



## When and why does belief in a controlling God strengthen goal commitment?



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### ABSTRACT

The perception that God controls one's life can bolster motivation to pursue personal goals, but it can also have no impact and even squelch motivation. To better understand how religious beliefs impact self-regulation, the current research built on Compensatory Control Theory's claim that perceiving the environment as predictable (vs. unpredictable) strengthens commitment to long-term goals. Perceiving God's intervention as following an understandable logic, which implies a predictable environment, increased self-reported and behavioral commitment to save money (Studies 1–3), excel academically (Study 4), and improve physical health (Study 5). In contrast, perceiving God as intervening in mysterious ways, which implies that worldly affairs are under control yet unpredictable, did not increase goal commitment. Exploratory mediational analyses focused on self-efficacy, response efficacy, and confidence in God's control. A meta-analysis (Study 6) yielded a reliable effect whereby belief in divine control supports goal pursuit specifically when it signals the predictability of one's environment.

### 1. Introduction

Religion is central to the lives of individuals and societies. Eighty-five percent of people worldwide subscribe to a formalized religion (Zuckerman, 2005) and the large majority of Americans believe in God (Gallup Poll, 2008), even by conservative estimates (Gervais & Najle, 2017). It is for good reason, then, that psychologists are increasingly interested in religion's impact on psychological functioning (Pargament, 2013). This work has deepened our understanding of social behavior and shed new light on basic psychological processes (Barrett, 2000; Norenzayan & Gervais, 2013; Waytz, Gray, Epley, & Wegner, 2010).

Within this scope lie important questions about when and why belief in supernatural causation affects self-regulation—the processes through which one alters responses or behavior in a goal-directed manner (Baumeister, Vohs, & Tice, 2007). Does believing that God controls one's life support everyday goal pursuit? Or does it inhibit motivation or simply not make a difference?

Prior theory offers conflicting answers. Classic theorists (Durkheim, 1912/1954; James, 1902/2002) and contemporary researchers (McGregor, Nash, & Prentice, 2010; Soenke, Landau, & Greenberg, 2013) contend that belief in divine control supports goal pursuit by

assuaging anxiety and feelings of uncertainty. Yet, other theorists claim that believing in God's intervention causes people to relinquish autonomous control over their life to a higher power, thus stifling individual ambition (Freud, 1927/1961; Rothbaum, Weisz, & Snyder, 1982).

Empirical evidence is scarce and paints a similarly murky picture. On the one hand, studies show that religiosity is positively associated with temptation resistance and self-control (Koole, McCullough, Kuhl, & Roelofsma, 2010; McCullough & Willoughby, 2009). Also, neurophysiological evidence shows that greater belief in God is marked by reduced activity in the anterior cingulate cortex—a cortical alarm system triggered by the detection of error and the experience of uncertainty—and hence may signal confident goal-directed action (Inzlicht, McGregor, Hirsh, & Nash, 2009). On the other hand, perceiving God as in control can have no impact and even deflate motivation. In one set of studies, participants experimentally reminded of a controlling God became less willing to expend effort or make sacrifices to pursue long-term goals (Laurin, Kay, & Fitzsimons, 2012).

The question remains when (and why) belief in God's control does and does not help people engage in such everyday goals as eating healthier and advancing their career.

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### 1.1. Compensatory Control Theory: predictability matters

Recent insights into the beliefs that underpin goal pursuit are useful here. Building on prior theory (Jost & Banaji, 1994; Lerner, 1980), Compensatory Control Theory (CCT) posits that people's confidence they are in control of their lives rests on a view of the external world as structured as opposed to disordered (Kay, Gaucher, Napier, Callan, & Laurin, 2008; Landau, Kay, & Whitson, 2015). This view is sustained by a broad network of beliefs that includes perceived regularities in the properties of stimuli and the time course of events. Believing that their social and physical environments are sufficiently structured, people can confidently predict the consequences of action, and are therefore likely to exploit that structure to pursue goals. If, in contrast, predictable structure seems lacking—for example, if stimuli appear difficult to place into dependable causal relations—then people lose confidence in their ability to achieve their goals. In short, CCT posits that beliefs implying a predictably structured world are cornerstones of the cognitive infrastructure underlying a confident sense of personal control.

This perspective yields the hypothesis that activating sources of *predictable* structure, in particular, will increase perceived personal control, even when those sources are superficially unrelated to the domain in which control is assessed. Supporting studies show that people feel more in control if given the opportunity to attribute seemingly random hazards and risks in their lives to the machinations of a cunning enemy—an effect mediated by reduced perceptions of randomness in the environment (Sullivan, Landau & Rothschild, 2010). Converging findings in organizational contexts show that priming people to view their workplace as characterized by a specifically predictable hierarchy increased self-reported control (Friesen, Kay, Eibach, & Galinsky, 2014).

A related hypothesis is that activating sources of predictable structure will promote commitment to personal goals. Supporting studies show that exposure to subtle reminders of orderly patterns in the natural environment made people more willing and likely to take action to pursue long-term goals (Kay, Laurin, Fitzsimons, & Landau, 2014). For example, priming predictable patterns in the placement of leaves on trees, or stars in the night sky, increased effortful pursuit of goals that bore no superficial relation to those patterns. Other research finds that subtly introducing disorder in the physical environment, in this case with askew wall décor and desktop clutter, undermined participants' ability to regulate their behavior (Chae & Zhu, 2014). Likewise, portraying corporations as agents that will intervene in people's lives in predictable ways buffered the loss of motivation that normally occurs when a salient goal seems overly demanding (Khenfer, Laurin, Tafani, Roux, & Kay, 2017). Attesting to the unique role of predictability, this effect disappeared when corporations were portrayed as benevolent but not capable of predictably influencing one's life. Collectively, these prior findings suggest that affirming sources of structure offering little predictability will *not* encourage goal pursuit.

### 1.2. Comparing popular conceptions of divine control

Applying evidence of predictability's motivating impact to the current question, we observe that popular conceptions of God's control differ in their implications for predictability. Acknowledging these differences may be crucial for understanding when and why religious beliefs affect goal pursuit. Indeed, other relevant studies show that activating and measuring different conceptions of God's control (e.g., omniscient vs. omnipotent) predict unique downstream effects on self-regulation (Laurin, Kay, et al., 2012).

One popular conception portrays God as a consistent implementer of rules who intervenes in worldly affairs according to a formal system of moral principles and codes, such as need and merit, that *humans can understand* (e.g., Psalm 33:11 “But the plans of the LORD stand firm forever, the purposes of his heart through all generations”). This conception implies that, by virtue of God's transparent control, one's

environment is not only structured but also predictable—a place where goal-directed actions are likely to produce desired outcomes. Thus, based on CCT, we hypothesized that belief in and exposure to this conception of God's control would strengthen commitment to personal goals.

Another popular but contrasting conception emphasizes a mysterious mode of divine causation, epitomized in the common expression “God works in mysterious ways” and reiterated throughout religious texts (Romans 11:33 “Oh, the depth of the riches of the wisdom and knowledge of God! How unsearchable his judgments, and his paths beyond tracing out!”). In this conception, God effects change in the world according to rules, codes, and plans that are *unknowable by humans*. This implies an unpredictable world in which one continually confronts events and circumstances that appear unjust, random, and even absurd.

It is notable that construing supernatural intervention as inherently mysterious has captivated people across cultures and historical eras (Howard-Snyder & Moser, 2002). What is the appeal? One answer is that it solves the problem of *theodicy*, reconciling God's alleged benevolence and omnipotence with the reality of evil and misfortune (Berger, 1967; Sullivan, 2016). It implies that seemingly undeserved suffering and arbitrary tragedies (e.g., genocides, natural disasters) are all part of God's broader, benevolent plan. It is futile to question His motives because they are unknowable.

