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Abstract

Recent psychological models of religion suggest that religious beliefs provide a form of psychological control. Independently, other research has found that an increase in psychological control can lead people to adopt riskier strategies. Hence, we hypothesized that activation of God concepts increases risk taking. In three studies, we found that God primes led to take greater risk taking as though participants were literally “taking a leap of faith.” In Study 2, we presented evidence that this effect could be mediated by increased psychological control. Although consistent with psychological models of religion, the findings also contradict some survey findings that religious people are less risk seeking. This inconsistency was addressed in Study 3 by looking at how religion, morality, and risk taking are related. Implications to a relational schema approach to study the effects of God primes are discussed.

Keywords

God, religion, risk taking, morality, control

On the northern summit of Tryfan, a mountain in Snowdonia, Northern Wales, sits 2 boulders 4 feet apart. Jumping across the boulders is a popular activity, despite the risk of free falling 3,000 feet (Nuttal & Nuttal, 2009). One special feature of this activity is that the two boulders are called “Adam” and “Eve,” and this raises the question whether these biblical references have anything to do with people accepting the risk to jump across them. In this research, we examined this question by investigating how activating the concept of God influences risk taking.

God and Religion

Religion is important to many people. Across the globe, religion influences how many people behave and how they think about their place in the world. Many religions endorse a divine being that purportedly rules over humankind. We refer to this being irrespective of its theistic origins as “God.”

Beliefs about God can have numerous influences, such as on moral behavior (Darley & Batson, 1973) and on ceremonial displays (Atran, 2002; Glucklich, 2000). In fact, previous studies have shown that God primes have been shown to affect agency beliefs (Dijksterhuis, Preston, Wegner, & Aarts, 2008), prosociality (Shariff & Norenzayan, 2007), honesty (Randolph-Seng, & Nielsen, 2007), spatial attention (Chasteen, Burdzy, & Pratt, 2010), allocation of punishment (McKay, Efferson, & Fehr, 2010), submissiveness (Saroglou, Corneille, & Van Cappellen, 2009), moral hypocrisy (Carpenter & Marshall, 2009), attachment-related processes (Birgegard & Granqvist, 2004; Granqvist, Mikulincer, & Shaver, 2010; Kirkpatrick, 1999), stress responses (Inzlicht & Tullett, 2010);

Weisbuch-Remington, Mendes, Seery, & Blascovitch, 2005), and humor (Saroglou & Jaspard, 2001). Research, however, has not examined whether God concepts, once activated, would affect risk taking.

Risky behaviors are commonly instigated in the presence of peers or even strangers (DiClemente, Hansen, & Ponton, 1996). In this research, we aimed to show that risky behaviors are also subject to forces that are more subtle and nonhuman. History is replete with risk-associated events, such as wars, motivated (or condoned) by religious objectives (e.g., the Crusade). In more recent times, former U.S. President George W. Bush felt it was a divine mandate from God for him to launch a military campaign in Iraq (MacAskill, 2005). Researchers have also found that people are more likely to aggress if they believe that their violence is sanctified (e.g., Bushman, Ridge, Das, Key, & Busath, 2007). These historical events and empirical studies, however compelling, offer little evidence about the link between God beliefs and risk taking because risk taking may only be weakly related to aggression.

We posit that the key in understanding the effect of God beliefs on risk taking lies in two associations—the association between God and control¹ and that between control and risk taking. With regard to the first, several theorists (Batson &

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Stocks, 2004; Berger, 1967; Freud, 1927) have postulated that religion fulfills basic psychological needs and imbues individuals with a sense of control in a world that is seemingly filled with randomness and chaos. In particular, the compensatory control model of religion (Kay, Gaucher, McGregor, & Nash, 2010) postulates that religion serves as an external source of control that compensates for chaos in one's internal life (see also Malinowsky, 1948). Note that in the compensatory control model of religion (Kay et al., 2010), religion is viewed as an *external source* of control (deriving a sense of control from God) and not as a source of *external control* (relegating a sense of control to God).

Similar findings were found specifically for God beliefs. Kay et al. (2010) demonstrated that when life seemed uncertain, people increased their belief in a God that is in control of chaos but not belief in a God that only creates the world. Also, voters believed more in the controlling God (vs. the creationist God) before a major election (high uncertainty) compared to after (high certainty; Kay, Gaucher, Napier, Callan, & Laurin, 2008). These findings suggest that people often draw from God beliefs a sense of control in uncertain times. Notably, these beliefs about God and control may exist as general schematic associations because of learned cultural associations, irrespective of an individual's religiosity.

Uncertainty is a key feature of risky activities (Yates & Stone, 1992), and there is evidence to suggest that psychological control increases risk taking (e.g., Kray, Paddock, & Galinsky, 2008; Nordgren, van der Pligt, & van Harreveld, 2007). For example, participants who imagined themselves to be drivers (high control) were more comfortable with taking risks (e.g., high driving speeds) than those who imagined themselves to be passengers (low control; Horswill & McKenna, 1999). Similarly, gamblers playing craps placed higher and more "difficult" bets on their own rolls (high illusion of control) than on other patron's rolls (low illusion of control; Davis, Sundahl, & Lesbo, 2000; Langer, 1975). Other researchers (Anderson & Galinsky, 2006) have found that a strong sense of personal power can drive risk taking, such as greater willingness to have unprotected sex. Some of these studies examined risky behaviors that are likely to be deemed undesirable, as they might be immoral. In this research, we examined risk taking as a general construct, one without such moral undertones.

