TAKING A LEAP OF FAITH: REMINDERS OF GOD LEAD TO GREATER RISK TAKING

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Contents

Abstract

Religion is a fundamental human concern. Recent psychological models of religion suggest that religious beliefs provide an external form of control. Independently, other research has found that increases in a sense of psychological control leads people to adopt riskier strategies. Hence, I hypothesized that if so, reminders of God would predict greater risk taking behavior. In three studies, I manipulated reminders of God using various means and found that such reminders lead people to take greater risks, as though people were literally "taking a leap of faith." My results are hence consistent with psychological models of religion but seem to contradict some survey research that has found more religious people to be less risk seeking. This inconsistency is addressed in the third study by looking at how religion, morality, norms, and risk taking are related. Implications to a relational schema approach to study the effects of God primes are discussed. In addition, the implications of this project to the religious landscape of Singapore are mentioned.

Chapter 1: Introduction

> "Once on the summit of Tryfan you will come to face to face with Adam and Eve. These two huge stone boulders top out on Tryfan's north summit and jumping from one to the other is a very brave and at the same time popular pastime. It is commonly known as the Leap of Faith. Urban legend says that those who jump the terrifying gap of around 4 feet at an altitude of 3000ft is then proclaimed Freemen of Tryfan. You can't see on the photo but there's a sheer cliff on the back side and one small misstep would be quite tragic. It didn't seem to bother this climber as he did this a second time for me to record the action. I'm glad he made it - I would have felt somewhat off if he didn't."
>
> – Stephen Waterfall (see footnote 1)

In many parts of the world, religion shapes how people behave, how they think about the world and their place in it. Central to the understanding of religion is the concept of deities—supernatural agents who are omninescent, omnipresent, and omnipotent. Yet, no one has ever seen them; they exist purely in our minds. I refer to these agents, irrespective of the empirical reality of their existence and their theistic origins, as "God". If religion has a profound influence on the human condition, then it is logical that God, as one of the representative agents for religion, would likewise have a substantial impact at the individual level. In this research, I investigate how activating relational schemas of God influences an important behavior—risk taking. First, I give a brief overview of

the interplay between God, religion and humankind. Then, I attempt to show that at the individual level, people have relational schemas of God. Next, I review one prominent psychological model of religion—the compensatory control model of religion—that provides theoretical support for our key mediator, psychological control, that drives risk taking. Finally, I attempt to draw links that culminate in the main hypothesis that activating relational schemas of God increases risk taking.

God, religion, and humankind

People's belief in Gods and other supernatural agents predate the formulation of religion—formal systems of beliefs involving the supernatural and its practices. Comparative religionists and anthropologists inform us that when looking at supernatural beliefs around the world, what is referred to as "God" includes many chimeras and other beings that derive from nonhuman things (Boyer, 2001). Mountains, rocks, rivers, trees, statues, and numerous other things that often bear little semblance to humans play critical roles in religious systems and are revered, worshipped, and feared.

People act on their beliefs. Sometimes such beliefs subtly impact personal behaviour, such as an additional impetus to behave more morally (Darley & Batson, 1973), and sometimes these beliefs lead to tremendous behavioural displays and commitment of one's resource (Atran, 2002). Ultimately, when patterns of these beliefs form a reasonably coherent web of meanings within a population of believers (Geertz, 1973), the belief in the supernatural becomes enshrined in formal systems in what is known as religion.

Almost all religious beliefs involve the supernatural (or what I loosely defined as *God*). The terms *God* and *religion* are not synonymous. For example, believing in God does not necessarily imply having a religion; but being religious implies believing in God.[2] For example, people pray to God (but not religion) and view God (but not religion) as having the capability of punishing people for their misdeeds. Hence, I view God as an agent (a representative figure) of religion through which religion can actively exert its effects.

God and religion dynamically exert their influence on humans and occupy a centrepiece in much of human history. Tales of human actions in the name of religion or God have been told through time, and many of these actions can still be observed in the modern day. The twin rocks, Adam and Eve, as described above seem to be another manifestation of religion's powerful permeation into important aspects of human existence. Could it be that people are willing to risk their lives by leaping across the boulders because they are motivated by their real or imagined relationship with God?

Relational schemas of God

The relationship between God and humans can, to some extent, be conceptualized as any other human relationship (Kirkpatrick, 1999). Hence, to understand how the concept of God might affect human behaviour, it is useful to first consider how relationships are encoded in memory. Baldwin (1992) proposed the concept of relational schemas to account for how relationships and their effects are represented in memory. According to Baldwin (1992), people organize their interpersonal experiences into working models in memory. These models are hypothesized to include schemas of the self and others. When mental

representations of relationship figures are activated consciously or nonconsciously, the psychological presence of that person is activated and people may think, feel and act as though the relationship figure is physically there. For example, researchers have found that when relational schemas of one's mother, colleague or friend were activated, people behaved in line with what the respective relationship figure would have expected them to do (Fitzsimons & Bargh, 2003).

Although relational schemas have traditionally been investigated in the realm of interpersonal relationships, it need not be restricted to human-human relationships. Baldwin's (1992) conceptualization of relational schemas is broad enough to encompass people's relationship with nonhuman entities, like God as I investigate here. Furthermore, several researchers have noted that some individuals possess a personal relationship with God like the ones shared with human attachment figures (see Granqvist, Mikulincer, & Shaver, 2010, for a review). According to Kirkpatrick (1999), these individuals would display classic attachment responses with God, such as separation anxiety and a desire for closeness. For example, when primed with words related to separation from their mothers and God, believers demonstrate a greater desire for closeness to their mothers and God to the same extent (Birgegard & Granqvist, 2004).

If people have relational schemas of God, then priming God (i.e., activating relational schemas of God) should influence people's affect, cognition and behavior. Several research provided some examples of this. According to Baldwin, Carrel and Lopez (1992), Catholic women subliminally exposed to a photograph of the Pope after reading a passage describing sexual pleasure displayed lower self-concepts, compared to those exposed to a photograph of a

stranger. More recently, Sharif and Norenzayan (2007) primed people with religious concepts and found that it increased prosocial behaviour. In a recent investigation (Dijksterhuis, Preston, Wegner, & Aarts, 2008), participants who were specifically primed with the word "God" while engaging in a competitive task with the computer felt less responsible for their own performance than those who were primed with the word "computer".

The current thesis aimed to extend this line of research by examining the effect of exposing people to God-related primes on how much risk they are willing to take. To my best knowledge, this issue has not been examined in past studies. Second, although there had been several studies that examined the effects of God-related primes, most of these studies were vague about exactly what constructs that were being primed. For example, it is not clear if exposing people to photographs of the Pope (Baldwin et al. 1992), religion-related words (e.g., *holy, divine, pious, God, religion*, etc.; Fishbach, Friedman, & Kruglanski, 2003; McKay, Efferson, & Fehr, 2010; Shariff & Norenzayan, 2007), religious paintings (Weisbuch-Remington, Mendes, Seery, & Blascovitch, 2005), or having participants recite the Ten Commandments (Mazar et al., 2008), bible verses (Carpenter & Marshall, 2009), or saying prayers (Lambert, Fincham, Braithwaite, Graham, Beach, 2009; Lambert, Fincham, Stillman, Graham, Beach, 2010), would prime God, religion, moral codes, afterlife, etc. To my knowledge, only one study (Dijksterhuis et al., 2008) specifically activated the concept of God by exposing participants to the word "God". This research is the first attempt aimed at understanding the effect on risk taking that the activation of the concept of God could have.

Psychological control as one of the functions of religion

Because God can be an agent of religion through which religion influences individuals, it is useful to consult psychological models of religion about the effects of priming God although God and religion may not be the same thing. Batson and Stocks (2004) postulated that one reason why religion is so prevalent across humanity and time is because it fulfils basic psychological needs. One function that religion serves is that it imbues believers with a sense of control in a world that is seemingly filled with randomness and chaos. This view is similar to those expounded by religion scholars of different scholarly traditions (e.g., Berger, 1967; Freud, 1927; Rutjens, van der Pligt, & van Harreveld, 2010) but empirical evidence remained scarce until only recently.