The utility of this perceived unpredictability is evidenced in how people prefer to characterize other humans' influence on their lives. Sullivan et al. (2010) showed that people preferred to see personal enemies as having vague, mysterious abilities and motives (vs. explicitly known powers) because that conception enables them to attribute a wide range of seemingly random outcomes to a single source of control. These findings suggest that conceiving of God's control as profoundly mysterious helps people make sense of why bad things happen to good people.

The “mysterious ways” conception may also support faith in the efficacy of petitionary prayer and the existence of God. For example, approximately 40% of Americans solicit God to improve their health (e.g., being cured from disease; Barnes, Powell-Griner, McFann, & Nahin, 2004). Those who believe God intervenes in a straightforward, transparent manner will be repeatedly disappointed when their requests appear to go unanswered or denied (disease persists or worsens). Believing in a mysterious mode of supernatural causation is more accommodating, allowing for the possibility that an apparently unanswered prayer may be approved on a secret timetable or denied for a good reason that cannot be fathomed (Barrett, 2001, 2004; Boudry & Braeckman, 2012; Boudry & De Smedt, 2011; Humphrey, 1995). In this view, failed prayers rarely call God's benevolent control into question, creating the type of unfalsifiable ideology that many people find compelling and consoling (Friesen, Campbell, & Kay, 2015).

Complementing these insights, CCT suggests that, despite its other benefits, construing God's control as mysterious is unlikely to support goal pursuit. Believing that God could intervene at any moment for unknowable and seemingly absurd purposes casts doubt on any reliable link between current goal-directed action and future outcomes. Based on this analysis, we hypothesized that belief in and exposure to this conception would *not* increase goal commitment, and may decrease it.

Indirect support for this hypothesis comes from evidence for the specific importance of predictability in the appeal of structure. Tullett, Kay, and Inzlicht (2014) showed that reminders of order (vs. randomness) decreased self-reported anxiety and performance monitoring, but not if the order was described as beyond comprehension. Still, these prior studies did not focus on the potential impact of priming different conceptions of God's control.

In sum, viewing God as controlling one's life may not be enough to help people pursue their goals. Based on CCT, we proposed that a key difference lies in how people represent God's *modus operandi*. People will commit to their goals particularly when God seems to govern the

world according to a transparent program, therefore lending predictable structure to the environment in which they pursue goals in their daily life.

To clarify, we do not claim that divinely-sourced predictability is more motivating than other sources of predictability. As we just saw, the empirical basis for our hypotheses is evidence that goal pursuit benefits from activating predictable (vs. unpredictable) structure sourced in *diverse* systems, ranging from arboreal patterns to workplace hierarchy. CCT does not make strong claims about the comparative impact of these sources.

However, other lines of work suggest that God-sourced predictability is particularly motivating. Compared to secular influences, God is commonly construed as an agent with human-like intentions and beliefs. Recent work on anthropomorphism (Epley, Waytz, & Cacioppo, 2007; Waytz et al., 2010) shows that people have an easier time comprehending agentic action than the cumulative influence of manifold, impersonal forces. For example, people were particularly likely to deploy psychological explanations for unpredictable computers, ostensibly because the attribution of mental states afforded a degree of coherence and predictability. Perceiving predictable order as created intentionally—because God wants it there—may portray it as more dependable as a basis for goal-directed action. In light of these findings, we designed one of the current studies to compare the effects of priming divine versus secular sources of predictability on goal commitment. Although this comparison was not the focus of the project, findings stand to inspire further research.

### 1.3. Study overview

Study 1 takes an individual differences approach to test whether the association between belief in God and goal commitment is moderated by the belief that God's intervention is predictable. We predict that, at high levels of belief in God's control, greater belief in God's predictability will correlate positively with goal commitment, whereas belief that God intervenes unpredictably will attenuate, and possibly reverse, this relation.

Studies 2 to 5 aim to establish causality by manipulating exposure to portrayals of God as controlling in either a predictable or a mysterious manner.

Study 5 also compares the effects of priming God's predictable control with priming secular sources of predictable order. This enabled us to test whether portraying God as predictably controlling impacts goal pursuit in a way that is not reducible to portraying the world as generally predictable (again, we view this as an open question).

We pursued both internal validity and generalizability by including critical comparison conditions, converging operations (e.g., diversified primes), and samples recruited from online and undergraduate populations. Studies span a range of real-world goal contexts. Studies 1 to 3 focused on commitment to a financial savings goal—a desirable end-state for which actions are specifically dedicated toward longer term rewards over short-term gains (Chapman & Elstein, 1995). Studies 4 and 5 focused on academic and health-related goals, respectively, and included behavioral measures of goal commitment.

Study 6 presents a meta-analysis to summarize and quantify the effects of God's predictability across the five previous studies.

For all studies, we report all participants, all conditions included in the study, and all relevant independent and dependent measures. We conducted each study in a single wave (i.e., no additional participants were added after analyses) and analyzed data only after the required sample size target was met (Simmons, Nelson, & Simonsohn, 2011). All studies were approved by the applicable university's Institutional Review Board.

Finally, we began looking at the process through which predictable divine control supports goal pursuit. CCT does not specifically identify mediators of activated sources of predictable order, focusing instead on predictability's unique impact. Accordingly, research inspired by CCT

does not favor one mediating process over another. Hence, the approach taken here was to catalyze future attention to this question by exploring three potential mediators suggested by prior work:

#### 1.3.1. Self-efficacy

This refers to the belief that one's actions can reliably produce, either directly or indirectly, desired outcomes for the self (Bandura, 2001). Decades of research spanning such diverse goals as smoking cessation and academic achievement show that self-efficacy fluctuates in response to situational factors and predicts goal pursuit independent of external task demands (e.g., Multon, Brown, & Lent, 1991; Stajkovic & Luthans, 1998).

It is possible that construing God as enforcing predictable contingencies between circumstances, events, and outcomes increases people's confidence in their own ability to undertake goal-directed action. By contrast, believing that God mysteriously pulls the strings of one's life may not support self-efficacy. We tested this possibility by assessing whether activating predictable (vs. unpredictable) divine control increased goal commitment by means of strengthening the perception that one is capable of effective action in the domains of personal finances (Study 3) and health (Study 5).

#### 1.3.2. Response efficacy

This refers to confidence that a given action will bring about a specific outcome. It is related to, but distinct from, self-efficacy (Cameron, Marteau, Brown, Klein, & Sherman, 2012; Landau et al., 2015). For instance, people discriminate between believing they are capable of carefully saving money (self-efficacy) and believing that careful saving generally improves financial outcomes (response efficacy). Lacking confidence that a given action produces effective results, people may not be sufficiently motivated to undertake it, even if they trust their ability to do so. To test the possibility that priming a predictably (vs. unpredictably) controlling God fosters goal commitment by means of strengthening response efficacy, we measured the perceived efficacy of specific goal-directed actions in the domains of academic achievement (Study 4) and health (Study 5).

#### 1.3.3. Secondary control

A third possibility is that the predictability of God's control may enhance goal pursuit merely by suggesting that the individual shares responsibility with God. Classic theorizing on personal control (Rothbaum et al., 1982) recognizes that an individual may feel greater control over outcomes in some circumstances by relying on the vicarious control afforded by a powerful external entity, such as God or a powerful group. However, this perspective argues for increased feelings of agency not via a renewed commitment to pursuing goals in general, but by shifting one's goals to align with the goals of the more powerful agent. Accordingly, (the illusion of) agency occurs via aligning oneself with the powerful entity, affirming the feeling of self-other overlap, or otherwise enhancing its perceived power (Greenaway et al., 2015). This is an entirely different form of control restoration than we are interested in here, so we do not directly test this mechanism. Doing so would require testing shifts in identification as the crucial dependent measure or predictor variable and then the feelings of agency that may result. This type of effect is well researched, however, in recent work on the group-based control restoration model (Fritsche et al., 2013; Greenaway et al., 2015). It is conceivable, of course, that people prefer to align themselves with groups that are predictable rather than unpredictable, insofar as doing so affords various social identification benefits, but this question is better suited for research specifically investigating the link between identification processes and control. All that said, to test the alternative possibility that the predicted effect is not due to the *type* of control God exerts, as we theorize, but rather to perceiving a predictable (vs. unpredictable) God as simply having *more* control from which one can share, we measured belief in God's control over the relevant goal domain (Study 5).

