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Interdependent Self-Construals Mitigate the Fear of Death and Augment the Willingness to Become a Martyr

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Humans are motivated by a quest for significance that is threatened by the inevitability of death. However, individuals with interdependent self-construals, self-representations that reflect embeddedness with and connection to others, are able to extend themselves through time and space through their linkage to a larger social group. The present set of 5 experiments tested the hypotheses that individuals primed with an interdependent self-construal would fear death less and would be more willing to face harm for the sake of the group than individuals with an independent self-construal, that is, self-representations that reflect autonomy and independence from others ("I have self-control"). The results show that interdependent self-construals, compared to independent self-construals, attenuate death anxiety, reduce the avoidance of death, increase the approach to death-related stimuli, induce a greater willingness to become a martyr, and induce a greater willingness to sacrifice the self for other members of important groups.

Keywords: self-construal, quest for significance, martyrdom, self-sacrifice, death anxiety

The quest for personal significance has been hailed as a fundamental human motivation by influential social scientists (e.g., Becker, 1962; Frankl, 1946/2000; Maslow, 1943). Maslow (1943), for example, placed self-actualization concerns at the apex of his motivational hierarchy. According to Frankl (1946/2000), self-actualization is encapsulated in, and attained through, attempts to serve a cause higher than the self. In the field of positive psychology, researchers have found that the quest for meaning is central to authentic happiness and that it can be attained by attaching oneself to a larger cause (Seligman, 2002). Becker (1973) and terror management theorists (e.g., Greenberg, Solomon, Pyszczynski, 1997) noted that the ultimate threat to personal meaning is death, the prospect of non-existence and hence utter insignificance. To ward off the threat of personal insignificance, individuals are motivated to attach themselves to social groups, to defend the groups' worldview (that lend members significance), and to act in service of their groups.

A person who views the self as interdependent with others in the social group should experience less death anxiety than should a person who views the self independently because identification with a group fortifies one's sense of self, hence boosting one's perceived significance. While a person's life may be temporary, a group can live on indefinitely. Through collective identification, a person is able to extend the self through space and time (Castano & Dechesne, 2005). The more important group membership becomes, the more important the group's *existence* should become relative to the individual's existence. Therefore, our first hypothesis is that thinking of the self *interdependently*, as embedded in a group, as opposed to conceiving of the self *independently*, as an unattached agent, should mitigate fears of death.

Attachment to a group may be strengthened by the individual's willingness to act on the group's behalf and to defend it against its enemies. Especially, the readiness to take personal risk and sacrifice one's personal concerns on the group's behalf may be richly rewarded by recognition and appreciation by the group, promising one a place in the group's collective memory, and in this sense a kind of immortality (Kruglanski, Chen, Dechesne, Fishman, & Orehek, 2009). Consistent with this idea is the notion offered by the philosopher Daniel Dennett (2002), who stated that unlike other species, humans are willing to engage in "the subordination of . . . genetic interests to other interests." Based on these considerations, our second hypothesis is that interdependent self-construal will increase one's willingness to become a martyr and

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the readiness to engage in altruistic suicide (Durkheim, 1897/1997) than an independent self-construal.

In summary, the relation between the interdependent (vs. the independent) self-construal, fear of death and the readiness to sacrifice was explored in five experimental studies. Two complementary hypotheses were investigated: (1) an interdependent self-construal would lead to lower death anxiety than an independent self-construal, and (2) an interdependent self-construal would lead to a greater willingness to sacrifice the self for others than an independent self-construal.

Preliminary Empirical Support

Preliminary support for our hypotheses can be gleaned from research on social identity theory (Tajfel & Turner, 1986), self-categorization theory (Turner, 1985), need for closure theory (Kruglanski & Webster, 1996), terror management theory (Greenberg et al., 1997), and identity fusion theory (Swann, Gómez, Seyle, Morales, & Huici, 2009). Each theory predicts that insecurity aroused by death anxiety will lead to greater identification with the in-group, and that individuals will be more willing to sacrifice the self for the sake of the group as group identifications becomes stronger. Importantly, though, while each of these approaches to the possible link between group identification and death are generally supportive of our hypotheses, they stop short of testing it directly. In this section, we review this evidence and explicate its limitations for the present hypotheses.

According to social identity and self-categorization theories, in-group identifications constitute a central aspect of self-understanding with strong in-group identifications fostering clearly defined and positively valenced perception of the self. Therefore, experience of insecurity should increase the tendency to identify with collectives in order to reduce aversive uncertainty (Hogg, 2000). Preliminary evidence for these notions can be gleaned from laboratory studies which have found that inductions of uncertainty increase identification with cohesive groups (Hogg, Sherman, Dierselhuis, Maitner, & Moffitt, 2007; Reid & Hogg, 2005). Similarly, theory related to the need for closure (Kruglanski & Webster, 1996) suggests that feelings of insecurity should generate a motivation to reduce uncertainty (i.e., reach closure). When the need for closure is aroused, a tendency toward "group centrism" has emerged (Kruglanski, Pierro, Mannetti, & De Grada, 2006), which includes identification with the in-group, striving for consensus, and derogation of out-groups. However, neither of these theories previously postulated a link between group identification and fear of death reduction specifically.

