



Contents lists available at ScienceDirect

## Journal of Experimental Social Psychology

journal homepage: [www.elsevier.com/locate/jesp](http://www.elsevier.com/locate/jesp)

## Do reminders of God increase willingness to take risks?☆

Cindel J.M. White<sup>a,\*</sup>, Chloe M. Dean<sup>b</sup>, Kristin Laurin<sup>b</sup><sup>a</sup> Department of Psychology, York University, Canada<sup>b</sup> Department of Psychology, University of British Columbia, Canada

## ARTICLE INFO

## Keywords:

God  
Risk taking  
Religion

## ABSTRACT

Many people, and American Christians in particular, view God as a benevolent protector. Those who believe in God may therefore expect that they can safely engage in potentially risky activities, secure in the knowledge that God will look out for their best interests and ensure good outcomes. Initial experiments supported this hypothesis, but recent attempts to replicate them failed. This unreliable pattern may reflect a false conceptual hypothesis, or an inadequate method: Both the initial reports and the replication attempts used outdated religious priming methods we now know to be ineffective. The present research aimed to clarify the relationship between thinking about God and risk-taking behaviors. A pilot study ( $N = 264$ ) showed that American Christians do expect that God will protect them during risky activities; moreover, those who hold this expectation more strongly report greater willingness to take risks. This registered report then used a high-powered preregistered experiment to test whether having participants explicitly think about God's (presumably protective) influence over what happens in their lives increases their willingness to take risks. Results confirmed that American Christian participants were more willing to take non-moral risks when thinking about God, compared to a control condition,  $d = 0.28$ , 95% CI [0.12, 0.44],  $p < .001$ . This pattern was robust to different exclusion criteria and was consistent across domains of career, recreational, and social risks. By using the most recent and sensitive methods, this study provides a more definitive test of the conceptual hypothesis that thinking about God can influence risk-taking.

Many religious individuals, including most of the Christians in the United States, believe that God acts as a protector. In line with this idea, recent findings suggested that thoughts of God can increase people's willingness to take risks, secure in the knowledge that God will protect them and ensure their safety (Chan, Tong, & Tan, 2014; Kupor, Laurin, & Levav, 2015). At the same time, more recent attempts to replicate these findings have failed (Gervais, McKee, & Malik, 2020; Gruneau Brulin, Hill, Laurin, Mikulincer, & Granqvist, 2018). Possible explanations for this pattern are that the hypothesis—that God's protection inspires risky behavior—is false, that the methods thus far used to test this hypothesis are inadequate, or both. We review both possibilities below, and provide a high-powered, pre-registered experiment using the most up-to-date methods to bring sharper theoretical clarity and help guide future research.

## 1. Is the hypothesis theoretically plausible?

The idea that God's protection could encourage risk taking is not

farfetched, theoretically speaking, especially among the American Christian participants who are the focus of our (and the majority of past) research. First of all, this population prototypically perceives God as ultimately loving, powerful, and capable of intervening in the world to ensure that believers experience positive, fulfilling lives (Johnson, Cohen, & Okun, 2015; Johnson, Li, Cohen, & Okun, 2013; Johnson, Okun, Cohen, Sharp, & Hook, 2019). Second, ample evidence shows that, outside the domain of risk, believers rely on this benevolent God to help them withstand other kinds of stress (e.g., Ano & Vasconcelles, 2005; Pargament, Smith, Koenig, & Perez, 1998; Park, 2005). Third, it therefore stands to reason that people might similarly rely on God to protect them should they take a risk: If they expect that God will prevent, or help them cope with, negative outcomes of the risk, these expectations might disinhibit them from risky action. Below we elaborate on each of these ideas.

\* This paper has been recommended for acceptance by Dr. Daryl Van Tongeren.

\* Corresponding author at: Department of Psychology, York University, 4700 Keele Street, Toronto, ON M3J 1P3, Canada.

E-mail address: [cjmwhite@yorku.ca](mailto:cjmwhite@yorku.ca) (C.J.M. White).

<https://doi.org/10.1016/j.jesp.2023.104539>

Received 5 January 2022; Received in revised form 31 July 2023; Accepted 28 August 2023

0022-1031/© 2023 Elsevier Inc. All rights reserved.

### 1.1. God as a benevolent, protective force determining people's outcomes

A recent survey of Americans by the Pew Research Center (2018) found that 48% believe that God determines what happens to them most or all of the time. Among Christians specifically, 74% believe that God is all-loving, all-knowing, and all-powerful and 77% specifically say that God has protected them. This latter figure jumps to 97% considering only those who believe in the God of the Bible.

These characteristics of God—a benevolent and protective force influencing what happens in people's lives—may explain why many believers view God as a secure attachment figure (Granqvist, Mikulincer, & Shaver, 2010; Kirkpatrick, 1999; Laurin, Schumann, & Holmes, 2014; Pollner, 1989). Attachment figures fit the profile of a benevolent, protective powerful entity that provides support and protection, and people turn to God, just as they do to attachment figures, for consolation and guidance in times of stress and suffering (Hamilton, Moore, Johnson, & Koenig, 2013; Park, 2005, 2016). Religious commitment in general, and secure attachment to God among Christians specifically, predict lower distress and greater psychological and even physical wellbeing (e.g., Bock, Hall, Wang, & Hall, 2018, 2023; Hoogeveen et al., 2022). Attachment to God as a secure base is embedded within grand narratives throughout the Christian Bible (Knabb & Emerson, 2013), thereby reflecting a widespread view of God within Christian populations.

#### 1.1.1. God as a source of comfort and safety in the face of stress

A powerful, benevolent, and protective God can provide the feelings of security and control that can help people cope with times of stress or danger. Existing work has primarily shown how turning to God helps religious believers cope and protects their wellbeing in the face of *uncontrollable* misfortune, stressors and traumas. For example, Black women living in majority-White communities in Canada reported turning to their confidence in God's love and protection to cope with the challenges of racism (Beagan, Etowa, & Bernard, 2012). Likewise, African Americans experiencing life-threatening illness use prayer to ask God for the strength to endure and protection and healing (Hamilton, Kweon, Brock, & Moore, 2020), and in the wake of a 2016 Louisiana flood, participants who were personally affected by the disaster reported turning to God as a source of protection, comfort, and nurturance, even more so than before the disaster (E. B. Davis et al., 2019). Moreover, these strategies seem to work: Turning to God for help and comfort, and believing that God will intervene to ensure beneficial outcomes, predicts greater psychological adjustment both during stressful life events (in meta-analytical estimates by Ano & Vasconcelles, 2005) and afterwards (J. I. Harris et al., 2008; Pargament et al., 1998).

#### 1.1.2. God as a security net in the face of risk

These findings have tended to focus on how religious individuals respond to stressors and misfortune outside of their control. But the kind of protective attachment role God plays in so many American Christians' lives may also encourage them to actively approach risky situations that offer some chance of reward at the expense of some chance of harm. Indeed, people are more likely to take risks when they feel more confident that it will pay off, and that they can cope with the consequences if it does not (e.g., Bandura, 1982; Fishbein & Ajzen, 1975; Krueger & Dickson, 1994; Wong & Yang, 2021). Human attachment figures permit children to more confidently explore new environments (Ainsworth, Blehar, Waters, & Wall, 1978; Fishbein & Ajzen, 1975; Harlow, 1958; Levav & Argo, 2010), and also make adults more comfortable with risky financial and recreational decisions (Anderson & Galinsky, 2006; D. Davis, Sundahl, & Lesbo, 2000; Langer, 1975; Nordgren, van der Pligt, & van Harreveld, 2007). To the degree God serves as an attachment figure, the same could apply. Consider a person deciding whether or not to take on a dangerous hike to the top of a beautiful mountain. With God's protection in mind, that person might feel either more confident that they will make it safely to the peak, and/or that they will be better able to cope with any injuries or other setbacks they suffer on the way. Either

of these expectations of protection, just like similarly positive expectations grounded in confidence in one's personal abilities (Bandura, 1982; Krueger & Dickson, 1994; Slinger & Rudestam, 1997; Wong & Yang, 2021), could embolden our climber to take the risk and seek the summit.

