy, 1971; Tajfel, 1974). Nevertheless, that unbelievers were generous toward out-group members is congruent with research indicating that religiosity is positively associated with prejudice.
(Davies, Tropp, Aron, Pettigrew, & Wright, 2011; Galen, 2012; Hall et al., 2010; Reicher, Haslam, & Rath, 2008).

A Baseline Perspective

 Relatedly, another interpretation of the apparent lack of in-group bias among both believers and unbelievers can be understood in light of the fact that the out-group context of the study’s paradigm was racial. Specifically, given that believers and unbelievers gave similarly to racial out-group members, that level could be considered a baseline level of donation for participants to avoid feeling, or appearing, racist. In conjunction, the selfishly low levels of donation among unbelievers might also be considered a baseline level of donation representing the norm of self-interest (Miller, 1999). If so, the noteworthy effect, illustrated in Appendix V (displaying a figure of in-group status of donation recipient by spiritual belief), isn’t that unbelievers gave less to their in-group (and that believers were relatively egalitarian), but that believers favored their in-group more, relative to the unbelievers: as much research on giving among the religious would predict (see Galen, 2012). From this perspective, it is important to recall that in-group bias does not necessarily take the form of out-group derogation/disadvantaging (Jonas et al., 2002). Rather, it can take the form of in-group favoritism which the believers demonstrated relative to the unbelievers.

Collectivism Effects

Additionally, the present study was intended to explore immortality priming effects across a culturally relevant dimension of personality: collectivism. As previous research has shown, collectivism was positively associated with levels of giving (see Oyserman et al., 2002; Parks & Vu, 1994; Utz, 2004). This is congruent with the notion
that collectivism tends to be positively associated with interpersonal cooperation (see Oysterman et al., 2002; Parks & Vu, 1994; Utz, 2004). Additionally, congruent with previous research, over and above its main effect, collectivism tended to promote giving especially when individuals gave to their racial in-group. This boost of in-group favoritism is in accord with the notion that collectivism is positively associated with stronger distinctions regarding in-group/out-group demarcations (see Oysterman et al., 2002).

However, contrary to expectations, collectivism was not associated with enhancement of an in-group bias reducing effect of immortality priming. Indeed, as mentioned, immortality priming did not significantly decrease (or increase) individuals’ in-group bias with respect to their donations. Therefore, though perhaps unlikely, it remains possible that collectivism could be positively associated with an in-group bias reducing effect of immortality priming, but that the present sample’s lack of in-group bias in the control priming conditions may have resulted in a measurement floor effect. In other words, the lack of variability of in-group bias across priming conditions might have masked whatever effect collectivism might have had with respect to its interaction with priming and the in-group vs. out-group status of the donation recipient.

Surprisingly, the positive association between collectivism and donations also was more pronounced among unbelievers. Given that this finding is not clearly supported by previous research on collectivism, that the effect was weak ($b = .07$), and that it was barely statistically significant ($p = .04$), this finding should be considered with an especially large amount of skepticism (see Oysterman et al., 2002). In short, it would be unsurprising if this effect would not replicate. Indeed evidence for such failure to
replicate was found in the present data, recalling that this effect was the only one that fell into insignificance based upon the analysis that included those who failed the race-related manipulation check.
Chapter 9: Limitations

Generalization

Strictly speaking, the findings from this study can generalize only to adults willing to volunteer in research for modest pay, from the city from which its participants were sampled. However, as mentioned, the theoretical bases of the present study (Meaning Maintenance, Terror Management, in-group bias, and collectivism), are considered universally endemic to humans. Therefore, the findings are expected to generalize to other adult humans in general. Additionally, considering that the findings are not contingent upon a time-sensitive event (e.g., a significant historical event), it seems plausible that the findings could generalize into the indefinite future.

Another threat to the generalization of the present findings pertains to the effects related to participants’ spiritual beliefs. In short, they were not conceived of a priori; instead the interaction of priming by participants’ spiritual belief was first discovered during the pilot phase of the data collection, though the other belief-related effects were not hypothesized at that time. Indeed, given that the immortality primes were intended to avoid direct reference to religion, a priori hypotheses had not been formed regarding differential responding between believers and unbelievers. As such, the belief-related findings cannot be considered in keeping with the classic hypothetico-deductive (H-D) approach (see Kerr, 1998), and represent a form of hypothesizing after the results are known (so-called HARKing; Kerr, 1998). The risk associated with this practice is that the Type I (i.e., false positive) error rate may be in excess of the known Type I error rate set by the statistical alpha level. In other words, there is an increased risk that HARKened findings might be illusory.
Upon discovering the aforementioned interaction of priming by participants’ spiritual belief, and hypothesizing that it may be evidence of the Meaning Maintenance Model in action, the scientifically prudent course of action was to continue collecting data to achieve the sample size as estimated by the power analysis. If the effect held, one might have a degree of confidence in it (indeed, as mentioned, it became the most significant effect of the study). If not, then one would also need to have a degree of confidence that such an effect had been spurious. According to Kerr (1998), this type of HARKing can be considered “empirical inspiration,” in that it involves forwarding new hypotheses that were unanticipated prior to the study, based on current empirical data. As Kerr points, this type of hypothesizing may be as common, at least in the social sciences, as hypothesizing derived by the classic H-D approach (1998).

Given that the present study employed a mechanism for the aforementioned two-way belief-related interaction hypothesis to be disconfirmed via the collection of the full sample size, according to Kerr (1998), that finding does not represent an egregious form of HARKing. However, it should be highlighted that it suffers from the following two symptoms forward by Kerr (1998). First, it includes a “too-convenient qualifier,” in that—as mentioned—unbelievers, primed with immortality, gave less relative to only one of the control conditions (the neutral condition; Kerr, 1998, p. 199). Given that there is no clear reason to explain why that effect did not also differ significantly from the affectively-positive primes, it suggests that such reduced giving might be a spurious effect. The second symptom, as mentioned, is that there was a “glaring methodological gaff,” in the form of an insignificant immortality thought accessibility manipulation check (Kerr, 1998, p. 199), which will be discussed later in this section.
In sum, the present findings pertaining to the effects related to participants’ spiritual beliefs are especially at risk of failing to replicate. Therefore, the only way to increase confidence in the findings related either to the aforementioned belief-related effects, and/or to those related to the priming manipulation, is through replication (Cesario, 2014; Kerrr, 1998). Well-run replications that confirm a given finding make it increasingly unlikely that the original results represented Type I error (Cesario, 2014; Kerrr, 1998), which—in other words—reduces the chance that the HARKened findings were false (Cesario, 2014; Kerrr, 1998).