According to terror management theory, the insecurity aroused when mortality is made salient should lead to in-group identification and defense of one's worldview. Terror management research has consistently found that the threat of death increases group identification and worldview defense (e.g., Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994; Greenberg, Simon, Porteus, Pyszczynski, & Solomon, 1995; Greenberg, Simon, Pyszczynski, Solomon, & Chatel, 1992; Greenberg et al., 1997; McGregor et al., 1998; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989). Specifically, individuals from out-groups with worldviews that differed from the participant were derogated when mortality was made salient (vs. control), but participants who were either a member of the in-group *or* who shared the participant's worldview

(or both) were evaluated favorably (See & Petty, 2006). Extending this research to the realm of martyrdom, among Iranian participants mortality salience manipulations have been found to increase the favorability of perceptions of other people who supported martyrdom on behalf of the perceiver's in-group and to increase participants' willingness to join the martyr's cause (Pyszczynski et al., 2006). Among British participants, mortality salience manipulations have been found to increase the willingness to self-sacrifice for the sake of their nation as long as an alternative means of symbolic immortality was not provided (Routledge & Arndt, 2008).

Testing the notion that the effects of mortality salience can be buffered by close personal relationships, Mikulincer and colleagues have consistently found that *stable relationships* can mitigate the fear of death (e.g., Mikulincer, Florian, Birnbaum, & Malishkevich, 2002; Mikulincer, Florian, & Hirschberger, 2003). This work detailed specific conditions that must be met in order for significant others to reduce death anxiety. For example, Mikulincer, Florian, and Tolmacz (1990) found that individuals with avoidant attachment styles scored higher on Templer's (1970) death anxiety measure than participants with secure or ambivalent attachment styles. Another way close relationships have been investigated in studies on death anxiety was to have participants imagine being separated from significant others. Specifically, Mikulincer et al. (2002) wrote,

> the experience of separation per se does not necessarily lead to death awareness. Mainly, when this separation implies a sustained or irreparable disruption of a close relationship, the individual may feel defenseless in denying the terror of his or her death and concerns about death may become more accessible. (p. 296)

More closely tied to the current hypotheses, researchers have found that individual differences in perceptions of symbolic immortality are negatively correlated with death anxiety (Florian & Mikulincer, 1998). Research has also found that intrinsic religiosity, which includes the internalization of religious teachings such as the belief in the afterlife, mitigates or alters the effects of mortality salience manipulations (Golec de Zavala, Cichocka, Orehek, & Abdollahi, 2012; Jonas & Fischer, 2006; Norenzayan, Dar-Nimrod, Hansen, & Proulx, 2009).

In yet another line of research, researchers have investigated the role of identity fusion in willingness to fight and die for the group. As predicted, participants whose identities were strongly fused (vs. weakly fused) consistently reported greater willingness to kill and to die for the sake of the group (Swann, Gómez, Dovidio, Hart, & Jetten, 2010). Preliminary evidence suggests that it is physiological arousal that augments the tendencies of highly fused participants to do so (Swann, Gómez, Huici, Morales, & Hixon, 2010).

The Present Research

The research reviewed above, generated by influential psychological theories and conducted by diverse research groups, has consistently found that in-group identification increases in times of threat and that it then promotes the belief that self-sacrifice and martyrdom for the group's cause are laudable and worthy. While this work is generally consistent with our hypotheses, its ability to inform our hypotheses is limited in two ways. First, in reliance on stable individual differences on the relevant dimensions (e.g., the

degree of fusion with one's group, one's attachment style) such research has been mainly correlational; as such it does not address the hypothesized causal relation between interdependent self-construal and the reduction in death anxiety. Second, whereas previous research has typically focused on fusion with and defense of a *specific* social group, the current theory suggests that a *general orientation* toward interdependent self-construal is capable of reducing death anxiety. To our knowledge, the link between interdependent self-construal in its general sense and death-related thoughts has not yet been investigated.

Perhaps the research that has come closest to the present concerns is Mikulincer and colleagues' work on attachment styles and death anxiety (Mikulincer et al., 1990, 2002). Yet, these authors' concerns were with attachment styles that presumably cannot be altered via induction of interdependent or independent self-construals: Manipulations of interdependent self-construals would not be expected to reduce ambivalent attachment styles specifically, nor do they imply "a sustained or irreparable disruption of a close relationship." In short, the general linkage between interdependent self-construal and death anxiety has not been examined thus far; hence it merits an investigation in its own right.

Accordingly, we conducted five experiments described in what follows. The first three experiments investigated whether priming an interdependent (vs. independent) self-construal causes a reduction in participants' death anxiety (Experiments 1–3) and increases participants' *general* readiness to engage in acts of martyrdom (Experiment 3). The fourth experiment examined whether an interdependent self-construal increases participants' *specific* willingness to sacrifice themselves for the sake of others, members of an important group. Finally, the fifth experiment investigated whether an interdependent self-construal leads to an increase in the approach/avoidance of death-related stimuli. A detailed description of our experiments is given below.

Experiment 1

The purpose of Experiment 1 was to examine whether an interdependent versus independent self-construal would affect death anxiety. To this end, participants were primed with either one or the other self-construal before completing a self-report measure of death anxiety. We predicted that participants in the interdependent self-construal condition would report lower death anxiety than their counterparts in the independent self-construal condition.

Method

Participants. Sixty Ohio State University undergraduate students (34 women, 26 men) completed the study in exchange for course credit. Gender did not produce any effects on the dependent measures in this study or any of the other studies and will therefore be omitted from further consideration.

