


Religious Afterlife Beliefs Decrease Behavioral Avoidance of Symbols of Mortality

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Abstract

An astonishing cultural phenomenon is where, far away from or close to a city center, people in different societies localize cemeteries that function as both sites of memory of lost ones and symbols of mortality. Yet a psychological account of such differences in behavioral responses to symbols of mortality is lacking. Across five studies ($N = 1,590$), we tested a psychological model that religious afterlife beliefs decrease behavioral avoidance of symbols of mortality (BASM) by developing and validating a word-position task for quantifying BASM. We showed evidence that religious believers, including Christians, Muslims, Hindus, and Buddhists, exhibited decreased BASM relative to nonbelievers. We also provide evidence for a causal relationship between religious afterlife beliefs and reduced BASM. Our findings provide new insight into the functional role of religious afterlife beliefs in modulating human avoidance behavior in response to symbols of mortality.

Keywords

afterlife belief, behavioral avoidance, culture, mortality, religion

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Introduction

Chinese tourists are surprised by unexpectedly running into cemeteries when visiting cities in Europe. They are curious when seeing how close to a graveyard people live and spend their leisure time there (Figure 1A) because these are rarely encountered in China. To exemplify how differently people localize cemeteries that function as both sites of memory of lost ones and symbols of death or mortality, we calculated the mean walking distance between a central railway station and five closest cemeteries in 10 cities in Europe and 10 cities in China. As shown in Figure 1B, the mean walking distance is significantly longer in Chinese than in European cities. Although such measures may provide a geographical account of why people are more easily to encounter cemeteries in European (vs. Chinese) cities, there lacks a psychological account of such an astonishing cultural difference in behavioral avoidance of symbols of mortality (BASM).

In this article, we examine a psychological model of causal relationships between religious afterlife beliefs and BASM. This model is built based on the spirit of earlier work that proposes a key role of cultural worldviews in influencing human existential anxiety and related social behavior (Greenberg et al., 1986, 1997; Pyszczynski et al., 1999; Solomon et al., 1991) and the fact that the majority of China's population is religiously unaffiliated, contrasting with the

populations in other regions such as Europe and the United States that are dominated by religious believers (Hackett et al., 2015). This model proposes that, while nonbelievers, who are not affiliated with any religion, usually tend to avoid symbols of mortality (e.g., cemeteries), religious afterlife beliefs play a causal role in reducing such a tendency and decreasing believers' BASM. This model is related to the cultural phenomenon mentioned above by providing a psychological account that religious afterlife beliefs reduce people's behavioral avoidance of physical or semantic symbols of mortality. This model has two predictions: first, believers of the world's major religions who share beliefs about the afterlife similarly show less BASM relative to nonbelievers; second, nonbelievers who are temporarily exposed to religious afterlife beliefs show reduced BASM relative to those who are not.

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Figure 1. Illustrations of cultural differences in cemetery locations. (A) Illustration of how close to a graveyard people live and spend their leisure time in Edinburgh, United Kingdom. Photos were taken by the last author of this article. (B) The mean walking distances between a central railway station and five closest cemeteries in 10 cities in Europe and 10 cities in China. The mean walking distance is significantly longer for the Chinese than European cities, mean difference = 11.47 km, $t(18) = 5.18$, $p < .0001$, 95% confidence interval [CI] = [6.82, 16.12]. The walking distances between a central railway station and five closest cemeteries were measured from maps provided by www.baidu.com and www.google.com.

To test these hypotheses requires quantitative estimation of BASM in large samples of nonbelievers and believers from different religions. Because this cannot be administered using questionnaires and is a big challenge for traditional field studies, it is necessary to develop a new paradigm that allows researchers to quantify BASM in a laboratory or through the internet. In addition, an ecologically valid measure of BASM should be able to predict individuals' behaviors in a real-life situation. To this end, we developed and validate a word-position (WP) task that allows quantification of BASM in a laboratory and through the internet. We showed that WP measures predicted BASM in a real-life situation. We then applied the WP task to religious believers, including Christians, Muslims, Hindus, and Buddhists, and showed evidence that they exhibited decreased BASM relative to nonbelievers. We also provided a causal test of the psychological model by showing that nonbelievers exposed to religious afterlife beliefs showed reduced BASM. Our findings highlight the psychological function of religious afterlife beliefs in shaping human BASM.

Religious afterlife beliefs

Believers of the world's major religions constitute the majority of human societies, with Christians, Muslims, Hindus, and Buddhists making up about 77% of the global population (Hackett et al., 2015). Believers from different religions exhibit divergent patterns of religious practices/rituals and daily behaviors as evidenced by diversity in their diets, dress, wedding/funeral procedures, and ways to cope with illness and dying (Noss & Noss, 1984; Puchalski & O'Donnell, 2005). Empirical research comparing believers and nonbelievers has shown ample evidence for differences in behaviors (Decety et al., 2015; Mathras et al., 2016; Purzycki et al., 2016), cognition (Ma & Han, 2012; Wiech et al., 2009), attitude (Hunsberger & Jackson, 2005), emotion (Markstrom et al., 2010), and brain activity underlying cognition and emotion (Fan & Han, 2018; Ge et al., 2009; Han et al., 2008; Han, Gu, et al., 2010; Huang & Han, 2014; Schjoedt et al., 2009; Yanagisawa et al., 2016).

Despite the aforementioned diversity, believers of different religions are similar to each other but are different from non-believers in answering a fundamental question, that is, what happens after death. For nonbelievers, who are not affiliated with any religion, physical death simply means the cessation of life in all forms. Religious believers, however, hold beliefs about the afterlife. Christians are taught that living a moral life on earth can lead to heavenly reward—full enjoyment of eternal union with God (Anderson, 2012). Similarly, the Qur'an teaches Muslims that on Judgment day, Allah (God) will welcome people who have lived a moral life to a paradise where they will enjoy everlasting peace and bliss (Esposito, 2005). Hindu and Buddhist scriptures similarly view death as a transition through which an individual can go through the cycle of deaths and rebirths and merge with the cosmic power or Western Paradise permanently (Deshpande et al., 2005). Thus, a common theme of religious traditions is the belief in spiritual continuation following physical death (e.g., heaven, Puchalski & O'Donnell, 2005), which is characterized by joy, peace, and happiness (DeSpelder & Strickland, 2009). Although some religions also preach beliefs of a bad afterlife (e.g., the hell), most religious believers wish and believe that they would deserve a good afterlife. To address how religious afterlife beliefs affect human behavior in the face of death threat is important for understanding the fundamental social and psychological functions of religious traditions.

Religion and death anxiety

A well-known approach to the function of religion is inspired by the Terror Management Theory (TMT, Greenberg et al., 1986, 1997; Pyszczynski et al., 1999). TMT posits that, as death anxiety arises from the juxtaposition of death awareness and the instinct for self-preservation, humans respond to manage their feeling of death anxiety by strengthening their adherence to existing cultural worldviews to protect their sense of significance and self-esteem. A terror management analysis of religion assumes that an important function of religious beliefs is to quell the terror that arises from human awareness of death (Greenberg et al., 1986; Vail et al., 2010) by providing conceptions of literal immortality such as heaven, reincarnation, or some form of consciousness persisting after physical death (Burkert, 1996).

As TMT emphasizes the function of religious beliefs in buffering death anxiety and thus influence human behavior under mortality threat, a large body of empirical studies focused on whether religious beliefs can quell the overwhelming terror induced by death awareness (see Vail et al., 2010, for review). One line of research examined the relationship between religiosity and self-reported death anxiety but has shown mixed results (see Ellis & Wahab, 2013; Jong, 2021 for review). For example, some studies reported results favoring negative correlations between religiosity and death anxiety such that more religious individuals are less fearful of death (Clements, 1998; Daaleman & Dobbs, 2010; Henrie & Patrick, 2014). Other

studies, however, showed results favoring positive correlations between religiosity and death anxiety such that more religious individuals are more fearful of death (Dezutter, Luyckx, & Hutsebaut, 2009; Ellis et al., 2013; Swanson & Byrd, 1998). There were also reports of a curvilinear relationship between religiosity and death fear (i.e., individuals with either high or low religiosity are least fearful of death and moderately religious individuals are the most fearful of death, (Cohen et al., 2005; Wink & Scott, 2005). Some studies even failed to find evidence for correlations between religiosity and death fear [e.g., Azaiza et al., 2010).