**Type of Giving**

However, this study’s findings are limited to voluntary, monetary giving. In short, it remains unknown whether its results would generalize to other modes of giving. Furthermore, the present paradigm employed a relatively spontaneous opportunity for giving. Therefore, it remains unknown whether its effects would generalize to premeditated giving.

**Insignificant ITA Manipulation Check**

Several other limitations have already been mentioned in the previous discussion. Foremost among them is, given the insignificant effect on the priming manipulation check, it remains uncertain whether the effects that varied by priming condition were indeed attributable to the priming, or whether the priming varied the hypothesized constructs. As previously discussed, it remains ambiguous whether, or to what extent, symbolic vs. spiritual immortality was primed: and whether this distinction matters. Although research suggest that that spiritual and symbolic forms of immortality serve similar and redundant functions (Dechesne et al., 2003; Florian & Mikulincer, 1998;
Huang et al., 2013; Routledge & Arndt, 2008), it remains unclear whether, or to what extent, effects may have varied depending upon whether the immortality primes were processed according to spiritual vs. symbolic notions of immortality.

Additionally, that the ITA manipulation check was insignificant is a concern, because—as mentioned—such a methodological shortcoming is symptomatic of unreplicable, HARKened findings (Kerr, 1998). Specifically, as Kerr (1998) asserts, given that the interaction between priming and participants’ beliefs, was derived during the pilot phase (i.e., not a priori), the failure of the ITA manipulation check increases the risk that this hypothesis, which represents a form of HARKing, is at a greater risk of failing to replicate than hypotheses derived through the classic H-D process. Therefore, despite that this interaction was the most statistically significant effect in the present study, it should not be interpreted as the one most likely to replicate.

**Inferential Statistics**

Furthermore, it bears mentioning that, not only the aforementioned priming effects, but all of the effects of the present study, are based upon inferential/probabilistic statistics. By their very nature, they are uncertain to various degrees. Therefore, it is possible that some (theoretically, perhaps all) could have resulted purely by chance. The only way to increase confidence in the present findings is through conceptual or direct replications (preferably the latter; Cesario, 2014). This is especially relevant to the present study’s novel effects, (i.e., those not strongly expected based on previous research), which—by definition—are not direct replications of previous research.

**Excluded Participants**
Additionally, it remains possible that the results could have been affected by the exclusion of those who failed the race-related manipulation check. Though statistical tests suggested this is unlikely to be attributable to the priming manipulation, as mentioned, the racial in-group/out-group status of the donation recipient was statistically significant. Specifically, compared to participants from the in-group donation recipient condition, those from the out-group recipient condition were more likely to have been included in the analyses. To reiterate, this is concerning insofar as it remains possible that those excluded might have differed on one or more unmeasured variables that might have been associated with the measured variables. Said another way, the present effects, which included those who passed the race-related manipulation check, might have been influenced by an unidentified variable that systematically co-varies with participants’ ability to pass that manipulation check (e.g., attentiveness). If so, then the present study’s effects would need to be further qualified to account for the moderating (perhaps mediating) effect of that unidentified variable.

Fortunately, as mentioned, when analyses were re-conducted to include those who failed the race manipulation check, the only two effects that crossed over the alpha significance level were unrelated to the race manipulation. Therefore, it seems one may retain a degree of confidence (within reason, not to exceed the statistical alpha level) in the effects related to the in-group/out-group status of the donation recipient. Additionally, research by Oppenheimer and colleagues (2009), has identified that between 35% – 45% of participants tend to respond inattentively on computer administered surveys. Therefore, the 17% who were excluded for failing the race-related manipulation check can be considered a surprising low failure rate. This suggests that the
study’s paradigm was not inordinately problematic with respect to the administration of that manipulation check. Nevertheless, it remains possible that the manipulation check, and subsequent statistical tests, were merely insensitive to differences between those who were included vs. excluded.

**Correlation vs. Causation**

Another limitation is endemic to the principle that correlation does not imply causation. Specifically, interpretations of the aforementioned collectivism-related effects cannot be explained in terms of causation. Although collectivism can be said to be associated with those effects, it remains possible that another, unidentified variable is associated both with collectivism and the reported outcomes, but that the unidentified variable could be the causal factor affecting those outcomes.
Chapter 10: Future directions and conclusion

Given that the subliminal priming of immortality did not significantly affect the ITA manipulation check, the question remains whether immortality can be primed via subliminal presentation of words related to that construct. One means to test that would be by way of a lexical decision task (D. Davis, personal communication, March 11, 2014). In short, if immortality can be primed via subliminal presentation of words related to that construct, then—following subliminally presented immortality primes (vs. controls)—one would expect individuals to be faster at recognizing words related to immortality.

If, indeed, it can be verified that immortality can be primed via subliminal means, then it might be worthwhile for future research to test whether the present study’s effects hold across other modes of giving. Such modes could include, for example, willingness to volunteer one’s time, or provide valuable information. Furthermore, further research could test whether the effects hold in less spontaneous circumstances that require planned decisions to give something of value.

Additionally, although research suggest that that spiritual and symbolic forms of immortality serve similar and redundant functions (Dechesne et al., 2003; Florian & Mikulincer, 1998; Huang et al., 2013; Routledge & Arndt, 2008), future research on immortality priming could focus on testing whether, and/or to what extent, effects vary depending upon whether immortality primes relate strictly to spiritual vs. symbolic notions of immortality. Relatedly, future research could measure participants’ levels of religiosity, to assess to what extent such effects vary according to strength of religiosity.
vs. whether mere spiritual belief itself, however weak, is sufficient to obtain effects similar to those of the present study.

Furthermore, as recommended in the limitations section, the findings of the present study, especially those involving participants’ beliefs, warrant replication (Cesario, 2014; Kerr, 1998). This is not only because those findings were novel, but that their hypotheses were not formulated according to the classic H-D process (Kerr, 1998).

As mentioned, it is reasonable to assume that hypothesizing which deviates from the classic H-D process may increase the Type I error rate beyond that set by the statistical alpha level (Kerr, 1998). Therefore, it is reasonable to assume that those findings are at an increased risk of being illusory, compared to hypotheses derived a priori.