The compensatory control model of religion[3] (Kay, Shepherd, Blatz, Chua, & Galinsky, 2010) postulates religion as an external source of control that serves to compensate for chaos in one's internal life (see also Malinowsky, 1948). In a series of studies, Kay et al. (2010) demonstrated that people increased their belief in a controlling God (i.e., a God that creates order) but not a creationist God when events in one's life seemed uncertain. Note that it is not the case that beliefs in God increased indiscriminately following feelings of uncertainty, but rather this increase was only specific to a God that people believed creates order. For example, one longitudinal study, Kay, Gaucher, Napier, Callan, and Laurin (2008) measured voter's beliefs in God before and after a major election, which served as a naturalistic manipulation of psychological control. They found that voters believed more in a controlling God (vs. a creationist God) two weeks before the election (low control) as compared to two weeks after (high control).

In another set of studies, Kay, Moscovitch and Laurin (2010) primed participants with randomness-related words (e.g., chance, random) and found that randomness led to significantly stronger beliefs in the existence of supernatural sources of control compared to those primed with negative valenced words unrelated to randomness. If beliefs in a controlling God help to cope with uncertainty, it could also mean that exposure to reminders of God might alleviate stress responses, and that is consistent with what Inzlicht and Tullett (2010) found. In their study, participants who wrote about religion displayed lower neurophysiological indicators of stress when mistakes were committed in an error-prone Stroop task. It has also been found that in conditions of stress, neural activity in the anterior cingulated cortex—a cortical region involved in anxiety responses—were lower (signalling lower anxiety responses) in believers than non-believers (Inzlicht, McGregor, Hirsh, & Nash, 2009).

Therefore, it is clear that people draw from religion a source of control derived from God, and this is especially so in times of uncertainty. Uncertainty is one of the main features of any risky activity (Yates & Stone, 1992). Hence, reminding people of God should affect risk taking. In the next section, I review literature examining psychological control and risk taking with the aim of making specific predictions.

Psychological control and risk taking

A number of studies have shown that greater psychological control has a facilitative effect on risk taking (Kray, Paddock, & Galinsky, 2008; Nordgren, van der Pligt, & van Harreveld, 2007). In one research (Horswill & McKenna, 1999), control was manipulated by having participants imagined that they were either drivers (high control) or passengers (low control). It was found that participants who were in control (drivers) were more comfortable with higher levels of risks (e.g., high driving

speeds, shorter gap acceptance and following distance, more dangerous overtaking, etc.) than controls (passengers).

In another research, Davis, Sundahl, and Lesbo (2000) investigated how experiencing an illusion of control—the tendency for people to overestimate their ability to control external events (Langer, 1975)—influenced real-life risk taking. According to Davis et al. (2000), casino 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). Other researchers (Anderson & Galinsky, 2006) have manipulated psychological control via a sense of personal power and found high power individuals to exhibit greater risk taking as measured by a variety of indicators—having unprotected sex, divulging interests during negotiations and risk perception.

In addition, the terror management perspective (Pyszczynski, Greenberg, & Solomon, 1998) suggests that the enhancement of self-esteem gives an illusion of control over one's finitude. Accordingly, Ben-Ari, Florian, and Mikulincer (1999) found that mortality salience promoted greater driving risks among drivers who perceived driving to be important to their self-esteem. Thus, converging evidence strongly supports the idea that feeling a sense of psychological control predisposes people to engage in greater risk taking behaviors.

The present research

From the review above, it is clear that religion impacts individuals in various ways and one of which is that it imbues people with a greater sense of control. This, in turn, may lead them to be more venturesome and daring to take risks. Hence, the main hypothesis is that exposure to God primes will increase risk taking.

The main hypothesis was tested in three experiments. In this research, the intention was to activate individuals' relational schema of God by priming only God and observe its effects on risk taking, which was measured using a well-validated behavioral task—the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). Study 1 provided the first test of this hypothesis by activating God concepts nonconsciously using subliminal God primes (the word "God") and examining its effects on risk taking. Study 2 aimed to replicate Study 1 but with several modifications. First, to extend the ecological validity of the findings, supraliminal primes that resemble everyday objects were used to prime God. Second, and more importantly, Study 2 was aimed at finding evidence that psychological control is a mediator of the effects of God primes on risk taking. Finally, Study 3 addressed an apparent contradiction between the current prediction and survey findings that have found a negative correlation between religiosity and risk taking behaviors.

In all three studies, I also explored if trait religiosity might moderate the effect of God primes on risk taking. Research has found effects of relationship primes to vary as a function of trait relationship variables such as relationship closeness (e.g., Shah & Kruglanski, 2003). Hence, if God can be treated as one of a person's many relationship figures (Kirkpatrick, 1999), it is possible that the effect of God primes might be moderated by trait religiousity variables; i.e., those who are more religious (e.g., hold strong beliefs about God and engage in religion-related practices) might be most affected by God primes. However, research examining the effects of God or religion priming has not yielded a definitive answer to whether trait religiosity might moderate the effects of God or religion primes. Six studies priming either God or religion have found no moderating effects of trait religiosity (using a variety of different measures) on dependent variables such as submissiveness (Saroglou,

Corneille, & Van Cappellen, 2009), prosociality (Shariff & Norenzayan, 2007), awarding punishment for transgressors (McKay et al., 2010), honesty (Randolph-Seng, & Nielsen, 2007), spatial attention (Chasteen, Burdzy, & Pratt, 2010) and gratitude (Lambert et al., 2009). Yet, there are other studies that have found religiosity to be a moderator of God or religion priming effects dependent variables such as self-evaluation (Baldwin et al., 1990), moral hypocrisy (Carpenter & Marshall, 2009), sense of authorship (Dijksterhuis et al., 2008), stress responses (Inzlicht & Tullett, 2010; Weisbuch-Remington et al., 2005), and humor (Saroglou & Jaspard, 2001). Given the mixed evidence with regard to the moderating role of religiosity in past God-prime studies, it would be indefensible to make a clear prediction on whether religiosity would moderate the effects of God primes on risk taking. Hence, trait religiosity (using a variety of indicators) was examined as moderator only for exploratory purposes.

Chapter 2: Study 1 - Does the phenomenon exist?

Study 1 provided the first test of the hypothesis that people tend to take more risks when they are exposed to God primes. Participants were subliminally primed with either the words *God*, *Dad* or *Water* and afterward engaged in a task that measured risk taking.

Two control primes were used to compare the effect of the God primes on risk taking. The word *Water* served as the neutral baseline prime. The word *Dad* was used as a control prime to rule out two alternative explanations. First, it is possible that priming God would co-activate a father-like relational schema that is observed among some religions (Freud, 1927) thereby activating relational schemas of fathers rather than representations related to God, which in turn affected risk taking. Second, because God can function as a secure attachment figure (Granqvist, Mikulincer, & Shaver, 2010), it is possible that priming God may activate a sense of security that encourages exploratory and even risky behaviors (see Feeny & Collins, 2004). Because past research has demonstrated that priming people with their fathers activated a sense of attachment security (Mikulincer et al., 2001), if the God primes lead to higher risk taking than the Dad primes, it would suggest that the effect of the God primes cannot be solely explained by the activation of fatherly or attachment security concepts.

Method

Participants

Participants were 172 National University of Singapore (NUS) undergraduates (M_{age} = 20.1; SD_{age} = 1.31; 46 males, 123 females, 3 did not provide gender information) who took part for course credits. Their religious affiliations can be found in Table 1. They were randomly assigned to be primed with the words *God* (God condition; *n* = 62), *Water* (Water condition; *n* = 54), or *Dad* (Dad condition; *n* = 56).