Another line of research examined function of religious beliefs by testing the mortality salience (MS) hypothesis that predicts that reminders of mortality increase tendencies to protect one's cultural worldview and self-esteem. It was found that reminders of mortality heightened afterlife beliefs (Heflick et al., 2015; Schoenrade, 1989) and faith in religious supernatural entities among believers (Jong et al., 2012; Norenzayan & Hansen, 2006), suggesting associations between death-related thoughts and religious beliefs. Other studies have shown that affirmation of religious beliefs decreased death-thought accessibility after individuals were primed to think about mortality (Jonas & Fischer, 2006) and challenging individuals' religious beliefs increased their anxiety and death-related thoughts (Schimmel et al., 2007). Although recent work showed inconsistent results such that affirmation of religious beliefs increased nonbelievers' death anxiety (Jackson et al., 2018), these results suggest influences of religious beliefs on death-related thoughts and anxiety.

The mixed results regarding the relationship between religiosity and death anxiety do not allow a conclusion that decreased death anxiety provides a direct psychological underpinning of reduced BASM in religious believers compared with nonbelievers. Most of the studies examining the relationship between religiosity and death anxiety estimated death anxiety using questionnaires. Questionnaire measures are susceptible to substantial influence from social contexts (Heine et al., 2002) and cannot be used to estimate BASM that requires measures of where to position oneself in relation with symbols of mortality. In addition, most of the previous studies relied on correlational analyses that cannot test causal relationships between religious belief and BASM. To date, there has been no research to measure behavioral performance as an index of BASM to investigate whether and how a specific aspect of religiosity (e.g., religious afterlife belief) influences individuals' BASM.

The present research

Based on the theoretical perspective of the TMT about the relationship between cultural worldviews that offer some form of death transcendence and human behavior under mortality threat (Greenberg et al., 1986, 1990; Pyszczynski et al., 1999), the current work tested a hypothesis that religious afterlife beliefs, as one of the core worldviews of the world's

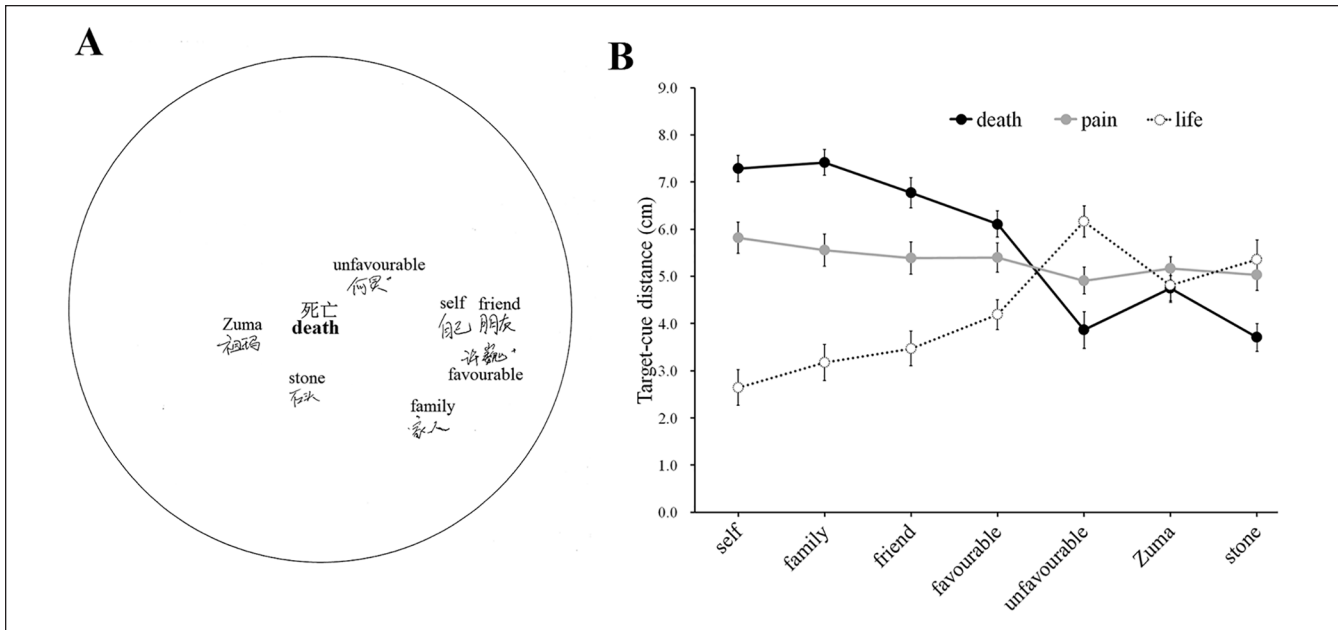


Figure 2. The Word-Position (WP) task and results of Study 1. (A) Illustration of the WP task. All Chinese words were translated into English and were inserted in Figure 1A by the authors for illustration here. The *death* cue is located at the center of the circle in this illustration. Favorable and unfavorable celebrities' names were marked with "+" and "-", respectively. The distance between the center of each target word and the center of a cue word was measured to index behavioral tendencies to avoid symbolic mortality threats. (B) The results of target-cue distances were obtained from Chinese nonbelievers in Study 1. Error bars represent the standard errors.

major religions, causally reduce BASM. According to the common good afterlife beliefs of the world's major religions (Burkert, 1996; Puchalski & O'Donnell, 2005) and our psychological model of causal relationships between religious afterlife beliefs and BASM, if physical death is followed by transition of oneself into other forms of existence which might be enjoyable circumstances as may religious people believe, religious believers should show reduced BASM compared with nonbelievers. By contrast, nonbelievers should show a greater tendency to avoid physical or semantic symbols of mortality such as a skull or the word "death" that remind the inevitability of death and induce death anxiety. These predictions are consistent with the TMT if BASM is regarded as a kind of proximal defense and religious afterlife beliefs, according to the TMT, as a shared cultural view provide a buffer of death anxiety and result in less need for proximal defense.

The current work tests two predictions of our model. First, relative to nonbelievers, religious believers, including Christians, Muslims, Hindus, and Buddhists, should show similar patterns of reduced BASM due to their shared afterlife beliefs. Second, exposing nonbelievers to religious afterlife beliefs should reduce their BASM due to a causal relationship between religious afterlife beliefs and BASM. An ideal estimation of BASM is to measure how far away individuals draw themselves away from a symbol of mortality in real-life situations. However, such measures are difficult to operate for large samples of participants of different

religious groups. A few previous studies utilized behavioral measures to capture proximal or distal defenses. For example, it has been shown that, relative to controls, individuals who had been recently reminded of their own mortality showed more negative reactions toward a scenario depicting a woman breast-feeding her infant in public (Cox et al., 2007), tended to purchase higher quantities of food products (Mandel & Smeesters, 2008), and led to less reported intentions of reckless driving but to higher driving speed (Taubman Ben-Ari et al., 2000). These measures, however, depend on complicated social behaviors that are susceptible to multiple factors and are not easily operated in laboratories.

Because previous research has indicated considerable similarity in the way people mentally traverse different (e.g., spatial and psychological) distances (Lieberman & Trope, 2014), we developed a semantically simplified WP task that can be easily operated in large samples in a laboratory and through the internet for assessment of BASM. The WP task requires a participant to position seven target words in a circle in which a cue word (*death*, *life*, or *pain*) is located at the center on a piece of A4 paper or a computer monitor, as illustrated in Figure 2A. The target words consist of *self*, *family*, *friend*, a favorable celebrity's name, an unfavorable celebrity's name, *Zuma* (a stranger), and *stone*. Because the distance between a target word and a cue word is the key measure of our studies and the shape of a piece of A4 paper or a computer monitor may bias participants to position the target words in a specific way, a circle is drawn on a piece of

A4 paper or a computer monitor and participants were asked to position all target words in the circle in order to reduce these potential influences to a minimum degree.