**Suggested Broader Implications**

If, indeed, the effect of the present study survive replication, it might suggest that they could apply to domains other than monetary donations, to extend to other “real world” scenarios whereby individuals are presented with an opportunity to be voluntary generous. Based on the interpretation of the effects, seen through the lens of the Meaning Maintenance Model, the conditions surrounding that opportunity may affect whether individuals will be either inclined or disinclined to behave generously. Specifically, to encourage generosity, it seems important not to disrupt individuals’ meaning-making frameworks, but—rather—that those frameworks ought to be in some way validated. As discussed, from the perspective of the Meaning Maintenance Model, such validation does not seem to create the need for individuals to affirm a sense of meaning though alternate, perhaps selfish, means (Heine et al., 2006) that might otherwise occur if their meaning-making frameworks are violated.
This has implications, for example, in the world of negotiation. It suggests that, to encourage generosity from one’s interlocutor, one ought to “meet them where they live,” so to speak. In other words, it would make sense for discussions to occur not in an environment foreign to the other person, given that such an environment might inadvertently include cues that might cause disruptions, however small, in that person’s meaning-making framework. At the extreme, such disruptions could include so-called culture shock. Based on the present study, such disruptions could be expected not to enhance individuals’ generosity, and might—instead—tend to cause them to manifest some form of selfishness. Noteworthy regarding this supposition is that it runs counter to popular notions of negotiation strategy which recommend that negotiations take place on one’s “home court” (Rainey, 2010). Presumably, by taking one’s negotiation counterpart out of their familiar surroundings, their comfort zone so-to-speak, one is better able to exert a subtle dominance that might influence the negotiations to one’s advantage.

Although further removed from the present study, the above example regarding negotiations could be further extended to speculate on the role of individuals’ meaning-making frameworks in the context of investigative interviewing. As mentioned, one prospective extension of the present study would be to test whether its finding generalize to other forms of voluntary giving, which could include voluntarily giving of valuable information. Consequently, it seems that, as with the above negotiation example, that interviewers ought to encourage interviewees’ generosity with respect to their giving of valuable informational by minimize disruptions to interviewees’ meaning-making frameworks. In keeping with that reasoning, an interesting complication arises with respect to the personal traits of the interviewer. Among published approaches to
investigative interviewing is the strategy to select an interviewer who is similar with respect to the background on the interviewee (i.e., to select an interviewer who might be more likely to be perceived by the interviewee as an in-group member on one or more characteristics): for example, with respect to race (Headquarters, 2006). However, such matching could, perhaps, be counterproductive insofar as interviewees are confronted with the need to make sense out of the fact that someone who appears “like them” is instead, at least to some extent, in an adversarial role. Whether or not such a disruption to interviewees’ meaning-making frameworks can be remedied is well beyond the reach of the present study. However, it might be that part of the rapport building phase, commonly integrated into investigative interviewing protocols, should include a component whereby interviewers make an effort to help interviewees make sense of the apparent anomaly regarding how they, the interviewers—who shares characteristics in common with the interviewee—ended up on the other side of the table so-to-speak (Headquarters, 2006).

However, it must be reiterated that the present findings should be neither relied upon, nor speculated upon, without replication (Cesario, 2014; Kerrr, 1998). As mentioned, only through replication can confidence be increased that the findings, especially those that were not hypothesized a priori, were not spurious (Cesario, 2014; Kerrr, 1998). Nevertheless, it may be hoped that the present study may play a part, however small, in advancing research on immortality priming.
Appendix A

Power analysis

**F tests** - ANCOVA: Fixed effects, main effects and interactions

**Analysis:** A priori: Compute required sample size

**Input:**
- Effect size $f = 0.25$
- $\alpha$ err prob $= 0.05$
- Power (1-$\beta$ err prob) $= 0.8$
- Numerator df $= 2$
- Number of groups $= 12$
- Number of covariates $= 1$

**Output:**
- Noncentrality parameter $\lambda = 9.875000$
- Critical $F = 3.058486$
- Denominator df $= 145$
- Total sample size $= 158$
- Actual power $= 0.8016375$
Appendix B

Example Drawing Entry Form Instructions

Drawing Entry Form Instructions

Thank you for your participation. The attached form will enter you in the drawing to win a $200 Amazon.com gift card. If you win, you will be notified through your SONA-associated email address at the conclusion of this study’s data collection.

As a reminder, our lab has partnered with the Ford Foundation to raise funds for their student of the month college scholarship fund. The student of the month for [April], 2013, is [Miguel Cruz]. If you win the $200 drawing, you have the option of donating any amount of that to the student of the month, by indicating the amount in the designated space on the attached entry form.

To preserve your privacy in this matter, please know that:

- You may indicate $0 if you wish, in which case no money will be issued to the student of the month. In all cases, that person will be unaware of your choice.
- If you win, the psychology department office will notify you by email, but they will not be aware of your decision to give any amount to the student of the month.
- Only the UNR accounting department will be aware of the dollar amounts you assign, but they will not be aware either of the reason for this drawing, or who decided upon the dollar amounts.
- Do not write your name on the outside of the attached envelope. After completing the attached form, simply seal it in the envelope, then deposit it in the drop box labeled “Drawing Drop Box” (near the door) when you exit.

(Turn over to complete the entry form.)
Instructions:
1. Write in the dollar amounts to be assigned to each of the persons in the spaces below.  
   *Total amount must equal $200.*

2. Detach the lower portion of this form.

3. Seal the lower part of this form in the provided envelope, then deposit it in the drop box labeled “Drawing Drop Box” (near the door).

---

Tear here. Remember to write your name in the blank on “Part A” below.

Part A.  
Issue the amount below to:

________________________

$________________________

Part B.  
Issue the amount below to:

__[Miguel Cruz]_____

$________________________
Appendix C

Horizontal and vertical collectivism scale

SELF-DESCRIPTION

We want to know if you strongly agree or disagree with some statements. If you strongly agree, enter a 7 in the blank space; if you strongly disagree, enter a 1 in that space; if you are unsure, enter a 4 next to the statement.

In short, use this key:

strongly disagree  1  2  3  4  5  6  7  strongly agree

1. My happiness depends very much on the happiness of those around me.
2. I would do what would please my family, even if I detested that activity.
3. I usually sacrifice my self-interest for the benefit for my group.
4. It is important for me to maintain harmony within my group.
5. I like sharing little things with my neighbors.
6. We should keep our aging parents with us at home.
7. The well-being of my co-workers is important to me.
8. If a relative were in financial difficulty, I would help within my means.
9. Children should feel honored if their parents receive a distinguished award.
10. If a co-worker gets a prize, I would feel proud.
11. To me, pleasure is spending time with others.
12. I would sacrifice an activity that I enjoy very much if my family did not approve of it.
13. Children should be taught to place duty before pleasure.
14. I feel good when I cooperate with others.
15. I hate to disagree with others in my group.
16. Before taking a major trip, I consult with most members of my family and many friends.
Appendix D

PANAS-X

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you have felt this way during the past week. Use the following scale to record your answers:

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>very slightly or not at all</td>
<td>a little</td>
<td>moderately</td>
<td>quite a bit</td>
<td>extremely</td>
</tr>
</tbody>
</table>