Materials and procedure.

Self-construal manipulation. Participants first completed an exercise designed to prime an independent or interdependent self-construal. The priming manipulation that we used was first developed by Gardner, Gabriel, and Lee (1999). Participants were presented with a paragraph describing a trip to a city. Their task was to circle all the pronouns in the paragraph. The independent

and interdependent versions differed only with respect to the pronouns used. Half the participants were assigned to the independent self-construal condition which used singular pronouns (e.g., *I, mine*). The other half of the participants were assigned to the interdependent self-construal condition which used plural pronouns (e.g., *we, ours*). A recent meta-analysis found that this is one of the most common manipulations and reliably induces independent versus interdependent self-construals (Oyserman & Lee, 2008).

Death anxiety. After participants completed the priming exercise, they completed the death anxiety scale (Templer, 1970). This scale measures death anxiety by asking individuals about the extent to which they disagree or agree with 15 death-related statements ($\alpha = .62$). For example, participants were asked to indicate the extent to which they disagreed or agreed with the statement "I am very much afraid to die." Participants answered the questions on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). A composite score was computed by reverse-scoring the appropriate items and then summing across the 15 responses.

Results and Discussion

We conducted an independent samples t test to test the hypothesis that an interdependent self-construal would lead to lower death anxiety than an independent self-construal. Consistent with our hypothesis, this analysis revealed that participants primed with an interdependent self-construal ($M = 47.75$, $SD = 9.37$) reported a lower death anxiety than participants primed with an independent self-construal ($M = 52.81$, $SD = 8.13$), $t(58) = 2.24$, $p = .03$. That is, Experiment 1 showed that participants who were primed with an interdependent self-construal were less anxious about death than participants who were primed with an independent self-construal.

Experiment 2

Although the results from Experiment 1 are consistent with our hypothesis, an alternative interpretation could suggest that priming words related to the self (e.g., I) may increase the tendency to respond affirmatively to items worded from the same perspective (as is the case in the death anxiety scale), whereas priming words related to the group (e.g., we) may have the reverse effect. To control for this possible influence, Gaertner, Sedikides, and Graetz (1999, Study 4) modified the wording of their dependent measure so that the word "you" replaced the word "I." Because the word "you" can refer to both a single person or to a group, Gaertner et al. reasoned that such a modification served as an appropriate check on such potential influences, and we followed their recommendation in our second experiment to ensure that our results were not simply due to responses biases.

Method

Participants. Fifty participants (34 women, 16 men) completed the study over the Internet in exchange for 35 cents. The age of participants ranged from 19 to 63, with a mean age of 33. All

participants lived in the United States, and resided in 25 different states.

Materials and procedure.

Self-construal manipulation. Participants first completed an exercise designed to prime an independent or an interdependent self-construal. Experiment 2 used a modified version of the priming procedure used in Experiment 1. Once again, participants were presented with a word search describing a trip to a city and the content was manipulated to include singular pronouns (independent self-construal) or plural pronouns (interdependent self-construal). Because the study was completed over the Internet (making it impossible for participants to circle the pronouns), we simply asked participants to count the number of pronouns in the essay.

Death anxiety. After participants completed the priming exercise, they completed a modified version of the death anxiety scale (Templer, 1970). We presented participants with the same 15 death-related statements, except that we modified each item to refer to "you" rather than to "I" ($\alpha = .86$). For example, the original item "I am very much afraid to die" was altered so that it read "You are very much afraid to die." Participants responded with the extent to which they agreed with the questions on a 6-point Likert scale (1 = *strongly disagree*, 6 = *strongly agree*). An aggregate score was computed by reverse-scoring the appropriate items and then summing across the 15 items.

Results and Discussion

We conducted an independent samples t test to test the hypothesis that an interdependent self-construal would lead to lower death anxiety than an independent self-construal, even after modifying the death anxiety scale to refer to "you" rather than "I." Consistent with our hypothesis, this analysis revealed that participants primed with an interdependent self-construal ($M = 48.96$, $SD = 13.0$) reported less death anxiety than participants primed with an independent self-construal ($M = 56.48$. $SD = 13.12$), $t(48) = 2.04$, $p < .05$. That is, Experiment 2 replicated the pattern of results from Experiment 1, such that participants primed with an interdependent self-construal reported less anxiety about death than participants primed with an independent self-construal.

Experiment 3

The purpose of our third study was threefold. First, we added a measure of willingness to become a martyr, which more directly tests the notion that an interdependent (vs. independent) self-construal would induce the readiness to self-sacrifice for the group. Second, to investigate whether it is the interdependent or the independent prime (or both) that affects martyrdom-readiness, in addition to the foregoing primes, we included in this study a no-prime control condition. We expected that the control condition and independent self-construal condition would not differ from each other because our American sample should already have predominantly an independent self-construal (e.g., Markus & Kitayama, 1991). Therefore, we expected the interdependent self-construal condition to differ from the control and independent self-construal conditions. Finally, we used a different manipulation of self-construal to examine whether our results generalize beyond the specific operation used in the first two experiments.

Method

Participants. One hundred nineteen undergraduate students (69 female, 47 male) at the University of Maryland participated in the study in exchange for course credit. Three participants did not report their gender.

Materials and procedure.