Procedure

Participants were tested in groups of one to eight. Upon arrival, they were led to their individual cubicles. They were given written instructions concerning the BART, which was presented as a "Balloon Game." Participants first went through 10 trials of the BART as practice. The practice trials preceded the priming procedure because if the practice trials were presented after the priming procedure, the effects of the primes might have diminished considerably by the time participants started on the main trials. Hence, the practice trials were administered first, followed by the priming procedure, and then the main trials of the BART. Headphones were worn to minimize external disturbances. After the practice trials, participants performed a circle-detection task which in actual fact served as a cover for the subliminal priming procedure. At the start of each trial, a fixation cross (+) was presented for 1000ms at the center of the screen, which was immediately followed by the prime. The prime was presented at the center of the screen for 17ms, followed by a mask that consisted of a string of *X*s which was presented for 50ms. A circle then appeared either on the left or right of the screen and participants had to indicate as quickly as possible by

pressing *z* or *m* on the keyboard, if the circle appeared on the left or right respectively. After participants made their responses the circle was removed and the whole sequence repeated again for 60 times. Thereafter, they completed 30 main trials of the BART where scores for risk taking were taken for analyses. Subsequently, they filled in religiosity measures, demographic (age and gender). Lastly, funnel debriefing was conducted where participants were first asked broad open-ended questions ("Did you see any words/letters being flashed on screen", "Were the tasks were related in any way," etc.), down to the specific questions (e.g., "There was a word flashed on screen. What do you think it was?") where the aims of the research were gradually revealed. The debriefing showed that no one saw the primes, nor suspected a link between the tasks. Finally, they were thanked and debriefed.

Measures

Risk taking. The BART is a computer program that simulates real-world risk taking and involves participants administering pumps to a series of virtual balloons over multiple trials. On each trial, a balloon would be presented on the computer screen and participants had to pump the balloon by clicking a virtual pump. They were told that each time they pumped the balloon without bursting it, they would earn one cent and that the more pumps they gave, the more money they would accumulate. But if the balloon exploded, they would lose the money they had earned on that trial (money earned from previous trials would be unaffected). At any time, they could choose bank in their earnings at any time by hitting a "Collect $$$" button. The number of pumps needed to burst the balloon on any particular trial was randomly set between 1-128 pumps. Because the explosion threshold for each trial was not revealed to the participants and is randomly determined by the BART program, any additional

pump is given at the risk of losing the monetary gains. In this way, the BART provides a measure of risk taking.

Following Lejuez et al. (2002), risk taking (i.e., BART) scores were computed by averaging the number of pumps on trials in which the balloons did not explode. Higher BART scores reflect greater risk taking. This index was more appropriate than averaging the number of pumps across all 30 trials which might not accurately reflect the participants' willingness to take risk. For example, a balloon on a particular trial might burst on the 10th pump but the participant might have intended to pump that balloon 20 times. Because the balloon in this case would have exploded before the full extent of the participant's inclination for risk taking was revealed, computing these ten trials into the final risk taking index would have underestimated this participant's risk taking tendency. As such, merely computing the responses made across all 30 trials would provide an overly conservative measure of risk taking (see also Wallsten, Pleskac, & Lejuez, 2005, for a discussion).

Intrinsic/extrinsic-Revised (I/E-R) religiosity scale (Gorsuch & McPherson, 1989). The I/E-R religiosity scale has 14 items that measure two orthogonal orientations towards religiosity. Intrinsic religiosity regards religion as an end, where individuals value religion for what it is. In contrast, extrinsic religiosity regards religion as a means, where individuals view religion as what they can obtain from it. Sample items for the intrinsic factor include "I enjoy reading about my religion," "I try hard to live all my life according to my religious beliefs," and those for the extrinsic factor include "I go to church mostly to spend time with my friends," and "Prayer is for peace and happiness," etc. The word "church" in some items (e.g., "I go to church mainly to spend time with my friends") 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 from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The reliability for the intrinsic (α = .81) and extrinsic (α = .87) facets were good. Therefore, an average score for each facet was computed.

Results

Manipulation check

All participants were clearly attentive to the priming task as their responses to the spatial locations of the circles were 99.2% correct. None of the participants reported seeing any words during the subliminal priming procedure.

Main analyses

I examined how the primes would influence risk taking and whether their effects were moderated by intrinsic and/or extrinsic religiosity. First, scores for the intrinsic and extrinsic religiosity facet scale were centered. Next, because the prime has three levels, two dummy variables, D_1 and D_2, were created. The God condition was designated as the base group and was coded as 0. In D_1 and D_2, the Water and Dad condition were coded as 1.[4] Next, the interaction terms with each dummy variable were computed. Thereafter, the dummy variables and centered religiosity scores were entered in step 1 of a hierarchical regression model and the interaction terms were entered in step 2 of the model.

Scores for intrinsic (uncentered M = 3.81, SD = 1.06) and extrinsic religiosity (uncentered M = 4.04, SD = 1.29) were analysed in two separate hierarchical regression models.[5] In the first hierarchical regression model where intrinsic religiosity and prime were used as predictors (see Table 3), there was a main effect of intrinsic religiosity (B = 2.58, t = 2.72, p = .007) which showed that intrinsically

oriented individuals were inclined 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). Means are displayed in Fig. 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 = 1.48, t = .66, p = .51)

In the second hierarchical regression model where extrinsic religiosity and prime were used as predictors (see Table 3), there was no main effect of extrinsic religiosity (B = .84, t = 1.06, p = .29), and 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, however, no moderating effects of extrinsic religiosity (D_1 with God condition: B = 3.59, t = 1.83, p = .07; D_2 with God condition: B = .82, t = .43, p = .67).

Discussion

The results provide preliminary evidence that nonconscious primes of God increases risk taking. Compared to two neutral control primes (*Water* and *Dad*), subliminal God primes increased risk taking. Importantly, there is evidence that the effect of the God prime on risk taking could not be explained by activation of concepts related to fathers or attachment-related security because those in the God condition took greater risks than those in the Dad condition. Individuals who were intrinsically oriented towards religion took more risks. However, there was no moderating influence of intrinsic or extrinsic religiosity. Many measurements of religiosity have been published (see Hill & Hood, 1999) and it is possible that the I/E-R religiosity scale which tapped into motivations for believing (Gorsuch & McPherson, 1989) did not capture other important facets of religiosity (e.g., the

degree people believe in God and the function of religion) to reveal the moderation. Hence, in the next study, in addition to marshalling evidence for the postulated mediator, psychological control, the measurement of religiosity was replaced with another measure of religiosity.

Chapter 3: Study 2 - Explaining the phenomenon

Study 2 was conducted for several reasons. First, Study 1 used a subliminal God prime in which the word God was flashed subliminally. In Study 2, I examined the ecological validity of the findings by using supraliminal primes. Hence, participants were exposed to a stack of papers that resembles advertisement brochures, an object that participants would encounter on a typical day.

Second, as reviewed in the Introduction, one of the important functions that religion serves is that it imbues people with a sense of control, and if so, priming God would indirectly lead to greater risk taking. The purpose of this study is to examine the validity of this causal chain. Rather than examining this causal chain via statistical mediation methods, the proposed mediator, psychological control, was experimentally manipulated. (Spencer, Zanna, & Fong, 2005). Such "manipulation-of-process design" is a theory-driven approach and is recommended whenever possible because it offers unique advantages over statistical mediation analysis in claiming for causality (see Spencer et al., 2005). Confidence in mediation is found when the experimental manipulation of the mediator changes the effect of the independent variable on the dependent variable in ways consistent with a priori theorizing.

In this study, participants were primed with either God or a neutral stimuli (water). Among those primed with God, a second manipulation followed that was designed to disable the enhanced psychological control that would have otherwise resulted from being just exposed to God primes alone. Specifically, for those primed with God, half were made to feel low in control and the results were compared with the other half whose sense of psychological control was not manipulated. It was ideal to have another comparison condition group where participants who were primed with

neutral (water) stimuli had to write about an event matched on negative valence (blood donation) to ensure that any differences within the God conditions were not the result of participants simply being distracted by a subsequent essay-writing task. Blood donation was chosen to control for valence to ascertain that any effects observed among those whose sense of control was lowered was not due to the negativity associated with low control. Hence there were three conditions (i.e., God-Low Control, God-Neutral Control, and Water-Neutral Control) and these three conditions are sufficient in testing the causal chain (see Shrout & Bolger, 2002); a complete 2 (Prime: God vs. Water) × 2 (Psychological control: Low vs. Neutral) is not necessary. Thereafter, risk taking was measured using the BART. Two predictions were made. First, when people's sense of psychological control was not manipulated, those primed with God would take greater risks than those primed with neutral stimuli. Second, individuals primed with God but felt low in control would take less risk than individuals primed with God but had not been made to feel low in control.