- ______ cheerful
- ______ sad
- ______ active
- ______ angry at self
- ______ disgusted
- ______ calm
- ______ guilty
- ______ enthusiastic
- ______ attentive
- ______ afraid
- ______ joyful
- ______ downhearted
- ______ bashful
- ______ tired
- ______ nervous
- ______ sheepish
- ______ sluggish
- ______ amazed
- ______ lonely
- ______ distressed
- ______ daring
- ______ shaky
- ______ sleepy
- ______ blameworthy
- ______ surprised
- ______ happy
- ______ excited
- ______ determined
- ______ strong
- ______ timid
- ______ hostile
- ______ frightened
- ______ scornful
- ______ alone
- ______ proud
- ______ astonished
- ______ relaxed
- ______ alert
- ______ jittery
- ______ interested
- ______ irritable
- ______ upset
- ______ lively
- ______ loathing
- ______ delighted
- ______ angry
- ______ ashamed
- ______ confident
- ______ inspired
- ______ bold
- ______ at ease
- ______ energetic
- ______ fearless
- ______ blue
- ______ scared
- ______ concentrating
- ______ disgusted
- ______ shy
- ______ drowsy
- ______ dissatisfied
- with self
- ______
### PANAS-X Scoring Key

#### Item Composition of the PANAS-X Scales

<table>
<thead>
<tr>
<th>Scale Description</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Negative Affect</td>
<td>afraid, scared, nervous, jittery, guilty, ashamed, irritable, hostile, upset, distressed</td>
</tr>
<tr>
<td>General Positive Affect</td>
<td>active, alert, attentive, enthusiastic, excited, inspired, interested, proud, strong, determined</td>
</tr>
<tr>
<td>Fear</td>
<td>afraid, scared, frightened, nervous, jittery, shaky</td>
</tr>
<tr>
<td>Sadness</td>
<td>sad, blue, downhearted, alone, lonely</td>
</tr>
<tr>
<td>Guilt</td>
<td>guilty, ashamed, blameworthy, angry at self, disgusted with self</td>
</tr>
<tr>
<td>Hostility</td>
<td>angry, irritable, hostile, scornful, disgusted, loathing</td>
</tr>
<tr>
<td>Shyness</td>
<td>shy, bashful, sheepish, timid</td>
</tr>
<tr>
<td>Fatigue</td>
<td>sleepy, tired, sluggish, drowsy</td>
</tr>
<tr>
<td>Joviality</td>
<td>cheerful, happy, joyful, delighted, enthusiastic, excited, lively, energetic</td>
</tr>
<tr>
<td>Self-Assurance</td>
<td>proud, strong, confident, bold, fearless, daring</td>
</tr>
<tr>
<td>Attentiveness</td>
<td>alert, attentive, concentrating, determined</td>
</tr>
<tr>
<td>Serenity</td>
<td>calm, relaxed, at ease</td>
</tr>
<tr>
<td>Surprise</td>
<td>surprised, amazed, astonished</td>
</tr>
</tbody>
</table>

To score a scale, sum the responses to the items in that scale.
Appendix E
Demographics/exit survey

1. During the related-unrelated word game, how many words did you see in each display?

2. Did you ever see more than two words flashed at a time?

3. If yes, was it the same word or a different word from the others you saw?

4. If you think it was a different word, list what you think it may have been.

5. If you had to assume that there was an additional word flashed, and had to guess, which of these words did you see (select one): endure, exasperation, elated, enforcement.

6. To fulfill our reporting requirements to the Ford Foundation, regarding the scholarship recipient to whom you could donate a portion of your prospective winnings from the upcoming drawing, what race was that scholarship recipient? If you’re unsure, please take your best guess.

   (Please select one.)
   a. American Indian
   b. Asian
   c. Black
   d. Latino
   e. Middle Eastern
   f. White

7. In an average month, what percent of college students do you feel have more money to spend on entertainment than you?

8. What is your age (in years)?

9. What is your biological sex? (Please circle.) Female Male
10. What is your race? (Please circle one.)
   a. American Indian
   b. Asian
   c. Black
   d. Latino
   e. Middle Eastern
   f. White
   g. Other (If other, please specify.) __________________

8. What is your religion? (Please circle one)
   a. Agnostic
   b. Atheist
   c. Buddhist
   d. Catholic
   e. Jewish
   f. Muslim
   g. Protestant
   h. Other (If other, please specify.) __________________
Appendix F

Recruitment post

Be a paid research participant

You are invited to participate in a study, on UNR’s campus, about how people tend to think about similar and contrasting ideas and how they form word associations. You will be asked to complete some questionnaires, and play a computer-based word association game that will help us to understand how people tend to make associations between ideas that are similar vs. different. Finally, you’ll be asked to complete a short exit survey, so we may collect demographic information and learn what participants think about the study. All of your answers will be kept confidential.

By participating, you will earn $20, and you will be entered into a drawing to win a $200 Amazon.com gift card.

The total time commitment for your participation is approximately 15-25 minutes.

Must be over the age of 18, and fluent in English.

If interested, e-mail: UNRwordstudy@gmail.com
Appendix G

Experimenter’s Script

Recall…

- If participants interrupt while you’re reading from the script, just kindly say “I apologize, but for standardization purposes, I’m supposed to go through this text as-written, but at the end of the study, I’ll be glad to answer your questions for you. I hope that’s okay.

- If participants ask you technical questions about the study, just kindly say, “I’m not really familiar with the technical aspects of this study. I basically just run the study on a day-to-day basis for the people who organized it.”

[These opening lines should be spoken from memory.]

Assistant: Hi, are you here for a study? Hi, I’m _____________; I’m the lab assistant. I just need a couple of minutes to get set up. Would you mind hanging out in the hallway for just a couple minutes? [Wait for response] Thanks a lot.

[Launch appropriate MediaLab file, prep appropriate donation form, & read the rest from the script.]

If you’d like to follow me, we’ll get started.

[In the lab, gesture to a chair in the computer lab, say...] “Feel free to have a seat.”

[Asst. takes a seat facing the participant.]

Thanks for coming in today.

Before we begin the actual study, I’d like to start by telling you what this study is about, and about the tasks I’ll be asking you to perform. But my memory isn’t perfect; so just so you know, I’ll be reading from a script.

[The following should be read from this script: reading in a personable way, and looking to the participant from time-to-time, and as naturally as possible.]

This study is designed to help us pretest materials for future studies of people's ability to perceive relationships between words. You’ll be asked to complete a survey about yourself, then you’ll play a word association game on the computer. For each trial of the word-association game, two words will be flashed on the screen: one right after the other,
and you’ll indicate whether the two words are closely related by pressing one key if you think they’re related, or another key if you think they’re unrelated.