Self-construal. Self-construal was manipulated by having participants read an essay about a Sumerian warrior (a manipulation first used by Trafimow, Triandis, & Goto, 1991, Study 2). In the independent condition, the warrior was interested in personal reward and prestige. In the interdependent condition, the warrior was interested in loyalty to the group. In the no-prime condition, participants were not presented with reading materials of any sort. A recent meta-analysis found that this is one of the most common manipulations of independent versus interdependent self-construals and reliably manipulates this variable (Oyserman & Lee, 2008).

Death anxiety. We measured death anxiety using the Death Anxiety Scale (Templer, 1970) as in Experiment 1 ($\alpha = .74$).

Martyrdom. Willingness to become a martyr was measured using two items in which participants responded regarding their willingness to sacrifice the self for a cause ($r = .59$, $p < .001$). Participants responded to the item, "If faced with circumstances that required as much, I would sacrifice my life for a cause that was important to me" and "I would not sacrifice my life for a cause highly important to me" (1 = *do not agree at all*, 7 = *very strongly agree*). After reverse scoring the second item, the average of the two items was computed as a composite score with higher scores reflecting greater willingness to self-sacrifice and hence martyrdom.

Results and Discussion

Death anxiety. To test our hypothesis regarding death anxiety, we computed a one-way ANOVA, with three levels of the self-construal variable (No Prime vs. Independent Prime vs. Interdependent Prime). This analysis revealed a significant effect of self-construal on death anxiety, $F(2, 116) = 3.30$, $p = .04$. As expected, participants in the independent prime condition and the no prime condition did not significantly differ on their death anxiety ($M_{control} = 53.29$, $SD = 15.27$; $M_{independent} = 55.90$, $SD = 13.26$; $t < 1$, $p = .43$). Therefore, we conducted a planned contrast analysis comparing participants in the interdependence condition to participants in the other two conditions. This analysis revealed that participants in the interdependent prime condition reported significantly lower death anxiety ($M = 48.08$, $SD = 13.37$) than participants in the no prime and independent prime conditions ($M = 54.61$, $SD = 14.25$), $t(116) = 2.43$, $p = .02$. These results replicate the findings from Experiment 1 using a different manipulation of self-construal.

Martyrdom. To test our hypothesis regarding martyrdom, we computed a one-way ANOVA with three levels of the self-construal variable (No Prime vs. Independent Prime vs. Interdependent Prime). This analysis revealed a marginally significant one-way effect of self-construal, $F(2, 116) = 2.82$, $p = .06$.[1] As expected, participants in the independent prime condition and the no prime condition did not significantly differ in their willingness

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[1] The pattern of results is the same for the two items. A within-subjects items factor does not interact with self-construal ($F < 1$).

to become a martyr ($M_{\text{control}} = 4.04$, $SD = 1.73$; $M_{\text{independent}} = 4.29$, $SD = 1.67$; $t < 1$, $p = .51$). Thus, we proceeded to conduct a planned contrast analysis comparing participants in the interdependent prime condition to the two other conditions. This analysis revealed that participants in the interdependent prime condition reported significantly greater willingness to become a martyr ($M = 4.90$, $SD = 1.65$) than participants in the no prime condition and independent prime condition ($M = 4.17$, $SD = 1.69$), $t(116) = 2.28$, $p = .02$.

These results conceptually replicate the findings of Experiments 1 and 2 by showing that a different manipulation of self-construal again led to lower levels of death anxiety in the interdependent condition than in the independent condition. Importantly, the present results show that the activation of interdependence increases individuals' readiness to sacrifice their life for a cause, a key feature of the concept of martyrdom.

Experiment 4

Although Experiment 3 supports our hypothesis that an interdependent self-construal increases the willingness to sacrifice the self for a cause, a stronger conclusion could be reached if the measure was a specific choice, rather than a statement of general intentions to sacrifice the self for a cause. To this end, participants were presented with a priming manipulation of either an independent or interdependent self-construal before completing a different measure of self-sacrifice for the group. Participants were asked whether they would be willing to sacrifice themselves for the benefit of four people who are part of a group they care about. If, as we have argued, thinking of the self as embedded in a meaningful social group reduces death-anxiety, then people who care highly about the group should be more willing to sacrifice themselves for the sake of in-group members even if they do not necessarily know them personally.

Method

Participants. Thirty-two Ohio State University (OSU) undergraduates (7 women and 25 men) participated in the study in exchange for partial course credits.

Materials and procedure.

Self-construal manipulation. The self-construal manipulation that was used was the word search task from Experiment 1. In a paragraph describing a trip to a city, half of the participants were randomly assigned to the independent self-construal condition and asked to circle singular pronouns (e.g., *I*, *my*) whereas the other half of participants were randomly assigned to the interdependent self-construal condition and asked to circle plural pronouns (e.g., *we*, *ours*).

Measure of self-sacrifice. After the self-construal manipulation, participants read a variation of the footbridge dilemma (see the Appendix). Each participant was told to imagine that a runaway trolley was about to kill four OSU students (i.e., in-group members) unless the participant jumped from the footbridge into the trolley's path. Participants then decided whether to jump off the footbridge to save the four other OSU students or stay on the footbridge and let the trolley kill them. As participants read the scenario and were making their choice, pictured on the computer screen was a scene depicting a trolley in the distance, a person on

a footbridge over the tracks, and four Ohio State students on the tracks forming the O-H-I-O pose, a common practice among Ohio State undergraduates to exhibit school spirit. It is apparent that the choice to jump off the footbridge and, hence, to commit suicide would benefit other in-group members.