#### 1.1.3. Theoretical significance

To summarize, an extensive literature on perceptions of God as a protective attachment figure, in combination with what we know about the underpinnings of risk decisions, leads straightforwardly to the prediction that reminders of God will increase risk taking, at least among American Christians. Moreover, testing this prediction carries theoretical importance. For one thing, it builds on theories of religious coping to extend our understanding of God's role in situations beyond uncontrollable stressors and traumas to everyday controllable decisions. For another, it provides a strong test of the authenticity of people's self-reported God images, which are notoriously vulnerable to social desirability concerns. When religious believers claim they view God as a loving benevolent figure, or that they rely on God in the face of stress, it is possible they are doing so out of a feeling of obligation to present themselves in a socially-desirable way (Gebauer, Sedikides, & Schrader, 2017; Sedikides & Gebauer, 2021) or to give the theologically-correct response (Slone, 2004). Testing whether mere reminders of God make people more willing to take risks may help address the question of social desirability. Finally, conclusive evidence against the hypothesis would suggest that God may play a relatively limited role in influencing believers' approach to risk, perhaps shaping their attributions and emotional responses to life events, but not their behavior or behavioral intentions. For these reasons, it is crucial that tests of the God-risk hypothesis use methods well-suited to provide strong conclusions.

### 1.2. Have past methods used to test this hypothesis been adequate?

Past studies that find an effect of God on risk-taking (Chan et al., 2014; Kupor et al., 2015) as well as past studies that do not (e.g., Gervais et al., 2020; Gruneau Brulin et al., 2018) have employed similar methods. They all have used experimental manipulations to activate the notion of God in the minds of participants, intending this as a proxy for manipulating belief in God. This is a common approach in the psychology of religion (Willard, Shariff, & Norenzayan, 2016), and one our pre-registered study will take as well, though using a markedly different manipulation. We note, however, that deeply held, chronically activated beliefs could also have a causal effect on behavior that superficially activated ideas might not. We return to this important point later.

Past experiments have used between-subjects manipulations, randomly assigning participants to a religious priming condition or to a control condition. Many used an implicit priming method (adapted from Shariff & Norenzayan, 2007) that asks participants to unscramble a series of five word sets into coherent 4-word sentences, with half of the word sets containing words relating to God and religion. Participants then reported their willingness to take risks, either via various self-report measures (Gervais et al., 2020; Gruneau Brulin et al., 2018; Kupor et al., 2015), or behaviorally using the Balloon Analogue Risk Task (Chan et al., 2014).

Recent work on best practices for activating religious cognitions to experimentally test their effects (Shariff, Willard, Andersen, & Norenzayan, 2016; White, Kelly, Shariff, & Norenzayan, 2019) strongly suggests that none of the past studies on God and risk were optimally designed to detect a true effect, if one indeed exists. Specifically, (a) implicit priming methods, (b) between-subjects designs, and (c) samples that included large numbers of non-believers could all have contributed to past literature's inconsistent findings and failed replications. Luckily, alternative methods could resolve each of these issues and provide greater power to detect an experimental effect.

#### 1.2.1. Methodological shortcoming #1: Implicit primes

Implicit priming methods may be ineffective at activating religious

concepts. Efforts to replicate implicit social priming effects in general (e.g., Doyen, Klein, Pichon, & Cleeremans, 2012; Harris, Coburn, Rohrer, & Pashler, 2013; Pashler, Coburn, & Harris, 2012), as well as implicit religious priming effects in particular (e.g., Berniūnas, Dranseika, & Tserendamba, 2020; Billingsley, Gomes, & McCullough, 2018; Gomes & McCullough, 2015), have often failed. By contrast, the effects of explicit religious primes, like directly telling participants to think about God when making their decisions, have proven reliable (e.g., Billingsley et al., 2018; Ginges, Sheikh, Atran, & Argo, 2016; White et al., 2019). A recent meta-analysis supports this distinction, finding that experiments using explicit religious primes have far more reliable effect sizes than those using implicit ones (Shariff et al., 2016). Together, these findings have led many to conclude that implicit religious priming may not be useful for testing anything at all, and that research should use exclusively explicit reminders (for discussion, see Hoogeveen & van Elk, 2021; Watanabe & Laurent, 2021).

Our primary study therefore used an explicit experimental manipulation, asking participants to think about God's influence over what happens in their life. This prime does not directly mention risks, or protection from harm, because doing so may artificially pressure participants to respond in a certain way (Watanabe & Laurent, 2021). At the same time, it reminds participants of the general idea that God has the power to influence their outcomes, and the research outlined above (as well as pilot data reported below) suggests that for many people this is likely to cue thoughts of God's protection and benevolence, which theoretically could increase risk taking.

### 1.2.2. Methodological shortcoming #2: Between-subjects designs

Between-subjects studies often lack the statistical power to detect real-but-small effects. Studies that are underpowered to detect small effects often result in inconsistent findings across studies (Buttton et al., 2013; Ioannidis, 2005; Lakens & Etz, 2017). Within-subjects designs can provide greater power by measuring change in behavior relative to each participant's baseline tendencies; this eliminates one potentially large source of variance, increasing power to detect small effects without a prohibitive cost (Bellemare, Bissonnette, & Kröger, 2014). Within-subjects religious priming has previously been used successfully to assess how thinking about God changes prosocial behavior, by assessing how much money participants will give away to strangers before and after being asked to think about God (White et al., 2019).

One obvious solution to this problem would be to have our study use a within-subjects design. However, as above, we wanted to avoid experimental demand characteristics that arise through easier hypothesis guessing in within-subjects designs. For this reason, our study retains prior work's between-subjects approach, but dramatically increases the sample size to ensure we are sufficiently powered to detect potentially-small religious priming effects, and to overcome the noise from individual variation in baseline risk-taking.

### 1.2.3. Methodological shortcoming #3: Failure to focus on believers

Finally, past studies' inclusion of non-religious alongside religious participants muddies the conceptual waters. Whereas much early work on religious priming claimed that activating culturally widespread religious notions should work as an experimental analog to the natural presence of those notions in a believer's mind (e.g., Shariff & Norenzayan, 2007), more recent work calls this into question. For example, research on prosocial behavior tends to find that religious priming reliably increases generosity among believers, but does nothing to the behavior of atheists (Shariff et al., 2016; White et al., 2019). The prior work on God and risk taking tested for moderation by religious belief, and reported none (Chan et al., 2014; Gervais et al., 2020; Kupor et al., 2015); however, the primary purpose of those experiments was to test for a main effect of condition, meaning if they risked being underpowered to detect that main effect (due to their between-subjects designs), they were even more so underpowered to detect interactions with belief. We therefore focused our studies exclusively on samples of Christians

from the United States, as this is a population for which there is substantial prior evidence of belief in a powerful, protective, benevolent God, which is the key belief likely to increase risky behavior.

### 1.3. An additional theoretical consideration

In designing our proposed study, we also had to take into account the well-established finding that thinking about God causes people to more closely conform to moral norms and avoid behavior that would garner social disapproval (e.g., not sharing money with strangers, Billingsley et al., 2018; Shariff et al., 2016; White et al., 2019). Risks can occasionally fall into this latter category (e.g., dangerous driving, substance use, gambling, and risky sexual activity), and these behaviors are *negatively* correlated with belief in God (Arnett, 1998; Diaz, 2000; Hoffmann, 2000; Kerestes, Youniss, & Metz, 2004; Marsiglia, Kulis, Nieri, & Parsai, 2005; Murray, Ciarrocchi, & Murray-Swank, 2007; Noussair, Trautmann, van de Kuilen, & Vellekoop, 2013; Poulson, Eppler, Satterwhite, Wuensch, & Bass, 1998; Sinha, 2016; Steinman & Zimmerman, 2004; Welte, Barnes, Tidwell, & Wieczorek, 2017). Conversely, God primes might increase certain risky behaviors—like diving into a roiling ocean to try to save a drowning child—not because they are risky but because they are prosocial. For these reasons, it was essential for us to study risks that are morally neutral: neither particularly moral nor particularly immoral.

### 1.4. Overview and registered study

In summary, the conceptual hypothesis that God beliefs enable risk-taking seems plausible; a pilot study described below helps further bolster its underpinnings. By contrast, the methods used to date to test this conceptual hypothesis fall short of current standards. The primary goal of the present study is to provide a more definitive test, using the most up-to-date methods, of whether or not experimentally activating beliefs about God's protection can increase risk-taking.