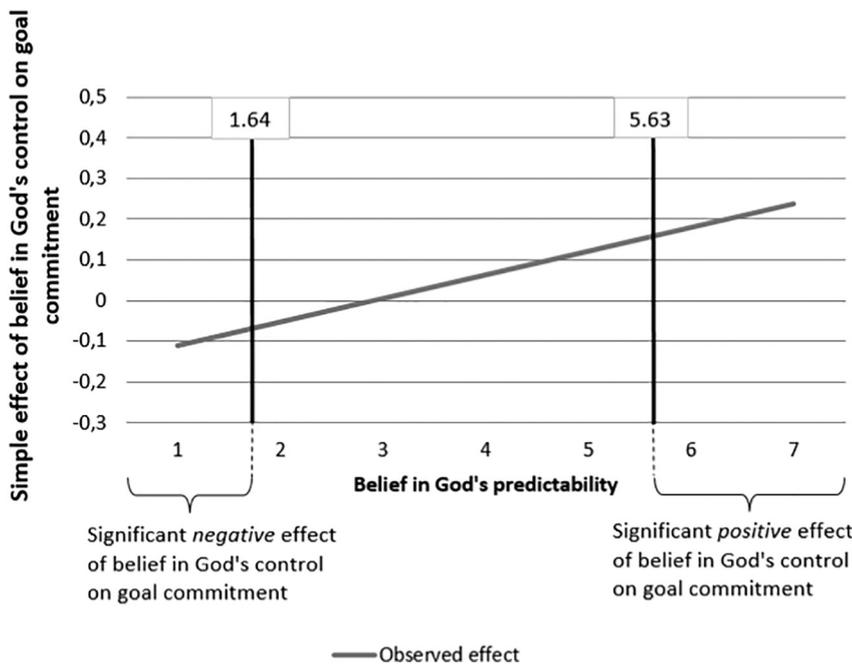


Fig. 1. Representation of the simple effect of belief in God's control on goal commitment at values of the moderator (belief in God's predictability) (Study 1).

## 2. Study 1

### 2.1. Method

#### 2.1.1. Participants

American residents ( $N = 278$ , 70.1% female,  $M_{\text{age}} = 45.6$ ) were recruited to participate in an online study using Toluna's participant database (Toluna is an international market research firm that collects online data for a per participant fee). Because there was no precedent for this correlational study, we sought a large sample, requesting data from the allotted maximum of 300 respondents and receiving 278. Data were collected in one wave and no additional participants were added after analyses. Participants self-identified as Christian (60.4%), non-religious (23.7%), Jewish (5.4%), Buddhist (1.4%), Hindu (0.7%), Muslim (0.4%), and other (2.2%). We retained atheists (5.8%) in the sample to maximize variability in our religious belief measures. See Supplemental material available online for detailed reporting of per-study analyses conducted with and without atheists.

#### 2.1.2. Procedure

As a cover story, we asked participants to take part in separate studies of religious attitudes and personal finances. The first scale measured belief in God's control with three items used in prior research (e.g., Laurin, Shariff, Henrich, & Kay, 2012): "God, or some type of supreme being, is in control, at least in part, of the events within our universe; God, or some other supreme being, makes most events in our world happen; The events that occur in this world unfold according to God's, or some other supreme being's, plan."

The next scale measured belief that God's control is predictable: "God (or some type of spiritual nonhuman entity) intervenes in the world's affairs with logical and identifiable patterns," and "The way God (or some type of spiritual nonhuman entity) intervenes in the world's affairs is predictable." Responses to both scales were made on a 7-point scale (1 = *Tremendously Doubtful*; 7 = *Very Likely*) and averaged to form composite scores for belief in God's control ( $\alpha = 0.95$ ) and predictability ( $\alpha = 0.83$ ).

In the ostensible second study, participants completed a goal commitment scale developed by Hollenbeck, Klein, O'Leary, and Wright (1989). They first listed a savings goal they were currently pursuing. Typical responses include "college educational savings for my son,"

"buy a new smartphone," "save for vacation in May," and "buy a car." Next, they responded to nine statements reflecting their commitment to persist in goal-directed strivings despite obstacles and other difficulties. Sample statements include "I am willing to put forth a great deal of effort beyond what I'd normally do to achieve this goal" and "Quite frankly, I don't care if I achieve this goal or not" (reverse scored). Responses were made on a 7-point scale (1 = *Strongly Disagree*; 7 = *Strongly Agree*) and averaged ( $\alpha = 0.86$ ).

Because savings goals are highly dependent on both income and age (i.e., the closer people are to retirement, the more concern they have with saving), we included age and income as covariates in all analyses in Studies 1 to 3—the studies examining financial savings goal commitment. Tables S1 to S4 in the Supplemental material available online report results with and without the covariates. These covariates did not interact with any of our predictor variables.

### 2.2. Results

Regressing savings goal commitment on belief in God's control, belief in God's predictability (both mean-centered), and their interaction returned the predicted interaction,  $b = 0.06$ ,  $SE = 0.02$ ,  $t(272) = 3.61$ ,  $p < .001$  (neither main effect was significant,  $ps > .20$ ).

We decomposed the interaction using the Johnson-Neyman technique, also known as a floodlight analysis (Hayes, 2013). Rather than rely on arbitrary plot points at 1 standard deviation above and below the mean, this technique probes the simple effect of a predictor variable at values of the moderator until finding significance, called the Johnson-Neyman points. We graphed the interaction in Fig. 1 depicting the Johnson-Neyman points that identify regions in the range of belief in God's control and goal commitment in which the association between belief in God's control and goal commitment is/is not significant.

The first Johnson-Neyman point for the predictability moderator occurs at a value of 1.64 ( $p = .05$ ,  $t = -1.96$ ), with a negative regression coefficient ( $b = -0.10$ ,  $SE = 0.05$ ). This indicates that as belief in God's control increased, belief in God's *unpredictability* predicted *less* savings goal commitment. The second Johnson-Neyman point occurs at a value of 5.63 ( $p = .05$ ,  $t = 1.96$ ), with a positive regression coefficient ( $b = 0.13$ ,  $SE = 0.07$ ). This indicates that as belief in God's control increased, belief in God's *predictability* predicted *more* savings goal commitment. These results support predictions that belief

in God's control increases long-term goal commitment when God is believed to intervene in a predictable manner, but not an unpredictable manner. Study 2 tests this hypothesis experimentally.

### 3. Study 2

#### 3.1. Method

##### 3.1.1. Participants

Participants ( $N = 116$ ) were recruited online via Amazon's Mechanical Turk. They self-identified as Christian (30.2%), non-religious (24.1%), atheist (19.0%), Hindu (19.0%), Muslim (4.3%), Buddhist (0.9%), and other (2.6%). We determined sample size by allocating 30 participants per cell provided that the non-atheist sample reached at least  $N = 100$  when the wave of data collection was complete. Adopting procedures used in prior work (e.g., Inzlicht & Tullett, 2010), we excluded atheists from the sample for two reasons: They would be insensitive to the overt portrayal of God as a legitimate source of control over worldly affairs (compare with Study 1, where this notion was not explicitly presented); and a God-based prime would likely cause an unfavorable attitude toward the study and interfere with proper completion. This practice remained for Studies 3 to 5, and full analyses with and without exclusion are available in the Supplemental materials (S2-A through S6-D2). Nine additional participants in the initial sample were automatically excluded prior to the manipulation for failing a comprehension check. This resulted in a final sample of 94 (35% female,  $M_{\text{age}} = 34.4$ ).