For example, if you see the words “rose” and “flower,” then you should press the “R” key to indicate that they’re related, but if you see words such as “sneaker” and “fajita,” then you should press the “U” key to indicate that they’re unrelated. When you get to that part of the study, you’ll see instructions that remind you of what keys to press.

Then, you’ll complete a fill-in-the-blank word task, and finally, you’ll be asked to complete an exit survey.

As promised when you signed up for this study, by participating, you’ll also be entered in a drawing to win a $200 Amazon gift card. Just so you know, you can discontinue your participation at any time, and if you do, you’ll still be entered in the drawing. If you wish to discontinue at any time, you can just let me know.

(Avoid eye contact during the following paragraph.)
Additionally, our research lab is partnering with the Ford Foundation to raise money for their student of the month scholarship fund. At the end of your participation today, you’ll have an option to decide how much, if any, of your potential winnings from the drawing you wish to donate to that charity.

[Hand information sheet to participant]
Okay, here’s an info sheet. You don’t have to sign it, and it says in writing what I just told you. It’s just for your records.

So, the first thing I’m going to ask you to do is fill out a brief questionnaire, on the computer, that asks about yourself. Just so you know, all your answers on this survey are completely confidential; so, you won’t be asked to input your name anywhere.

Also, I know the monitor might be set a little higher than you’re used to, but that’s so you won’t have any glare on the screen that could interfere with your performance on the tasks.

When you’re finished, just let me know that you’re done. I’ll just be sitting out in the hallway.”

[When the participant notifies you of their completion, continue below.]
Ready for the exit survey?

Did you get a chance to fill out the entry form?

[If not, lift the cabinet drawer and say, “It’s right in here. So, go ahead and fill that out, and just let me know when you’re done with that.]  
[On the survey, enter password: ` ` ]

When you’re done, just let me know. I’ll be out in the hallway.

[When the participant notifies you of their completion, continue below.]

Okay, mind if I get your feedback about the study?

[Continue to debriefing script.]

Debriefing Script

**Assistant: [The following can be read from this script.]** I just have four questions for you......

- What did you think of the study in general?

[Wait for participant’s responses after every question.]

- Sometimes we have technical difficulties with the word-association game. Did the word-association game load for you?

- We know that the word association game can seem a bit fast-paced, but other than that, did anything seem weird about it?

  [ Only if participant answers affirmatively, assistant asks the following.]  
  “What seemed weird?” “When did that thought come to mind?” and “How often did such thoughts come to mind?”

- Did the computer give you any pop-up error messages or warnings?
Assistant: As you know, this is a word association study, but that doesn’t really tell you much about it. We don’t tell participants all about the theories involved up front, because we don’t want to influence your natural responses. But when we’re done collecting data, we’d be glad to send you an email that tells you the background of the study and what we expect to find.

It’s entirely your choice; you can opt in or opt out. If you opt in, I’ll ask you to write your email on the top, scrap part of the drawing entry form. What would you prefer?

[AFTER ACCOMMODATING THEIR PREFERENCE, CONTINUE BELOW]

Okay, if you have any questions or concerns between now and then, about this study, you can contact the investigators who are listed on your information sheet.

The last thing I need you to do is sign a receipt for your payment.

[HAVE PARTICIPANTS SIGN RECEIPT BOOK.]

Assistant: Okay, thanks again, and good luck with the rest of your semester.

[ON THE SURVEY, ENTER PASSWORD “==” THEN COMPLETE THE FINAL SECTIONS OF IT.]
Appendix H

Information Sheet

UNIVERSITY OF NEVADA, RENO SOCIAL BEHAVIORAL INSTITUTIONAL REVIEW BOARD
INFORMATION SHEET REGARDING PARTICIPATION IN A RESEARCH STUDY

TITLE OF STUDY: Word association study
INVESTIGATOR(S): Deborah Davis, PhD (775)682-8682 & Michael J. Williams (775)784-6225
PROTOCOL #: .
SPONSOR: n/a

PURPOSE
You are being asked to participate in a research study. This study is about how people tend to think about similar and contrasting ideas and how they form word associations.

PARTICIPANTS
You are being asked to participate because you are an adult, English-speaking, UNR college student. We expect approximately 211 UNR students to complete this study.

PROCEDURES
If you agree to participate in this research study, you will be asked to complete some questionnaires, and play a computer-based word association game.

First, you’ll be asked to fill out a questionnaire that includes questions that may give us information about your feelings about both yourself and other people, and the way these may affect how you make associations between ideas that are similar vs. different.

Finally, you’ll be asked to complete a short exit survey, so we may collect demographic information and learn what participants think about the study.

The total time commitment for your participation is approximately 15-25 minutes.

If you do not/cannot participate in the study according to the instructions that you will be given, you may conclude your participation without penalty by informing the lab assistant that you wish to leave.

DISCOMFORTS, INCONVENIENCES, AND/OR RISKS
It is believed that there is only minimal risk to you for participating in this study. Although we do not expect it, you might feel mild stress in playing the game, completing the questionnaires, but any discomfort shouldn’t last long.

Of course, it is impossible to anticipate all possible risks associated with this study. Therefore, there may be unknown or unforeseen risks associated with your participation.
in this study. To minimize any risk to you, at any time you may discontinue your participation in the study by closing your web browser. If you discontinue your participation in the study, you will not be penalized, and will still receive full credit for your participation.

BENEFITS
There may be no direct benefits to you as a participant in this study. However, your participation may improve your understanding of social science research. Additionally, your participation may help to advance scientific knowledge, which could benefit society.

CONFIDENTIALITY
Your identity will be protected to the extent allowed by law. You will not be asked to put your name on any of the questionnaires, which means there will not be any way to link your name with your responses. Your answers will be kept confidential and you will not be personally identified in any reports or publications that may result from this study.

The Department of Health and Human Service (HHS), other federal agencies as necessary, and the University of Nevada, Reno Social Behavioral Institutional Review Board may inspect your study records. All data will be stored in a locked research laboratory room for five years, and then destroyed.

COSTS/COMPENSATION
There will be no cost to you for participating, and you will earn $20 for participating. Additionally, if you are eligible to earn research credits to count toward your participating courses, you will earn 2 credits toward your undergraduate coursework this semester by participating in this study. Also, your name will be entered in a drawing for a chance to win a $200 Amazon gift card. The random drawing will be conducted at the conclusion of this study’s data collection. If you win, you will be notified through your SONA-associated email address. When the drawing is conducted, the winning participant will be contacted via their SONA-associated email address. The winner message will have one month to reply, otherwise their winnings will be forfeit. If the winner does not reply within one month, a new winner will be chosen at random, and the 1st winner will notified that their winnings have been forfeited.