We first present results from a pilot study which found that (a) that American Christians expect that God will protect them in the face of self-generated risks, and (b) that these expectations are correlated with self-reported willingness to take this risk. We then present a pre-registered, approved-prior-to-data-collection experimental test using a strong explicit manipulation, a well-powered sample comprised exclusively of American Christians, and a measure of morally neutral risk-taking. This design offered the best chance of detecting a causal effect of reminders of God beliefs, if indeed there is a true effect. Specifically, we randomly assigned participants to think about God's influence over what happens in their lives, or to a control condition, before asking their willingness to engage in a morally neutral self-generated risky behavior from daily life. Beyond the above-mentioned theoretical implications of the risk hypothesis, if reminders of God do increase risk-taking, this would suggest religious beliefs may provide more than coping in the face of unavoidable suffering, but may make believers more willing to put themselves into dangerous situations they could otherwise choose to avoid entirely. People often avoid risk more than they rationally should (e.g., Kahneman & Tversky, 1979); if some religious beliefs help them overcome that tendency, allowing them to confidently pursue novel experiences and seize opportunities that they would otherwise miss out on, this could plausibly be one of the competitive advantages that many religions provide their believers (see D. Johnson, 2015; Laurin & Kay, 2017; Norenzayan et al., 2016).

## 2. Pilot study

This pilot study aimed to further test the plausibility of the conceptual hypothesis. If American Christians do *not* expect God's protection in the face of risks, or if this expectation does not correlate with willingness to take risks, that would cast serious doubt on the conceptual hypothesis and discourage us from pursuing the proposed project. Full materials,

data, and analysis scripts are available at <https://osf.io/wtycq/>. In this and the accompanying Supplementary Materials, we report all measures, manipulations, and exclusions.

## 2.1. Methods

### 2.1.1. Participants

Participants completed an online survey through Prolific's online panels ([www.prolific.co](http://www.prolific.co)), in return for a small monetary payment. We recruited an initial sample of 350 participants; of these, 309 met the eligibility criteria: Their Prolific pre-screen data indicated they were from the United States and they identified as Christian, and they also identified as Christian within the survey. Moreover, to avoid confounding the action's risk with its perceived morality, we excluded an additional 45 participants who self-generated a risk that they deemed either exceptionally moral ( $n = 30$ ) or exceptionally immoral ( $n = 15$ , the same pattern of results is found when analyzing data from all participants). The final sample therefore included 264 participants (139 women, 116 men, and 9 who reported other gender labels or did not answer the question; 74% White, 10% Black, 7% Hispanic or Latino, 6% Asian, 3% multiple or other ethnicities; age  $M = 40.35$ ). Most participants believed strongly in God ( $M = 4.46$  on a 5-point scale Likert-type scale, 93% of participants score above scale midpoint). This sample was sufficient to detect within-subjects differences of  $d = 0.17$  or correlations of  $r = 0.17$  with 80% power.

### 2.1.2. Procedure

**2.1.2.1. Open-ended description of a risk.** Participants were told that this study investigates their perspective on risks in daily life. They were told that "A risky activity is one that has uncertain consequences: It could be dangerous and cause you harm, or it could really pay off, for example with material benefits, or with the thrill of the experience." Participants first described a risk that they have considered taking in the past. To ensure generalizability across different types of risks that people encounter in daily life, participants were randomly assigned to describe either: (a) a recreational risk, such as "hiking a potentially unsafe trail or going down a potentially dangerous ski slope", (b) a financial risk, such as "investing some of your income in a speculative stock or in a new business venture," (c) a risk in their career, such as "asking your boss for a promotion or leaving your current well-paying job to start a new career you enjoy more", or (d) a risk in their social relationships, such as "disagreeing with a close friend or family member about a major issue, or moving to a new city far away from your friends and extended family." These different domains of risks encompass many different types of morally-neutral risks, thereby providing generalizability while still avoiding domains of risk that are overly moral or immoral.

After describing the risky activity, participants were reminded that it "could be dangerous and cause you harm, or it could really pay off, for example with material benefits or with the thrill of the experience," and were asked to describe, "If you decided to take this risk, what is a bad outcome, danger, or harm that you might suffer?" Because we wanted to probe beliefs about how God might mitigate negative outcomes of risk-taking, this writing prompt encouraged participants to think specifically and concretely about the potential dangers of their actions. We used their description of the potential bad outcomes they might experience to frame the questions about God's protection below.

**2.1.2.2. Beliefs about God's protection.** On the next page of the survey, we reminded participants of the potential bad outcome they had described, and asked them to rate six items pertaining to that bad outcome. The first three measured their expectation that God would protect them by helping them *to avoid bad outcomes*, e.g., "God will prevent this bad outcome from occurring and ensure a good outcome" ( $\alpha = 0.92$ ); the next three their expectation that God would protect them

by helping them *cope with the bad outcome*, if it did occur, e.g., "God will ensure that in the long run, any suffering this experience brings you is offset by good experiences later" ( $\alpha = 0.86$ ). All items used 5-point scales ranging from *definitely not* to *definitely* with a midpoint of *unsure*.

An additional item not directly relevant to protection, but nonetheless relevant to God's reactions, asked participants whether participants believed that God would respond to the risk taking by punishment with a bad outcome or reward with a good outcome. The Supplemental Material describes the rationale behind this item, and analyses suggesting that on average participants expected reward more than punishment, though the majority felt unsure.

**2.1.2.3. Likelihood of risk taking.** Participant reported their likelihood of actually engaging in the behavior within the next month, if they had the opportunity, on single item with a 7-point scale from *extremely unlikely* to *extremely likely*.

**2.1.2.4. Moral valence of risk.** Participants selected whether engaging in the action would be the "morally right" thing to do, the "morally wrong" thing to do, or whether the "activity isn't really relevant to morality. Engaging in it is neither especially morally right or wrong." As noted above, 85% ( $n = 264$ ) of the eligible sample of 309 selected the third option, indicating that the domains of activity investigated here (i. e., social, career, recreational, and financial risks) are not typically considered morally relevant.

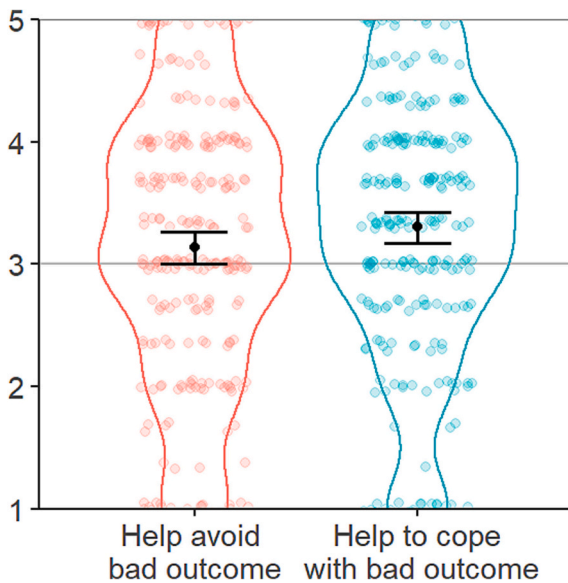
**2.1.2.5. Demographics.** Finally, participants reported their demographic characteristics (including gender, age, ethnicity, income, educational attainment, political orientation, nationality, and religious denomination) as well as their level of belief in God (3-item composite of "I believe in God," "I believe in a divine being who is involved in my life," and "There is no God or higher power in the universe" [reverse-scored], all on scales from *strongly disagree* [1] to *strongly agree* [5]) and other indicators of religious commitment (e.g., level of religiosity, spirituality, frequency of religious service attendance). Participants also reported how concerned they were about COVID-19 and they had the opportunity to leave additional comments about how they believe God responds to risk-taking.

## 2.2. Results

### 2.2.1. Does God protect risk-takers?

Participants' reports that God would prevent bad outcomes and that God would help them cope with bad outcomes were very highly correlated,  $r(262) = 0.82$ ,  $p < .001$ , indicating that both are likely part of the same package of beliefs in a protective, benevolent God, but we analyzed each separately because they are conceptually distinct and each theoretically-plausible motivators of risk taking. We used one-tailed one-sample  $t$ -tests to test whether responses were significantly above the scale midpoint. As depicted in Fig. 1, for avoiding bad outcomes, scores were near but significantly above the midpoint of 3 ("not sure"),  $M = 3.14$ ,  $SD = 1.11$ ,  $t(263) = 1.99$ ,  $p = .024$ . For coping with the bad outcome, scores were similarly above the midpoint,  $M = 3.31$ ,  $SD = 1.08$ ,  $t(263) = 4.65$ ,  $p < .001$ . These figures in no way reflect that believers feel absolutely certain of God's protection, which is reasonable given religious teaching that God's plans are often beyond human understanding and cannot be known with certainty, and the acceptance that answers to many religious questions are mysterious and inexplicable (Liquin, Metz, & Lombrozo, 2020). However, only a small minority (6%) felt sure God would NOT protect them in any way (i.e., selected "definitely not" for both items); nearly all thought there was at least some chance God would protect them, with half or more suspecting God would probably or definitely help them avoid (48%) and cope with (58%) bad outcomes. Overall, these analyses suggest only a minority of participants dismissed the idea of God's protection.