The social axiom religiosity subscale (Leung & Bond, 2004), was used to examine if religiosity would moderate the God-risk taking effect. Social axioms are general, context-free beliefs that people acquire about their world as a result of socialization.The religiosity subscale measures the extent to which people believe in the existence of supernatural forces and the beneficial functions of religious belief. Because people derive a sense of control from religion (Kay et al., 2008), it is possible that functionalist beliefs in religion would moderate the main effect of priming God on risk taking.

Method

Participants

Participants were 138 NUS undergraduates comprising 50 males and 84 females (4 did not provide information on gender) who participated in exchange for course credits. Mean age was 21.0 (*SD* = 1.62). Information about their religious affiliations is reported in Table 1. Participants were randomly assigned to the God and Water condition. Within the God condition, half were randomly assigned to be induced to feel low in control (Low Control condition) or not (Neutral Control condition). Hence the sample consisted of n = 43 in the God-Low Control condition, n = 55 in the God-Neutral Control condition, and n = 40 in the Water-Neutral Control condition.

Procedure

Participants were ushered to their individual cubicles. Apart from standard computer equipment (mouse, keyboard, monitor), an additional stack of papers had been placed at the corner of each cubicle, and the top sheet of the stack read either "The Nature of God" (God condition) or "The Nature of Water" (Water condition). These papers were presented as innocuous everyday objects and were in participants' peripheral vision field. It was neither explicitly pointed out nor did participants questioned about the purpose of the stack of papers. All participants reported in the post-experimental debrief that they saw the stack of papers but were unaware of its influence on themselves.

Like Study 1, participants began with a 10-balloon practice trial of BART. When the trials ended, they were asked to write an essay. Those in the God condition

were instructed to write an essay describing either a time in their lives 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 wrote about their experiences with blood donation (Water-Neutral Control condition). Participants then attempted a 30-balloon BART as the main trials. Thereafter, they filled in questionnaires that gathered information on their demographics, religiosity, and suspicion checks. Finally, they were funnel debriefed (which revealed that no one suspected that the stack of papers influenced their performance in BART, nor suspected that the tasks were connected) and thanked.

Pretest for psychological control manipulation. The manipulation check items for the psychological control manipulation were not presented within the main experimental session as existing research suggests that doing so may compromise the integrity of key dependent variables (Kuhnen, 2010). If the checks were made before the main BART, it may unintentionally increase psychological control among those in the Water condition because they would be primed by the control-related words in the items, thereby contaminating the risk taking scores for that group. If the checks were made after the main BART, the effect of the psychological control manipulation may have worn off by then. Hence, the manipulation was pretested in a separate sample of 31 NUS undergraduates. These participants rated five items measuring psychological control (α = .72) after describing a low control incident (n = 14) or a blood donation incident (n = 17). The items, rated on a 5-point scale from 1 (*Strongly disbelieve*) to 5 (*Strongly believe*), were: “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 two items and the rest were adopted from Rotter (1966; next two items) and Levenson (1981; last item).

The manipulation checks for the psychological control manipulation indicated that participants in the Low Control condition (M = 2.99, SD = .74) indeed reported feeling a lower sense of control than those in the neutral control condition (M = 3.80, SD = .41), $t(29) = 3.87$, $p = .001$. Participants in both conditions did not differ in terms of how negative they felt as measured by four negative affect items ("How fearful / sad / upset / negative are you feeling now?"), all ps > .46, thus indicating that both conditions were equal in negative valence.

Measures

Risk taking. The BART was used in the same way as in Study 1.

Social axioms religiosity subscale. The social axioms questionnaire (Leung & Bond, 2004) has five subscales (e.g., social cynicism, effort-outcome expectancies, etc.) of which only the religiosity subscale was used. The religiosity subscale has 12 items, which included items such as: "There is a supreme being controlling the universe", "Belief in a religion makes people good citizens", "Ghosts or spirits are people's fantasy", etc. Participants responded on a 5-point scale ranging from 1 (*Strongly disbelieve*) to 5 (*Strongly believe*). The subscale was reliable ($\alpha = .77$) and the average score was computed as a composite measure of religiosity.

Results

Main analyses

Means are plotted in Fig. 2. A one-way ANOVA showed a significant difference in risk taking across the three conditions, $F(2, 137) = 4.05$, $p = .02$, $\eta = .04$.

Subsequent posthoc Tukey analyses revealed that under conditions when their sense of control was not lowered, those primed with God exhibited significantly more risk taking than those primed with water (p = .05), and thus replicated the main finding in Study 1. However, among those primed with God, those made to feel low in control displayed less risk taking than those not made to feel low in control (p = .04), and in fact, to similar levels as those who were not primed with God (p = .99).

Next, religiosity was examined if it would moderate the main findings. There was no reason to include the God-Low Control condition for the purpose of testing this moderation because the religiosity variables were included only to test for moderation effects on the main effect, which is the effect of God prime versus control prime on risk taking. Hence, only the cells from the Neutral Control condition were used, where the God and Water conditions were coded as 1 and 0, respectively. Subsequently, the social axioms religiosity subscale scores were centered (uncentered M = 3.33, SD = .58) and the interaction term was computed. Next, Prime and the interaction term were entered in step 1 and 2, respectively, in a hierarchical regression model. The results of the regression model (see Table 4) revealed no main effect of religiosity, B = 2.76, t = .85, p = .40, and no evidence of moderation as the interaction term was nonsignificant, B = -1.07, t = .16, p = .87.

Discussion

Like in Study 1, when individuals' psychological control was not manipulated, those primed with God took more risks than those primed with a neutral stimulus. This occurred with a different type of prime from that in Study 1, thus suggesting the robustness and ecological validity of the findings. In addition, among those exposed to the God primes, those who felt low in psychological control took fewer risks than

those whose sense of psychological control were not manipulated. The pattern of results suggests that when relational schemas of God were activated, people felt a greater sense of psychological control, which in turn droves risk seeking behaviour. Deliberately inducing a feeling of low psychological control negated any feelings of high control that resulted from being primed with God to levels almost equivalent to those who were not primed with God. Again, although a different facet of religiosity was examined as a potential moderator, there was still no evidence of moderation.

Although the main finding that God primes lead to greater risk taking was replicated, the main finding does not corroborate with similar lines of research that have found a negative correlation between religiosity and risk taking. This apparent contradiction is addressed in the next study.

Chapter 4: Study 3 - Resolving an apparent contradiction

Studies 1 and 2 demonstrated that priming people with God led people to take greater risks. Also, in Study 1, people who were higher in intrinsic religiosity exhibited higher risk taking tendencies. These findings contradict some correlational studies which have found a *negative* correlation between religiosity and various risk taking behaviors. For example, more religious individuals have a tendency to be less involved in criminal activities (Abar, Carter, & Winsler, 2009), unprotected casual sex (Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998), substance abuse (Kerestes, Youniss, & Metz, 2004; Sinha, Cnaan, & Gelles, 2007), gambling (Diaz, 2000), and have more conservative attitudes towards risks (Hoffman & Miller, 1995; McNamara, Burns, Johnson, & McCorkle, 2010). While these findings were mainly from Western countries, similar patterns have also been found in Taiwan (Liu, 2010). These studies measured religiosity as traits. In cognitive terms, traits are measures of chronic accessibility while states are levels of current accessibility (Higgins, 1996). Hence, as a trait, religiosity would exert its influences in the same way that would be expected by priming God. Thus, priming God, which momentarily increases accessibility of God concepts, should have led to a decrease in risk taking behavior but the opposite was found in Studies 1 and 2.

I hypothesize a crucial difference that can account for the inconsistency between Studies 1 and 2 and the survey literature lies in the risk taking behaviors examined. The survey literature that examined the relationships between religiosity and risk behaviors assessed risk behaviors such as casual sex without condoms (Murray, Ciarrocchi, Murray-Swank, 2007; Poulson et al., 1998), earlier sexual experiences (Woody, Russel, D'Souza, & Woody, 2000), extramarital sex (Gore &

Yeatman, 2005), criminal offences (Abar et al., 2009), substance abuse (Kerestes et al., 2004), gambling (Diaz, 2000), etc., all of which inherently have moral underpinnings.[6] In contrast, in Studies 1 and 2, the risk taking measure, BART, was always introduced in morally neutral terms as a "balloon game", and money, the reward for performance in the BART, has no inherent moral connotations. To clarify, while it is true that risk taking varies with the domain of risk taking (Weber, Blais, & Betz, 2006), the point is not that people primed with God would show different risk taking patterns depending on the domains of risk taking. Rather, it is whether the domain of risk taking has an inherent moral injunction.[7] I hypothesize that when moral injunctions involving BART are invoked, people will take less risk when primed with God.