##### 3.1.2. Procedure

Participants were randomly assigned to one of three conditions. Those in the *predictable God* condition read a short article under the guise of a reading comprehension task. The article stated that a team of leading scientists was successfully able to develop an algorithm called the "God coefficient" designed to predict global events. In the *unpredictable God* condition, participants read that the scientists' search for the algorithm was unsuccessful. In both conditions, the article postulated that the premise for developing the algorithm was scientific proof that a God-like force controls worldly affairs. This is important because it ensured that participants in both conditions were presented with compelling evidence of God's omnipotent control. The articles differed only in whether God's intervention was portrayed as predictable or unpredictable. Specifically, the relevant passage in the *predictable God* condition read:

The fact that the algorithm retrospectively predicted societal change, and is doing well at predicting emerging new ones, suggests that to the extent God intervenes in the world's affairs, he or she does so according to logical and identifiable patterns.

The corresponding passage in the *unpredictable God* condition read:

The fact that the algorithm could not retrospectively predict societal change nor relevantly predict emerging new ones, suggests that to the extent God intervenes in the world's affairs, he or she does so without logical nor identifiable patterns.

Participants in the *baseline* condition proceeded directly to the dependent measure. All participants completed the same measure of financial savings goal commitment used in Study 1 ( $\alpha = 0.81$ ).

#### 3.2. Results

Submitting goal commitment scores to an ANCOVA (controlling for age and income, as discussed) returned a significant omnibus effect,  $F(2, 89) = 5.01, p = .009, \eta_p^2 = 0.10$ . To decompose this effect, we conducted pairwise comparisons using Fisher's least significant difference (LSD) to take into account the overall error term. Participants exposed to a predictable God portrayal reported stronger savings goal

commitment ( $M = 5.35, SE = 0.17$ ) than those exposed to an unpredictable God portrayal ( $M = 4.76, SE = 0.19; p = .02$ ) and no God portrayal ( $M = 4.63, SE = 0.16; p = .003$ ). The latter two conditions did not differ ( $p = .62$ ). Study 2 replicates Study 1 experimentally, showing that exposure to a portrayal of God as controlling worldly affairs in a predictable manner increased goal commitment compared with a portrayal of God as equally controlling but unpredictable.

### 4. Study 3

Study 3 begins to examine mechanism, focusing on self-efficacy. We predicted that the effect of exposure to a predictable God portrayal on goal commitment would be partially mediated by confidence that one can take action to achieve desired outcomes.

#### 4.1. Method

##### 4.1.1. Participants

American residents ( $N = 115, 77.4\%$  female,  $M_{\text{age}} = 38.3$ ) were recruited using Toluna's respondent database. Participants self-identified as Christian (53.9%), nonreligious (37.4%), Jewish (2.6%), Hindu (0.9%), Muslim (0.9%), Buddhist (0.9%), and other (3.5%). Atheists ( $n = 5$ ) were excluded. As with Study 2, sample size was determined by allocating 30 participants per cell provided that non-atheist sample reached at least  $N = 100$  (Toluna, the survey company, over-collected by 15). This study included the same attention check as in Study 2, but no participants in this sample failed the check.

##### 4.1.2. Procedure

Participants were randomly assigned to either the *predictable God* condition or the *unpredictable God* condition. The materials were identical to those used in Study 2. Next, participants completed a four-item scale of perceived confidence in the savings domain (adapted from Yim, Chan, & Lam, 2012): "I have confidence in my ability to save money effectively; I have excellent savings skills and ability; I do not doubt my ability to save money effectively; I am proud of my savings skills and ability" (1 = *Strongly disagree*; 7 = *Strongly agree*;  $\alpha = 0.92$ ). The Hollenbeck et al. (1989) goal commitment scale came last ( $\alpha = 0.78$ ).

#### 4.2. Results

Exposure to a predictable (vs. unpredictable) God increased both savings confidence ( $M_{\text{predictable}} = 4.84, SE = 0.21$  vs.  $M_{\text{unpredictable}} = 4.14, SE = 0.24, F(1, 111) = 4.64, p = .03, \eta_p^2 = 0.04$ ) and commitment ( $M_{\text{predictable}} = 5.53, SE = 0.12$  vs.  $M_{\text{unpredictable}} = 5.10, SE = 0.14, F(1, 111) = 5.63, p = .03, \eta_p^2 = 0.04$ ).

We ran a mediation analysis to examine whether savings confidence mediated the effect of God portrayal condition on goal commitment (Hayes, 2013, Model 4). The independent variable was our manipulation (dummy coded: *unpredictable God* = 0, *predictable God* = 1), the mediator was savings confidence, the dependent variable was savings goal commitment, and age and income were covariates. Fig. 2 depicts the mediation model. An analysis based on 5000 bootstrapped samples showed that confidence mediated the effect of our manipulation on goal commitment. The mean indirect effect excluded zero ( $a \times b = 0.14$ ; 95% CI = 0.01 to 0.33). Furthermore, in this mediation model, while the total effect of our manipulation was significant ( $\beta = 0.22, t(111) = 2.20, p = .03$ ), its direct effect on goal commitment was only marginally significant ( $\beta = 0.15, t(110) = 1.55, p = .13$ ), thus providing additional evidence that confidence served as a mediator.

### 5. Study 4

Study 4 tests whether the primary predicted effect emerges in a different context of goal engagement and when employing a dependent measure that is more personally relevant than the scales used in the

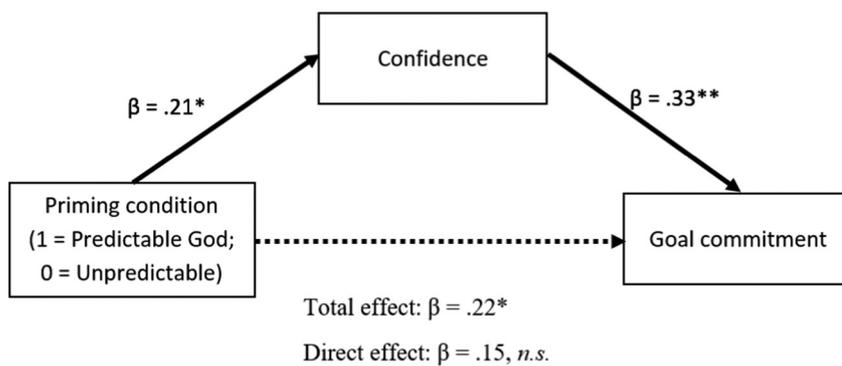


Fig. 2. Mediation of the effect of God portrayal condition on goal commitment by confidence; the mediation model was run while controlling for age and income (Study 3). All path coefficients represent standardized regression weights. The direct effect coefficient represents the effect of the independent variable after controlling for the effect of the proposed mediator. Total adjusted  $R^2$  for the direct effect model = 0.11,  $F(4, 110) = 4.64, p = .002$ .

\*Significant at  $p < .05$ . \*\*Significant at  $p < .01$ .

previous studies. College students considered their goal to perform well on their next final exam before completing a planning exercise in which they apportioned time to preparing for that exam. Complementing Study 3's focus on the mediation of self-efficacy, Study 4 focused on the potential role of response efficacy—the belief that particular goal-directed actions will produce desired outcomes.

## 5.1. Method

### 5.1.1. Participants

Undergraduates ( $N = 130$ ; 13% self-identified as atheist) were recruited in public venues across campus. We again determined sample size by allocating 30 participants per cell provided that the non-atheist sample reached at least  $N = 100$ . Given the goal of the study, atheists were excluded from analysis, resulting in a final sample of 113 (65 female,  $M_{\text{age}} = 19.7$ ; 15 participants did not complete demographic questions).