**Fig. 1.** Likelihood that God will help people who take risks to avoid bad outcomes, and cope with bad outcomes if they should occur. Black points indicate the mean (and 95% confidence interval), colored points represent individual participants' scores. The horizontal line indicates the scale's neutral midpoint.

### 2.3. Likelihood of risk taking

The average likelihood of actually taking the risk in the next month,  $M = 3.79$ ,  $SD = 2.01$ , did not differ from the scale midpoint of 4 ("Neither likely nor unlikely"),  $t(263) = -1.68$ ,  $p = 3.79$ , with some participants being willing, some unwilling, and other unsure about whether they would take the risk. People were more willing to take the risk to the extent they expected God to help them avoid,  $r(262) = 0.18$ , 95% CI [0.07, 0.30],  $p = .002$ , or cope with,  $r(262) = 0.13$  [0.01, 0.25],  $p = .037$ , bad outcomes. Likelihood of risk taking was not correlated with merely believing in God,  $r(262) = -0.02$  [-0.14, 0.10],  $p = .71$ . This offers preliminary evidence that risk taking is positively correlated with the belief that God will help risky decisions turn out for the best, despite their potential harms.

**2.3.1.1. Variation between risk domains.** We did not predict differences across the different types of risk we asked participants to generate, and analyses examining them separately are necessarily underpowered. Nevertheless, we conducted these separate analyses (reported in detail in the Supplementary Materials) and found directionally similar effects for each domain in most cases. The one exception was participants seemed to expect God would only help them cope with (not avoid) bad outcomes of financial risk. For that reason, our main study omits the financial risk category, focusing on the other three.

### 2.4. Discussion

These pilot data indicated that Christian participants from the United States tended to believe that God would (or at least might) protect them from the potential harms of taking risks, helping them both avoid negative outcomes of risky behavior and cope with bad outcomes that did arise. These beliefs were also correlated, weakly but significantly, with an increased willingness to engage in the risky behavior within the next month. Our method ensured that the risks participants considered were not especially moral or prosocial, which corresponded to the vast majority of risks they generated across recreational, career, financial, and social domains. These findings lend credence to the hypothesis that

thinking about God could increase American Christians' willingness to take risks, by mitigating the perceived threat of risky behavior. We tested this hypothesis in the primary preregistered study, using an experimental manipulation of whether participants were thinking about God.

Of course, even if people consider God as a likely source of protection in the face of risk, it may nonetheless be that brief experimentally-induced reminders of God are not sufficient to affect risk taking. If our pre-registered study produced a null result, those findings could point to two conclusions. First, that researchers may want to stop using experimental methods to assess any effect of God beliefs on risky behavior. Second, that if believing in a benevolent, protective God figure influences people's risk decisions, as the pilot data hints that it might, it may do so in ways that would be better assessed through alternative non-experimental methods, like longitudinal studies that can capture natural variation in people's real beliefs over time.

### 3. Registered study

Participants in the primary experiment described a potentially-risky activity that they had considered taking, and then were randomly assigned to think about God or not prior to reporting their likelihood of taking the risk in the near future. We limited our sample to American Christians, excluded participants who described their risk as moral/immoral rather than morally neutral, and excluded participants who failed various comprehension and attention checks throughout the survey, to ensure this sample had the best chance of detecting an experimental effect, if any existed. Full materials, data, analysis scripts, and the originally-approved registered report are available at <https://osf.io/h8s7w/>.

#### 3.1. Methods

##### 3.1.1. Participants

Participants completed an online survey through Prolific's online panels in return for a small monetary payment. We planned to recruit participants on an ongoing basis until we reach a final sample of at least 300 participants per condition after exclusions, and we retained any participants beyond this total who passed all exclusion criteria. The pilot study revealed small correlations between belief in God's protection and willingness to take risks,  $r = 0.13$  for avoidance of harm,  $r = 0.18$  for coping with harm, equivalent to Cohen's  $d$ s between 0.26 and 0.37. Although these correlations come from a different analysis than that of the primary experiment, they provided some estimate of what (small) effect sizes we might have expected in the main study. A priori power analyses indicated that a sample size of 306 per condition would be required to detect the smallest of these effects with 90% power in an independent samples  $t$ -test.

Individuals were only eligible to participate if they were from the United States and they identified as Christian: We only advertised to participants if they identified a US nationality and Christian religion in their Prolific profile, and excluded those who, within our survey, did not report US nationality ( $N = 24$ ) or a Christian faith ( $N = 47$ ). We also excluded participants who failed an English-language comprehension question at the beginning of the survey ( $n = 55$ ), who failed an attention check question at the end of the survey ( $n = 1$ ), who failed to follow instructions to write about an risk they have considered taking ( $n = 1$ ), or who indicated their activity was morally right ( $n = 117$ ) or morally wrong ( $n = 79$ ), as opposed to morally neutral.

We also excluded participants who did not answer "God" in some form to the question "Who or what did we ask you to think about when answering the last set of questions?";  $n = 153$ . This was intended as a manipulation check, with no parallel question in the control condition because such a question would have had no answer. This difference between conditions, especially given the unexpected high number of participants who failed the check, undermines the goal of random

assignment, so we also include below unplanned robustness checks that included participants even if they failed the manipulation check question.

The final sample consisted of 631 Christians from the United States, including 59% Protestant Christians, 34% Catholic Christians, 1% Eastern Orthodox Christians, and 7% non-denominational or other Christian denominations (e.g., Jehovah's Witness). This final sample was 52% female, 47% male, 1% non-binary or not reported gender; 80% White, 6% Black, 6% Asian, 5% Hispanic or Latino, 3% multiple or other ethnicities; aged between 18 and 78 years ( $M = 42$  years); with a median income of \$60,000 - \$69,999, and 66% had greater than High School education. Most participants very strongly believed in God,  $M = 4.38$ ,  $SD = 0.73$ , on a 5-point scale, 93% above scale midpoint.

### 3.1.2. Procedure

Participants chose to take part in a study on risk-taking attitudes (no mention of God or religion was made in the recruitment materials). After providing consent, and passing an English comprehension question (where they read a passage of text and identified which character performed a specific action), participants wrote about a risky action that they have considered taking in daily life. Participants were then randomly assigned to two between-subjects conditions that either explicitly primed God ( $n = 303$ ) or did not mention God ( $n = 328$ ), before reporting their willingness to engage in the risky behavior in the future. Full details are available in the Supplementary Materials.

### 3.1.3. Self-generated risk

Participants completed the self-generated risk task, in which they wrote about a risk that they have considered taking in the past and might engage in in the future. Similar to the pilot study, participants were randomly assigned to one of three prompts, describing different domains of risk-taking (recreational, career, or social; omitting financial risks for reasons described above).

### 3.1.4. God prime

We explicitly asked half of the participants to think about God while reporting their willingness to take the risk. Participants in the God Prime condition were instructed "Before you answer these questions, please think about God's influence over what happens in your life. Think about your likelihood of engaging in this risky activity or behavior, after considering God's influence over your life." Participants in the control condition were not reminded of God, but merely asked to "Think about your likelihood of engaging in this risky activity or behavior."

### 3.1.5. Willingness to take the risk

After describing the risk in the text box, participants reported the likelihood that they would take this risk in the future, through a series of questions that specified different timespans: "If you had the opportunity to engage in this behavior within the next [two days/week/two weeks/month/two months/three months], what is the likelihood you would do it?" on a scale ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*). We averaged these six items into a score of willingness to take the risk (Cronbach's  $\alpha = 0.98$ ). The timespans were presented in random order. We included multiple timespans not because we wanted to learn anything about participants' specific time horizon; rather because multi-item measures, generally provide more reliable measures than do single items, and doing it this way avoided redundancy in question phrasing which might annoy participants. To reinforce the manipulation, for participants in the God Prime condition only, each item began with "After considering God's influence over your life, if you had the opportunity to engage in this behaviour...".

### 3.1.6. Moral valence of risk

Participants selected which of these statements described their risky activity: the morally right thing to do, the morally wrong thing to do, or the activity isn't really relevant to morality and engaging in it is neither

especially right nor wrong. As planned, only participants who selected the third statement, indicating their risky activity was irrelevant to morality (80% of total responses), were retained in the final analysis.