RIGHT TO REFUSE OR WITHDRAW
You may refuse to participate or withdraw from the study at any time. If you withdraw, you will still receive one SPRCs. If the study design or use of the data is to be changed, you will be so informed and your consent re-obtained. You will be told of any significant new findings developed during the course of this study, which may relate to your willingness to continue participation.

QUESTIONS
If you have questions about this study, please contact Deborah Davis, PhD at (775)682-8682 and/or Michael J. Williams at (775) 682-8660.
You may ask about your rights as a research subject or you may report (anonymously if you so choose) any comments, concerns, or complaints to the University of Nevada, Reno Social Behavioral Institutional Review Board, telephone number (775) 327-2368, or by addressing a letter to the Chair of the Board, c/o UNR Office of Human Research Protection, 205 Ross Hall / 331, University of Nevada, Reno, Reno, Nevada, 89557.
Appendix I
Full Debriefing Statement

Dear esteemed research participant:

You are receiving this message, because you participated in a study at UNR entitled the "Word Association Study," and because you requested to be fully debriefed about that study upon its conclusion. In that study, we weren’t able to tell you everything about it up-front, because we didn’t want to influence your natural responses to out questions and the lab environment. Now that the data collection has concluded, we’re glad to tell what the study was about.

Background on the study
Previous research has found that when individuals think about threats to their existence, they tend to become relatively antisocial toward outgroup members (i.e., those who hold different values, or who are of different ethnic backgrounds from themselves).

Purpose of the study purpose
We intend to test whether the reverse is true. Specifically, we intend to test whether comforting individuals about their mortal existence will tend to cause them to be as prosocial toward outgroup members as they otherwise would be toward ingroup members.

Anticipated research findings
We expect that participants who have been primed with neutral or non-existential positive words will naturally favor donating part of their prospective winnings to others who are of a race similar to their own. However, we expect that participants who have been primed with existentially comforting words will favor those of different races just as much as those of their own race.

Scientific/Scholarly rationale
Over two decades of research on so-called "terror management theory" has found that when individuals are reminded of their own mortality, that they tend to increase their favoritism for ingroup members, and be less favorable toward outgroup members (e.g., those of a different race/ethnicity). However, it is not known whether the reverse of that phenomenon is true. Specifically, it is unknown whether comforting individuals about their mortal existence will tend to cause them to be as prosocial toward outgroup members as they otherwise would be toward ingroup members (i.e., toward those of a similar race/ethnicity).

However, previous research has shown that other kinds of feelings of security (e.g., feelings of security in one's close personal relationships) can reduce ingroup favoritism. Therefore, there is reason to believe that other feelings of security (i.e., existential security, in the form of thoughts about the possibility of immortality/an afterlife), will
also help to reduce ingroup favoritism. This study was the first to test whether that tends to be the case. Furthermore, given that thoughts of mortality can be effectively induced subliminally (i.e., without a person’s conscious awareness), there was reason to believe that we could effectively bring to participants’ minds thoughts of immortality by quickly showing participants words related to immortality. This is called subliminal priming.

The purpose of subliminal priming was to prevent participants from accidentally thinking about mortality, when we wish them to think about immortality. For example, if we consciously asked participants to think about the possibility of an afterlife, they might inadvertently think about the inevitability of dying. By subliminally priming participants regarding immortality, we expect to avoid inadvertently causing participants to think about mortality.

Finally, contrary to what one might assume, research has shown that individuals who have highly "collectivistic" personalities tend to favor their ingroups more than those who are highly "individualistic" Collectivism is the extent to which someone defines themselves by their group memberships, and the degree to which they put the interests of the group above their own. Therefore, we expect that the bias-reducing effect of existentially-comforting thoughts will be more pronounced for those who are relatively collectivistic (because, in essence, collectivists have more room for improvement regarding reducing their ingroup favoritism than individualists).

The nature of the incomplete disclosures
First, participants were not told that they will be subliminally presented with emotionally positive or neutral words. If participants knew in advance that they might be shown those words, they might have felt or reacted differently than if they are unaware of that. In short, we needed to obtain participants unbiased, natural responses throughout the study for the results to be valid. Considering that none of the words were emotionally negative or unpleasant, there is no reason to expect that participants would feel discomfort of any kind.

Second, participants were not told in advance that they would be offered the chance to donate a portion of their prospective winnings from the drawing, and that the name of the would-be recipient (a fictitious name) would vary by race. If participants expected either of those aspects of the study, they might be influenced to act in ways that they thought the experimenter would approve of. Were participants to do so, we may find no differences between our experimental conditions, insofar as participants would probably tend to be unnaturally generous regarding their donation.

Third, on the information sheet given to participants, the benefits to science were stated in intentionally vague language to obscure the study's purpose. That was necessary because, if participants were aware that the study is exploring the conditions under which they might be especially charitable to outgroup members, it might unnaturally affect the amount that they would opt to donate. Once again, we needed to obtain participants' unbiased, natural responses throughout the study for the results to be valid.
We needed to wait until the data collection was complete, because one of our previous studies that had a full-disclosure debriefing during the data collection phase, some participants "spreading the word" about the underlying premise of our study. By the end of the semester, approximately 40% of our participants knew the details of our study, which prevented them from responding naturally during the study. Obviously, we cannot afford to run a study in which we must throw out 40% of the data. Such leaked information serves no one. It cheats participants of a genuine experience of social science experience; it wastes the time of study personnel, and it does a disservice both to the scientific community and to the general population whom we hope to serve through this research.

Closing words
We hope that you enjoyed your participation in this study, and that you feel good about meaningfully contributing to important and interesting scientific work, both in our nation and in our community. You have our deep appreciation for your participation in this project. We hope that your participation in this study enhanced your interest in the social sciences.
Appendix J

Table 1.

Tests of Effects of In-group/Out-group Status of the Donation Recipient and Participants’ Spiritual Beliefs on the Likelihood of Cases Being Excluded From the Analyses.

<table>
<thead>
<tr>
<th></th>
<th>Likelihood Ratio</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>In-group status</td>
<td>8.63</td>
<td>1</td>
<td>.00</td>
</tr>
<tr>
<td>Spiritual belief</td>
<td>.36</td>
<td>1</td>
<td>.55</td>
</tr>
<tr>
<td>In-group status * Spiritual belief</td>
<td>.01</td>
<td>1</td>
<td>.94</td>
</tr>
</tbody>
</table>


Table 2.