The distance between a target word and the cue word “death” was used as an index of avoidance to put the target words such as *self*, *family*, and *friend* close to a semantic symbol of mortality. If death-related thoughts induce anxiety about one’s own existence, as argued by the TMT (Hayes et al., 2010; Pyszczynski et al., 1999), people may put the self and close others further away from the cue word “death” that remind them of mortality compared with a control condition (e.g., the cue word “pain”). However, this effect should be reduced in religious believers than nonbelievers, according to the first prediction of our model regarding the relationship between religious afterlife beliefs and BASM. Moreover, exposing nonbelievers to religious afterlife beliefs should similarly reduce the effect of the cue word “death” on positioning the target words such as *self*, *family*, and *friend*, according to the second prediction of our model.

The cue word “life” was used to examine the relationship between religious afterlife beliefs and individuals’ inclinations to approach life. It has been long realized that to affiliate with other living organisms is a fundamental need and propensity of humans (Kellert, 1996; Wilson, 1984). Empirical research also showed evidence for humans’ preference for the state of being alive in perception (Calvillo & Jackson, 2014), semantic processing (Mak et al., 2002), and memory (VanArsdall et al., 2015), suggesting the propensity for cognitive processes of life relevant information. Brain imaging findings further suggest distinct neural underpinnings of mental process of life- and death-related stimuli. For example, detection of animacy in visual stimuli is associated with increased activities in the parietal, cingulate, and fusiform cortices (Blakemore et al., 2003; Cross et al., 2016). Thoughts about death induced by words or sentences, however, are characterized by decreased activities in the cingulate and insular cortices (Han et al., 2010; Klackl et al., 2014; Luo et al., 2019; Shi & Han, 2013). A recent study has further revealed that behavioral responses to learn the association between the word “life” and a shape were characterized by an affirmative response bias to life-shape pairs (Gao & Han, 2022). By contrast, individuals who learned the association between the word “death” and a shape showed a denial response bias to death-shape pairs. In addition, the affirmative and denial response biases were predicted by neural activities in the right frontal and dorsal cingulate cortices, respectively. Taken together, the findings of previous research suggest coexistence of both avoidance of death and preference for life in humans. To examine religious influences on both avoidance of death and approach to life—the two aspects of human desires for survival—helps us to understand human behaviors under mortality threat. If BASM manifests both avoidance of death and preference for life in humans, one may expect opposite effects of religious afterlife beliefs on the distances between a target word (e.g., *self*, *family*, and *friend*) and the cue words “death/life.”

Similar to the previous TMT studies, the cue word “pain” was used to control potential influences of death-unrelated negative emotion, language processing, or any inclination to write a word far away from the center of a circle. The distance between a cue and the stranger’s name (Zuma) was also used to control a participant’s cue-independent inclination to write any word close to the center of a circle because a stranger’s name should not bias any specific group’s performance in the WP task due to familiarity and social distance.

The WP task should provide a measure that can capture the characteristics of behavioral tendencies under mortality threat such as that BASM is stronger for self and close others (e.g., family, friend) than for strangers due to (reflecting ingroup favoritism in care for others’ lives), for favorable than unfavorable persons (reflecting influences of attitude on care for others’ lives), and for animate (e.g., a person like Zuma) than inanimate (e.g., stone) entities (reflecting the nature of BASM in relation to animate entities). We measured target-(*death*)cue and target-(*life*)cue linear distances to provide quantitative estimation of BASM and behavioral approach to life, respectively. A larger target-(*death*)cue distance reflects greater BASM and a smaller target-(*life*)cue distance reflects greater behavioral approach to life. Specifically related to our hypothesis, the WP-task measures allow us to clarify whether religious believers relative to nonbelievers show shorter target(*self*)-(*death*)cue distances and whether these distances in nonbelievers can be reduced by exposing them to religious afterlife beliefs.

In the pilot study and Study 1, we examined the psychometric qualities of the WP task by testing whether the target-(*death*)cue distances can capture nonbelievers’ characteristics of BASM such as being stronger for self/close others than for strangers and for favorable than unfavorable persons. We also examined the validity of the WP task to capture nonbelievers’ behavioral approach to symbolic life by testing whether target-(*life*)cue distances would show opposite patterns compared with target-(*death*)cue distances. Study 2 examined the validity of the WP-task by testing whether the target-(*death*)cue distances can predict individuals’ real-life avoidance behavior in response to a physical symbol of mortality. In Study 3, we applied the WP task to nonbelievers and Christians from China to test if, relative to nonbelievers, Christians would show decreased BASM. In Study 4, we applied the WP task to Muslims, Hindus, Buddhists, and nonbelievers through the internet to test whether the results in Study 3 can be generalized to other religious and nonreligious samples. In Study 5, we examined a causal relationship between religious afterlife beliefs and BASM by exposing nonbelievers to religious afterlife beliefs before the WP task. We tested the prediction that priming a good afterlife belief compared with a secular positive belief should reduce BASM in nonbelievers. In all, our results demonstrate reduced BASM in Christians, Muslims, Hindus, and Buddhists (vs. nonbelievers) and cast new light on a causal relationship between religious afterlife beliefs and BASM.

Study 1

Study 1 employed a between-subjects design to test whether target-cue distances measured in the WP task can capture nonbelievers' characteristics of BASM. Specifically, we predicted that the measures in the *death* cue condition should exhibit larger target-(*death*)cue distances for self/close others than strangers, for favorable than unfavorable persons, and for animate than inanimate entities. Moreover, if target-cue distances measured in the WP task can reflect both behavioral avoidance of symbolic mortality and behavioral approach to symbolic life, we would expect opposite patterns of target-(*life*)cue and target-(*death*)cue distances.

We asked participants to complete questionnaires to assess their death anxiety and self-esteem, which, according to TMT, provide a key buffer of death fear and anxiety (Greenberg et al., 1986; Harmon-Jones et al., 1997; Pyszczynski et al., 1999). As we employed a between-subjects design to examine the effects of cue words on participants' behavioral performance in the WP task, to collect these questionnaire measures allowed us to control potential influences of death anxiety and self-esteem on the WP-task measures in different cue word conditions. Specifically, we tested whether the WP measures of BASM are independent of self-reports of death anxiety and self-esteem across individuals. Furthermore, we examined whether target-cue distances in the WP task reflect nonbelievers' characteristics of BASM when death anxiety and self-esteem are controlled.

Method

Participants. Study 1 recruited 90 Chinese undergraduate and graduate students who were paid 20¥ for their participation. All reported to be unaffiliated with any religion (i.e., nonbelievers). Participants were randomly assigned to the *death* (16 males, 14 females, 22.17 ± 4.11 years), *pain* (15 males, 15 females, 22.73 ± 3.26 years) and *life* (14 males, 16 females, 23.90 ± 2.78 years) cue conditions. A proper sample size for the present research was estimated using the G*Power software (Faul et al., 2007) before data collection. To detect a medium effect size ($f = 0.25$, with $\alpha = .05$, power = 0.80, correlation = .50, and nonsphericity correction = 1/6), a sample of 24 participants per condition ($N = 72$) would be necessary to detect interaction effects in a repeated-measures ANOVA. To further confirm the sample size, we conducted a pilot study (see Supplementary materials) that recruited a relatively larger sample ($N = 95$, see Supplementary materials for the results of the pilot study) due to recent recommendations that larger samples are necessary to adequately power behavioral studies (Fraleay & Vazire, 2014). Approval for all studies was granted by the local ethics committee at the School of Psychological and Cognitive Sciences, Peking University. Informed consent was obtained prior to the experiment, and all participants were debriefed following the completion of the study. All participants had normal or

corrected-to-normal vision and reported no neurological or psychiatric history. By the end of the study, an experimenter debriefed the participants on all procedures they completed. All data and stimulus materials reported can be found at Open Science Framework (<https://osf.io/c8f6j/>). No studies in this manuscript were preregistered.