### 5.1.2. Procedure

The study was described as a survey of students' attitudes about studying and study materials. This cover story allowed us to combine the manipulation of God portrayal and our measure of planned study behavior. Participants were told they would first read an excerpt from a college textbook and rate its quality. They were randomly assigned to the *predictable God* or *unpredictable God* conditions. Depending on condition, they read one of the two articles used in Studies 2 and 3. To bolster the cover story, we edited the article slightly to resemble the writing style of college textbooks, and we adjusted the article's formatting so that it appeared to be photocopied from a textbook. Four filler items further supported the cover story: how easy was the excerpt to understand; how knowledgeable its author seemed; how interesting the material was; and interest in reading more on the topic.

To measure response efficacy, we then instructed participants to “Think of a course you are currently taking that will have a final exam” and to indicate their likely final grade (in percentage) if “you didn't study at all for the rest of the semester” and if “you studied as much as you could for the rest of the semester.” We computed a difference score to measure confidence in the efficacy of studying. Instructions then read “Now, we're interested in what you think makes up and contributes to your final grade in this class. Take a couple of minutes to reflect on how much each of the following factors contributes to your performance in this class. Then, drag each bar to the percentage that best reflects your feelings.” They were shown five factors: paying attention, hard work, the professor's personal preferences, the test grader's passing moods, and random luck. We reasoned that the degree to which participants judged their final grade as determined by the first two factors captures beliefs in the efficacy of particular goal-relevant behaviors.

Next was the dependent measure of planned effort investment. We adapted a paradigm used in prior research (Landau, Oyserman, Keefer, & Smith, 2014). As part of an ostensible survey of study habits and intentions, participants were asked to complete a planner of the two

weeks leading up to their next final exam. They were asked to “take some time to think about the events you see yourself doing during this two-week period” and “indicate those events on the planner.” Participants were shown a calendar representing 14 days, each divided into three slots representing morning, afternoon, and evening. For each slot, they were asked to choose from a dropdown menu that offered three options:

- An ‘S’ is entered for any timeslot they planned to be “studying for finals. These activities include, for example, reading over notes, reading your textbook, meeting in study groups, and anything else you do to prepare for your final exams.”
- An ‘LO’ is entered for any timeslot they planned to be doing “leisure activities with other people. These activities include, for example, hanging out with friends, going to parties, and going out to eat with a romantic partner.”
- An ‘LS’ is entered for any timeslot they planned to be “doing leisure activities by yourself. These activities include, for example, watching TV, exercising, or shopping by yourself.”

The participants were then told to “fill in as many spaces on the planner as you want. Also, if you're uncertain what you'll be doing during a given time, just leave that space blank – you don't need to fill in every space.”

Our primary outcome, the number of timeslots dedicated to studying (ranging from 0 to 42,  $M_{\text{grand}} = 28.11, SD = 17.03$ ), is a count variable. The discrete, non-normal distribution of such variables yields biased parameter estimates in standard OLS regression. Therefore, we analyzed the data using Poisson regression (Coxe, West, & Aiken, 2009).

## 5.2. Results

Exposure to a predictable (vs. unpredictable) God did not affect either item assessing response efficacy; Item 1 (ranging from  $-20$  to  $100, M = 37.45.11, SD = 22.00$ ):  $M_{\text{predictable}} = 37.78, SD = 22.85$  vs.  $M_{\text{unpredictable}} = 37.10, SE = 21.31, t(98) = 0.15, p = .89$ ; Item 2 (ranging from  $3$  to  $50, M = 37.89.11, SD = 8.02$ ):  $M_{\text{predictable}} = 38.55, SE = 6.29$  vs.  $M_{\text{unpredictable}} = 37.21, SE = 9.51, t(102) = 0.85, p = .40$ . This is likely due to the poor validity of our novel measures, owing in part to the narrow range of target behaviors or the low likelihood of students perceiving that random luck determines their exam grades. Also, the two new items were not, in retrospect, appropriately specific to the target goal. They referred more generally to one's expected grade in a class overall, which is likely to be based on several criteria besides their performance on the final exam, which is the goal-related outcome of primary interest. Hence, we did not pursue the planned mediation analyses.

We tested our primary prediction by regressing the total timeslots participants dedicated to studying onto priming condition (dummy coded:  $0 = \text{unpredictable God}, 1 = \text{predictable God}$ ). We found a significant effect ( $b = 0.23, SE = 0.05, z = 18.64, p < .001$ ). For each

timeslot that participants exposed to a portrayal of an unpredictable God planned to dedicate to studying, those exposed to a predictable God planned to dedicate 1.26 ( $e^{0.23}$ ) timeslots on average.

## 6. Study 5

Study 5 had five objectives. First, it compared the effects of divine versus secular sources of predictability within the same goal domain. This enabled us to test whether the predicted effect is uniquely caused by the salience of God's predictable control, or whether it stems from induced perceptions of predictability in general. Past research suggests that belief in God is particularly effective at satisfying needs for structure relative to secular sources because of God's unique features (e.g., omnipotence and unfalsifiability) (Friesen et al., 2015; Laurin & Kay, 2017). Based on these findings, we expected that priming a predictable God would strengthen goal commitment more than priming secular sources of predictable control.

Second, Study 5 was designed to conceptually replicate and extend the predicted effect to another domain of goal pursuit, namely, maintaining physical health. Participants were exposed to one of four descriptions of the health domain. Two descriptions highlighted the role of God's direct influence on personal health, but framed this control as either predictable or unpredictable. In the other two descriptions, the focus was instead on a well-mapped nexus of secular factors influencing personal health in either a predictable or unpredictable manner.

As a third aim, Study 5 advances our exploration of the process through which God's predictability facilitates goal pursuit, complementing our heretofore focus on self-efficacy (Study 3) and response efficacy (Study 4). We measured self-efficacy and response efficacy related to health behaviors as exploratory potential mediators. We also measured belief in God's control over one's physical health to examine the alternative possibility that the expected effect on goal commitment is simply due to differences in perceptions of God's degree of overall influence over the relevant goal domain.

Fourth, we aimed to extend our previous studies by measuring goal commitment behaviorally. While we used a behavioral outcome in Study 4, there may have been confounds as to why participants chose to commit time to studying (e.g., fear of failure). As a result, we examined whether our effect generalized to a previously established behavioral measure of goal commitment. One widely used paradigm is to measure the time people elect to engage with goal-relevant information (Fishbach & Ferguson, 2007; Moskowitz, 2002; Shah, 2003). Adapting this procedure, we measured the amount of time that participants spent in a self-paced reading of informative guides for improving their health (Bann, McCormack, Berkman, & Squiers, 2012; Haun, Valerio, McCormack, Sørensen, & Paasche-Orlow, 2014).

A final aim was to test whether the effects of God's predictability generalize across different materials. In addition to providing further evidence of convergent validity, a conceptual replication allows us to address potential limitations of our previous materials. Most notably, the *unpredictable God* essay used in previous studies claims that scientists have not discovered any meaningful pattern to God's control. It is possible that participants interpreted this message as implying that God's control is ultimately predictable, but that science (or human knowledge in general) is not (yet) up to the task of understanding God's ways and means. Put differently, those materials potentially portrayed human scientists as inept. Study 5 used new essays portraying humans as equally capable of characterizing God's control. They argue that scientists have solid, hard-won evidence that God operates in either predictable or unpredictable ways to control health. These materials afford a cleaner test of participants' response to differing conceptions of God's predictability.

## 6.1. Method

### 6.1.1. Participants

Participants were recruited online via Amazon Mechanical Turk ( $N = 396$ ; 39% self-identified as atheist). Our design included four unique conditions, and we again determined sample size by allocating 30 participants minimum per cell. Due to the unexpectedly large proportion of self-identified atheists ( $n = 153$ ), we decided to include them in the analyses in order to maximize statistical power.