In summary, existing literature indicates that religion imbues people with a sense of control, and this heightened psychological control may lead people to take more risks.² We also derive from this literature the proposition that there exist learned schematic associations between God concepts and general risk taking. Hence, we proposed the primary hypothesis that God primes should elicit higher risk taking in a morally neutral task, and the mediator hypothesis that psychological control should mediate this effect. Three studies were conducted, in which participants were exposed to the word *God*, and risk taking was measured by the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). Study 1 provided the first test of the primary hypothesis. Study 2 tested whether psychological control is a mediator of the hypothesized effect. In

Table 1. Religious Affiliation (Studies 1, 2, and 3).

	Study 1	Study 2	Study 3	Aggregate
Buddhism	34 (19.8%)	26 (18.8%)	27 (19.0%)	87 (19.2%)
Protestantism	44 (25.6%)	30 (21.7%)	43 (30.3%)	117 (25.9%)
Catholicism	10 (5.8%)	6 (4.3%)	11 (7.7%)	27 (6.0%)
Islam	6 (3.5%)	6 (4.3%)	6 (4.2%)	18 (4.0%)
Hinduism	4 (2.3%)	11 (7.8%)	1 (0.7%)	16 (3.5%)
Taoism	7 (4.1%)	8 (5.8%)	9 (6.3%)	24 (5.3%)
No religion	65 (37.8%)	46 (33.3%)	40 (28.2%)	151 (33.4%)
Others	2 (1.2%)	1 (0.7%)	2 (1.4%)	5 (1.1%)
Missing data	0 (0.0%)	4 (2.9%)	3 (2.1%)	7 (1.5%)

Note. "Others" comprise people whose religious affiliations do not fall within mainstream religions (e.g., Universal Consciousness, Paganism, etc.).

Study 3, we also examined how God primes would affect risk taking when the risky act was no longer deemed morally neutral, which would address an apparent contradiction between the current prediction and the survey findings on a negative correlation between religiosity and risk taking.

Study 1

Participants were subliminally primed with the words *God*, *Dad*, or *Water* and subsequently engaged in a risk-taking task. *Water* served as the neutral prime. *Dad* was used to rule out two alternative explanations. First, because some religions conceptualize God as a fatherly figure, priming God could coactivate a father-like concept, which in turn affects risk taking. Second, because God can function as a secure attachment figure (Granqvist et al., 2010) and father primes are known to activate a sense of attachment security (Mikulincer et al., 2001), priming God could activate a sense of security which in turn encourages risky behavior (Feeny & Collins, 2004). If *God* produces higher risk taking than *Dad*, it would suggest that the effect of the God prime cannot be solely explained by the activation of fatherly or attachment security concepts. Also, we measured intrinsic and extrinsic trait religiosity as potential moderators.

Method

Participants

Participants were 172 National University of Singapore (NUS) undergraduates ($M_{\text{age}} = 20.1$; standard deviation [SD_{age}] = 1.31; 46 males, 123 females, 3 undisclosed) who participated for course credits. See Table 1 for participants' religious affiliations. They were randomly assigned to be primed with the word *God* ($n = 62$), *Water* ($n = 54$), or *Dad* ($n = 56$).

Procedure

Participants were randomly assigned to individual cubicles. First, instructions about BART (presented as a "Balloon Game") were given. Then, participants attempted 10 practice trials of the BART. Thereafter, they performed a 60-trial subliminal priming task concealed as a circle-detection task. On

each trial, a central fixation cross (+) was presented for 1,000 ms, followed by the 17-ms prime, and then a 50-ms mask (XXXXXXXX). A circle then appeared on screen and participants indicated its location by pressing *z* (left) or *m* (right). The circle was thereby removed and the next trial was activated. Thereafter, they completed 30 main trials of the BART.

On each BART trial, participants had to pump an inflatable on-screen balloon by clicking a virtual pump. With each pump, they could earn 1 cent if the balloon did not explode, but if the balloon exploded, they would lose all the money they accumulated on that trial. At any time, they could choose bank in their earnings by hitting a “Collect \$\$\$” button. Risk taking was computed by averaging the number of pumps on trials in which the balloons did not explode (Lejuez et al., 2002; see also Wallsten, Pleskac, & Lejuez, 2005). Higher scores reflect greater risk taking.

After the BART, participants completed demographic measures and funnel debriefing items (Bargh & Chartrand, 1999). No one saw the primes nor suspected a link between the tasks.

Measures

Intrinsic/Extrinsic–Revised (I/E-R) Religiosity Scale. The 14-item I/E-R religiosity scale (Gorsuch & McPherson, 1989) measures two orthogonal orientations toward religiosity. Intrinsic religiosity (e.g., “I try hard to live all my life according to my religious beliefs”; $\alpha = .81$) regards religion as an end, where individuals value religion for what it is. Extrinsic religiosity (e.g., “I go to church mostly to spend time with my friends”; $\alpha = .87$) regards religion as a means where individuals view religion in terms of what they can gain from it. The word “church” in some items was replaced with “[a] place(s) of worship” to make it applicable to non-Christian/Catholic participants. Participants answered the items on 5-point scales ranging from 1 (*Strongly disagree*) to 5 (*Strongly agree*). An average score for each facet was computed.

Results and Discussion

Two separate one-way analysis of variance (ANOVA) revealed that prime, administered before the religiosity measures, did not affect intrinsic, $F(2, 169) = .78, p = .93, \eta^2 < .01$, or extrinsic, $F(2, 169) = .57, p = .56, \eta^2 < .01$, religiosity ratings.