Tests of Model Effects

<table>
<thead>
<tr>
<th>Effect</th>
<th>Likelihood Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immortality priming</td>
<td>.50</td>
</tr>
<tr>
<td>In-group status</td>
<td>3.15</td>
</tr>
<tr>
<td>Spiritual belief</td>
<td>1.98</td>
</tr>
<tr>
<td>Collectivism</td>
<td>6.31</td>
</tr>
<tr>
<td>Immortality priming * In-group status</td>
<td>3.07</td>
</tr>
<tr>
<td>Immortality priming * Spiritual belief</td>
<td>16.62</td>
</tr>
<tr>
<td>Immortality priming * Collectivism</td>
<td>2.80</td>
</tr>
<tr>
<td>In-group status * Spiritual belief</td>
<td>3.84</td>
</tr>
<tr>
<td>In-group status * Collectivism</td>
<td>4.13</td>
</tr>
<tr>
<td>Spiritual belief * Collectivism</td>
<td>4.05</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Spiritual belief</td>
<td>.29</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Collectivism</td>
<td>.62</td>
</tr>
<tr>
<td>Immortality priming * Spiritual belief * Collectivism</td>
<td>2.89</td>
</tr>
<tr>
<td>In-group status * Spiritual belief * Collectivism</td>
<td>1.56</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Spiritual belief * Collectivism</td>
<td>2.33</td>
</tr>
</tbody>
</table>

Dependent variable: Dollars donated.
### Appendix L

Table 3.

**Median and mean donations from the interaction of priming condition, in-group/out-group status of recipient, and participants’ spiritual beliefs.**

<table>
<thead>
<tr>
<th>Priming condition</th>
<th>Recipient</th>
<th>Participant Spiritual Belief</th>
<th>Mdn</th>
<th>$M^3$</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral affect</td>
<td>Out group</td>
<td>Unbelievers</td>
<td>50.0</td>
<td>61.25</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>20.0</td>
<td>33.91</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Unbelievers</td>
<td>10.0</td>
<td>25.63</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>25.0</td>
<td>38.0</td>
<td>15</td>
</tr>
<tr>
<td>Pleasant affect</td>
<td>Out group</td>
<td>Unbelievers</td>
<td>25.0</td>
<td>49.44</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>20.0</td>
<td>33.0</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Unbelievers</td>
<td>0.0</td>
<td>41.67</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>27.5</td>
<td>39.5</td>
<td>20</td>
</tr>
<tr>
<td>Immortality</td>
<td>Out group</td>
<td>Unbelievers</td>
<td>15.0</td>
<td>49.64</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>50.0</td>
<td>72.92</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Unbelievers</td>
<td>0.0</td>
<td>4.5</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Believers</td>
<td>50.0</td>
<td>71.84</td>
<td>19</td>
</tr>
</tbody>
</table>

---

3 Given that the distribution of the dependent variable was not normally distributed, the median (vs. the mean) is the more appropriate measure of central tendency. The mean is displayed here merely to provide additional information regarding the shapes of the data displayed in this table.
Table 4. Tests of model effects, including those who failed the race-related manipulation check

<table>
<thead>
<tr>
<th>Effect</th>
<th>Likelihood Ratio</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immortality priming</td>
<td>1.01</td>
<td>2</td>
<td>.60</td>
</tr>
<tr>
<td>In-group status</td>
<td>3.72</td>
<td>1</td>
<td>.05</td>
</tr>
<tr>
<td>Spiritual belief</td>
<td>6.54</td>
<td>1</td>
<td>.01</td>
</tr>
<tr>
<td>Collectivism</td>
<td>4.83</td>
<td>1</td>
<td>.03</td>
</tr>
<tr>
<td>Immortality priming * In-group status</td>
<td>2.53</td>
<td>2</td>
<td>.28</td>
</tr>
<tr>
<td>Immortality priming * Spiritual belief</td>
<td>13.59</td>
<td>2</td>
<td>.00</td>
</tr>
<tr>
<td>Immortality priming * Collectivism</td>
<td>2.77</td>
<td>2</td>
<td>.25</td>
</tr>
<tr>
<td>In-group status * Spiritual belief</td>
<td>4.04</td>
<td>1</td>
<td>.04</td>
</tr>
<tr>
<td>In-group status * Collectivism</td>
<td>4.64</td>
<td>1</td>
<td>.03</td>
</tr>
<tr>
<td>Spiritual belief * Collectivism</td>
<td>2.13</td>
<td>1</td>
<td>.14</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Spiritual belief</td>
<td>.07</td>
<td>2</td>
<td>.97</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Collectivism</td>
<td>1.89</td>
<td>2</td>
<td>.39</td>
</tr>
<tr>
<td>Immortality priming * Spiritual belief * Collectivism</td>
<td>2.64</td>
<td>2</td>
<td>.27</td>
</tr>
<tr>
<td>In-group status * Spiritual belief * Collectivism</td>
<td>2.10</td>
<td>1</td>
<td>.15</td>
</tr>
<tr>
<td>Immortality priming * In-group status * Spiritual belief * Collectivism</td>
<td>1.06</td>
<td>2</td>
<td>.59</td>
</tr>
</tbody>
</table>

*Dependent variable: Dollars donated.*
Appendix N

Table 5.

Collectivism Scale Reliability Statistics

<table>
<thead>
<tr>
<th>Cronbach's Alpha</th>
<th>Cronbach's Alpha Based on Standardized Items</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.739</td>
<td>.754</td>
<td>16</td>
</tr>
</tbody>
</table>
### Collectivism Item-Total Statistics

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Scale Mean if Item Deleted</th>
<th>Scale Variance if Item Deleted</th>
<th>Corrected Item-Total Correlation</th>
<th>Squared Multiple Correlation</th>
<th>Cronbach's Alpha if Item Deleted</th>
</tr>
</thead>
<tbody>
<tr>
<td>The well-being of my co-workers is important to me.</td>
<td>72.99</td>
<td>87.29</td>
<td>.39</td>
<td>.37</td>
<td>.72</td>
</tr>
<tr>
<td>If a co-worker gets a prize, I would feel proud.</td>
<td>73.50</td>
<td>87.71</td>
<td>.25</td>
<td>.36</td>
<td>.73</td>
</tr>
<tr>
<td>If a relative were in financial difficulty, I would help within my means.</td>
<td>72.99</td>
<td>85.74</td>
<td>.37</td>
<td>.25</td>
<td>.72</td>
</tr>
<tr>
<td>It is important for me to maintain harmony within my group.</td>
<td>73.00</td>
<td>84.60</td>
<td>.47</td>
<td>.33</td>
<td>.71</td>
</tr>
<tr>
<td>I like sharing little things with my neighbors.</td>
<td>73.82</td>
<td>84.26</td>
<td>.33</td>
<td>.29</td>
<td>.73</td>
</tr>
<tr>
<td>Statement</td>
<td>Score 1</td>
<td>Score 2</td>
<td>Score 3</td>
<td>Score 4</td>
<td>Score 5</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>I feel good when I cooperate with others.</td>
<td>72.89</td>
<td>84.76</td>
<td>.47</td>
<td>.43</td>
<td>.72</td>
</tr>
<tr>
<td>My happiness depends very much on the happiness of those around me.</td>
<td>73.86</td>
<td>84.29</td>
<td>.29</td>
<td>.32</td>
<td>.73</td>
</tr>
<tr>
<td>To me, pleasure is spending time with others.</td>
<td>73.32</td>
<td>85.96</td>
<td>.30</td>
<td>.23</td>
<td>.73</td>
</tr>
<tr>
<td>I would sacrifice an activity that I enjoy very much if my family did not approve of it.</td>
<td>75.31</td>
<td>79.69</td>
<td>.39</td>
<td>.31</td>
<td>.72</td>
</tr>
<tr>
<td>I would do what would please my family, even if I detested that activity.</td>
<td>75.22</td>
<td>78.31</td>
<td>.45</td>
<td>.32</td>
<td>.71</td>
</tr>
</tbody>
</table>
Before taking a major trip, I consult with most members of my family and many friends.