Importance of in-group. Importance of the in-group was measured by assessing our participants' degree of group identification (Leach et al., 2008). Ratings of group satisfaction were specifically used as the measure of group identification because, as Leach et al. (2008, p. 147) put it, "satisfaction is perhaps the most general way in which individuals may identify with an in-group." Degree of group satisfaction was assessed with a four-item measure (e.g., "I am glad to be part of OSU," "I think that OSU has a lot to be proud of," "It is pleasant to be part of OSU," "Being an OSU student gives me a good feeling"; $1 = strongly\ disagree$, $7 = strongly\ agree$).[2]

Results and Discussion

We used a binary logistic regression to examine the influence of self-construal (effect coding: $-1 =$ interdependent self-construal, $1 =$ independent self-construal), group identification (centered), and the interaction of self-construal and group identification on the extent of participants' willingness to sacrifice their lives. These analyses allowed the possibility of testing whether interdependent participants would be willing to sacrifice their lives for other in-group members only if they highly identified themselves with the group (1 SD above the mean). There were no main effects of self-construal, $b = -0.90$, Wald $\chi^2 = 1.65$, $p = .20$, or group identification, $b = -1.70$, Wald $\chi^2 = 2.06$, $p = .15$. However, the interaction between self-construal and group identification was significant, $b = 2.62$, Wald $\chi^2 = 4.93$, $p = .03$ (see Figure 1).

Simple effects tests revealed that increasing group identification was marginally associated with a greater willingness of participants to sacrifice their lives only among those induced to think of themselves interdependently, $b = -4.32$, Wald $\chi^2 = 3.57$, $p = .06$, but not independently, $b = 0.93$, Wald $\chi^2 = 2.35$, $p = .13$. Looking only at those who were highly satisfied with the group, Ohio State, participants in the interdependent self-construal condition were more likely to jump off the footbridge (92.27% of participants) than participants in the independent self-construal condition (32.08% of participants), $b = 1.61$, Wald $\chi^2 = 3.75$, $p = .05$. Although not predicted, looking at those who were less satisfied with the group, participants in the interdependent self-construal condition were less likely to jump off the footbridge (0.00% of participants) than participants in the independent self-construal condition (73.61% of participants), $b = -3.40$, Wald $\chi^2 = 4.09$, $p = .04$.

The results of Experiment 4 provide evidence that the extent to which one cares about the group will influence the extent to which an interdependent self-construal may impact the willingness to

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[2] In addition to group identification (Leach et al., 2008), identify fusion (e.g., Swann et al., 2009) was also assessed, in counterbalanced order, with reference to "Ohio State." The correlation between identity fusion and group identification was strongly positive, $r(32) = .52$, $p < .01$. Additionally, the effect of fusion and the interaction between fusion and self-construal manipulation did not influence the decision to jump off the footbridge (all $ps > .30$). As such, the fusion measure was left out of all subsequent analyses.
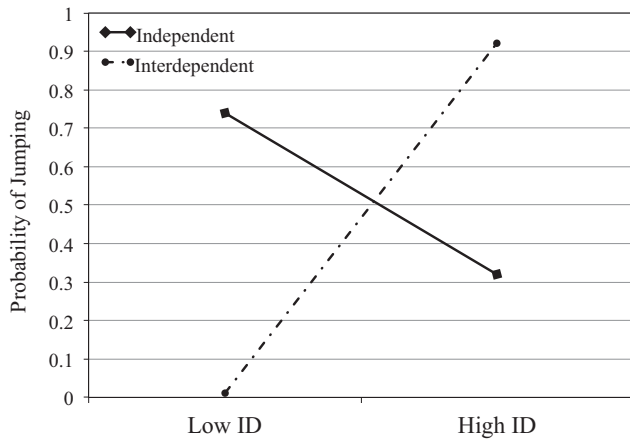
Figure 1. Experiment 4: Predicted probability of jumping by self-construal, interdependent versus independent, and group identification (ID; ± 1 *SD* from the mean).

sacrifice one's own life to save the lives of other in-group members. That is, the more one cares about the group, the more one should feel embedded and identified with it, and the more likely one is to make sacrifices on its behalf. As we have seen, in the present study, interdependent participants were more willing to sacrifice themselves the more they were satisfied with the group. This suggests that an interdependent self-construal is more likely to increase individuals' tendency to sacrifice their own life when it will benefit the group.

The next experiment moves beyond self-reported death anxiety and willingness to sacrifice the self and examine how self-construal can influence implicit measures of behavioral tendencies of approach and avoidance of death.

Experiment 5

The purpose of Experiment 5 was to conceptually replicate the results of Experiments 1–4. Specifically, although the foregoing experiments support our hypotheses, we wanted to move beyond the explicit measurement of death anxiety and willingness to sacrifice the self to an implicit assessment of behavioral tendencies toward death. As will be seen, our procedure here also affords an additional test of our prediction that an interdependent, compared to an independent, self-construal would prompt behavioral tendencies that facilitate acts of martyrdom and self-sacrifice. To this end, participants were presented with a manipulation that primed either an independent or interdependent self-construal before completing a computer task designed to measure implicit tendencies to approach or avoid death.