Next, we conducted separate hierarchical regression analyses for the two religiosity moderators. Intrinsic (uncentered $M = 3.81, SD = 1.06$) and extrinsic (uncentered $M = 4.04, SD = 1.29$) religiosity were centered. Two dummy variables, D_1 and D_2 , were constructed as follows: The Water and Dad conditions were coded 1 and the God condition was coded 0. Then, the interaction terms between the centered religiosity scores and the dummy variables were computed. The dummy variables and centered religiosity scores were entered in Step 1 and the interaction terms were entered in Step 2.

Using intrinsic religiosity as moderator, there was a main effect of intrinsic religiosity ($B = 2.58, t = 2.72, p = .007$), indicating that intrinsically oriented individuals were inclined

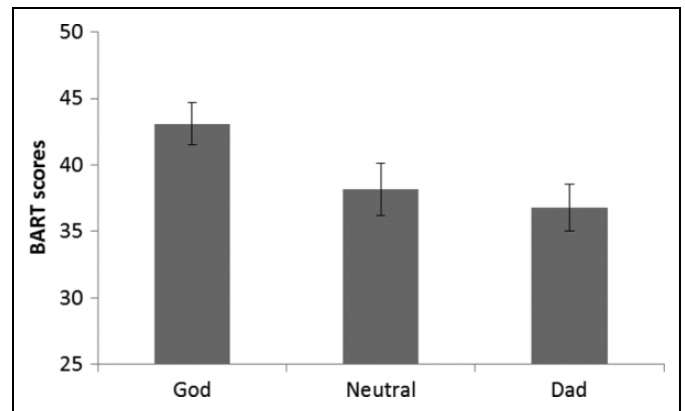


Figure 1. Risk taking by prime (Study 1). Note. Error bars represent standard errors.

to take more risks. Importantly, participants primed with *God* took more risks than those primed with *Water* ($B = -5.00, t = 2.05, p = .04$) or *Dad* ($B = -5.89, t = 2.43, p = .02$; see Figure 1). There was, however, no evidence that intrinsic religiosity moderated the effects of D_1 ($B = 3.63, t = 1.47, p = .15$) and D_2 ($B = 2.48, t = .66, p = .51$).

Using extrinsic religiosity as moderator, there was no main effect of extrinsic religiosity ($B = .84, t = 1.06, p = .29$). Again, participants primed with *God* took more risks than those primed with *Water* ($B = -4.79, t = 1.93, p = .05$) or *Dad* ($B = -6.22, t = 2.52, p = .01$). There was no moderating effects of extrinsic religiosity ($D_1: B = 3.59, t = 1.83, p = .07$; $D_2: B = .82, t = .43, p = .67$).

In summary, the main effects of prime indicates that *God* primes increase risk taking, and this effect is unlikely to be due to activation of father- or attachment-related concepts. Furthermore, high intrinsic religiosity individuals took more risks, which is consistent with the compensatory view of religion (Kay, Whitson, Gaucher, & Galinsky, 2009) that intrinsically oriented individuals chronically feel a higher sense of control and hence have a greater tendency to take risks.

Study 2

Next, we examined whether psychological control mediates the effect of *God* primes on risk taking. Using the “manipulation-of-process design” (Spencer, Zanna, & Fong, 2005), we reasoned that if *God* primes increased psychological control which in turn led to higher risk taking, disabling this mediator mechanism via experimental manipulation (i.e., lowering the sense of psychological control among those primed with *God*) would lower risk taking. Accordingly, among those primed with *God*, half wrote about an experience where they felt low in control and the other half wrote about blood donation. Blood donation would control for valence; that is, to ascertain that any effects of weakened psychological control was not due to the associated negativity. *Water* again served as neutral prime; except the *Water* condition participants also wrote about blood donation—in this way, the results in the *Water*- and

God-Neutral Control conditions could be compared to Study 1 and any difference between them could be attributed to the difference in prime (*God* versus *Water*). Also, we employed a more naturalistic prime of God to simulate everyday encounters with God-related objects.

Method

Participants

Participants were 138 NUS undergraduates ($M_{age} = 21.0$, $SD_{age} = 1.62$; 50 males, 84 females, 4 did not indicate gender) who participated for course credits (see religious affiliations in Table 1). Participants were randomly assigned to the Water ($n = 40$) or the God condition. Within the God condition, participants were further assigned to write about low control (God-Low Control condition; $n = 43$) or blood donation (God-Neutral Control condition; $n = 55$).

Procedure

Participants were seated in cubicles where a stack of papers were placed at the corner of the desk. The top sheet of the stack read either “The Nature of God” (God condition) or “The Nature of Water” (Water condition) in large font. We did not point out the purpose of the papers, and neither did participants ask about them. Postexperimental debrief revealed that all participants noticed the papers but were unaware of its influence.

Like Study 1, participants began with 10 practice trials of the BART. Then they were asked to write an essay. Those in the God condition were instructed to describe either a time where they felt low in control (God-Low Control condition) or their experiences with blood donation (God-Neutral Control condition). Those in the Water condition were asked to write about their experiences with blood donation. Participants then proceeded to 30 trials of the BART. Thereafter, they completed demographics, social axioms religiosity subscale (Leung & Bond, 2004), and suspicion checks measures. Debrief revealed that no one suspected that the tasks were connected.