The WP task. We developed the WP task to estimate an individual's BASM or inclinations to approach symbolic life. In the WP task participants were asked to write seven target words (e.g., self, family, friend, a favorable celebrity's name, an unfavorable celebrity's name, a stranger's name "Zuma," stone) in a circle on a piece of A4 paper, with a cue word (*death*, *pain*, or *life*) located at the center of the circle (Figure 2A). The order in which participants were asked to write the target words was randomized across all participants. Participants were asked to mark their favorable and unfavorable celebrities' names with "+" and "-", respectively. The radius of the circle was 9.5 cm on a piece of A4 paper. Participants were asked not to position all target words in a row or a column. The distance between the centers of a target word and the central cue word (i.e., *death*, or *life*, or *pain*) was measured with a unit of cm as an index of target-related BASM or to approach symbolic life. The center of a word was defined as the center of a rectangle that just covers the word. A target-cue distance was measured as the distance between the centers of a target word and a cue word. A longer target-(*death*)cue distance reflects greater BASM and a shorter target-(*life*)cue distance reflects greater inclination to approach symbolic life. *Pain* cue was used as a control condition to estimate influences of negative effects on target-cue distances. Study 1 employed a between-subjects design with Target (self, family, friend, a favorable celebrity's name, an unfavorable celebrity's name, Zuma, stone) as a within-subjects variable and Cue (*death*, *pain*, or *life*) as a between-subjects variable.

Estimation of death anxiety and self-esteem. Study 1 asked participants to complete the Death Attitudes Profile-Revised (DAP-R) (Wong et al., 1994). The DAP-R scale consists of 32 items rated on a seven-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). There are seven items for estimating fear of death, 5 items for estimating death avoidance, five items for estimating neutral acceptance, 10 items for estimating approach acceptance of death, and five items for estimating escape acceptance of death. Self-esteem was estimated using the Self-Esteem Scale (Rosenberg, 1965).

Results and discussion

Target-cue distances were subjected to an ANOVA with Target (self, family, friend, a favorable celebrity's name, an unfavorable celebrity's name, Zuma, stone) as a within-subjects variable and Cue (*death*, *pain*, or *life*) as a

between-subjects variable. Effect sizes as indexed by partial eta squares were reported in all studies. Post hoc pairwise comparisons were conducted (a) to compare target-cue distances of the same target between two different cue conditions (e.g., [self]target-cue distances in the *death* and *pain* cue conditions) and (b) to compare target-cue distances between two targets in the same cue condition (e.g., [self]target-cue vs. (Zuma)target-cue in the *death* cue condition). The mean differences, 95% CI, and p values of the post hoc pairwise comparisons with Bonferroni corrections were reported.

To estimate the distinct patterns of target-cue distances in the three conditions, we conducted a 7×3 ANOVA, which revealed a significant Target \times Cue interaction, $F(12, 522) = 28.131, p < .001, \eta_p^2 = .393$, indicating different patterns of target-cue distances in response to *death/life/pain* cues (Figure 2B). The first set of comparisons examined differences in target-cue distances across the three cue conditions. Separate analyses of target-cue distances for each target confirmed that, as predicted, self/family/friend were positioned farther away from *death* relative to *pain* (self: mean difference = 1.470, 95% CI = [0.325, 2.615], $p = .007$; family: mean difference = 1.860, 95% CI = [0.708, 3.012], $p < .001$; friend: mean difference = 1.387, 95% CI = [0.197, 2.576], $p = .017$). Moreover, self/family/friend were positioned closer to *life* relative to *pain* (self: mean difference = -3.177 , 95% CI = $[-4.322, -2.031]$, $p < .001$; family: mean difference = -2.380 , 95% CI = $[-3.532, -1.228]$, $p < .001$; friend: mean difference = -1.913 , 95% CI = $[-3.103, -0.724]$, $p = .001$).

The second set of comparisons examined differences in target-cue distances across different targets for each cue. The analyses revealed that, relative to Zuma, self/family/friend were positioned further away from *death* (self vs. Zuma: mean difference = 2.543, 95% CI = [1.417, 3.670], $p < .001$; family vs. Zuma: mean difference = 2.670, 95% CI = [1.632, 3.708], $p < .001$; friend vs. Zuma: mean difference = 2.027, 95% CI = [0.928, 3.126], $p < .001$). The favorable (vs. unfavorable) celebrity was positioned further away from *death* (mean difference = 2.247, 95% CI = [0.923, 3.571], $p < .001$). Zuma compared with Stone tended to be positioned further away from *death* (mean difference = 1.040, 95% CI = $[-0.162, 2.242]$, $p = .171$). Target-(*life*)cue distances showed opposite patterns as self/family/friend were positioned closer to *life* compared with Zuma (self vs. Zuma: mean difference = -2.173 , 95% CI = $[-3.300, -1.047]$, $p < .001$; family vs. Zuma: mean difference = -1.640 , 95% CI = $[-2.678, -0.602]$, $p < .001$; friend vs. Zuma: mean difference = -1.343 , 95% CI = $[-2.442, -0.244]$, $p = .005$), and the favorable compared with the unfavorable celebrity was also positioned closer to *life* (mean difference = -1.970 , 95% CI = $[-3.294, -0.646]$, $p < .001$). These effects, however, were not observed for target-(*pain*)cue distances ($ps > .05$).

To control for possible influences of self-esteem and death anxiety on the WP-task measures of BASM, we also conducted a repeated measures ANCOVA with self-esteem

and death anxiety as covariates to estimate the distinct patterns of target-cue distances. The analyses also revealed a significant Target \times Cue interaction, $F(12, 486) = 27.292, p < .001, \eta_p^2 = .403$. Detailed results of post hoc analyses are reported in the Supplementary materials.

Rating scores of self-esteem and death anxiety were subjected to a one-way ANOVA to assess possible differences in self-esteem and death anxiety across the three cue conditions. The results revealed that neither self-esteem nor death anxiety measures differed significantly between participants in the three cue conditions (see Table S1). To assess whether target-cue distances measured in the WP task were independent of self-report of self-esteem and death anxiety, we calculated the differential target-cue (self vs. Zuma) distance in the *death* cue condition to indicate self specific BASM and its correlation with questionnaire measures of self-esteem and death anxiety, but did not find any significant correlation (self-esteem: $r = .022, p = .909$; fear of death: $r = .043, p = .823$; death avoidance: $r = -.215, p = .253$; neutral acceptance: $r = .131, p = .492$; approach acceptance of death: $r = -.117, p = .538$; escape acceptance of death: $r = -.104, p = .585$), indicating that our BASM measure is independent of individuals' self-esteem and death anxiety.

The results of Study 1 indicate that target-cue distances measured in the WP task can quantify nonbelievers' BASM. The significant differential target-(*death*)cue distances related to self/close others (vs. Zuma) and to a favorable (vs. unfavorable) celebrity reflect ingroup favoritism of and attitude influences on BASM. The WP-task measures of BASM also tended to be greater for animate than inanimate entities and this was confirmed in a large sample, that is, (Zuma)target-(*death*)cue distance was significantly longer than (stone)target-(*death*)cue distance when combining the data from nonbelievers of Studies 1 and 3 (mean difference = 1.077, 95% CI = [0.194, 1.960], $p = .005$). These effects cannot be interpreted by negative emotion because the *pain* cue did not significantly affect target-cue distances. The target-cue distances measured in the WP task also capture nonbelievers' inclinations to approach symbolic life that are stronger for self/family/friend than a stranger (reflecting ingroup favoritism) and for favorable than unfavorable persons (reflect attitude influences). The results were verified even when controlling individuals' self-esteem levels and death anxiety, which were similar across participants in the three cue conditions. These results established the WP-task as a good measure of both BASM and inclinations to approach a semantic symbol of life in nonbelievers.