### 3.1.7. Manipulation check

Next, participants in the God framing condition answered the open-ended question: "Who or what did we ask you to think about when answering the previous set of questions about your likelihood of taking the risk?"<sup>1</sup>

### 3.1.8. Hypothesis guessing

Participants wrote open-ended answers to the questions "What do you think the purpose of the study was? What results do you think we expected to find?" A research assistant coded answers from participants in the God condition into the following categories: (a) thinking about God will *increase* willingness to take the risk,  $n = 23$ , (b) thinking about God will *decrease* willingness to take the risk,  $n = 5$ , (c) anything else,  $n = 275$  (we originally planned to code (c) as three separate categories—non-directional hypotheses that God will affect behavior, non-specific purposes about measuring behavior or risk-taking that did not mention God, or other nonsensical, irrelevant, incorrect responses—but our pre-registered analyses treated them as a single category so we coded them as such). Participants in the control condition had no reason to know we were studying how God affects risk, and indeed no participants in the control condition mentioned God or religion in their hypothesis guess.

### 3.1.9. Individual differences and demographics

Finally, participants completed additional questions probing their demographic characteristics (gender, age, ethnicity, income, educational attainment, political orientation, nationality, and religious denomination), and their religious beliefs and commitments.

## 3.2. Results

### 3.2.1. Primary hypothesis test

Our primary analysis used an independent-samples  $t$ -tests to compare participants' willingness to engage in the risky behavior when thinking about God vs. when not reminded of God. As depicted in Fig. 2, participants were significantly more likely to take the risk when thinking about God ( $m = 3.90$ ,  $sd = 2.01$ ), than in the control condition when not reminded of God ( $m = 3.34$ ,  $sd = 2.02$ ), Cohen's  $d = 0.28$ , 95% CI [0.12, 0.44],  $t(625.34) = 3.52$ ,  $p < .001$ . With this confirmatory finding in hand, we turned to a series of analyses testing its robustness; unless otherwise noted, these analyses were pre-registered with a specific analysis plan but with the caveat they would be labeled "exploratory".

### 3.2.2. Robustness checks

**3.2.2.1. Variation across domains.** First, we explored whether the effect of thinking about God on risk taking was present within each domain of activity, by conducting independent-samples  $t$ -tests separately with each of the three risk types. As we noted in our pre-registered plan, these analyses necessarily had lower power than the full analysis because each participant reported on only one risk type. Participants were significantly more likely to take career risks when thinking about God,  $d = 0.39$  [0.12, 0.65],  $t(224) = 2.90$ ,  $p = .004$ ; the trend was similar but not significant for both social risks,  $d = 0.23$  [-0.08, 0.54],  $t(148) = 1.47$ ,  $p$

<sup>1</sup> The qualification "about your likelihood of taking the risk" deviates from what we had pre-registered. We made this change to clarify the intended target of our question, after launching the study and noticing that many of the first 20 participants answered the original, unclarified question by describing something relevant to the study that was not God, such as "Social relationships," "A risky action," "Whether or not it is a morally right thing to do or not".

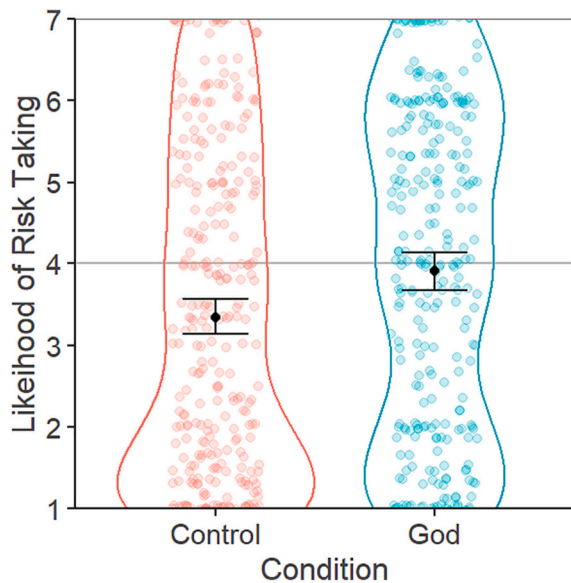


Fig. 2. Likelihood that participants will engage in the risky behavior in the near future. Black points indicate the mean (and 95% confidence interval), colored points represent individual participants' scores. The horizontal line indicates the scale's neutral midpoint (neither likely nor unlikely).

= .14, and recreational risks,  $d = 0.21 [-0.05, 0.46]$ ,  $t(240) = 1.60$ ,  $p = .11$  (see Supplementary Fig. S3).

**3.2.2.2. Hypothesis guessing.** Due to the explicit nature of our manipulation, we considered that participants in the God priming condition could change their behavior as a function of their suspicions about how the experimenters would want them to respond. For example, participants who correctly guessed our hypothesis could have tried to provide favorable data, or conversely they could have been motivated to show their individuality by disconfirming it. Only a small minority of participants in the God-framed condition mentioned a specific directional hypothesis about how thinking about God could affect risk-taking (7.6% reported thinking about God would increase risk-taking, and 1.7% reported thinking about God would decrease risk-taking). The majority (90.7%) did not list a hypothesis that mentioned both God and risk-taking.

To examine whether hypothesis guessing was associated with our experimental effect, we used a linear regression predicting willingness to take the risk from a dummy-coded variable specifying whether participants were (a) in the control condition [coded as the reference group], (b) in the experimental condition and guessed the hypothesis that God would *increase* risk-taking, (c) in the experimental condition and guessed the hypothesis that God will *decrease* risk-taking, or (d) in the experimental condition and guessed something else. Compared to the control condition (likelihood  $m = 3.34$ ,  $sd = 2.02$ ), thinking about God did significantly increase risk-taking among participants who were unable to guess a specific directional hypothesis,  $m = 3.94$ ,  $sd = 2.04$ ,  $b = 0.60 [0.28, 0.93]$ ,  $p < .001$ , indicating that the effects of the God priming condition were likely not driven by participants merely responding to experimenter demand. The other two comparisons were not statistically significant (hardly surprising given how few participants guessed a directional hypothesis), but participants who guessed the hypothesis that God will increase risk-taking reported slightly higher likelihoods,  $m = 3.70$ ,  $sd = 1.74$ ,  $b = 0.36 [-0.49, 1.22]$ ,  $p = .40$ , and those who guessed the hypothesis God will decrease risk-taking reported slightly lower likelihoods of risk-taking,  $m = 2.73$ ,  $sd = 1.23$ ,  $b = -0.61 [-2.39, 1.18]$ ,  $p = .50$ . Intriguingly, these are in the direction one would expect under experimenter demand, though it is equally possible that participants based their hypothesis guesses by looking back at how they

themselves had just acted. In any case, these comparisons come from such a small number of participants that we cannot interpret them with any confidence.

**3.2.2.3. Variation in exclusion criteria.** One additional set of robustness checks was not pre-registered, and examined how the effect held up to different exclusion criteria. In light of the higher exclusion rates in the God condition due to the manipulation check being present only in that condition, we deemed it especially important to test whether the effect held up if we retained otherwise-qualified participants who failed to mention "God" in their manipulation check response. It did: In this sample, we again found that participants were more likely to take the risk when thinking about God,  $m = 3.91$ ,  $sd = 2.01$ , than in the control condition,  $m = 3.34$ ,  $sd = 2.02$ ,  $d = 0.28 [0.13, 0.43]$ ,  $t(699) = 3.79$ ,  $p < .001$ . This finding rules out a series of alternative explanations based on the one-sided manipulation check we used; for example, that the kind of participant who would fail that manipulation check, and was therefore only present in the control condition, was dispositionally more risk-averse.

Having conducted one non-pre-registered robustness check, we thought it worthwhile to further explore the consistency of the effect in additional unplanned analyses. The observed effect emerged if we retained even participants who described risks that they felt had (im)moral connotations: In this larger sample, participants were still more likely to take a risk when thinking about God,  $m = 3.88$ ,  $sd = 2.06$ , than in the control condition,  $m = 3.37$ ,  $sd = 2.05$ ,  $d = 0.25 [0.11, 0.39]$ ,  $t(753.55) = 3.47$ ,  $p < .001$ . More generally, if we analyze all participants with available data, completely setting aside all exclusion criteria, we continue to find a robust effect of thinking about God on likelihood of taking risks,  $m = 3.92$ ,  $sd = 2.05$ , in the God condition versus  $m = 3.40$ ,  $sd = 2.05$ , in the control condition,  $d = 0.26 [0.13, 0.39]$ ,  $t(915) = 4.01$ ,  $p < .001$ .