Pretest for psychological control manipulation. The manipulation was pretested in a separate sample of 31 NUS undergraduates. These participants rated 5 psychological control items ($\alpha = .72$), on 5-point scales from 1 (*Strongly disbelieve*) to 5 (*Strongly believe*), after describing a low control incident ($n = 14$) or a blood donation incident ($n = 17$): “I am responsible for most of the things that happen to me,” “I feel that I am in control of my own life,” “I feel that I don’t have enough control over the direction my life is taking,” “There really is no such thing as luck,” and “I feel that what happens in my life is chiefly controlled by powerful others.” We composed the first 2 items, and the rest were adopted from Rotter (1966) and Levenson (1981). The low control participants ($M = 2.99$, $SD = .74$) reported a lower sense of control than the neutral control participants ($M = 3.80$, $SD = .41$), $t(29) = 3.87$, $p = .001$. Both conditions did not differ on four negative affect items (“How fearful/sad/

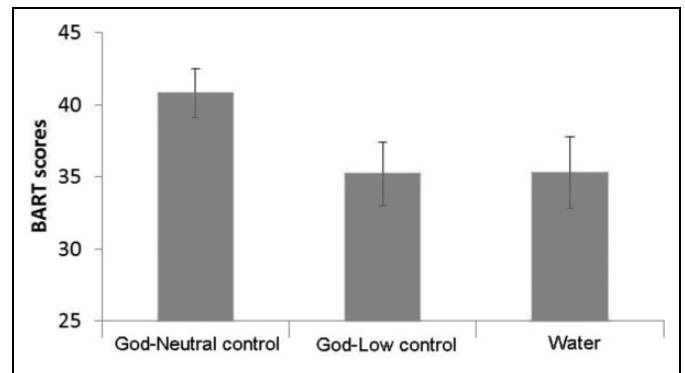


Figure 2. Risk taking by prime (Study 2).
Note. Error bars represent standard errors.

upset/negative are you feeling now?”), all $ps > .46$, indicating that they were comparable in valence.

Results and Discussion

Means are plotted in Figure 2. A one-way ANOVA showed a significant difference in risk taking across the three conditions, $F(2, 137) = 4.05$, $p = .02$, $\eta = .04$. Post hoc Tukey analyses revealed higher risk taking in the God-Neutral Control condition compared to the Water condition ($p = .05$), which replicated Study 1 but using different prime materials, hence enhancing the robustness and ecological validity of the findings. Among those exposed to the God prime, those who felt low in psychological control (God-Low Control condition) took fewer risks than those whose sense of psychological control were not manipulated (God-Neutral control; $p = .04$). No difference was found between the God-Low Control condition and the Water condition in risk levels ($p = .99$). These results imply that when concepts of God are activated, people feel greater psychological control, which can in turn drive risky behavior, but the negation of such feelings of high control can attenuate risk taking to baseline levels. There was no main effect of religiosity ($B = 2.76$, $t = .85$, $p = .40$) nor Prime \times Religiosity interaction ($B = 1.07$, $t = .16$, $p = .87$).

Study 3

Studies 1 and 2 demonstrated that priming people with God increases risk taking. Also, in Study 1, people higher in intrinsic religiosity exhibited higher risk taking. These findings seem to contradict some survey findings demonstrating *negative* correlations between trait religiosity and risk-taking behaviors including criminal involvement (Abar, Carter, & Winsler, 2009), unprotected casual sex (Murray, K. M., Ciarrocchi, J. W., Murray-Swank, 2007; Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998), substance abuse (Kerestes, Youniss, & Metz, 2004; Sinha, Cnaan, & Gelles, 2007), and gambling (Diaz, 2000), which should imply that activating religious concepts decreases risk taking. However, the risk behaviors in these studies are imbued with

moral underpinnings. In contrast, in Studies 1 and 2, the BART, including the monetary reward, was described to participants as a typical laboratory task without any moral connotations. These survey findings could imply the possibility of learned associations between religiosity and risk-taking acts conceived as morally improper, but the current findings reflect, as hypothesized, learned associations between God concepts and risk taking in the generic and nonevaluative sense. The point is not that people primed with God would show different risk-taking patterns depending on the domain of risk taking. Rather, it is whether the domain of risk taking has moral connotations. If risk taking is presented in morally neutral terms, as we have done in Studies 1 and 2, we argue that God primes would increase risk taking. But if there are moral injunctions associated with the risky act, we hypothesize that people would take less risk when primed with God.

To test this proposition, participants were supraliminally primed with either God or a control prime while performing the BART. To manipulate moral injunction, participants were led to perceive the BART in immoral (Greed condition) or amoral tones (Amoral condition). Also, the control prime participants were primed with *Fairies* instead of *Water*, to eliminate the possibility that the effect of *God* was due to its supernatural meaning.

Method

Participants

Participants were 142 NUS undergraduates ($M_{\text{age}} = 21.1$; $SD_{\text{age}} = 1.53$; 55 males) who participated for course credits (see religious affiliations in Table 1). They were randomly assigned to the cells of a 2 (prime: God vs. fairy) \times 2 (moral injunction: greed vs. amoral) design.

Procedure

Similar to Study 2, participants were seated in cubicles where a stack of papers were placed at the corner of their desk. The top sheet of the stack read either “The Nature of God” (God condition) or “The Nature of Fairies” (Fairy condition). Debrief revealed that all participants had noticed the papers but were unaware of its influence. After 10 practice trials of the BART, they read a bogus “scientific” article designed to induce perceived moral or amoral injunctions. Those in the greed condition read an article that denounced the accumulation of wealth and stated that performance on the “balloon game” predicts unethical money-related acts (e.g., embezzlement)—negative and immoral. Those in the amoral condition read that the “balloon game” predicts negative health outcomes—negative but amoral. Note that negativity in both groups was controlled for. Participants then attempted the BART. Next, the participants completed manipulation and suspicion checks and demographic items. No one could guess the hypothesis. They were thanked and debriefed.