Study 2

To test the ecological validity of the WP-task measures of BASM, in Study 2, we examined whether the WP-task measures of BASM can predict individuals' avoidance behavior in response to a physical symbol of mortality in a real-life situation. We tested this by applying the WP-task to an

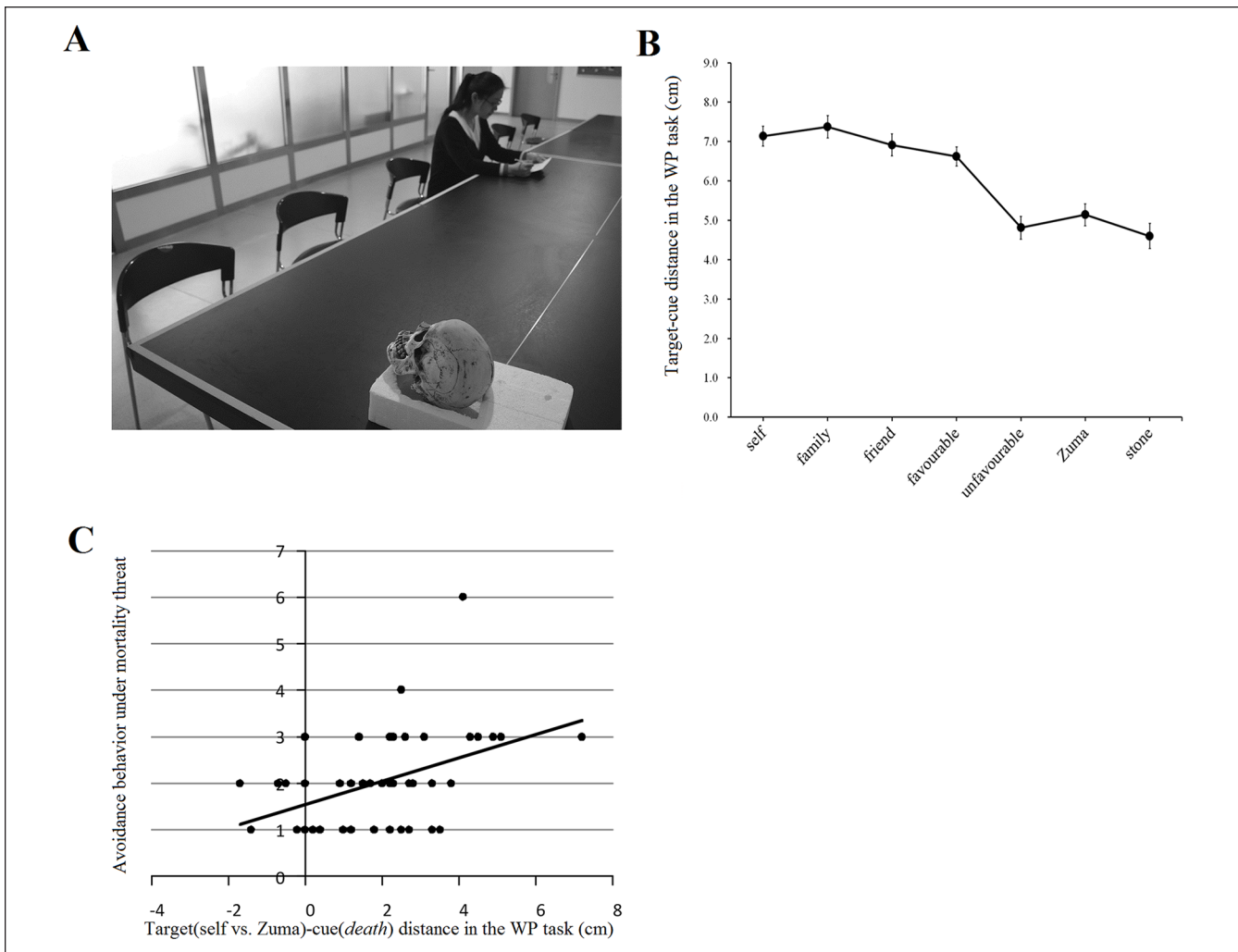


Figure 3. Illustration of the paradigm and results of Study 2. (A) Illustration of the test of avoidance behavior in a real-life situation of mortality threats in Study 2. (B) Target-(*death*)cue distances estimated from nonbelievers in Study 2. Error bars represent the standard errors. (C) The correlation between the measure of BASM in the WP task (i.e., the differential target[self vs. Zuma]-cue(*death*) distance) and avoidance behavior in a real-life situation of mortality threats. BASM = behavioral avoidance of symbols of mortality; WP = word-position.

independent group of nonbelievers and measuring their avoidance behaviors in response to a physical symbol of mortality in a real-life situation. Avoidance behavior was estimated by measuring how far participants chose to sit away from a fake skull.

Method

Participants. Study 2 recruited 44 Chinese undergraduate and graduate students who participated as paid volunteers (22 males, 22 females, 21.50 ± 2.18 years). All reported to be unaffiliated with any religion.

WP task and estimation of death anxiety and self-esteem. Participants completed the same WP task, self-esteem scale, and death anxiety measure as in Study 1. These were the same as

those in Study 1 except that all participants were assigned to the *death* cue condition of the WP task.

Measure of behavioral avoidance of a physical symbol of mortality. Upon arrival in a test room, each participant was led to a long table to complete the consent form by an experimenter (Figure 3A). A fake skull was located on one end of the table and was used to produce mortality threat. The participants were not mentioned anything about the skull to match the WP-task in which the participants were similarly not mentioned anything about the cue word “death.” There were six chairs beside the table at varying distances from the skull. The participant was asked to choose a chair to sit in and to wait for the experimenter to get a consent form from another room. The distance between the skull and the chair chosen by a participant (measured as the number of chairs) was used as

an index of behavioral avoidance of mortality threats. After finishing the consent form, the participant was led to another room to complete the WP task. Finally, the participant was asked to complete the self-report measures of death anxiety and self-esteem.

Results and discussion

The results of target-(*death*)cue distances in the WP task replicated those of Study 1 (Figure 3B). A one-way ANOVA with Target (self, family, friend, a favorable celebrity's name, an unfavorable celebrity's name, Zuma, stone) as a within-subjects variable showed a significant main effect of target on target-(*death*)cue distances, $F(6, 258) = 23.764, p < .001, \eta_p^2 = .356$. Post hoc pairwise comparisons confirmed that participants positioned self/family/friend further away from *death* than Zuma (self vs. Zuma: mean difference = 1.995, 95% CI = [1.103, 2.888], $p < .001$; family vs. Zuma: mean difference = 2.227, 95% CI = [1.115, 3.339], $p < .001$; friend vs. Zuma: mean difference = 1.770, 95% CI = [0.606, 2.935], $p < .001$) and positioned the favorable celebrity further away from *death* than the unfavorable celebrity (mean difference = 1.809, 95% CI = [0.695, 2.923], $p < .001$).

Next, we assessed whether the WP-task measure of BASM can predict individuals' behavioral avoidance of a physical symbol of mortality in a real-life situation. To estimate individuals' BASM by controlling their cue-independent inclination to write any word close to the center of a circle, we calculated the differential target(self vs. Zuma)-cue(*death*) distance as an index of BASM. This differential target-cue distance was positively correlated with the distance between the fake skull and the chair that an individual chose to sit on ($r = .445, p = .002$, Figure 3C). A participant with a larger differential target(self vs. Zuma)-cue(*death*) distance sat further away from the fake skull. However, the differential target(self vs. Zuma)-cue(*death*) distance was not correlated with the questionnaire measures of death anxiety ($ps > .05$). In addition, neither questionnaire measures of death anxiety nor those of self-esteem were significantly correlated with the distance between the fake skull and the chair where a participant chose to sit ($ps > .05$), except that the rating score of the neutral acceptance subscale of the DAP-R scale, which estimates individuals' indifferent attitude toward death (Wong et al., 1994), was negatively correlated with the distance between the fake skull and the chair where a participant chose to sit ($r = -.311, p = .05$), suggesting that individuals who thought death is more acceptable sat more closely to the skull.

The results of Study 2 indicate that the WP-task measure of BASM can predict individuals' avoidance of a physical symbol of mortality. The avoidance behavior was estimated implicitly and reflected individuals' momentary behavior to avoid physical symbols of mortality. The results suggest that behavioral avoidance of semantic and physical symbols of

mortality (e.g., word "death" and a skull) may be mediated by similar psychological process.

Study 3

In Study 3, we employed the WP task to test the hypothesis that, relative to nonbelievers, religious believers show reduced BASM by recruiting Christians and nonbelievers from the same country (i.e., China) to control for potential influences of local cultures on BASM. Because cultural traits such as independence/interdependence can lead to different types of self-esteem that buffers death anxiety (Du et al., 2013) and high levels of interdependent self-construal may attenuate the effect of heightened death-awareness on anxiety (Juhl & Routledge, 2014), Study 3 also estimated participants' cultural traits (i.e., interdependence and independence). Moreover, self-esteem and death anxiety were measured to examine whether any group difference in BASM between Christians and nonbelievers could be explained by differences in self-esteem and death anxiety.