Using the same attention filters from previous studies, 7 participants were removed before analyses due to failing the attention check, and 1 was removed who spent over 21 h to complete the study. These participants were evenly distributed across the four priming conditions ( $\chi^2_{df=3} = 4.99, p = .17$ ). This resulted in a final sample of  $N = 388$  (170 women,  $M_{age} = 34$ ; 12 participants did not complete demographic questions).

To bring our methodology in line with the foregoing studies, we also conducted the same analyses after excluding the atheists. When excluding the  $n = 153$  self-reported atheists from the sample, all four conditions still contained  $> 50$  participants, and all significant omnibus effects remained statistically significant at  $\alpha = 0.05$ . Furthermore, post-hoc analyses revealed that all relevant pairwise comparisons remained significant.

### 6.1.2. Procedure

The study was described as investigating how people think about health issues. Participants were given the following instructions upon beginning the survey:

Messages about health and wellness are everywhere, from the Internet to brochures at work. Many messages overlook the facts in an effort to market a new treatment or medication. As a result, many of us don't hear about truly important discoveries. The main goal of this study is to introduce you to one of these discoveries. On the next screen is an article describing the fusion of religion and science.

The articles were designed to appear as though they had been published online through the reputable scientific journal *Nature*, and included the journal logo as well as internet advertisements to bolster the cover story. Images of the full articles have been provided as Supplementary materials (S7-A to D).

Participants were randomly assigned to read one of the four articles, each of which included a 'sum-up' sentence designed to succinctly convey that article's intended message. Participants in the *predictable God* condition ( $n = 95$ ) read an article asserting that scientists had discovered that God has control over physical health, and that he works in straightforward, predictable ways (representative statement: "*God decides questions about our health, and we can predict the answers He will give*"). Those in the *unpredictable God* condition ( $n = 99$ ) read that God is in control of their health but works in mysterious ways ("*God decides questions about our health, but we cannot predict the answers He will give*").

Participants in the *predictable secular* condition ( $n = 93$ ) read that God has no control over people's health, but that scientists fully understand the manifold secular determinants of health ("*God cannot determine questions about our health, but we can find the answers ourselves*"). Finally, in the *unpredictable secular* condition ( $n = 101$ ), participants read that God has no control over their health, and that scientists have demonstrated conclusively that the secular factors determining health operate in unpredictable ways ("*God cannot determine questions about our health, and we cannot find the answers ourselves*"). It bears repeating that the goal of including these four conditions was to evaluate whether the effect observed in previous studies was merely a function of enhanced predictability, in general, versus a unique product of priming thoughts about a predictable and *divine* order.

We closely matched the descriptions of God's control with those of secular determinant of health to convey the health domain as equally predictable or unpredictable, depending on condition. Still, predictable

order and unpredictable order take on *qualitatively different meanings* depending on their source of control. Also, the lines of research reviewed earlier suggest that goal pursuit will be highest in one cell (predictable God) compared to the other three, and an omnibus ANOVA is an overly conservative test of that contrast. Therefore, we treated the four conditions as distinct and analyzed them in a one-way ANOVA rather than a factorial interaction between two independent variables. Still, we report the two-way factorial in Footnote 1.

### 6.1.3. Mediators

Self-efficacy was measured using a single item from the validated Internal Locus of Health measure: “If I take the right actions, I can stay healthy” (1 = *Strongly disagree*, 7 = *Strongly agree*;  $M_{grand} = 4.65$ ,  $SD = 1.01$ ; Wallston & Wallston, 1981). Response efficacy was measured with a single face valid item: “How much does this message help you understand what you can do to influence your health?” (1 = *Not at all*, 7 = *Very much*;  $M_{grand} = 2.91$ ,  $SD = 2.05$ ).

Next, participants completed a validated God Locus of Health Control (GLHC) scale designed to capture belief in God's control over one's health (Wallston et al., 1999). Six items were adapted with slight wording updates: “If my health worsens, it is up to God to determine whether I will feel better again; Most things that affect my health happen because of God; God is directly responsible for my health getting better or worse; Whatever happens to my health is God's will; Whether or not my health improves is up to God; God is in control of my health” (1 = *Strongly disagree*; 7 = *Strongly agree*;  $\alpha = 0.98$ ;  $M_{grand} = 2.10$ ,  $SD = 1.47$ ).

### 6.1.4. Behavioral DV

The primary dependent measure was a behavioral index of participants' motivation to engage in health-promoting behaviors. This measure was operationalized as the time that participants spent reading a series of health infographics (Supplemental materials; S8A–G) ostensibly designed by the FDA for public health education (Bann et al., 2012; Haun et al., 2014). We stress that participants were not given any direct incentive to spend more or less time reading the infographics. Indeed, the procedure was designed to allow for participants to *not* expend time or effort engaging these materials. Instructions stressed that reading the infographics was entirely optional and not required for completion of the study or receipt of compensation. The following instructions were given to participants before they were shown the infographics:

On the next few pages you'll see some health infographics and related quiz items. These are examples of health guidelines that have been well researched by the FDA and its collaborators. We are interested in how knowledgeable people are about these essential tips for improving health, but are mainly presenting you with this information for your own benefit. *Feel free to spend as much or as little time as you like on the following pages.* Because this is public information, and our main goal is merely to expose as many people as possible, the quiz items are completely optional. You are welcome to answer as many or as few of them as you choose. (italics in original).

Although responses to the quiz items were measured, the items were designed to be very easy, so we did not expect performance to warrant analysis. Indeed, > 75% of answers provided were correct ( $M_{grand} = 0.75$ ,  $SD = 0.19$ ) and the distribution was highly skewed. As such, we determined that time spent reading the infographics would be a less biased behavioral measure of health motivation, as it reflects how willing participants were in the moment to devote time and attention to engage with health-relevant information.

## 6.2. Results

A one-way ANOVA was conducted in all analyses, and Bartlett's  $K^2$  statistic was calculated and tested for each model at  $\alpha = 0.05$  to

confirm homoscedasticity of group variances (Snedecor & Cochran, 1989). All subsequent pairwise comparisons were tested according to Fisher's LSD method.

### 6.2.1. Exploratory potential mediators

Tests of the initial self-report measures revealed only marginally significant effects of the priming condition on participants' self-efficacy ( $F(3, 384) = 2.13$ ,  $p = .096$ ,  $\eta^2 = 0.02$ ), but significant effects on perceptions of response efficacy ( $F(3, 384) = 31.18$ ,  $p < .001$ ,  $\eta^2 = 0.20$ ), and beliefs in God's control over health (GLHC scale;  $F(3, 384) = 3.61$ ,  $p = .013$ ,  $\eta^2 = 0.03$ ).

Participants reported greater self-efficacy after being exposed to a portrayal of a *predictable God* ( $M = 4.82$ ,  $SD = 0.96$ ) compared to an *unpredictable God* ( $M = 4.54$ ,  $SD = 1.15$ ;  $p = .048$ ); *unpredictable secular control* ( $M = 4.52$ ,  $SD = 1.04$ ;  $p = .04$ ); and *predictable secular control* ( $M = 4.74$ ,  $SD = 0.82$ ), although the last comparison was non-significant ( $p = .59$ ). No other pairwise comparisons were significant. Nevertheless, these results are only suggestive that the *predictable God* prime increased feelings of self-efficacy, as the omnibus test was not significant ( $p = .096$ ).

On the measure of response efficacy, participants who read either the *predictable secular* article ( $M = 4.02$ ,  $SD = 1.95$ ) or the *unpredictable secular* article ( $M = 3.58$ ,  $SD = 1.88$ ) felt as though they had a better understanding of what they could do to influence their health than those who saw either the *predictable God* article ( $M = 2.21$ ,  $SD = 1.89$ ) or the *unpredictable God* article ( $M = 1.85$ ,  $SD = 1.66$ ;  $ps < .001$ ). This suggests that highlighting secular (vs. supernatural) forces behind health boosted confidence in the effectiveness of practical steps for improving health. There were no significant differences across the two *secular* articles or the two *God* articles.