To test this proposition, some participants were supraliminally primed with either God or a control prime, in the same way as Study 2. The control prime used in this study was one related to fairies. People believe in a variety of supernatural agents such as aliens, ancestors, devil, angels, etc. (Boyer, 2001) and it is possible that the main results could be due to an activation of a general concept of a supernatural figure rather than God specifically. Hence, fairy primes were chosen as the comparison group to control for the element of "supernaturalness" of the God primes. To associate the act of taking risks with morality, participants were then led to believe that there would be future immoral (or amoral) consequences implicated with one's performance in BART. Thereafter, participants attempted BART, followed by several questionnaires. It is possible that the measures of religiosity were overly specific in the past two studies. Hence, general trait religiosity measures of trait religiosity were obtained to test for any possible moderation of the main effect.

Method

Participants

Participants were 142 NUS undergraduates (M_{age} = 21.1; SD_{age} = 1.53; 55 males) who took part for course credits. Their religious affiliations are reported in Table 1. Participants were randomly assigned to the cells of a 2 (Prime: God vs. Fairy) × 2 (Moral injunction: Greed vs. Neutral). The sample consisted of n = 33 in the God-Greed, n = 33 in the God-Neutral, n = 38 in the Fairy-Greed, and n = 38 in the Fairy-Neutral conditions.

Procedure

Participants were led to their individual cubicles where, similar to Study 2, there was either a folder that read "The Nature of God" (God condition) or "The Nature of Fairies" (Fairy condition) at the corner of their desk. Like in Study 2, all participants reported in the post-experimental debrief that they noticed the stack of papers but were unaware of its influence.

Participants started with a 10-balloon trial of the BART like in Studies 1 and 2. Next, they read an article designed to invoke moral injunctions against taking risks. Participants in the Greed condition read an article that denounced the accumulation of wealth and were led to believe how the performance on the "balloon game" had been found to predict one's tendency to commit crimes related to money (e.g., cheating insurance companies)—negative and immoral consequences. Participants in the Neutral condition read an article that describes the toxicity of water when overconsumed and were led to believe that performance on the BART predicts how much water one drinks, and hence one's chances of suffering from certain medical

problems (e.g., kidney stones)—negative but amoral consequences. Hence, negativity was controlled for as both groups were presented with negative information on what their performance in BART predicts. To make the article more persuasive and credible (Hovland & Weiss, 1951), participants were told that the findings were from a scientific expert, a (fictitious) Professor Higgins. Subsequently, they attempted 30 balloons of the actual BART, and then a series of manipulation and suspicion checks, as well as religiosity and demographic items. Suspicion checks revealed that no one could guess the hypothesis nor suspected the stack of papers influenced their performance in BART. Lastly, they were thanked and debriefed.

Measures

Risk taking. Risk taking was computed in the same way as described in Studies 1 and 2.

Religiosity. Participants' general levels of religiosity were obtained by asking them to rate on 7-point scales "How religious are you?" (1 = *Not religious*; 7 = *Very religious*), "How important is religion to your identity?" (1 = *Not important*; 7 = *Very important*), and the following items on a that ranged from 1 (*To a small extent*) to 7 (*To a large extent*): "To what extent do you practice the requirements of your (or any) religion/faith?", "To what extent do you feel close to your (or any) god?", "To what extent do you believe in the teachings of your (or any) religion/faith?" and "To what extent does religion influence your actions and decisions?" The reliability of these six items was excellent ($\alpha = .97$) and the average was used as the measure of general trait religiosity.

Manipulation checks for moral injunction. Participants were assessed if the manipulation resulted in them perceiving the desire for excessive money (i.e., greed)

as more morally wrong. Participants were asked about their moral attitudes towards 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 related to greed was of interest in this manipulation check. In addition, participants were also assessed if they believed the negative consequences that were implied in their performance in BART would apply to themselves. Specifically, they were asked "To what extent do you think Professor Higgin's predictions will apply to you?" and rated this item on a 7-point scale from 1 (*Not at all*) to 7 (*To a large extent*).

Results

Manipulation check for moral injunction

Participants who read the passage about greed indeed felt that being greedy was more morally wrong (M = 4.71; SD = 1.33) compared with those who read the passage about water, (M = 3.42; SD = 1.25), $t(141) = 2.49$, $p = .02$. In addition, those who read about greed felt that the scientific predictions would apply to them (M = 3.32; SD = 1.33) to the same extent as those who read the passage about water (M = 3.59; SD = 1.35), $t(141) = 1.18$, $p = .24$. Together, these checks indicated that the moral injunction manipulation was successful and that participants, regardless of whether they read about greed or water, believed the negative consequences implicated in BART were personally applicable to them.

Main analyses

Two sets of dummy coded variables were created, one for Prime (coded as God = 1, Fairy = 0) and one for Moral injunction (coded as Greed = 1, Neutral = 0). Religiosity scores were centered (uncentered $M = 3.80$, $SD = 1.71$) and the interaction terms were then computed. In a hierarchical regression model, prime, moral injunction and the centered religiosity were entered in step 1, followed by the three two-way interaction terms in step 2, and one three-way interaction term in step 3 (see Table 5). In step 3, the Prime × Moral injunction × Religiosity interaction ($B = 3.95$, $t = 1.38$, $p = .17$) was not significant. An examination of the lower order effects in step 2 revealed that the Prime × Religiosity ($B = .39$, $t = 1.81$, $p = .79$), and Moral injunction × Religiosity ($B = -2.60$, $t = 1.81$, $p = .07$) interactions were not significant, but as predicted, the Prime × Moral injunction interaction was significant, $B = -16.37$, $t = 3.37$, $p = .001$. There were no main effects of Prime ($B = .23$, $t = .09$, $p = .93$), Moral injunction ($B = -3.55$, $t = 1.45$, $p = .15$) or Religiosity ($B = -.01$, $t = .02$, $p = .99$) in step 1.

Mean BART scores of the Prime × Moral injunction interaction are plotted in Fig. 3. Simple effects analyses revealed that in the absence of moral injunctions, individuals primed with God took more risks than those primed with fairies, $F(1, 138) = 4.07$, $p = .05$, $\eta = .03$. This replicated our main findings in Studies 1 and 2. Notably, comparing our effects of God with Fairy primes ruled out that our effects were due to "supernaturalness." However, when moral injunctions were invoked, individuals primed with God displayed less risk taking tendencies than those primed with Fairy, $F(1, 138) = 4.66$, $p = .03$, $\eta = .03$. This finding mirrors correlational studies of religiosity and risk taking. As expected, among those primed with God, risk taking reduced when moral injunctions were evoked, $F(1, 138) = 10.74$, $p = .001$, $\eta = .07$,

but among those primed with Fairy, no differences in risk taking were observed, $F(1, 138) = .98$, $p = .33$, $\eta = .007$.

Discussion

When moral injunctions against risk taking were absent, participants took more risks, but when moral injunctions against risk taking were invoked, the pattern was completely opposite. The findings provide evidence that the discrepancy between the findings of survey literature and mine could possibly be due to an inherent moral component often implicated in survey literature.