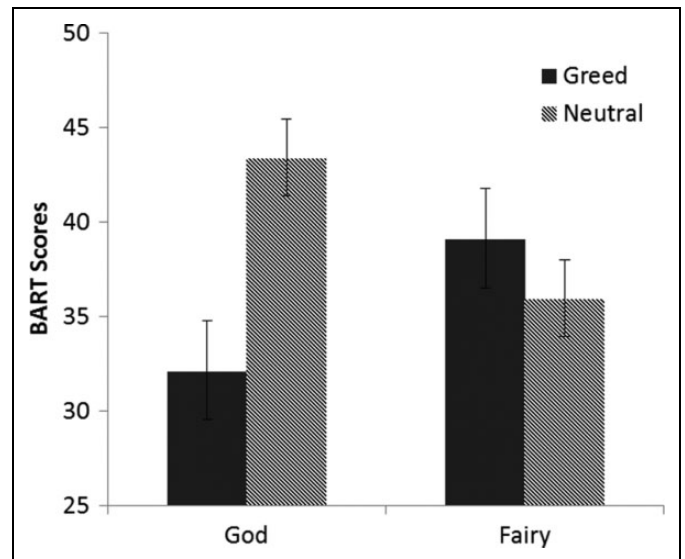


Figure 3. Risk taking by prime and moral injunction (Study 3). Note. Error bars represent standard errors.

Measures

Manipulation check for moral injunction. Participants rated their moral attitudes toward six issues (premarital sex, feeling jealous at friend’s success, eating meat, skipping classes, being late for appointments, and being greedy about money). The items were phrased “To me, [issue] is . . .,” and responses were made on 7-point scales from 1 (*morally wrong*) to 7 (*morally right*). Only the item on greed was of interest; the rest served as mask items. Also, participants were assessed on how much they believed that the (bogus) negative predictions stated about the BART applied to themselves (“To what extent do you think the predictions will apply to you?”) on a 7-point scale from 1 (*Not at all*) to 7 (*To a large extent*).

Results and Discussion

Participants in the greed condition felt more strongly that monetary greed was morally wrong ($M = 3.42$; $SD = 1.25$) than those in the amoral condition, ($M = 4.71$; $SD = 1.33$), $t(141) = 2.49$, $p = .02$. However, the greed condition participants ($M = 3.32$; $SD = 1.33$) did not differ from the amoral condition participants ($M = 3.59$; $SD = 1.35$) on how much they thought the predictions about BART applied to them, $t(141) = 1.18$, $p = .24$, suggesting that the believability of both passages was comparable.

A 2 (prime: God vs. fairy) \times 2 (moral injunction: greed vs. amoral) ANOVA revealed a significant interaction, $F(1, 138) = 9.43$, $p = .003$, $\eta^2 = .07$. There were no main effects of prime, $F(1, 138) = 0.1$, $p = .92$, $\eta^2 < .01$, or moral injunction, $F(1, 138) = 2.97$, $p = .09$, $\eta^2 = .02$. Note that no main effect of prime was expected this time because of the hypothesized moderating effect of moral injunction.

Simple effects analyses revealed that in the absence of moral injunctions (amoral condition), individuals primed with *God*

took more risks than those primed with *Fairies*, $F(1, 138) = 4.07, p = .05, \eta = .03$ (see Figure 3). This replicated our main findings in Studies 1 and 2 and also ruled out the possibility that the effect was due to “supernaturalness.” However, when moral injunctions were invoked (Greed condition), individuals primed with *God* displayed less risk taking than those primed with *Fairies*, $F(1, 138) = 4.66, p = .03, \eta = .03$, which mirrors correlational studies of religiosity and risk taking. As expected, among those primed with *God*, risk taking was reduced when moral injunctions were evoked, $F(1, 138) = 10.74, p = .001, \eta = .07$, but among those primed with *Fairies*, no difference in risk taking was observed, $F(1, 138) = .98, p = .33, \eta = .007$. The findings provide evidence that the discrepancy between survey findings and ours could possibly be due to the difference in morality underpinnings in the risk domains. That is, the risk-taking domains examined in past survey research may have a stronger moral content than that examined in Studies 1 and 2. Future studies that seek to correlate religiosity and risk taking should sample risks from a greater variety of domains (Weber, Blais, & Betz, 2006), including those normally immoral (e.g., unprotected casual sex) and amoral (e.g., trying new health treatment).

General Discussion

Prominent psychological models of religion (Kay et al., 2009; Freud, 1927) have emphasized the role of psychological control in religion. Independently, a heightened sense of control has often been implicated in risk-taking behaviors. Building on these theoretical foundations, we hypothesized and found that supraliminal and subliminal God primes increased risk taking (Studies 1–3), compared to a neutral prime (Studies 1 and 2), a secure attachment/fatherly prime (Study 1), or a supernatural prime (Study 3). We further showed psychological control mediated these effects (Study 2).

The results of Study 3 also reconciled an apparent contradiction from some survey research that found negative correlations between religiosity and risk-taking behaviors. We argued that these survey findings sampled risk taking from domains implicated as immoral (e.g., criminal behaviors) and that high religiosity would reduce risky acts in domains perceived as immoral. Consistently, in Study 3, when moral injunctions against risk taking were primed, the main effect was reversed.