For the GLHC scale, participants who read the *predictable God* article reported greater belief in God's control over health compared to participants who read the *unpredictable God* article ( $M = 2.52$ ,  $SD = 1.68$  vs.  $M = 2.01$ ,  $SD = 1.40$ ;  $p = .01$ ); the *predictable secular* article ( $M = 1.90$ ,  $SD = 1.28$ ;  $p = .003$ ); and the *unpredictable secular* article ( $M = 1.98$ ,  $SD = 1.42$ ;  $p = .009$ ). The latter three conditions did not differ. It bears repeating that these effects were observed with self-reported atheists included in the analyses, providing strong support for the idea that framing God as having predictable control over health has a robust effect on goal-relevant attitudes and perceptions.

### 6.2.2. Primary analyses

Our primary dependent measure of goal commitment was the average amount of time spent viewing the health infographics and corresponding quiz questions. Across all participants, the grand mean of time spent on the task was approximately 36.42 s with a standard deviation of 21.13 s. However, the raw distribution of this measure was highly skewed (3.13) and leptokurtic (24.14), indicating violations of normality assumptions. Thus, a log-transformation was applied so that the distribution would conform to the ANOVA model ( $skewness = -0.79$ ,  $kurtosis = 1.76$ ).

Submitting the log-transformed data to a one-way ANOVA returned a significant omnibus effect,  $F(3, 384) = 4.12$ ,  $p = .007$ ,  $\eta^2 = 0.03$ .<sup>1</sup> Pairwise comparisons revealed that participants who read the *predictable God* article spent more time reading the health-promotional material than those who read the *unpredictable God* article ( $M = 1.57$ ,  $SD = 0.23$  vs.  $M = 1.48$ ,  $SD = 0.25$ ;  $p = .01$ ); the *predictable secular* article ( $M = 1.49$ ,  $SD = 0.24$ ;  $p = .04$ ); and the *unpredictable secular* article ( $M = 1.45$ ,  $SD = 0.27$ ;  $p = .001$ ). No other pairwise

<sup>1</sup> Submitting our primary behavioral measure to a  $2 \times 2$  ANOVA reveals no interaction effect,  $F(1, 384) = 0.64$ ,  $p = .42$ ,  $\eta^2 = 0.002$ , although the main effects of the *god manipulation* and *predictability manipulation* were both significant ( $ps < .05$ ). In line with the foregoing studies, however, removing the atheists from our sample ( $n = 153$ ) brings this interaction effect to a likelihood of marginal significance,  $F(1, 231) = 3.53$ ,  $p = .06$ ,  $\eta^2 = 0.015$ .

comparisons were statistically significant. All mean and standard deviation values are reported here according to the log-transformation.

Although the pattern of means for both the self-efficacy measure and the measure of God's perceived control over personal health showed patterns mirroring the effect on the dependent measure, there were no significant mediation effects to report. Nor did we observe mediational effects for response efficacy.

Study 5 shows that priming the idea of God controlling health in predictable ways led people to spend significantly more time attending to and engaging health-relevant information than those primed to think that the same goal domain was controlled by God but in unpredictable ways or by secular forces in either predictable or unpredictable ways.

Our findings are consistent with past research suggesting that believing in an omniscient and benevolent agent as being in control of one's life affords unique psychological benefits over perceiving a non-supernatural foundation of predictability and control (e.g., Granqvist & Kirkpatrick, 2008). In addition to further exploring the causal mechanisms underlying these effects, future work would benefit from examining the functional distinctions between different sources of predictable control as well as whether those differences are reflected in goal commitment and other self-regulatory processes.

## 7. Study 6: meta-analysis

### 7.1. Method

We conducted meta-analysis to summarize and quantify the support for our claim that beliefs in specifically *predictable* divine control increase goal-relevant confidence and commitment. For an initial meta-analysis of the effects of God's predictability, we included all relevant effect sizes, including those from the same sample, to assess overall evidence that predictability influences goal pursuit across a wide range of measures. We converted all relevant *t* values to a single effect size metric (*r*) using Rosenthal and Rosnow's (1984) conversion formula. Standardized regression weights were treated as *r*s for the analysis (Peterson & Brown, 2005). Given the pattern of responses in Study 5, we included the omnibus tests of the effect of our predictability manipulation on self-efficacy (confidence) and our behavioral index of engagement (commitment). Where appropriate, we used the effect sizes estimated including covariates as these control for random variance due to demographic variables.

We then entered each relevant *r* (and appropriate standard error) into a weighted random effects meta-analysis. Because our effect sizes are the result of different procedures across studies, and we assume that the effects of predictability generalize to a wider range of experiences than those in our studies, this is the most appropriate meta-analytic approach (Hedges & Vevea, 1998).

We clarify the meta-analysis by distinguishing between classes of dependent measures. Several measures assess goal *commitment*, including the savings intentions assessed in Studies 1–3, the willingness to spend time studying (Study 4), and time spent reviewing health information (Study 5). Other measures assess *confidence* that the self can achieve desired outcomes, namely the self-confidence mediator in Study 3, the candidate mediators of action effectiveness in Study 4, and self-efficacy in Study 5. We conduct more focused analyses of these clusters of outcomes as well.

### 7.2. Results

Across studies, there was consistent evidence that God's perceived predictability increased goal pursuit across measures,  $r = 0.16$  (95% CI: 0.08, 0.24),  $SE = 0.04$ ,  $z = 4.03$ ,  $p < .0001$ . All effect sizes and confidence intervals are presented in Fig. 3.

Does this overall effect on goal pursuit emerge with respect to specific outcomes? In a more focused meta-analysis of the effects of predictability on *commitment* outcomes, we again found evidence of an

overall effect,  $r = 0.21$  (95% CI: 0.07, 0.34),  $SE = 0.07$ ,  $z = 3.08$ ,  $p = .002$  (Fig. 4).

Finally, there was overall evidence that God's predictability increased goal *confidence*. Despite the absence of effects on some measures, such as the candidate action effectiveness mediators in Study 4, the effect of predictability on confidence appeared robust,  $r = 0.12$  (95% CI: 0.05, 0.19),  $SE = 0.04$ ,  $z = 3.34$ ,  $p = .0008$  (Fig. 5).

## 8. General discussion

How, why, and when religious belief impacts self-regulation is an important question, but relevant empirical findings have been mixed. By focusing on a previously ignored dimension of belief in supernatural control—perceived predictability of divine influence—we sought to reconcile conflicting findings and refine emerging theoretical models of religion's psychological significance.

Five studies showed that viewing God as controlling worldly affairs can help people engage their personal goals, but there is considerable nuance in when this effect emerges. Participants who believed that God's control confers a predictable order on the world, and those briefly exposed to this conception, were more committed to their long-term goals, even though those goals did not bear an obvious relation to religion. In contrast, associating God's control with low predictability *decreased* goal commitment and confidence. The results of an internal meta-analysis support our claim that affirming a specific conception of divine influence—one in which God intervenes in a predictable manner—supports goal pursuit across a range of outcomes, including commitment and confidence.

These results help to reconcile prior conflicting findings. They show that an important yet unacknowledged moderator is the extent to which God's control is believed to imbue the world with predictable order. One theoretical implication is that predictability perceptions will be a necessary part of a complete understanding of religion's impact on self-regulation.

The current studies provide an initial look at the mechanisms by which beliefs in divine control affect self-regulation. We identified three potential mediators in the mainstream self-regulation literature: self-efficacy (belief that one can achieve certain ends); response efficacy (confidence that particular actions reliably produce expected outcomes); and confidence that God directly intervenes in the pursuit of a given goal.