Critics, however, could argue for an alternative interpretation: morality need not be implicated but instead, the manipulation of moral injunction may have been confounded with self-relevancy. In BART, participants were not subjected to losses (in the strictest sense of the word) because they did not lose anything that did not belong to them in the first place. When there is no loss to the self, people take more risks when reminded of God. Conversely, when there is some loss to the self (i.e., making participants believe that the BART predicts self-relevant consequences), participants took less risk when reminded of God. This reasoning may be further bolstered by the fact that the risk examples cited in the correlation studies above (unprotected sex, criminality, etc.) seem to pertain to the self losing something that it owns (health, freedom, etc.), and is therefore consistent with the fact that high religiosity correlates with lower risk taking. Hence, God reminders may serve to increase risk taking only if the risk being undertaken does not result in a loss to the self. However, this account is an unlikely alternative explanation for two reasons. One, it is unlikely to explain why individuals who were intrinsically oriented towards religion took more risks when morality was not implicated in Study 1. More

importantly, in this study, participants in the neutral moral injunction condition were presented with negative self-relevant but amoral implications of BART (health consequences of high water intake). Hence, in both moral injunction conditions, the negative implications clearly pertained to the self.

We thus conclude that perhaps risk taking domains conceptualized and measured in previous survey literature may have been biased towards those that have an inherent moral content (e.g., criminality). Future studies that seek to correlate religiosity and risk taking should sample risks from a greater variety of domains (Weber, Blais, & Betz, 2006), including domains that are normally regarded as moral (e.g., risking one's life to save others), immoral (e.g., unprotected casual sex) or amoral (e.g., financial investments).

Note that I do not imply that the effect of God primes on risk taking is specific to monetary risk taking. Rather, the point is that the effect of God primes on risk taking depends on whether the domain of risk taking involves a moral content or not. Indeed, the BART was originally created as a measure of *general* risk propensity (Lejuez et al., 2002) and it has been found to correlate with a wide range of risk taking behaviors such as substance use (Hopko et al., 2006; Skeel, Pilarski, Pytlak, & Neudecker, 2008), driving without the use of seatbelts (Lejuez et al., 2003), and unsafe sex (Lejuez, Simmons, Aklin, Daughters, & Dvir, 2004). Furthermore, the reward for taking risks in BART was money, and this feature was exploited when manipulating moral injunctions. The implication is that if the reward was course credits, for example, and moral injunctions against earning course credits were invoked ("participants should intrinsically want to take part in psychological studies for the good of science"), the same pattern of results should also be expected.

In addition, despite including a more general measure of trait religiosity, no evidence of moderation emerged. It is possible that there could still other untapped facets of religiosity to be tested. However, it could also be the case that religiosity does not moderate the effect of God primes on risk taking.

Chapter 5: General discussion

Various 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, I hypothesized that God primes should increase individuals' sense of psychological control, which in turn should lead people to be more venturesome.

Indeed, in three studies reported here, God-related primes increased actual risk taking behaviours. In Study 1, people subliminally primed with the word *God* took greater risks compared to people primed with a neutral word or the word *Dad*. The results indicated that it is unlikely that the effects were due to co-activated father schema or a sense of security associated with an attachment figure because activating people's relational schemas of their fathers (using the prime Dad) did not produce the same increase in risk taking.

If God primes temporarily boost one's sense of psychological control which in turn lead to greater risk taking, then negating a sense of psychological control should attenuate risk taking among those exposed to God primes. Consistent with this proposition, Study 2 found that when people were deliberately made to feel low in control after exposure to a supraliminal God prime presented as words on an innocuous folder, people's sense of control were disabled and this led to a significant decrease in risk taking. In fact, this group of people performed no differently than those who were not exposed to God primes. Hence, the current evidence suggests that the enhancing effect of God primes on risk taking is likely due to an increased in a sense of control.

Admittedly, this is only partial way to test our proposed mediation chain. Another experimental way to test this mediation is to further enhance psychological control after God primes and one should expect risk taking to further increase above and beyond just being primed with God alone. A third way is to construct a statistical mediation model with sense of psychological control as one of the measured variables. But note that any single approach is unlikely to provide a complete picture of causality as scholars have noted that convincing evidence for causal pathways often requires a multi-pronged approach (Green, Ha, & Bullock, 2010).

Our main results seem to contradict some survey research that have found a negative correlation between religiosity and risk taking behaviors, which suggests that God primes, in fact, should lead to lower risk taking. I argued that these research have sampled risk taking from domains inherently implicated as immoral (e.g., criminal behaviors, casual unprotected sex, etc.). When morality was taken into consideration, the inconsistency between past research and the current is resolved. Specifically, in Study 3, when moral injunctions against risk taking were made salient by making participants feel that taking risks was reflective of their moral self, the main effect was reversed. This suggests that future correlation research may benefit by sampling risk taking behaviors from a wider domain when correlating with religiosity.

It may seem intuitive that the highly religious people would be most affected by God primes. However, despite using several measures to capture religiosity (intrinsic-extrinsic religiosity scale, Study 1; social axioms religiosity subscale, Study 2; general trait religiosity, Study 3), religiosity did not moderate the effects of God primes on risk taking. It is unlikely that the null findings were a result of poorly conceived measures of religiosity given the variety of measurements that were employed. Furthermore, the religiosity scales used were relevant to people of all

religious groups, even to those with no religious affiliations. Critics may further argue that the measures neglected people who believed in God and yet do not subscribe to any formal religion (see Zuckerman, 2008; footnote 2). However, even when analyzed alone, items such as "Do you believe in God?" did not yield any moderating effects.

As reviewed in the Introduction, religiosity does not always moderate God-prime effects. Rather than explaining non-moderation of religiosity by focusing on specific weaknesses of each research (e.g., measurement error, other untapped facets of religiosity, etc.), perhaps it is more useful to consider the possibility that the moderation may depend on the type of behaviors being observed. According to Barrett (2004), our evolved mental architecture of a hyperactive agency detection device and theory of mind predisposes humans to believe in the existence of supernatural agents. Therefore, theism is natural and atheism is unnatural. Hence, when primed with God, people assimilate it naturally into their mental architecture regardless of their reported religiosity. Fundamental behaviors (increased risk taking as a result of increased psychological control, as investigated here), or basic psychological processes (e.g., attention; Chasteen et al., 2010) may not be moderated by religiosity, while learnt behaviours may be as a result of socialization processes (e.g., humor: Saroglou & Jaspard., 2001). Admittedly, this proposition is speculative. Nevertheless, it seems premature to expect that trait religiosity should always moderate effects stemming from priming God. It may be a fertile area for future research to explore why and when some God prime effects are moderated by religiosity and others not.

Although various religiosity measures did not moderate the effect of God primes on risk taking, intrinsic religiosity (but not extrinsic religiosity, functionalist axiomatic beliefs in religion, and general measures of religiosity), predicted risk

taking in Study 1, whereby more intrinsically oriented individuals took greater risks. This finding complements my theoretical argument that intrinsically oriented individuals may chronically feel a higher sense of control because of their religious beliefs and hence showed a greater tendency to take risks.

Specificity of God primes

The concept of God is related to many other concepts such as religion, supernatural figures, morality, etc. Past research has often made been unclear about what exactly was primed because other concepts (e.g., religion, ancestors, spirits, holiness) related to God were often deliberately primed within the same experimental setup. In this thesis, the intention was to activate the relational schema of God and hence, only God was primed. The paradigm adopted here—exposing people with the word *God*—resembles past research on activating relational schemas, such as being exposed to a photograph of the relationship figure (e.g., Baldwin et al., 1992), being exposed to a name of a significant other (Andersen, Glassman, & Gold, 1998) and writing a description of a significant other (Shah & Kruglanski, 2003). The effect of God primes were then compared with other primes (dad, water, and fairies), thereby ruling out several alternative explanations. Although it is possible God primes may activate father schemas and attachment-related sense of security, Study 1 indicated that the effects of God primes cannot be explained by father schemas and attachment concepts alone. Furthermore, in Study 3, by comparing the effects of God primes with fairy primes, it lends support to the idea that the results were not just due to *any* supernatural figure, but a rather specific one—God.

Critics may highlight that the word "God" reflects a Christian-oriented bias and may thus pose a concern to my sample of religiously diverse participants (see

Table 1). This concern has some validity because in some religions, the relevant deities are usually referred differently, such as "Allah" in Islam, or "Guan Yin" in Taoism, rather than "God" per se. Furthermore, polytheistic faiths (e.g., Buddhism, Taoism, Hinduism, etc.) assume the existence of many gods. It is likely that the results will differ when individuals are primed with "Allah" because priming "Allah" would likely affect only individuals (e.g., Muslims) who have knowledge of Islam. However, I argue that the way individuals *cognitively* represent their deities should be the same across all faiths. That is, regardless of how one addresses his or her divine deity, the cognitive representation of that deity is likely to be a superordinate abstract category. Therefore, it is unsurprising that priming "God" had effects on risk taking across people with different religious affiliations.