Would religious categories moderate the effect of God primes on risk taking? To investigate whether the effect was asymmetrical across religious faiths, we aggregated our data and classified participants' religious affiliations into three groups: (1) Catholics and Protestants; (2) non-Christians (i.e., Buddhists, Taoists, Muslims, Hindus, and nonmainstream religious affiliations); and (3) atheists. Our analyses revealed no Prime \times Religious Affiliation interaction on risk taking, $F(2, 448) = 2.34, p = .10, \eta^2 = .01$. This implies that the effect of God primes on risk taking was independent of religious affiliations. We proposed that there are learned schematic associations between God concepts and risk taking, and these data

suggest that similar associations are learned by and shared between members of different faiths. Our samples were obtained in Singapore, a small city-state in which members of different religious groups are exposed to similar messages about each religious concept through everyday interaction, educational settings, and the media. It therefore may not be surprising that a similar construct of God and learned associations with risk taking were shared across affiliations.

It seems prudent to note that there is no consistent evidence in the literature on whether trait religiosity moderates the effects of religious primes. Several studies found a moderation (Baldwin et al., 1990; Carpenter & Marshall, 2009; Dijksterhuis et al., 2008; Inzlicht & Tullett, 2010; Saroglou & Jaspard, 2001; Weisbuch-Remington et al., 2005) but many did not (Chasteen et al., 2010; Laurin, Kay, & Fitzsimmons, 2012; Randolph-Seng & Nielsen, 2007; Rounding, Lee, Jacobson, & Ji, 2012; Saroglou et al., 2009) or have mixed findings within studies (McKay et al., 2010; Shariff & Norenzayan, 2007). The reasons (e.g., different dependent variables, religiosity measures, types of prime) for these divergent findings are complex and beyond the scope of this article (see also Laurin et al., 2012).

Religion has great impact on humanity. More specific to this research, God as a dominant agent of religion can exert powerful effects on people. These influences can be subtle and non-conscious triggered by innocuous objects such as the stack of papers used to prime God in Studies 2 and 3, which resemble common things found in daily life (e.g., books, posters, and billboards). Because God and religion have widespread influences on humanity, and their representations so ubiquitous, future research can examine what other effects God primes exert, such as the effectiveness of clinical interventions (West, 2000), aggression (e.g., terrorism; Victoroff & Kruglanski, 2009), and processes related to the self (e.g., self-mortification; Glucklich, 2000). The increase in psychological control as a consequence of God primes could also have important downstream consequences, such as those involved in self-regulation (McCullough & Willoughby, 2009).

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Notes

1. Although God primes reduced individuals' sense of agency (Dijksterhuis et al., 2008) which is often interpreted as feeling less in control, this feeling of control is the qualia of having caused an action in the past, not a feeling of having the capacity to do something in the future, which is closer to Kay et al.'s (2010) concept of control. See Skinner (1996) for a thorough discussion.

2. High religiosity has been linked to high self-control, which may lead to lower risk taking. Self-control, the capacity to suppress impulses, is qualitatively different from the psychological control we posit in this article. In addition, although some risk decisions are made impulsively (especially under time pressure), not all risks are as such. Indeed, there was no time pressure to perform the Balloon Analogue Risk Task (BART). Furthermore, several research have found no correlations between various measures of impulsivity and BART (Aklin, Lejuez, Zvolensky, Kahlerc, & Gwadzd, 2005; Lejuez, Aklin, Zvolensky, & Pedulla, 2003; Reynolds, Ortengren, Richards, & de Wit, 2006). Therefore, even if God prime increases self-control, this would not necessarily lead to low risk taking, particularly not in the BART.