Method

Participants. Forty-six University of Maryland undergraduate students (37 women, 9 men) completed the study in exchange for course credits.

Materials and procedure.

Self-construal manipulation. Participants first completed an exercise designed to prime an independent or an interdependent self-construal. Experiment 5 used the same priming procedure as

Experiments 1 and 4. That is, participants were presented with a word search describing a trip to a city and asked to either circle singular pronouns (independent self-construal) or plural pronouns (interdependent self-construal).

Implicit behavioral approach/avoidance of death. After participants completed the priming exercise, they performed a joystick lexical decision task on the computer. This particular task was designed to measure implicit tendencies to approach or avoid death (adapted from the implicit behavioral tendencies measure of Fishbach & Shah, 2006). Participants were presented with a series of letter strings and were asked to determine as quickly and accurately as possible whether the letter string was a word or a nonword. Half the participants were asked to pull the joystick toward them if the letter string was a word and push the joystick away from them if the letter string was not a word. The rest of the participants were given the opposite instructions, that is, to pull the joystick toward them if the letter string was not a word and push the joystick away from them if the letter string was a word. At the beginning of each trial, a fixation point ($+$) appeared at the center of the screen for 200 ms. Participants were instructed to focus their attention on the fixation point. The fixation point was then replaced by a target letter string, which remained on the screen until the participant responded. Each response was followed by a 1,000-ms pause, followed by the next trial.

After six practice trials, which included an equal number of words and nonwords, participants commenced with the main part of the joystick lexical decision task. In this part, a total of 48 trials were presented, half of which represented word trials (24 trials). In 12 of these trials (critical trials), the target words were death-related (e.g., *coffin*; Arndt, Greenberg, Solomon, Pyszczynski, & Simon, 1997; Greenberg et al., 1994). In the other 12 trials (comparison trials), the target words were unrelated to death (e.g., *table*). Upon task completion, participants were debriefed and dismissed. None of the participants were able to identify the purpose of the joystick task. In addition, none of the participants were able to identify the relationship between the word search and the joystick lexical decision task.[3]

Results and Discussion

Given the difficulty of interpreting response latencies for errors, only correct responses were used in all of the following analyses (see Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, 1990). The average error rate for participants in the joystick lexical decision task was 0.26%. To control for excessive positive skew, response latencies were trimmed within ± 3.0 *SD* of each participants' cell mean.

To assess whether self-construals affected implicit tendencies to approach or avoid death, we conducted a 2 (word-type: control words vs. death words) $\times$ 2 (action: pulling vs. pushing) $\times$ 2

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[3] In order to test for the neutrality of the control words in the lexical decision task, we conducted a pre-test in which we randomly assigned 50 participants to either the independent or the interdependent prime condition (using the same procedure as this experiment) and measured their ratings of the pleasantness ($\alpha = .62$), goodness ($\alpha = .78$), and relevance ($\alpha = .88$) of each of the control words using 1 (*strongly disagree*) to 5 (*strongly agree*) scales. Analyses revealed no differences between conditions for any of the three ratings (for all effects, $t < 1$, $p > .6$), suggesting that the words were in fact neutral with respect to our experimental manipulation.

(self-construal: independent vs. interdependent) mixed ANOVA with repeated measures on word-type. The mixed ANOVA showed no main effects for self-construal ($M_{independent}$ = 714.90 ms, SE = 21.44 vs. $M_{interdependent}$ = 697.82 ms, SE = 24.65), $F(1, 42)$ = 0.27, p = .60, or action ($M_{pulling}$ = 703.76 ms, SE = 20.91 vs. $M_{pushing}$ = 708.96 ms, SE = 25.10), $F(1, 42)$ = 0.03, p = .87, but did reveal a main effect for word-type ($M_{control}$ = 687.93 ms, SE = 15.90 vs. M_{death} = 724.80 ms, SE = 17.35), $F(1, 42)$ = 33.61, $p < .01$, indicating that participants were faster to respond to control words than death words overall. However, more importantly, the analysis revealed that the main effect of word-type was qualified by a significant three-way Word-Type × Action × Self-Construal interaction, $F(1, 42)$ = 13.35, $p < .01$, indicating that response to word-type, control words versus death words, varied by action, pulling versus pushing, and self-construal, independent versus interdependent.

To further specify the nature of the three-way interaction, we examined the Action × Self-Construal two-way interactions separately for both control words and death words. If our predictions are correct, that self-construal and action affect implicit behavioral tendencies to approach or avoid death, the predicted Action × Self-Construal two-way interaction should only be observed when participants are responding to death words and not for the control words. This is exactly what was found: the two-way Action × Self-Construal interaction was observed for death words, $F(1, 42)$ = 5.12, p = .03 (see Figure 2), but not for control-words, $F(1, 42)$ = 1.01, p = .32, indicating that participants' responses were specific to encountering death.