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean Score</th>
<th>SD 1</th>
<th>SD 2</th>
<th>SD 3</th>
<th>SD 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>I usually sacrifice my self-interest for the benefit for my group.</td>
<td>74.16</td>
<td>78.77</td>
<td>.55</td>
<td>.41</td>
<td>.70</td>
</tr>
<tr>
<td>Children should be taught to place duty before pleasure.</td>
<td>74.07</td>
<td>88.21</td>
<td>.16</td>
<td>.18</td>
<td>.74</td>
</tr>
<tr>
<td>I hate to disagree with others in my group.</td>
<td>75.00</td>
<td>83.19</td>
<td>.29</td>
<td>.22</td>
<td>.73</td>
</tr>
<tr>
<td>We should keep our aging parents with us at home.</td>
<td>74.15</td>
<td>85.67</td>
<td>.26</td>
<td>.20</td>
<td>.73</td>
</tr>
<tr>
<td>I often do &quot;my own thing.&quot;</td>
<td>73.00</td>
<td>87.59</td>
<td>.27</td>
<td>.30</td>
<td>.73</td>
</tr>
</tbody>
</table>
Appendix P

Table 7.

Tests of subliminal primes on mood/affect measure (PANAS-X)

Items tested via parametric (ANOVA) method

<table>
<thead>
<tr>
<th>Mood item</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive Affect</td>
<td>.87</td>
<td>.42</td>
</tr>
<tr>
<td>Negative Affect</td>
<td>.09</td>
<td>.91</td>
</tr>
<tr>
<td>(Inverse transformed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td>.03</td>
<td>.98</td>
</tr>
<tr>
<td>(Inverse transformed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attentiveness</td>
<td>.52</td>
<td>.60</td>
</tr>
<tr>
<td>Shyness</td>
<td>.04</td>
<td>.97</td>
</tr>
<tr>
<td>(Log10 transformed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serenity</td>
<td>.04</td>
<td>.96</td>
</tr>
</tbody>
</table>

Items tested via non-parametric (Kruskal-Wallis) method

<table>
<thead>
<tr>
<th>Mood item</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hostility</td>
<td>3.08</td>
<td>.21</td>
</tr>
<tr>
<td>Guilt</td>
<td>.27</td>
<td>.88</td>
</tr>
<tr>
<td>Sadness</td>
<td>2.39</td>
<td>.30</td>
</tr>
<tr>
<td>Joviality</td>
<td>.91</td>
<td>.64</td>
</tr>
<tr>
<td>Fatigue</td>
<td>.13</td>
<td>.94</td>
</tr>
<tr>
<td>Surprise</td>
<td>.12</td>
<td>.94</td>
</tr>
<tr>
<td>Self-assurance</td>
<td>2.57</td>
<td>.28</td>
</tr>
</tbody>
</table>
Appendix Q

Figure 1. Distribution of Dependent Variable Across Conditions

Distribution of Dependent Variable Across Conditions

Mean = 44.08
Std Dev. = 51.133
N = 161

Normal curve
Appendix R

Figure 2. Distribution of Dependent Variable: Immortality priming condition
Appendix S

Figure 3. Distribution of Dependent Variable: Affectively-positive priming control condition

Frequency

Dollars Donated

Mean = 39.85
Std. Dev. = 48.026
N = 52

Normal curve
Figure 4. Distribution of Dependent Variable: Affectively-neutral priming control condition

Mean = 37.87
Std. Dev. = 46.017
N = 54

Normal curve
Figure 5. Odds of Donating More Than Neutral Affect Condition
Figure 6. Donors’ beliefs, and Status of Status of Donation Recipient, on Odds of Increased Donation

![Bar chart showing odds for in-group and out-group recipients for spiritual unbelievers and believers with sample sizes n=27, n=31, n=54, n=49.](chart.png)
Appendix W

Figure 7. Association between collectivism and probability of donation.

* $b = .04$

*p < .01*
Figure 8. Association between collectivism and probability of donation to in-group vs. out-group.
Appendix Y

Figure 9. Association between collectivism and probability of donation between spiritual believers vs. unbelievers.
Appendix Z

Table 8.

Median and mean donations from the interaction of priming condition, in-group/out-group status of recipient, and participants’ level of collectivism.

<table>
<thead>
<tr>
<th>Priming condition</th>
<th>Recipient</th>
<th>Level of Collectivism</th>
<th>Mdn</th>
<th>M̄</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral affect</td>
<td>Out group</td>
<td>Low</td>
<td>20.0</td>
<td>37.94</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>45.0</td>
<td>44.64</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Low</td>
<td>5.0</td>
<td>13.75</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>50.0</td>
<td>55.45</td>
<td>11</td>
</tr>
<tr>
<td>Pleasant affect</td>
<td>Out group</td>
<td>Low</td>
<td>20.0</td>
<td>47.45</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>20.0</td>
<td>32.08</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Low</td>
<td>40.0</td>
<td>55.31</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>20.0</td>
<td>21.54</td>
<td>13</td>
</tr>
<tr>
<td>Immortality</td>
<td>Out group</td>
<td>Low</td>
<td>100.0</td>
<td>75.42</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>25.0</td>
<td>47.5</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>In-group</td>
<td>Low</td>
<td>10</td>
<td>33.46</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High</td>
<td>50</td>
<td>60.94</td>
<td>16</td>
</tr>
</tbody>
</table>

Given that the distribution of the dependent variable was not normally distributed, the median (vs. the mean) is the more appropriate measure of central tendency. The mean is displayed here merely to provide additional information regarding the shapes of the data displayed in this table.