Method

Participants. Study 3 recruited 186 Chinese undergraduate and graduate students as paid volunteers. Among these, 93 self-reported to be unaffiliated with any religion (33 males, 60 females, 21.57 ± 2.93 years), and 93 were self-identified Christians (Protestants; 49 males, 44 females, 22.17 ± 2.70 years). Christians and non-religious participants were matched in education (1–7 years at university). Christian participants were members of local Protestant communities. Their religious attitudes were evaluated using a questionnaire containing 10 religious items derived from Minnesota Multiphasic Personality Inventory (Butcher et al., 1989). All Christian participants reported believing there is a God and there will be the second coming of Christ.

WP task and estimation of death anxiety and self-esteem. Study 3 employed the same measures of BASM, death anxiety, and self-esteem as Study 1.

Estimation of cultural traits. Study 3 controlled for potential influences of cultural traits on target-cue distance measures in the WP task by asking participants to complete the Self-Construal Scale (Singelis, 1994) to estimate their cultural traits. This questionnaire consists of 24 items with 12 items for estimation of independence and 12 items for estimation of interdependence that require ratings on a seven-point Likert-type scale (1 = *strongly disagree*, 7 = *strongly agree*).

Results and discussion

Target-cue distances were subjected to an ANOVA with Target (self, family, friend, a favorable celebrity's name, an

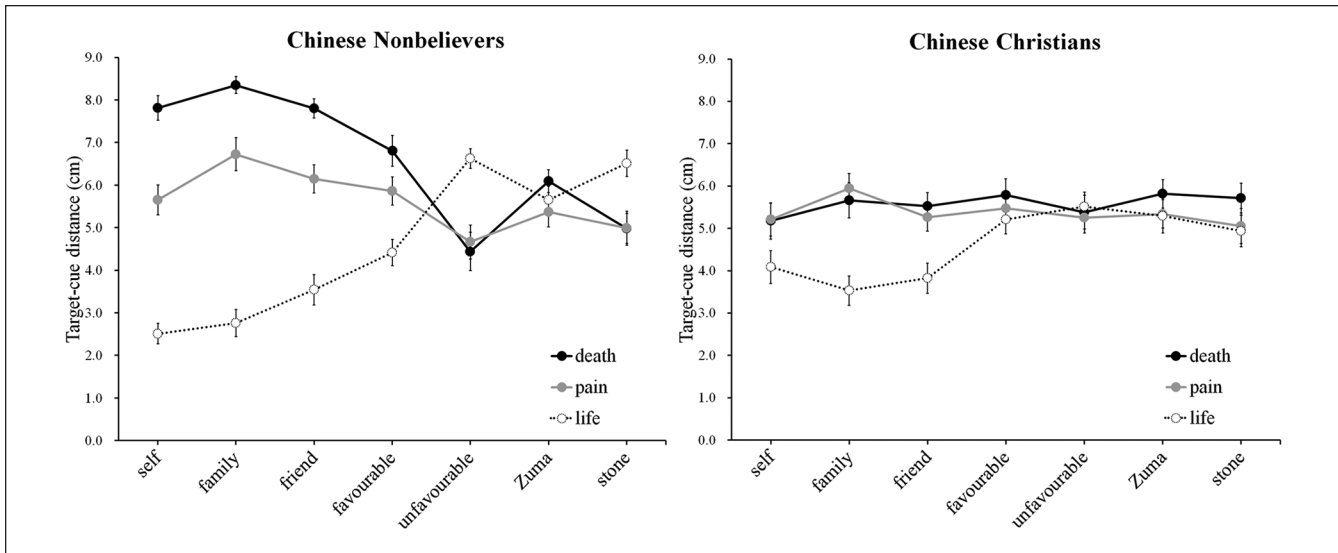


Figure 4. Target-cue distances measured from Chinese nonbelievers and Christians in Study 3. Error bars represent the standard errors.

unfavorable celebrity's name, Zuma, stone) as a within-subjects variable, and Cue (*death*, *pain*, or *life*) and Group (e.g., nonbelievers vs. Christians) as between-subjects variables. Target-cue distances from each subject group were further subjected to an ANOVA with Target as a within-subjects variable and Cue as a between-subjects variable. Post hoc pairwise comparisons were also conducted to compare target-cue distances between two different targets in the same cue condition (e.g., self vs. Zuma in the *death* cue condition), between two different cue conditions (e.g., [self]target-cue distances in the *death* and *pain* cue conditions), and between two different subject groups (e.g., [self]target-(death)cue distances from nonbelievers and Christians).

The target-cue distances from Chinese Christians and nonbelievers are shown in Figure 4. To estimate the distinct patterns of target-cue distances in Chinese Christians and nonbelievers, we conducted a $7 \times 3 \times 2$ ANOVA of target-cue distances, which showed a significant triple interaction of Target \times Cue \times Group, $F(12, 1080) = 8.474, p < .001, \eta_p^2 = .086$, indicating different patterns of target-cue distances in the *death/pain/life* cue conditions in Christians and nonbelievers. Separate analyses showed that nonbelievers' results replicated those of Study 1 (see Supplementary materials for statistical details). As predicted, Christians positioned all targets equally close to *death* or *pain* ($ps > .05$). Moreover, relative to nonbelievers, Christians also positioned self-closer to *death* (mean difference = $-2.637, 95\% \text{ CI} = [-3.675, -1.599], p < .001$) but farther away from *life* (mean difference = $1.574, 95\% \text{ CI} = [0.669, 2.480], p = .001$), suggesting that both BASM and behavioral tendencies to approach life were decreased in Christians relative to nonbelievers. To examine if religious believers would like to form more circle-like patterns of the target words than

nonbelievers, we calculated the number of nonbelievers and Christians who positioned the seven targets around the *death* cue in a circle-like pattern. It turned out that, out of the 31 participants in each subject group, 22 nonbelievers and 21 Christians positioned the seven targets around the *death* cue in a circle-like pattern. Thus, the circularity inclination was almost the same in the two subject groups and cannot explain the difference in target-cue distance between nonbelievers and Christians.

Rating scores of self-esteem, death anxiety, and self-construals were subjected to one-way ANOVAs. As shown in Tables S2 and S3, neither self-esteem, death anxiety nor self-construals differed significantly between participants in the three cue conditions, except that nonbelievers reported slightly higher fear of death in *life* than *pain* cue conditions. Direct comparisons of the rating scores from Christians and nonbelievers revealed higher self-esteem in nonbelievers than Christians, 29.67 ± 3.73 versus $27.72 \pm 4.97, t(184) = 3.018, p = .003, \text{Cohen's } d = .445$. Moreover, relative to Christians, nonbelievers reported greater fear of death, 3.16 ± 1.32 versus $2.46 \pm 1.35, t(184) = 3.575, p < .001, \text{Cohen's } d = .527$, greater tendency to avoid death, 3.46 ± 1.65 versus $2.51 \pm 1.46, t(184) = 4.138, p < .001, \text{Cohen's } d = .610$, and greater tendency to regard death as a neutral thing, 5.88 ± 0.90 versus $5.13 \pm 1.19, t(184) = 4.840, p < .001, \text{Cohen's } d = .713$, Christians actually regarded death as a good thing. However, Christians compared with nonbelievers reported higher approach acceptance of death, 3.09 ± 1.03 versus $5.05 \pm 1.25, t(184) = 11.626, p < .001, \text{Cohen's } d = 1.714$, and escape acceptance of death, 3.25 ± 1.48 versus $3.96 \pm 1.77, t(184) = 2.950, p = .004, \text{Cohen's } d = .434$. Self-Construal scores did not differ significantly between nonbelievers and Christians, interdependence: 5.13

± 0.57 versus 5.22 ± 0.62 , $t(182) = 1.004$, $p = .317$, Cohen's $d = .148$; independence: 4.69 ± 0.70 versus 4.56 ± 0.69 , $t(181) = 1.289$, $p = .199$, Cohen's $d = .191$. The differential (self vs. Zuma)target-(death)cue distance was not significantly correlated with any of the questionnaire measures in nonbelievers and Christians ($ps > .05$).