One alternative explanation was not ruled out empirically and deserves greater scrutiny here. Critics may argue that instead of priming a relational schema of God and activating its psychological presence, God primes co-activated religions concepts, which then influenced risk taking in an ideomotor-action way (Bargh, 1994). While it may be true that priming God did activate religion concepts, it is unlikely that any activated religion concepts in turn drove risk taking behaviors. This is because people associate more religion with having an attenuating effect on risk taking, as various survey studies have suggested (Abar et al., 2009; Diaz, 2000; Hoffman & Miller, 1995; Kerestes et al., 2004; McNamara et al., 2010; Poulson et al., 1998; Sinha et al., 2007). Therefore, if the co-activation account is true, then priming God should have decreased, not increased, risk taking. Future research may seek to rule out this alternative explanation empirically by comparing God primes with religion primes, for example, with a folder titled "The Nature of Religion". Even though God and religion have much in common, teasing apart the influence of religion from that of

God in this and future studies priming God may lead to new insights. A relational schema approach in understanding the effects of God primes may, for example, lead to new directions in clinical interventions (West, 2000), and a better understanding of religion-inspired behavior towards others (e.g., terrorism; Victoroff & Kruglanski, 2009) or self (e.g., self-mortification; Glucklich, 2000).

What do the findings with subliminal versus supraliminal primes imply?

Religion, like many other topics examined in social psychology (e.g., prejudice), is a topic that is personal and sensitive in nature. The preponderance of self-report methods used in studying the social effects of religion (Batson, 1986) may be especially prone to social desirability responding, especially since risk taking is a topic that often has negative connotations with deviance and recklessness (Arnett, 1992). The use of subliminal and supraliminal God primes avoids this problem as one does not need to be aware of the primes and that the primes need not be visible or conscious for the effects to occur. This also implies that people can be unconsciously influenced by God-related objects. Furthermore, the stack of papers used to prime God (Study 3) are good representations of these daily religion objects as they resemble common objects found in daily life like books, posters, and billboards. Given that religious representations are so prominent and ubiquitous, it may be fruitful to examine what other effects may result from the activation of God concepts.

On a broader issue, this research suggests an interpretation of the functions of religious artefacts (such as amulets) or any object imbued with religious significance. Unlike protective parents or supportive spouses whose physical presence is undeniable, supernatural divine figures only have a psychological presence; to my

knowledge, there have been no confirmatory sightings of any supernatural figures. It is through the physical embodiment of the divine that religious artefacts exert their effects. In my experiments, it was not the case that the prime used was a blatant amulet or an object (e.g., a crucifix) with strong religious associations; on the contrary, merely presenting an innocuous and mundane stimulus (i.e., printing "The Nature of God" on a stack of papers placed in a corner) was enough to generate the predicted effects on psychological safety in God. One could extend these findings and argue that in daily life, formal religious symbols should have even greater effects than our primes.

What else can God primes affect?

Religion has great impact on humanity. More specific to this research, God as a representative agent of religion, can exert powerful effects at the level of the individual. This theme resonates closely with observations around the world, and also with experimental studies (e.g., Bushman, Ridge, Das, Key, & Busath, 2007). Appeals to God (more so than religion per se) often provide an additional impetus to act. It is widely known that ex-US President George W. Bush received an apparent mandate from God that led to his decision to launch the military campaign in Iraq (MacAskill, 2005), and experimentally, it has been shown that sanctified violence increases actual aggression, even towards unrelated people (Bushman et al., 2007). Given that God and religion have widespread influences on humanity, perhaps future research can examine what other effects God primes exert. For example, the increase in psychological control as a result of being primed with God may have other downstream consequences, particularly those involved in self-regulation (McCullough & Willoughby, 2009).

Coda: Implications to Singapore

While conceptualizing Study 3, the Straits Times published an article on the space crunch faced by some religious groups in finding venues big enough to hold their services (Lee, 2010). It was reported that one religious group had intentions to hold some of its services near a major casino. By definition, gambling involves risks. Studies 1 and 2 would suggest that such a move would have unintended consequences of increasing gambling behaviour among attendees. If that were to happen, or perhaps even before it were to happen, one (preventive) solution is for religious leaders to invoke moral injunctions against gambling during their services. As Study 3 demonstrated, invoking moral injunctions when people are primed with God can have the effect of decreasing risk taking.

Footnotes

1. This caption accompanied a photograph titled “Leap of faith” taken by Stephan Waterfall in Mount Snowdonia, Northern Wales, in 2007. The photograph is not included in this thesis because of copyright reasons. It can be found on http://www.watchthisspace.ca/pixelpost/index.php?showimage=332
2. In recent decades, anthropologists of religion such as Zuckerman (2008) have noted a rise in the number of people, particularly in Western Europe, who proclaim to have a religion but, at the same time, profess to *not* believe in God when further probed. Sociologists have termed this “cultural religion”, or simply, partaking in religion as part of a cultural tradition without believing in the supernatural elements.
3. The compensatory control model of religion views religion 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).
4. The designation of base groups is arbitrary, though it is typically coded as 0 (Aiken & West, 1993). But in this case, because there are one experimental and two comparison groups, it is easier to interpret the regression weights if the experimental group (God condition) is coded as 0. It is not necessary to create orthogonal (independent) weights for this set of dummy codes because the possible redundancy due to correlated dummy codes will be corrected by multiple regression.
5. The results remain unchanged even when the analyses were combined into one hierarchical regression model but the presentation would be unnecessarily more

complicated because additional interaction terms (e.g., Prime × IR × ER, IR × ER) have to be included.

6. This is not to say that we derive morality from religion. See Dawkins (2007) and Boyer (2001) for a discussion.
7. The reason why any domain (e.g., eating dog meat) has an inherent moral implication is beyond the scope of this research. Interested readers may refer to Haidt, Koller, & Dias (1993) and Krebs (2008) for social-cultural and evolutionary explanations of morality.

Tables

Table 1. Religious Affiliation of Participants in Studies 1, 2 and 3.

	Study 1	Study 2	Study 3	Aggregate
No religion	65 (37.8%)	47 (33.3%)	43 (28.9%)	155 (33.8%)
Buddhist	34 (19.8%)	26 (18.4%)	27 (18.1%)	87 (19%)
Taoist	7 (4.1%)	8 (5.7%)	9 (6%)	24 (5.2%)
Christian	44 (25.6%)	30 (21.3%)	44 (29.5%)	118 (25.8%)
Catholic	10 (5.8%)	6 (4.3%)	12 (8/1%)	28 (6.1%)
Muslim	6 (3.5%)	8 (5.7)	6 (4%)	20 (4.4%)
Hindu	4 (2.3%)	11 (7.8%)	3 (2%)	18 (3.9%)
Others	2 (1.2%)	1 (0.7%)	5 (3.3%)	8 (1.7%)

Note: The category "Others" consists of people who proclaim believing in God but not within the "mainstream" religions (e.g., Universal Consciousness, Flying Spaghetti Monster, Paganism).

Table 2. Hierarchical Regression Analyses Predicting Risk Taking from Prime and Centered Intrinsic Religiosity (IR), Study 1.

Predictors	ΔR^2	*B*	*SE*	*t*	*p*
Step 1	.082				.002
D_1		-5.00	2.44	2.05	.04
D_2		-5.89	2.42	2.43	.02
IR		2.58	.95	2.72	.007
Step 2	.012				.34
D_1		-5.23	2.44	2.14	.03
D_2		-5.95	2.42	2.46	.02
IR		.96	1.71	.56	.57
IR × D_1		3.63	2.48	1.47	.15
IR × D_2		1.48	2.25	.66	.51

Note. God condition was designated as the base category, coded as 0. In D_1, the Water condition was coded as 1; in D_2, the Dad condition was coded as 1; IR = intrinsic religiosity.

Table 3. Hierarchical Regression Analyses Predicting Risk Taking from Prime and Extrinsic Religiosity (ER), Study 1.