To further specify the nature of the significant two-way Action × Self-Construal interaction in response to death words, we examined the action: pulling versus pushing and self-construal prime: independent and interdependent conditions separately. Simple effects analyses revealed when pulling death words toward, independent participants (M = 762.86 ms, SE = 29.62) were

significantly slower than interdependent participants (M = 667.80 ms, SE = 33.12), $F(1, 42)$ = 4.58, p = .04; in contrast, although non-significant, when pushing death words away, independent participants (M = 703.32 ms, SE = 34.59) were directionally faster to respond than interdependent participants (M = 765.20 ms, SE = 40.56), $F(1, 42)$ = 1.35, p = .25. For independent participants, an analysis of simple effects, although non-significant, revealed that independent participants were directionally slower to respond when they had to pull death words toward (M = 762.86 ms, SE = 29.62) than when they had to push death words away (M = 703.32 ms, SE = 34.59), $F(1, 42)$ = 1.71, p = .20; in contrast, interdependent participants were marginally quicker to respond when they had to pull death words toward (M = 667.80, SE = 33.12) than push death words away (M = 765.20 ms, SE = 40.56), $F(1, 42)$ = 3.46, p = .07.

In summary, Experiment 5 found that self-construals influenced implicit behavioral tendencies to approach or avoid death. Specifically, it was found that action, pulling versus pushing, and self-construal, independent versus interdependent, influenced participants' responses to death words (and not to control words). When pulling death words toward, independent participants were significantly slower to respond than interdependent participants; in contrast, when pushing death words away, independent participants were directionally quicker to respond than interdependent participants. The data also showed that independent participants were directionally slower to pull death words toward than push death words away; in contrast, the opposite was observed for interdependent participants, interdependent participants were marginally quicker to pull death words toward than push death words away (see Figure 2). This pattern of data supports the idea that adopting an interdependent mindset, a mindset of embeddedness with others, prompts behavioral tendencies that facilitate acts of martyrdom and self-sacrifice.

General Discussion

People perceive the self to be both separate (independent) from and connected (interdependent) to others (e.g., Baumeister & Leary, 1995; Brewer & Gardner, 1996; Kühnen & Oyserman, 2002). Whether one or the other self-construal will be adopted may depend on the situation. We capitalized on this affordance in all five of our experiments by experimentally priming either an independent or interdependent self-construal. The results consistently demonstrate that, compared to an independent self-construal, an interdependent one attenuates individuals' anxiety about death (Experiments 1–3), fosters a greater willingness to sacrifice the self for a cause (Experiments 3 and 4), prompts lesser avoidance of death (Experiment 5), and greater willingness to approach death (Experiment 5). We have interpreted these findings to mean that interdependent self-construals afford individuals a sense of continual existence via attachment to an enduring group (Castano & Dechesne, 2005); this may mitigate the fear of one's own demise.

The present research goes beyond previous research by (a) investigating a general orientation toward interdependence rather than identification or fusion with a specific group, (b) investigating this linkage experimentally, and (c) investigating the direction of causality in which interdependent self-construals cause reduced death anxiety and increased self-sacrifice. Research motivated by terror management theory has consistently found that reminders of
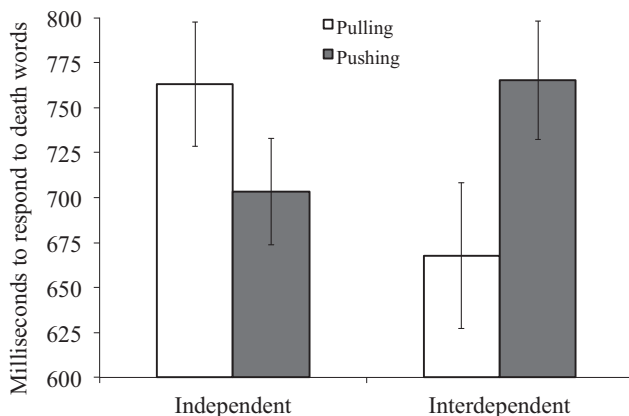
Figure 2. Experiment 5: Milliseconds to respond to death words by experimental condition: action, pulling versus pushing, and self-construal, independent versus interdependent. Independent participants were significantly slower to respond when they had to pull death words toward than push death words away. In contrast, although non-significant, interdependent participants were directionally faster to respond when they had to pull death words toward than push death words away. Error bars represent the standard error of the mean.

one's own mortality increase worldview defense (e.g., Greenberg et al., 1992, 1994, 1995, 1997; McGregor et al., 1998; Rosenblatt et al., 1989). This research, however, investigated the reverse causal direction from the current studies, namely from death anxiety to group-based attitudes rather than from group-based attitudes to death anxiety. Moreover, research on mortality salience effects has investigated the defense of *specific* group views rather than a *general* orientation toward interdependence.

Research on identity fusion has found a correlation between self-reported fusion with a specific group and the willingness to die on its behalf (Swann, Gómez, Dovidio, et al., 2010; Swann, Gómez, Huici, et al., 2010). Again, this research has been focused on fusion with specific groups rather than general interdependent self-construal. In addition, the correlational nature of the identity fusion research makes it impossible to know the causal pathway that links identity fusion and self-sacrifice. Therefore, the present research offers novel hypotheses, consistently supported across five experiments, that go beyond previous research and theorizing.

The reduction in the fear of death and increase in one's readiness to engage in acts of self-sacrifice apparently prompted by the primed sense of interdependence highlights an intriguing consequence of enhanced social identification, namely, the willingness to confront one's end and sacrifice one's individual existence on the altar of collectivity. In cases of severe intergroup conflict such sacrifice might be coupled with acts of unbridled violence against the perceived enemy of one's tribe. Thus, human sociality that lends meaning to our existence (Hogg, 2000; Kruglanski et al., 2006, 2013; Pyszczynski et al., 2006), and can produce satisfaction and happiness (Baumeister & Leary, 1995; Seligman, 2002), also has a dangerous side that may prompt violence and destruction.