Because the analyses of questionnaire measures indicated that Christians scored lower in self-esteem, fear of death, and death avoidance relative to nonbelievers, we conducted ANCOVAs of target-cue distances with self-esteem, death anxiety, and cultural traits as covariates. The analysis also revealed a significant three-way interaction of Group \times Target \times Cue, $F(12, 1014) = 8.698$, $p < .001$, $\eta_p^2 = .093$, see Supplementary materials for the results of post hoc pairwise comparisons and confirmed the distinct patterns of target-cue distances in Christians and nonbelievers even when considering their differences in self-esteem and death anxiety.

Study 3 showed evidence for decreased BASM and decreased behavioral approach to a semantic symbol of life in Christians compared with nonbelievers. The results were confirmed when controlling group differences in cultural trait and self-esteem. Self-reported cultural traits (i.e., interdependence and independence) did not differ between Christians and nonbelievers and self-esteem was even lower in Christians relative to nonbelievers. Thus, it is unlikely that self-esteem is responsible for the decreased BASM in Christians than nonbelievers. The results indicate reduced BASM in religious believers than nonbelievers.

Study 4 and Study 5

Study 4 tested whether followers of other religions show reduced BASM relative to nonbelievers. Study 5 examined a causal relationship between religious afterlife beliefs and reduced BASM. See Supplementary materials and Figure 5 and Figure 6 for methods and results in Studies 4 and 5.

General discussion

The present research examined the relationship between religious afterlife beliefs and decreased BASM by developing the WP-task. We showed consistent evidence for BASM in nonbelievers from different societies (e.g., China and the United States) and for reduced BASM in different religious populations, including Christians, Muslims, Hindus, and Buddhists. Our results indicate that the difference in BASM between religious believers and nonbelievers is independent of local cultures and ecological contexts. The decreased BASM in religious believers compared with nonbelievers cannot be attributed to group differences in self-esteem or cultural orientation that are supposed to buffer death anxiety (Greenberg et al., 1986; Harmon-Jones et al., 1997; Pyszczynski et al., 1999) because the WP-task measure of BASM was independent of self-report of self-esteem and

cultural orientation in both religious believers and nonbelievers.

The decreased BASM in religious believers (vs. nonbelievers) does not simply reflect religious influences on negative emotion because religious believers and nonbelievers did not differ in their responses to a negative emotional cue (i.e., *pain*) in the WP task. The results support a psychological model of the relationship between religious afterlife beliefs and BASM and provide evidence for a fundamental similarity in decreased BASM in religious believers relative to nonbelievers. BASM may be regarded as a kind of proximal defense of mortality threat as suggested by the TMT (Greenberg et al., 1986, 1997; Pyszczynski et al., 1999; Solomon et al., 1991) and our results in the WP task obtained from nonbelievers provide further support to the TMT. Our results obtained from religious believers are also consistent with the TMT by showing that shared religious after-life beliefs as a cultural view reduces BASM and suggesting that religious after-life beliefs as a shared cultural view may reduce the need for proximal defense. However, our findings also suggest that BASM as a cognitive construct is different from death anxiety or fear of death because we found that BASM is not correlated with death anxiety. From this point of view, it may be argued that religious after-life beliefs as a shared cultural view influence people's behavior through modulations of BASM as a cognitive construct rather than a negative effect such as death anxiety.

Our findings go beyond revealing the difference in BASM between religious believers and nonbelievers by establishing causal evidence that temporarily activated religious afterlife beliefs can reduce BASM in nonbelievers. Priming Christian or Buddhism afterlife beliefs relative to the control priming reduced BASM as indicated by comparable target-cue distances in *death* and *pain* cue conditions and similar responses to self/family/friend and a stranger in the *death* cue condition. These effects cannot be accounted for by self-esteem and death anxiety because these were matched in different priming conditions. Moreover, changes in BASM due to priming were further confirmed after controlling self-esteem and death anxiety as covariates. Previous research showed that, while priming religious afterlife beliefs increased religious believers' racial prejudice (Johnson et al., 2010) and enhanced their prosociality toward ingroup members (Preston & Ritter, 2013), religious priming failed to affect nonbelievers' behavior (see Shariff et al., 2016, for a meta-analysis). Our findings, however, suggest that BASM is sensitive to exposure of religious afterlife belief even in nonbelievers.

A possible mechanism of the reduced BASM in religious believers (vs. nonbelievers) is their lessened affective responses to the self under mortality threat due to positive afterlife beliefs. Self-focused attention and psychological arousal play important roles in avoidance behavior (Clark & Wells, 1995) and individuals under conditions of social threat reported increased self-focused attention and heightened

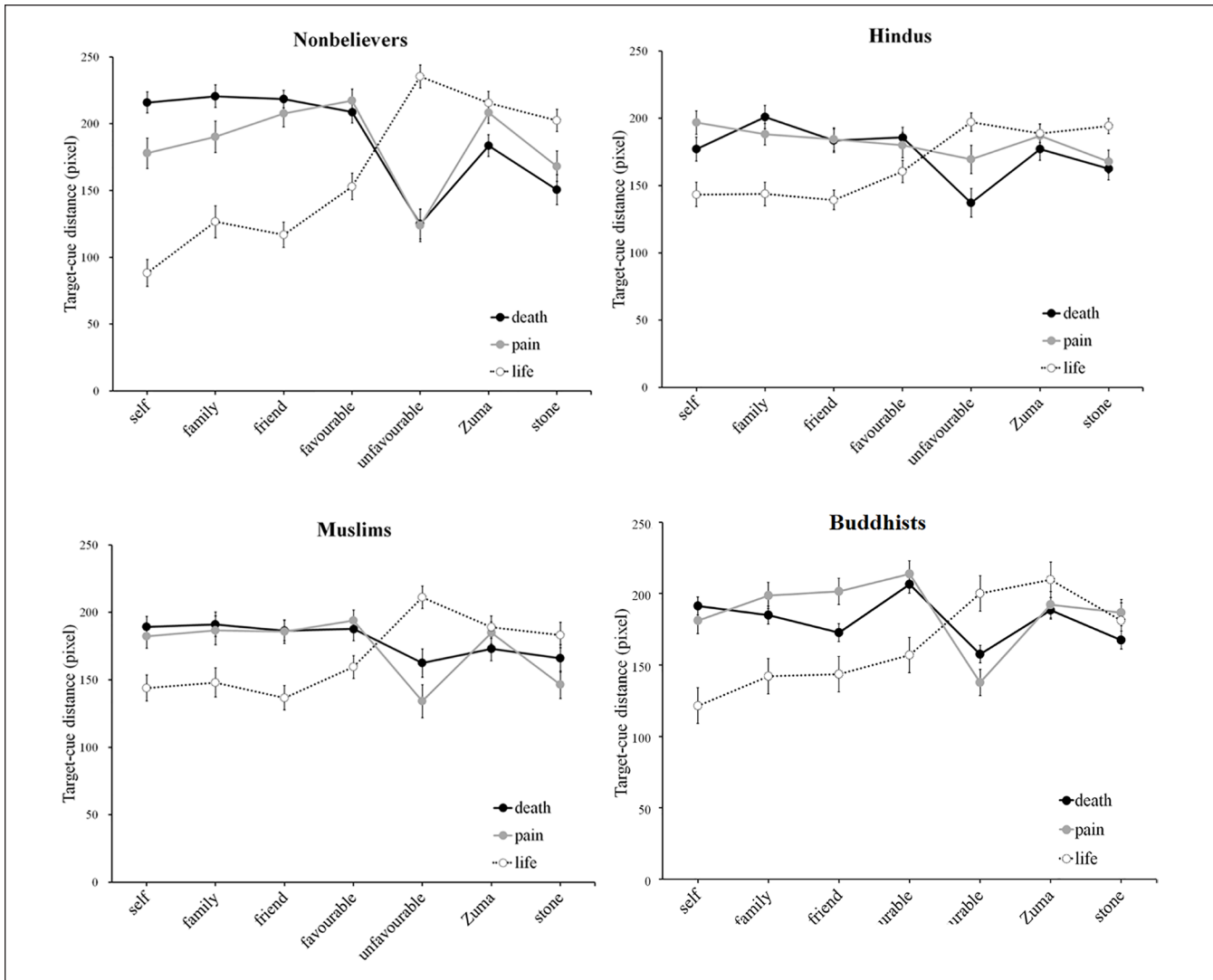


Figure 5. Target-cue distances obtained from nonbelievers, Muslims, Hindus, and Buddhists in Study 4. Error bars represent the standard errors.