## 4. Discussion

This registered report used the best experimental practices in the psychology of religion to test the hypothesis that thinking about God will increase non-moral risk-taking. In a pilot study, we found that American Christians hold the explicit belief that God will protect them from harm and ensure that risky behavior will turn out for the best. Our primary study used a high-powered, pre-registered explicit priming method, and found that when thinking about God, American Christians reported a greater likelihood of taking a risk in their career, social life, or a recreational activity, compared to a control condition that did not mention God or religion. These results lend credence to theoretical claims that belief in a benevolent and controlling God can increase certain types of risky behavior. They also emphasize the importance of using more reliable and robust methods when testing the experimental effects of religion on psychological phenomena.

### 4.1.1. Best practices in experimental methods to study religion

Past findings have provided inconsistent evidence for (Chan et al., 2014; Kupor et al., 2015) and against (Gervais et al., 2020; Gruneau Brulin et al., 2018) the general hypothesis that experimental reminders of God will increase risk-taking. Therefore, our registered experiment aimed to provide the best possible test of the hypothesis, using improved methods that correct several issues present in past experiments. We did not use the implicit sentence-unscrambling task that had been used in several original studies of religious priming effects with recent failed replications (e.g., Billingsley et al., 2018; Gervais et al., 2020; Gomes & McCullough, 2015), but instead used an explicit framing method that has been shown to be much more reliable in activating religious beliefs



and subsequently shaping behavior (e.g., White et al., 2019). Such explicit requests to think about God while making decisions are an ecologically-valid part of life in religious communities, and in this study was able to increase Christians' willingness to take risks. We also ensured that our study had sufficient statistical power to detect small effects in our between-subjects design. We further limited our sample to Christians (who generally view God as a benevolent protector) rather than including a broader sample of the American population that includes many people with more disparate beliefs (about God's character, or whether God exists at all) and would be unlikely to respond to our experimental prompt. Finally, we focused on willingness to take morally-neutral risks, both by priming domains of risk that are not obviously connected to morality and focusing on participants who self-identified their risk as morally-neutral (thus excluding risky behaviors that may be viewed as overly moral or immoral, and therefore confounded with the effect of religious primes on prosociality, Shariff et al., 2016). Each of these factors gave us the best chance of detecting an experimental effect, according to prior empirical findings and theorizing. We confirmed the robustness of our results across multiple exclusion criteria within the available data.

Further considerations that would improve the likelihood of successful experiments might include relying on within-subjects designs, to improve statistical power by using each participant as their own control, and ensuring that dependent measures are carefully chosen to avoid ceiling and floor effects. In the case of risk-taking, this consideration led us to ask participants to generate risks that they have considered taking, and our pilot data confirmed substantial variability across the whole range of willingness to take these risks in the future. If we had asked participants to think about risks that were easy to agree to, or very dangerous risks that few people would attempt under any circumstances, it would be unlikely that many people would change their willingness after thinking about God.

Future studies that aim to test the reliability or replicability of claims about religion and psychology do not only need to conduct high-powered direct replications, but also to continue developing innovative methods that use more robust techniques. This may in part involve using explicit primes, rather than fickle implicit priming techniques. But it should also involve making sure that methods are adapted to the specific theoretical question and population of study. Experimental studies of religion are most likely to be effective when they activate religious beliefs that participants already endorse, and likely to be ineffective when attempting to change a person's pre-existing beliefs. Effective experimental work in the psychology of religion therefore requires that researchers understand the belief commitments of their participants, and ask research questions that are meaningful and appropriate to their samples of participants. (For further discussion of the use of experiments to study religious cognition see Hoozevee & van Elk, 2021; Watanabe & Laurent, 2021.)

#### 4.1.2. Implications for understanding religious impacts on motivation

If thinking about God does truly increase believers' willingness to take risks, this would provide another context in which commitment to a benevolent, powerful God can help believers cope with life's stressors. Belief in God may not only help people to manage the pain of unchosen suffering (Ano & Vasconcelles, 2005; Pargament et al., 1998; Park, 2005), but also support confidence that self-chosen risks might turn out for the best, and thereby could encourage people to seize opportunities they would have otherwise avoided. Notably, in our experiment reminders of God did not lead people to recklessly approach all risks: the mean in the God-framed condition was near the scale midpoint of "neither likely nor unlikely". It merely reduced the number of participants who were extremely unlikely to take the risk in the future (35% of participants scored between 1 "extremely unlikely" and 2 "moderately unlikely" in the control condition, but only 24% of participants in the God condition). Indeed, there is well-documented tendency for people (and animals) to be risk averse (see Hintze, Olson, Adami, & Hertwig,

2015), preferring safer options over more risky options with a higher expected value. Thinking about God might help people overcome this bias, adding to the many ways that religious beliefs can support believers' flourishing and wellbeing.

Shifting our level of analysis, it is conceivable that a benevolent, protective God's influence on the willingness to take risks contributed to the sociocultural popularity of this particular type of God (Laurin & Kay, 2017; Norenzayan et al., 2016). Taking risks is not only an individual venture, but a social one as well: Coordinated action of many sorts, from group hunting to investments in infrastructure, involve some degree of risk. If societies with cultural representations of benevolent Gods are more willing to take such risks, this could be another factor contributing to the spread of these representations.

To be clear, the data we have presented here provide no direct support for these tentative ideas about individual and societal benefits. Our purpose in speculating about them here is to highlight the potential connections between the influence of God reminders on risk-taking and some relevant theoretical frameworks, to inspire future research that might test these connections directly.

#### 4.1.3. Limitations and future directions

The methodological steps we took to maximize our chance of detecting an experimental effect of thinking about God limited the population of participants we sampled from and the materials we used. In terms of populations, we focused on American Christians, consistent with substantial prior literature showing that American Christians view God as a benevolent protector (e.g., Granqvist et al., 2010; Johnson et al., 2015, 2013; Kirkpatrick, 1999), something we confirmed in our Pilot Study. These effects would likely also be found in other religious traditions that have a culture of appealing to benevolent interventionist deities to mitigate potential harms, but people who believe that higher powers are distant, ambivalent, or otherwise not interested in ensuring human welfare are unlikely to take greater risks when thinking about their gods. Other aspects of religion might also bolster confidence to take risks through alternative mechanisms, such as if religious concepts remind people of their valued group identities (e.g., as Christians), which may increase self-esteem and perceived social support and thereby buffer anxieties about risky actions.

In terms of materials, we used self-reported willingness to take a self-generated risk; further research might test whether the pattern extends to behavioral measures of risk. For example, researchers could ask participants to think about God before completing the Balloon Analogue Risk Task (Chan et al., 2014), a commonly used behavioral measure of risk taking in which participants must decide how much to inflate a balloon in order to win points, with more pumps increasing their payout, but also the risk that the balloon will pop and they will lose everything. Similarly, it would be valuable to extend the findings to risk-taking in more naturalistic settings would also be valuable. Reminders of God could also be presented in a more ecologically valid way, such as a sermon or prayer about God's protection, similar to those that Christians might experience in their typical religious practice. Finally, while we focused specifically on risks without moral connotations, we did not directly test whether this mattered. Nonetheless, we suspect that thinking about God would probably discourage, rather than increase, willingness to engage in immoral risks, such as those perceived as obviously harmful to oneself or others, or those explicitly identified as immoral within one's religious community (e.g., drinking and driving, drug use).

#### 4.2. Conclusions

This experiment used improved methods to resolve inconsistencies in the prior literature, and found that experimentally activating thoughts of God can increase willingness to take non-moral risks. More generally, our findings indicate that future studies testing these constraints on generalizability are likely to be most successful when they adopt the



methodological reforms employed in our study, such as focusing on specific religious beliefs and risky behaviors that have a solid theoretical rationale for showing any effect, ensuring that samples have sufficient statistical power, and avoiding implicit priming methods that are typically ineffective in modern high-powered studies. In addition to future experimental work, a full understanding of religious psychology also requires a range of non-experimental methods, as many religious beliefs (and they ways they are entwined with everyday life) cannot be understood in brief psychological interventions, but only as they develop across the life-course through a combination of individual experiences and social influences. Our studies contribute to these theoretical and methodological developments, by showing that American Christians do expect that God will help believers to cope with the potential dangers of risky action, and subsequently that they are more willing to take risks when thinking about God.

### Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could influence the work reported in this paper.

### Data availability

Full materials, data, and analysis scripts are available at <https://osf.io/wtycq/>.

### Acknowledgements

This work was supported by a Social Sciences and Humanities Research Council of Canada grant (012577) to Kristin Laurin.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2023.104539>.

### References

- Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation*. Lawrence Erlbaum.
- Anderson, C., & Galinsky, A. D. (2006). Power, optimism, and risk-taking. *European Journal of Social Psychology*, 36(4), 511–536. <https://doi.org/10.1002/ejsp.324>
- Ano, G. G., & Vasconcelles, E. B. (2005). Religious coping and psychological adjustment to stress: A meta-analysis. *Journal of Clinical Psychology*, 61(4), 461–480. <https://doi.org/10.1002/jclp.20049>
- Arnett, J. J. (1998). Risk behavior and family role transitions during the twenties. *Journal of Youth and Adolescence*, 27(3), 301–320. <https://doi.org.ezproxy.library.ubc.ca/10.1023/A:1022851003328>.
- Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37, 122–147. <https://doi.org/10.1037/0003-066X.37.2.122>
- Beagan, B. L., Etowa, J., & Bernard, W. T. (2012). “With god in our lives he gives us the strength to carry on”: African Nova Scotian women, spirituality, and racism-related stress. *Mental Health, Religion and Culture*, 15(2), 103–120. <https://doi.org/10.1080/13674676.2011.560145>
- Bellemare, C., Bissonnette, L., & Kröger, S. (2014). Statistical power of within and between-subjects designs in economic experiments. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.3149007>
- Berniūnas, R., Dranseika, V., & Tserendamba, D. (2020). Between Karma and Buddha: Prosocial behavior among Mongolians in an anonymous economic game. *The International Journal for the Psychology of Religion*, 30(2), 142–160. <https://doi.org/10.1080/10508619.2019.1696497>
- Billingsley, J., Gomes, C. M., & McCullough, M. E. (2018). Implicit and explicit influences of religious cognition on Dictator Game transfers. *Royal Society Open Science*, 5(8), Article 170238. <https://doi.org/10.1098/rsos.170238>
- Bock, N. A., Hall, M. E. L., Wang, D. C., & Hall, T. W. (2018). The role of attachment to God and spiritual self-awareness in predicting evangelical Christians' appraisals of suffering. *Mental Health, Religion & Culture*, 21(4), 353–369. <https://doi.org/10.1080/13674676.2018.1494706>
- Bock, N. A., Hall, M. E. L., Wang, D. C., & Hall, T. W. (2023). Spiritual self-awareness as a moderator between attachment to god and evangelical Christians' appraisals of suffering. *Spirituality in Clinical Practice*, 10(2), 131–149. <https://doi.org/10.1037/scp0000223>
- Button, K. S., Ioannidis, J. P. A., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S. J., & Munafò, M. R. (2013). Power failure: Why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, 14(5). <https://doi.org/10.1038/nrn3475>. Article 5.
- Chan, K. Q., Tong, E. M. W., & Tan, Y. L. (2014). Taking a leap of faith: Reminders of god lead to greater risk taking. *Social Psychological and Personality Science*, 5(8), 901–909. <https://doi.org/10.1177/1948550614537309>
- 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(6), 1224–1242. <https://doi.org/10.1111/j.1559-1816.2000.tb02518.x>
- Davis, E. B., Kimball, C. N., Aten, J. D., Hamilton, C., Andrews, B., Lemke, A., ... Chung, J. (2019). Faith in the wake of disaster: A longitudinal qualitative study of religious attachment following a catastrophic flood. *Psychological Trauma Theory Research Practice and Policy*, 11(6), 578–587. <https://doi.org/10.1037/tra0000425>
- 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. *The Social Science Journal*, 37(3), 453–458. [https://doi.org/10.1016/S0362-3319\(00\)00083-5](https://doi.org/10.1016/S0362-3319(00)00083-5)
- Doyen, S., Klein, O., Pichon, C.-L., & Cleeremans, A. (2012). Behavioral priming: It's all in the mind, but whose mind? *PLoS One*, 7(1), Article e29081. <https://doi.org/10.1371/journal.pone.0029081>
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Addison-Wesley.
- Gebauer, J. E., Sedikides, C., & Schrader, A. (2017). Christian self-enhancement. *Journal of Personality and Social Psychology*, 113, 786–809. <https://doi.org/10.1037/pspp0000140>
- Gervais, W. M., McKee, S. E., & Malik, S. (2020). Do religious primes increase risk taking? Evidence against “anticipating divine protection” in two preregistered direct replications of Kupor, Laurin, and Levav (2015). *Psychological Science*. <https://doi.org/10.1177/0956797620922477>
- Ginges, J., Sheikh, H., Atran, S., & Argo, N. (2016). Thinking from God's perspective decreases biased valuation of the life of a nonbeliever. *Proceedings of the National Academy of Sciences*, 113(2), 316–319. <https://doi.org/10.1073/pnas.1512120113>
- Gomes, C. M., & McCullough, M. E. (2015). The effects of implicit religious primes on dictator game allocations: A preregistered replication experiment. *Journal of Experimental Psychology: General*, 144(6), e94–e104. <https://doi.org/10.1037/xge0000027>
- Granqvist, P., Mikulincer, M., & Shaver, P. R. (2010). Religion as attachment: Normative processes and individual differences. *Personality and Social Psychology Review*, 14(1), 49–59. <https://doi.org/10.1177/1088868309348618>
- Gruneau Brulin, J., Hill, P. C., Laurin, K., Mikulincer, M., & Granqvist, P. (2018). Religion vs the welfare state—The importance of cultural context for religious schematics and priming. *Psychology of Religion and Spirituality*, 10(3), 276–287. <https://doi.org/10.1037/rel0000200>
- Hamilton, J. B., Kweon, L., Brock, L.-U. B., & Moore, A. D. (2020). The use of prayer during life-threatening illness: A connectedness to God, inner-self, and others. *Journal of Religion and Health*, 59(4), 1687–1701. <https://doi.org/10.1007/s10943-019-00809-7>
- Hamilton, J. B., Moore, A. D., Johnson, K. A., & Koenig, H. G. (2013). Reading the bible for guidance, comfort, and strength during stressful life events. *Nursing Research*, 62(3), 178–184. <https://doi.org/10.1097/NNR.0b013e31828fc816>
- Harlow, H. F. (1958). The nature of love. *American Psychologist*, 13(12), 673–685. <https://doi.org/10.1037/h0047884>
- Harris, C. R., Coburn, N., Rohrer, D., & Pashler, H. (2013). Two failures to replicate high-performance-goal priming effects. *PLoS One*, 8(8), Article e72467. <https://doi.org/10.1371/journal.pone.0072467>
- Harris, J. I., Erbes, C. R., Engdahl, B. E., Olson, R. H. A., Winkowski, A. M., & McMahon, J. (2008). Christian religious functioning and trauma outcomes. *Journal of Clinical Psychology*, 64(1), 17–29. <https://doi.org/10.1002/jclp.20427>
- Hintze, A., Olson, R., Adami, C., & Hertwig, R. (2015). Risk sensitivity as an evolutionary adaptation. *Scientific Reports*, 5, 8242. <https://doi.org/10.1038/srep08242>
- Hoffmann, J. P. (2000). Religion and problem gambling in the U.S. *Review of Religious Research*, 41(4), 488–509. <https://doi.org/10.2307/3512317>
- Hoogeveen, S., & van Elk, M. (2021). Advancing the cognitive science of religion through replication and Open Science. *Journal for the Cognitive Science of Religion*, 6(1–2), 158–190. <https://doi.org/10.1558/jcsr.39039>
- Hoogeveen, S., Sarafoglou, A., Aczel, B., Aditya, Y., Alayan, A. J., Allen, P. J., ... Wagenmakers, E.-J. (2022). A many-analysts approach to the relation between religiosity and well-being. *Religion, Brain & Behavior*, 1–47. <https://doi.org/10.1080/2153599X.2022.2070255>
- Ioannidis, J. P. A. (2005). Why most published research findings are false. *PLoS Medicine*, 2(8), Article e124. <https://doi.org/10.1371/journal.pmed.0020124>
- Johnson, D. (2015). *God is watching you: How the fear of god makes us human*. Oxford University Press.
- Johnson, K. A., Cohen, A. B., & Okun, M. A. (2015). God is watching you but also watching over you: The influence of benevolent god representations on secular volunteerism among Christians. *Psychology of Religion and Spirituality*. <https://doi.org/10.1037/rel0000040>
- Johnson, K. A., Li, Y. J., Cohen, A. B., & Okun, M. A. (2013). Friends in high places: The influence of authoritarian and benevolent god-concepts on social attitudes and behaviors. *Psychology of Religion and Spirituality*, 5(1), 15–22. <https://doi.org/10.1037/a0030138>
- Johnson, K. A., Okun, M. A., Cohen, A. B., Sharp, C. A., & Hook, J. N. (2019). Development and validation of the five-factor LAMB measure of god representations. *Psychology of Religion and Spirituality*, 11(4), 339–349. <https://doi.org/10.1037/rel0000207>

- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263–291. <https://doi.org/10.2307/1914185>
- Kerestes, M., Youniss, J., & Metz, E. (2004). Longitudinal patterns of religious perspective and civic integration. *Applied Developmental Science*, 8(1), 39–46. [https://doi.org/10.1207/S1532480XADS0801\\_5](https://doi.org/10.1207/S1532480XADS0801_5)
- Kirkpatrick, L. A. (1999). Attachment and religious representations and behavior. In *Handbook of attachment: Theory, research, and clinical applications* (pp. 803–822). The Guilford Press.
- Knabb, J. J., & Emerson, M. Y. (2013). “I will be your God and you will be my people”: Attachment theory and the grand narrative of scripture. *Pastoral Psychology*, 62(6), 827–841. <https://doi.org/10.1007/s11089-012-0500-x>
- Krueger, N., & Dickson, P. R. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences*, 25(3), 385–400. <https://doi.org/10.1111/j.1540-5915.1994.tb00810.x>
- Kupor, D. M., Laurin, K., & Levav, J. (2015). Anticipating divine protection? Reminders of god can increase nonmoral risk taking. *Psychological Science*, 26(4), 374–384. <https://doi.org/10.1177/0956797614563108>
- Lakens, D., & Etz, A. J. (2017). Too true to be bad: When sets of studies with significant and nonsignificant findings are probably true. *Social Psychological and Personality Science*, 8(8), 875–881. <https://doi.org/10.1177/1948550617693058>
- Langer, E. J. (1975). The illusion of control. *Journal of Personality and Social Psychology*, 32(2), 311–328. <https://doi.org/10.1037/0022-3514.32.2.311>
- Laurin, K., & Kay, A. C. (2017). The motivational underpinnings of belief in god. In J. M. Olson (Ed.), *Vol. 56. Advances in experimental social psychology* (pp. 201–257). Academic Press. <https://doi.org/10.1016/bs.aesp.2017.02.004>
- Laurin, K., Schumann, K., & Holmes, J. G. (2014). A relationship with God? Connecting with the divine to assuage fears of interpersonal rejection. *Social Psychological and Personality Science*, 5(7), 777–785. <https://doi.org/10.1177/1948550614531800>
- Levav, J., & Argo, J. J. (2010). Physical contact and financial risk taking. *Psychological Science*, 21(6), 804–810.
- Liquin, E. G., Metz, S. E., & Lombrozo, T. (2020). Science demands explanation, religion tolerates mystery. *Cognition*, 204, Article 104398. <https://doi.org/10.1016/j.cognition.2020.104398>
- Marsiglia, F. F., Kulis, S., Nieri, T., & Parsai, M. (2005). God forbid! Substance use among religious and nonreligious youth. *American Journal of Orthopsychiatry*, 75(4), 585–598. <https://doi.org/10.1037/0002-9432.75.4.585>
- Murray, K. M., Ciarrocchi, 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(3), 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(5), 533–544. <https://doi.org/10.1002/bdm.565>
- Norenzayan, A., Shariff, A. F., Gervais, W. M., Willard, A. K., McNamara, R. A., Slingerland, E., & Henrich, J. (2016). The cultural evolution of prosocial religions. *Behavioral and Brain Sciences*, 39. <https://doi.org/10.1017/S0140525X14001356>. e1 (19 pages).
- Noussair, C. N., Trautmann, S. T., van de Kuilen, G., & Vellekoop, N. (2013). Risk aversion and religion. *Journal of Risk and Uncertainty*, 47(2), 165–183.
- Pargament, K. I., Smith, B. W., Koenig, H. G., & Perez, L. (1998). Patterns of positive and negative religious coping with major life stressors. *Journal for the Scientific Study of Religion*, 37(4), 710–724. <https://doi.org/10.2307/1388152>
- Park, C. L. (2005). Religion as a meaning-making framework in coping with life stress. *Journal of Social Issues*, 61(4), 707–729. <https://doi.org/10.1111/j.1540-4560.2005.00428.x>
- Park, C. L. (2016). Meaning making in the context of disasters. *Journal of Clinical Psychology*, 72(12), 1234–1246. <https://doi.org/10.1002/jclp.22270>
- Pashler, H., Coburn, N., & Harris, C. R. (2012). Priming of social distance? Failure to replicate effects on social and food judgments. *PLoS One*, 7(8). <https://doi.org/10.1371/journal.pone.0042510>
- Pew Research Center. (2018). *When Americans say they believe in god, what do they mean?* Pew Research Center. <https://www.pewresearch.org/religion/2018/04/25/when-americans-say-they-believe-in-god-what-do-they-mean/>.
- Pollner, M. (1989). Divine relations, social relations, and well-being. *Journal of Health and Social Behavior*, 30(1), 92–104. <https://doi.org/10.2307/2136915>
- 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(5), 227–232. <https://doi.org/10.1080/07448489809600227>
- Sedikides, C., & Gebauer, J. E. (2021). Do religious people self-enhance? *Current Opinion in Psychology*, 40, 29–33. <https://doi.org/10.1016/j.copsyc.2020.08.002>
- Shariff, A. F., & Norenzayan, A. (2007). God is watching you: Priming god concepts increases prosocial behavior in an anonymous economic game. *Psychological Science*, 18(9), 803–809. <https://doi.org/10.1111/j.1467-9280.2007.01983.x>
- Shariff, A. F., Willard, A. K., Andersen, T., & Norenzayan, A. (2016). Religious priming: A Meta-analysis with a focus on prosociality. *Personality and Social Psychology Review*, 20(1), 27–48. <https://doi.org/10.1177/1088868314568811>
- Sinha, C. (2016). Decolonizing social psychology in India: Exploring its role as emancipatory social science. *Psychology & Society*, 8(1), 57–74.
- Slinger, E., & Rudestam, K. E. (1997). Motivation and disinhibition in high risk sports: Sensation seeking and self-efficacy. *Journal of Research in Personality*, 31(3), 355–374. <https://doi.org/10.1006/jrpe.1997.2193>
- Slone, D. J. (2004). *Theological incorrectness: Why religious people believe what they shouldn't*. Oxford University Press.
- Steinman, K. J., & Zimmerman, M. A. (2004). Religious activity and risk behavior among African American adolescents: Concurrent and developmental effects. *American Journal of Community Psychology*, 33(3–4), 151–161. <https://doi.org/10.1023/B:AJCP.0000027002.93526.bb>
- Watanabe, S., & Laurent, S. M. (2021). Past its prime? A methodological overview and critique of religious priming research in social psychology. *Journal for the Cognitive Science of Religion*, 6(1–2). <https://journals.equinoxpub.com/OLDJCSR/article/view/38411>.
- Welte, J. W., Barnes, G. M., Tidwell, M.-C. O., & Wieczorek, W. F. (2017). Predictors of problem gambling in the U.S. *Journal of Gambling Studies*, 33(2), 327–342. <https://doi.org/10.1007/s10899-016-9639-1>
- White, C. J. M., Kelly, J. M., Shariff, A. F., & Norenzayan, A. (2019). Supernatural norm enforcement: Thinking about karma and god reduces selfishness among believers. *Journal of Experimental Social Psychology*, 84, Article 103797. <https://doi.org/10.1016/j.jesp.2019.03.008>
- Willard, A. K., Shariff, A. F., & Norenzayan, A. (2016). Religious priming as a research tool for studying religion: Evidentiary value, current issues, and future directions. *Current Opinion in Psychology*, 12, 71–75. <https://doi.org/10.1016/j.copsyc.2016.06.003>
- Wong, J. C. S., & Yang, J. Z. (2021). Seeing is believing: Examining self-efficacy and trait hope as moderators of youths' positive risk-taking intention. *Journal of Risk Research*, 24(7), 819–832. <https://doi.org/10.1080/13669877.2020.1750463>