Predictors	ΔR^2	*B*	*SE*	*t*	*p*
Step 1	.047				.04
D_1		-4.79	2.49	1.93	.05
D_2		-6.22	2.46	2.52	.01
ER		.84	.79	1.06	.29
Step 2	.021				.16
D_1		-4.79	2.47	1.94	.05
D_2		-6.31	2.45	2.58	.01
ER		-.63	1.40	.45	.65
ER × D_1		3.59	1.96	1.83	.07
ER × D_2		.82	1.92	.43	.67

Note. God condition was designated as the base category, coded as 0. In D_1, the Water condition was coded as 1; in D_2, the Dad condition was coded as 1; ER = extrinsic religiosity.

Table 4. Hierarchical Regression Analyses Predicting Risk Taking from Prime and Social Axiom Religiosity Subscale, Study 2.

Predictors	ΔR^2	*B*	*SE*	*t*	*p*
Step 1	.071				.04
Prime		6.55	3.12	2.10	.04
Religiosity		-2.76	3.25	.85	.40
Step 2	.000				.87
Prime		6.53	3.14	2.08	.04
Religiosity		-2.22	4.61	.48	.63
Prime × Religiosity		-1.07	6.53	.16	.87

Note. The water condition was designated as the base category, coded as 0.

Table 5. Hierarchical Regression Analyses Predicting Risk Taking from Prime, Moral Injuction, and Religiosity, Study 3.

Predictors	ΔR^2	*B*	*SE*	*t*	*p*
Step 1	.015				.54
Prime		.23	2.49	.09	.93
Moral injunction		-3.55	2.45	1.45	.15
Religiosity		-.01	.73	.02	.99
Step 2	.085				.007
Prime		8.68	3.46	2.51	.01
Moral injunction		3.89	3.25	1.20	.23
Religiosity		1.22	1.17	1.05	.30
Prime × Moral injunction		-16.37	4.85	3.37	.001
Prime × Religiosity		.39	1.44	1.81	.79
Religiosity × Moral injunction		-2.60	1.43	1.81	.07
Step 3	.013				.17
Prime		8.01	3.48	2.30	.02
Moral injunction		4.40	3.26	1.35	.18
Religiosity		2.04	1.30	1.56	.12
Prime × Moral injunction		-15.95	4.85	3.29	.001
Prime × Religiosity		-1.68	2.07	.81	.42
Religiosity × Moral injunction		-4.42	1.94	2.27	.03
Prime × Religiosity × Moral injunction		3.95	2.87	1.38	.17

Note. The dummy codings for Prime were God = 1, Fairy = 0, and for Moral injunction, Greed = 1, Neutral = 0.

Figures

Fig. 1. Pattern of means of primes on risk taking, Study 1.

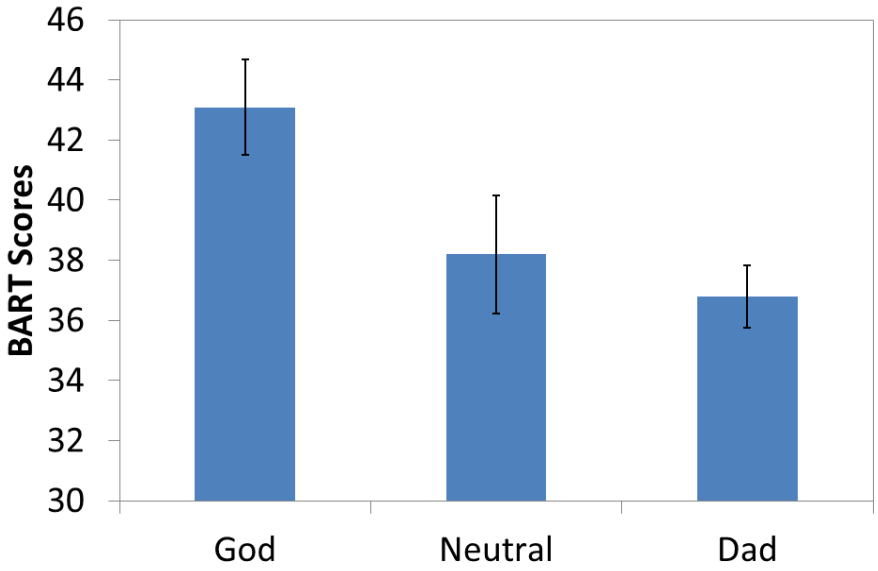


Fig. 2. Pattern of means of primes and psychological control on risk taking, Study 2.

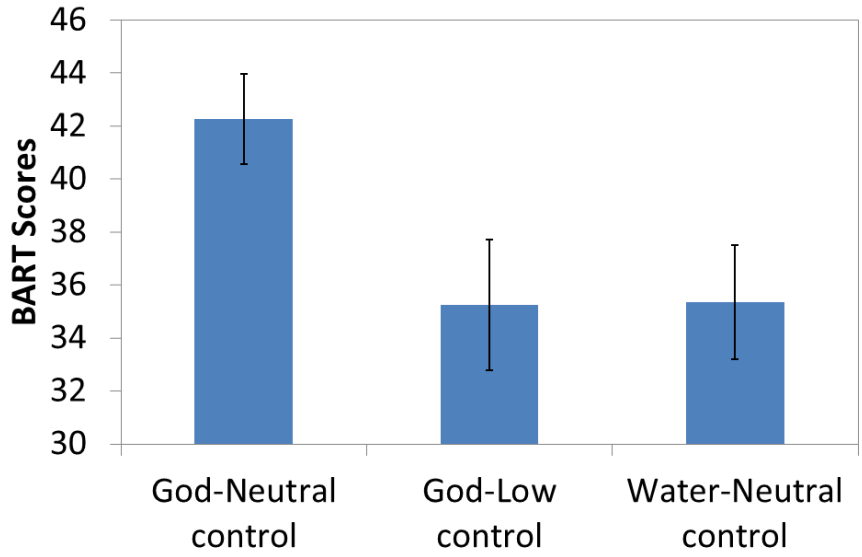
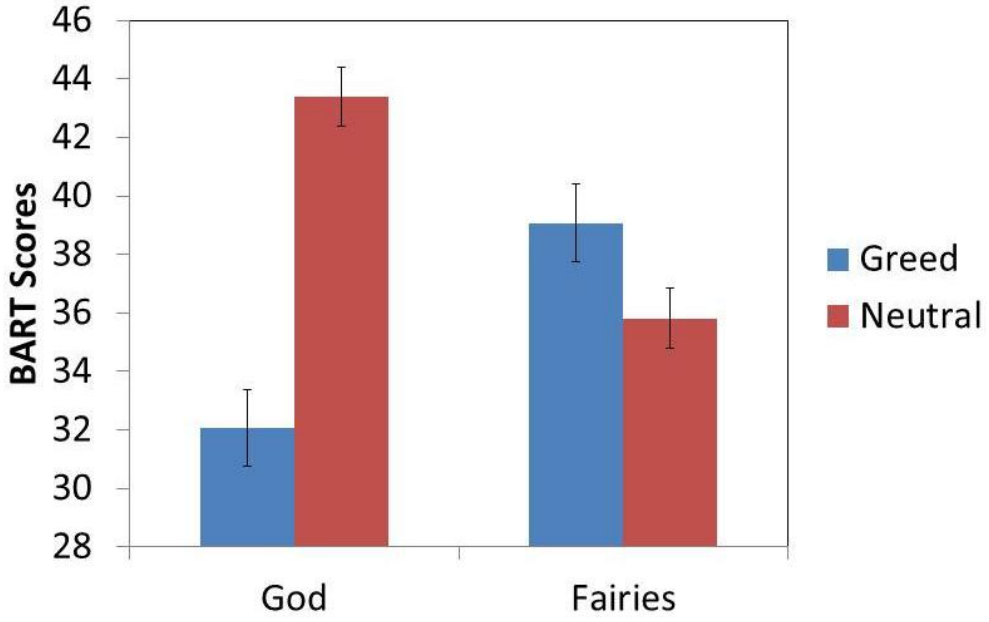


Fig. 3. Pattern of means of primes and moral injunction on risk taking, Study 3.



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