References

- Abar, B., Carter, K. L., & Winsler, A. (2009). The effects of maternal parenting style and religious commitment on self-regulation, academic achievement, and risk behavior among African-American parochial college students. *Journal of Adolescence, 32*, 259–273. doi:10.1016/j.adolescence.2008.03.008
- Aklin, W. M., Lejuez, C. W., Zvolensky, M. J., Kahlerc, C. W., & Gwadzd, M. (2005). Evaluation of behavioural measures of risk taking propensity with inner city adolescents. *Behaviour Research and Therapy, 43*, 215–228. doi:10.1016/j.brat.2003.12.007
- Anderson, C., & Galinsky, A.D. (2006). Power, optimism, and risk-taking. *European Journal of Social Psychology, 36*, 511–536. doi:10.1002/ejsp.324
- Atran, S. (2002). *In gods we trust: The evolutionary landscape of religion*. Oxford, England: Oxford University Press.
- Baldwin, M. W. (1992). Relational schemas and the processing of information. *Psychological Bulletin, 112*, 461–484. doi:10.1037/0033-2909.112.3.461
- Baldwin, M. W., Carrell, S. E., & Lopez, D. F. (1990). Priming relationship schemas: My advisor and the Pope are watching me from the back of my mind. *Journal of Experimental Social Psychology, 26*, 435–454. doi:10.1016/0022-1031(90)90068-W
- Bargh, J. A., & Chartrand, T. L. (2000). The mind in the middle: A practical guide to priming and automaticity research. In H. T. Reis & C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 253–285), New York, NY: Cambridge University Press.
- Batson, C. D., & Stocks, E. L. (2004). Religion: Its core psychological functions. In J. Greenberg, S. L. Koole, & T. Pyszczynski (Eds.), *Handbook of experimental existential psychology* (pp. 141–155). New York, NY: Guilford Press.
- Berger, P. L. (1967/1990). *The sacred canopy: Elements of a sociological theory of religion*. New York, NY: Anchor Press.
- Birgegard, A., & Granqvist, P. (2004). The correspondence between attachment to parents and God: Three experiments using subliminal separation cues. *Personality and Social Psychology Bulletin, 30*, 1122–1135. doi:10.1177/0146167204264266
- Bushman, B. J., Ridge, R. D., Das, E., Key, C. W., & Busath, G. L. (2007). When God sanctions killing: Effect of scriptural violence on aggression. *Psychological Science, 18*, 204–207. doi:10.1111/j.1467-9280.2007.01873.x
- Carpenter, T. P., & Marshall, M. A. (2009). An examination of religious priming and intrinsic religious motivation in the moral hypocrisy paradigm. *Journal for the Scientific Study of Religion, 48*, 386–393. doi:10.1111/j.1468-5906.2009.01454.x
- Chasteen, A. L., Burdzy, D. C., & Pratt, J. (2010). Thinking of God moves attention. *Neuropsychologia, 48*, 627–630. doi:10.1016/j.neuropsychologia.2009.09.029
- Darley, J., & Batson, C. D. (1973). From Jerusalem to Jericho: A study of situational and dispositional variables in helping behaviour. *Journal of Personality and Social Psychology, 27*, 100–108. doi:10.1037/h0034449
- Davis, D., Sundahl, I., & Lesbo, M. (2000). Illusory personal control as a determinant of bet size and type in casino craps games. *Journal of Applied Social Psychology, 30*, 1224–1242. doi:10.1111/j.1559-1816.2000.tb02518.x
- Diaz, J. D. (2000). Religion and gambling in sin city: A statistical analysis of the relationship between religion and gambling patterns in Las Vegas residents. *Social Science Journal, 37*, 453–458. doi:10.1016/S0362-3319(00)00083-5
- DiClemente, R. J., Hansen, W. B., & Ponton, L. E., (Eds.). (1996). *Handbook of adolescent health risk behavior*. New York, NY: Plenum.
- Dijksterhuis, A., Preston, J., Wegner, D. M., & Aarts, H. (2008). Effects of subliminal priming of self and God on self-attribution of authorship for events. *Journal of Experimental Social Psychology, 44*, 2–9. doi:10.1016/j.jesp.2007.01.003
- Feeny, B. C., & Collins, N. L. (2004). Interpersonal safe haven and secure base caregiving processes. In J. A. Simpson & W. S. Rholes (Eds.), *Adult attachment: Theory, research, and clinical application* (pp. 300–338). New York, NY: Guilford Press.
- Freud, S. (1927). *The future of an illusion*. London, England: Hogarth Press.
- Glucklich, A. (2000). *Sacred pain: Hurting the body for the sake of the soul*. New York, NY: Oxford University Press.
- Gorsuch, R. L., & McPherson, S. E. (1989). Intrinsic/extrinsic measurement: I/E-revised and single-item scales. *Journal for the Scientific Study of Religion, 28*, 348–354. doi:10.2307/1386745
- Granqvist, P., Mikulincer, M., & Shaver, P. R. (2010). Religion as attachment: Normative processes and individual differences. *Personality and Social Psychology Review, 14*, 49–59. doi:10.1177/1088868309348618
- Horswill, M. S., & McKenna, F. P. (1999). The effect of perceived control on risk taking. *Journal of Applied Social Psychology, 29*, 377–391. doi:10.1111/j.1559-1816.1999.tb01392.x
- Inzlicht, M., & Tullett, A. M. (2010). Reflecting on God: Religious primes can reduce neurophysiological response to errors. *Psychological Science, 21*, 1184–1190. doi:10.1177/0956797610375451
- Kay, A. C., Gaucher, D., McGregor, I., & Nash, K. (2010). Religious belief as compensatory control. *Personality and Social Psychology Review, 14*, 37–48. doi:10.1177/1088868309353750
- Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology, 95*, 18–35. doi:10.1037/0022-3514.95.1.18