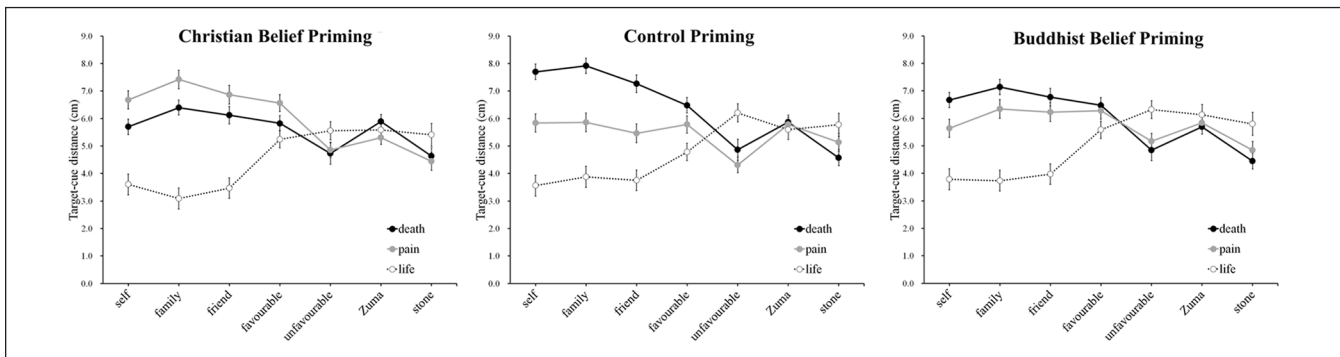


Figure 6. Target-cue distances of the three subject groups who were primed with Christian afterlife belief, Buddhism afterlife belief, or the control priming materials in Study 5. Error bars represent the standard errors.

arousal (Mansell et al., 2003). Similarly, the task of positioning the self (and close others) in relation to the *death* cue may

enhance self-focused attention and arousal that in turn drive avoidance to position the self-close to the *death* cue in

nonbelievers. However, if religious afterlife beliefs provide comfortable and enjoyable views of afterlife in religious believers, requiring religious believers to position the self in relation to the *death* cue would not enhance self-focused attention and arousal as those in nonbelievers and the decreased self-focused attention and arousal in turn reduce BASM. In consistent with this account, a recent event-related potential study showed that, in a task to identify one's own name and a stranger's name that flashed around the *death*, *pain*, or *life* cue, one's own name elicited a larger parietal activity at 340 to 500 ms (P300) after stimulus onset when flashing around the *death* cue than *pain* and *life* cues in nonbelievers, and this effect was significantly reduced in Christians (Fan & Han, 2018). The P300 amplitude has been demonstrated to be enlarged by highly arousing stimuli (e.g., Cuthbert et al., 2000; Olofsson et al., 2008) due to enhanced attention to emotionally salient stimuli (Polich, 2007). Thus is likely that increased attentional and emotional responses to the self under mortality threat may serve as an intermediate mechanism that accounts for the difference in BASM between nonbelievers and religious believers.

Another possible cognitive mechanism underlying the reduced BASM in religious believers relative to nonbelievers is the variation of self-focus due to religious beliefs and experiences. Empirical findings suggest differences in cognitive and neural representations of the self between religious believers and nonbelievers. Nonbelievers but not Christians responded faster to one's own face (Ma & Han, 2012). This finding suggests weakened self-focus in religious believers than in nonbelievers since self-face advantage in behavioral responses has been suggested to be an indicator of self-awareness (Keenan et al., 2003). Brain imaging studies also revealed that nonbelievers (but not Christians and Buddhists) engaged the ventral region of the medial prefrontal cortex (e.g., Han et al., 2008, 2010)—a brain region underlying encoding of self-relevance that is affected by cultural beliefs and experiences (Han et al., 2013; Han & Northoff, 2009; Han & Ma, 2015). These results implied lessened cognitive/neural representations of the self in religious believers than in nonbelievers. This is consistent with the religious spiritual request for self-transcendence, that is, to deny oneself to live a spiritual life (Ching, 1984; McDaniel, 1987) or to get rid of one's mind-set of any sense of "me" or "mine" (i.e., the no-self doctrine advocated by Buddhism, Albahari, 2006). Weakened self-representation implicates a shrunken target for mortality threat to act upon and thus leads to decreased BASM. Future research should test this account.

One of the major functions of religious beliefs is to reduce a person's fear of death (Grogh-Marnat, 1992). Previous research focused on the relationship between religion and death anxiety (Ellis & Wahab, 2013; Jong, 2021; Jong et al., 2017). The WP task developed in the current research allowed us to estimate both relationships between religious beliefs and BASM and between religious beliefs and behavioral approach to symbolic life. Given the similar survival value of inclinations to avoid death and to approach life, one

may expect coexistence of an increased inclination to approach life and a reduced BASM. Indeed, we showed evidence that nonbelievers consistently positioned the self and close others (vs. a stranger) closer to life and positioned a favorable (vs. unfavorable) person closer to life. Religious believers (vs. nonbelievers), however, positioned the self-closer to *death* but further away from *life*. However, we showed that priming nonbelievers with religious afterlife beliefs or secular immortality beliefs failed to affect (self) target-(life)cue distances in nonbelievers. The results suggest that short-term priming of religious immortality beliefs cannot significantly modulate behavioral tendency to approach symbolic life. It appears that long-term religious practices are necessary for influencing on both BASM and behavioral approach to life.

The decreased BASM in religious believers identified here provides possible cognitive underpinnings of their social behaviors under mortality threat. There has been evidence for associations between religion and social behavior related to death threats. For example, the frequency of mosque attendance positively predicted support for suicide attacks in Muslim samples (Ginges et al., 2009) and religiosity (both prayer and religious attendance) was positively related to the willingness to die for one's beliefs (Norenzayan & Hansen, 2006). Although the findings of these studies indicate a possible link between religiosity and social behavior under mortality threat, the psychological underpinnings remain unclear. The WP task can be used to assess the relationship between BASM and sacrificial death-risking behaviors. Although the current work focused on the relationship between a specific religious afterlife belief (e.g., heaven) and BASM, believers of different religions have other common afterlife beliefs (e.g., hell) and nonbelievers may also share secular afterlife beliefs such as continuity of dead agents' psychological states (Bering, 2006). Future research should test how these afterlife beliefs affect individuals' BASM and thus, in turn, influence their social behavior.

The present research has several limitations that require further examination. First, while the WP task is brief, intuitive, and can be easily applied to different populations, it is unknown to what degree the WP-task measures of BASM and behavioral approach to symbolic life are influenced by social contexts and desirability. Second, although the present research did not find evidence for correlation between BASM and interdependence, it remains elusive how an individual's performance in the WP task is affected by other cultural traits and social expectations. Third, the present research only tested young adults. Whether the WP-task measures can reflect BASM in nonbelievers of other age groups remains unclear. These limitations should be considered in future research.

Conclusion

The present research developed and validated the WP task and used this task to assess religious believers' and nonbelievers' BASM and behavioral approach to semantic symbols of life.

We showed evidence for reduced BASM in religious believers including Christians, Muslims, Hindus, and Buddhists, relative to nonbelievers. We also revealed evidence for a causal relationship between religious beliefs and decreased BASM. Our findings highlight a fundamental similarity of behavioral tendencies among religious believers that distinguish them from nonbelievers. These findings strengthen our understanding of the social and psychological functions of religious beliefs in guiding behaviors under mortality threat. Future research on cultural differences in death- and life-related cognitive/affective processes should consider religious beliefs as a fundamental variable and go beyond East-West cultural comparisons because the majority of nonbelievers are distributed in the Asia-Pacific region (Hackett et al., 2015). Finally, while the findings of the current work shed new light on the relationship between religious beliefs and BASM as a psychological construct, future work should clarify whether and how other factors such as natural disasters or wars that cause massive mortality influence people's decision-making to localize symbolic of death such as cemeteries.

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Author Contributions

The first and second authors contributed equally to this manuscript.

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Supplemental Material

Supplemental material is available online with this article.

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