The desire for individual immortality implicit in our foregoing analysis is compatible with the heroic depiction that is often bestowed upon acts of martyrdom on behalf of one's social group. Interdependence priming may also highlight for the individual the group's evolutionary advantage for her or his close genetic relatives (Wilson & Wilson, 2007). This notion has been applied to the study of suicide terrorism (Victoroff, 2009). According to an evolutionary account, suicidal terrorism may be one example of *altruistic suicide* (Durkheim, 1897/1997; Pedahzur, Perliger, & Weinberg, 2003). Indeed, early research testing such claims suggests that Palestinian suicide bombers did indeed bestow evolutionary benefits on their kin (Blackwell & Sugiyama, 2007). An alternative account to the evolutionary and altruistic motives is that the person may ultimately be pursuing individual level goals such as fame or reward in a presumed afterlife. Future research could profitably explore the potential evolutionary benefits in cases of self-sacrifice as well as the extent to which personal versus group motives are driving the present effects.

Limitations and Directions for Future Research

One limitation with the measures of self-sacrifice in these experiments is that, thankfully, our participants did not kill themselves. Whether our participants who stated that they would engage in self-sacrifice would actually commit suicide in the given situations is an open question. It may be the case that participants in the interdependent (vs. independent) condition felt greater pressure to respond according to group goals, while behaving no differently than participants in the independent condition on self-

sacrificial behavior. While giving participants the opportunity to commit suicide is not a viable option, we were able to measure participants' implicit behavioral tendencies using a task for which the purpose was unknown to our participants (Experiment 5). In this way, participants could not respond according to demand characteristics or explicit perception of social pressure. We found converging results using this implicit measure, and while it is still quite removed from actual self-sacrificial behavior, it lends support for the notion that such self-report indices are tapping a pattern that would likely emerge if true behavior were measured.

While the experiments reported here manipulated independent versus interdependent self-construals, if our hypotheses are correct, then people from cultures where an interdependent self-construal is more prevalent (e.g., Eastern cultures such as Japan) than an independent self-construal (e.g., Western cultures such as the U.S.) should be less afraid of death and be more likely to endorse martyrdom and acts of self-sacrifice. History is ripe with examples of martyrdom and altruistic suicide carried out by individuals from Eastern cultures, including Seppuku (Harakiri) among Samurai since the 12th century, Jauhar in India since the 14th century, Puputan in Bali in the 20th century, Kamikaze pilots from Japan during the second world war, and most recently suicide bombing missions by Islamist terrorists. It seems that such examples are less common within cultures that value independence, and arise in those cultures only when interdependence is highlighted. Although our findings and historical anecdotes point to a possible difference between cultures in death anxiety and willingness to become a martyr, this topic has not been systematically studied.

Cross-cultural examinations of the fear of death are particularly important in light of the fact that mortality salience effects have been observed in collectivist cultures, including China (Tam, Chiu, & Lau, 2007), Japan (Heine, Harihara, & Niiya, 2002; Wakimoto, 2006), and Iran (Pyszczynski et al., 2006). While this may seem to suggest that interdependent self-construals do not reduce death anxiety enough to reduce mortality salience effects, other research has found that Japanese participants were more strongly influenced by thinking about group death than individual death, whereas Australians were more strongly influenced by thinking about individual death than group death (Kashima, Halloran, Yuki, & Kashima, 2004); a finding that is consistent with the present analysis. Future research is necessary in order to more fully understand the role of culture in death anxiety.

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(*Appendix follows*)

Appendix

Footbridge Dilemma in Reference to Ohio State

Imagine a runaway trolley is hurtling down the tracks toward four Ohio State undergrads who will be killed if it proceeds on its present course. You are standing on a footbridge spanning the tracks. The only way to save the OSU undergrads is to jump from the footbridge into the trolley's path. What will you do?

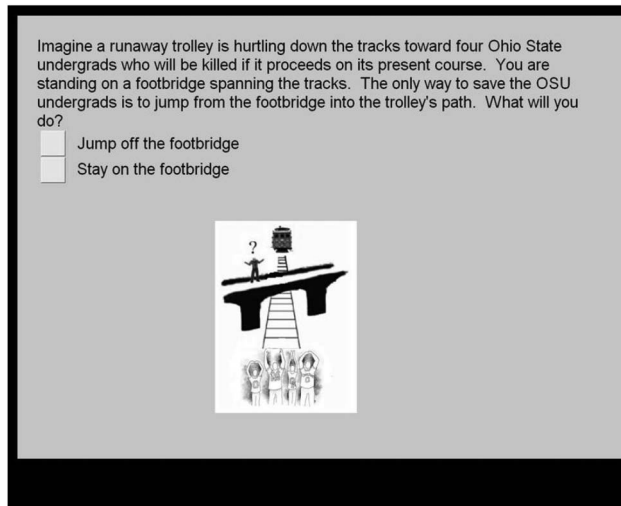☐ Jump off the footbridge
☐ Stay on the footbridge

Figure A1. The scene on the computer screen that was shown to participants as they read the variation of the footbridge dilemma. It is apparent that the choice to jump off the footbridge and, hence, to commit suicide would benefit other in-group members. OSU = Ohio State University.