- Kay, A. C., Whitson, J. A., Gaucher, D., & Galinsky, A. D. (2009). Compensatory control: Achieving order through the mind, our institutions, and the Heavens. *Current Directions in Psychological Science, 18*, 264–268. doi:10.1111/j.1467-8721.2009.01649.x
- Kerestes, M., Youniss, J., & Metz, E. (2004). Longitudinal patterns of religious perspective and civic integration. *Applied Developmental Science, 8*, 39–46. doi:10.1207/S1532480XADS0801_5
- Kirkpatrick, L. A. (1999). Attachment and religious representations and behavior. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 803–822). New York, NY: Guilford Press.
- Kray, L. J., Paddock, E. L., & Galinsky, A. D. (2008). The effect of past performance on expected control and risk attitudes in integrative negotiations. *Negotiation and Conflict Management Research, 1*, 161–178. doi:10.1111/j.1750-4716.2008.00009.x
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology, 32*, 311–328. doi:10.1037/0022-3514.32.2.311
- Laurin, K., Kay, A. C., & Fitzsimons, G. M. (2012). Divergent effects of activating thoughts of God on self-regulation. *Journal of Personality and Social Psychology, 102*, 4–21. doi:10.1037/a0025971
- Lejuez, C. W., Aklin, W. M., Zvolensky, M. J., & Pedulla, C. M. (2003). Evaluation of Balloon Analogue Risk Task (BART) as a predictor of adolescent real-world risk-taking behaviors. *Journal of Adolescence, 26*, 475–479. doi:10.1016/S0140-1971(03)00036-8
- Lejuez, C. W., Read, J. P., Kahler, C. W., Richards, J. B., Ramsey, S. E., Stuart, G. L., . . . Brown, R. A. (2002). Evaluation of a behavioral measure of risk taking: The Balloon Analogue Risk Task (BART). *Journal of Experimental Psychology: Applied, 8*, 75–84. doi:10.1037/1076-898X.8.2.75
- Leung, K., & Bond, M. H. (2004). Social axioms: A model for social beliefs in multi-cultural perspective. *Advances in Experimental Social Psychology, 36*, 119–197. doi:10.1016/S0065-2601(04)36003-X
- Levenson, H. (1981). Differentiating among internality, powerful others and chance. In H. M. Lefcourt (Ed.), *Research with the locus of control construct* (Vol. 1, pp. 15–63). London, United Kingdom: Academic Press.
- MacAskill, E. (2005, October 7). George Bush: “God told me to end the tyranny in Iraq.” *Guardian*. Retrieved July 29, 2011, from <http://www.guardian.co.uk/world/2005/oct/07/iraq.usa>
- Malinowsky, B. (1948). *Magic, science and religion and other essays*. New York, NY: Doubleday.
- McCullough, M. E., & Willoughby, B. L. B. (2009). Religion, self-regulation, and self-control: Associations, explanations and implications. *Psychological Bulletin, 135*, 69–93. doi:10.1037/a0014213
- McKay, R., Efferson, C., & Fehr, E. (2010). Wrath of god: Priming and punishment. *Proceedings of the Royal Society B: Biological Sciences, 278*, 1858–1863. doi:10.1098/rspb.2010.2125
- Mikulincer, M., Gillath, O., Halevy, V., Avihou, N., Avidan, S., & Eshkoli, N. (2001). Attachment theory and reactions to others’ needs: Evidence that activation of the sense of attachment security promotes empathic responses. *Journal of Personality and Social Psychology, 81*, 1205–1224. doi:10.1037//0022-3514.81.6.1205
- Murray, K. M., Ciarrochi, J. W., & Murray-Swank, N. A. (2007). Spirituality, religiosity, shame and guilt as predictors of sexual attitudes and experiences. *Journal of Psychology and Theology, 35*, 222–234.
- Nordgren, L. F., van der Pligt, J., & van Harreveld, F. (2007). Unpacking perceived control in risk perception: The mediating role of anticipated regret. *Journal of Behavioral Decision Making, 20*, 533–544. doi:10.1002/bdm.565
- Nuttall, J., & Nuttall, A. (2009). *The mountains of England and Wales* (3rd ed., Vol. 1). Cumbria, UK: Cicerone.
- Poulson, R. L., Eppler, M. A., Satterwhite, T. N., Wuensch, K. L., & Bass, L. A. (1998). Alcohol consumption, strength of religious beliefs, and risky sexual behavior in college students. *Journal of American College Health, 46*, 227–232. doi:10.1080/07448489809600227
- Randolph-Seng, B., & Nielsen, M. E. (2007). Honesty: One effect of primed religious representations. *International Journal for the Psychology of Religion, 17*, 303–315. doi:10.1080/10508610701572812
- Reynolds, B., Ortengren, A., Richards, J. B., & de Wit, H. (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and Individual Differences, 40*, 305–315. doi:10.1016/j.paid.2005.03.024
- Rotter, J. B. (1966). Generalized expectancies of internal versus external control of reinforcements. *Psychological Monographs, 80*, 1–28.
- Rounding, K., Lee, A., Jacobson, J. A., & Ji, L.-J. (2012). Religion replenishes self-control. *Psychological Science, 23*, 635–642. doi:10.1177/0956797611431987
- Saroglou, V., Corneille, O., & Van Cappellen, P. (2009). “Speak, Lord, your servant is listening”: Religious priming activates submissive thoughts and behaviors. *International Journal for the Psychology of Religion, 19*, 143–54. doi:10.1080/10508610902880063
- Saroglou, V., & Jaspard, J. -M. (2001). Does religion affect humour creation? An experimental study. *Mental Health, Religion, and Culture, 4*, 33–46. doi:10.1080/713685611
- Shariff, A. F., & Norenzayan, A. (2007). God is watching you: Priming God concepts increases prosocial behavior in an anonymous economic game. *Psychological Science, 18*, 803–809. doi:10.1111/j.1467-9280.2007.01983.x
- Sinha, J. W., Cnaan, R. A., & Gelles, R. W. (2007). Adolescent risk behaviors and religion: Findings from a national study. *Journal of Adolescence, 30*, 231–249. doi:10.1016/j.adolescence.2006.02.005
- Skinner, E. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*, 549–570. doi:10.1037/0022-3514.71.3.549
- Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: Why experiments are often more effective in examining psychological process than mediational analyses. *Journal of Personality and Social Psychology, 89*, 845–851. doi:10.1037/0022-3514.89.6.845
- Victoroff, J., & Kruglanski, A. W. (2009). *Psychology of terrorism: Classic and contemporary insights*. Hove, UK: Psychology Press.
- Wallsten, T. S., Pleskac, T. J., & Lejuez, C. W. (2005). Modeling behavior in a clinically diagnostic sequential risk-taking task. *Psychological Review, 112*, 862–880. doi:10.1037/0033-295X.112.4.862
- Weber, E. U., Blais, A., & Betz, N. E. (2006). A domain-specific risk-attitude scale for adult populations. *Judgment and Decision Making, 1*, 263–290. doi:10.1002/bdm.414

- Weisbuch-Remington, M., Mendes, W. B., Seery, M. D., & Blascovitch, J. (2005). The nonconscious influence of religious symbols in motivated performance situations. *Personality and Social Psychology Bulletin, 31*, 1203–1216. doi:10.1177/0146167205274448
- West, W. (2000). *Psychotherapy and spirituality: Crossing the line between therapy and religion*. London, UK: Sage.
- Yates, J. F., & Stone, E. R. (1992). The risk construct. In J. F. Yates (Ed.), *Risk-taking behavior* (pp. 1–26). New York, NY: John Wiley.

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