Study 3 showed that the effect of priming God's predictable control on commitment to savings goals was mediated by self-efficacy regarding savings (e.g., "I have confidence in my ability to save money effectively"). Studies 4 and 5 provided mixed evidence for any of the three processes. Study 5 showed that God's perceived predictability increased self-efficacy and a perception that God intervenes in health outcomes, but neither effect accounted for the observed priming effect on commitment to health goals.

In summary, while we found consistent evidence that God's predictable control enhances goal pursuit, the data do not speak definitively to one model for *why* that effect occurs. Given that in Study 3 savings confidence emerged as a mediator, and that in Study 5 the pattern of means for self-efficacy matched the pattern of goal engagement, we suspect that self-efficacy plays a mediating role. Perhaps with more sensitive measures of self-efficacy (or our other potential mediators), future research may be able to more carefully disentangle the underlying processes. At a minimum, the current project raises this important issue and, we believe, provides a theoretical framework for making sense of why beliefs about divine control can uniquely affect self-regulation.

Study 5 also returned initial evidence that priming divine sources of predictable control motivated people more than secular sources of predictable control. These findings converge with other evidence that, among the various sources of external control that might help people navigate their lives, there is particular appeal in the conception of a

Fig. 3. Summary of main effects of predictability across outcomes (Studies 1–5).

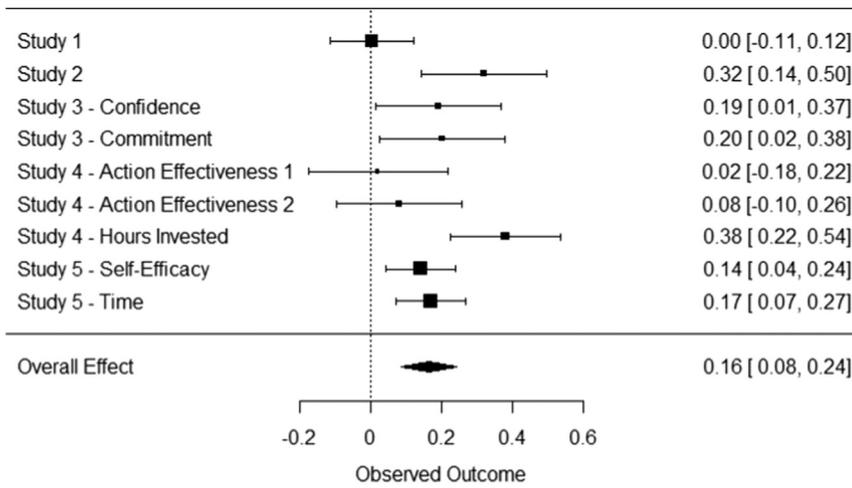


Fig. 4. Summary of predictability effects on goal commitment (Studies 1–5).

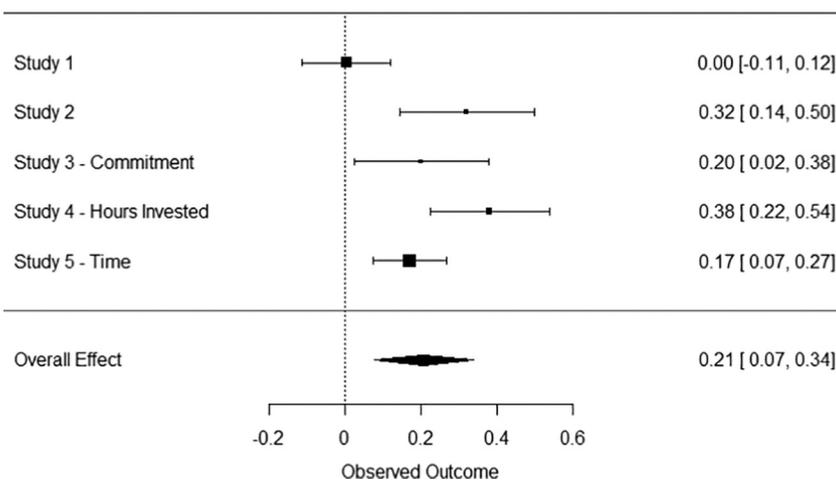
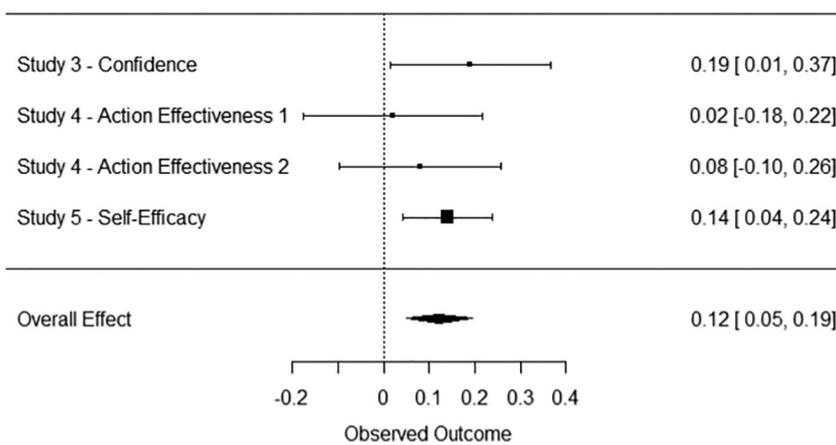


Fig. 5. Summary of predictability effects on goal confidence (Studies 3–5).



personified deity that is omnipotent, omniscient, and benevolent (e.g., Barrett, 2000; Kirkpatrick, 2005; Waytz, Morewedge, et al., 2010). That said, we cannot on the basis of a single study make conclusive claims about the differential impact of external control sources. This is a rich question, and one that requires considerable future research. The current findings provide a starting point for further inquiry.

Our results also contribute to the emerging literature linking the perception of structure in the world to a confident sense of personal control and agency (Landau et al., 2015). They sharpen the theoretical picture by demonstrating that structure is not, in itself, sufficient; predictability is also necessary. Related studies show that the notion of

a mysterious order in the world can elicit anxiety nearly as much as randomness (Tullett, Kay, & Inzlicht, 2015). The current findings apply this insight to supernatural belief, demonstrate consequences for personal goal commitment, and highlight the mediating role of self-efficacy.

### 8.1. Questions for future research

While the current studies provide overall evidence for the claim that God's predictable influence bolsters personal goal pursuit, there are important questions for future research.

One issue just mentioned concerns the mechanism underlying our observed effect. Also deserving attention are unexpected results. In both Studies 2 and 5, exposure to an unpredictably controlling God portrayal did not decrease goal commitment compared to baseline or secular influence. It is possible that participants assumed that God's intervention may be unpredictable, even mysterious, but ultimately is in their best interest. This assumption may have sustained their goal commitment despite losses in predictability. Future research should examine how beliefs in divine mystery and benevolence interact to affect self-regulation.

Another important question for future research concerns the range of our primary independent variable. We focused specifically on perceptions that God is both controlling and predictable (vs. unpredictable). But what consequences might one see for a belief that God is predictable but not especially controlling? One might believe, as many Christians do, that God has instilled in humans a power of self-direction and personal accountability for their actions, yet He otherwise cares little about such worldly affairs as sporting events, personal finances, and political diplomacy. Such a God may have predictable standards for good conduct that determine one's ultimate fate, but have little to no causal influence on one's day-to-day activities. We have not explored whether such a conception of God influences goal pursuit, but see this as an interesting possibility that may have broad implications. For instance, a laissez-faire God with predictable standards may not motivate goal pursuit, but may help mitigate fears about death and the afterlife.

There are important questions about the relative malleability of a perception of God's predictability. Across studies we used both trait measures and state manipulations of this variable, suggesting that it may have both a stable level over time and be subject to momentary fluctuation. The fact that religious texts vacillate between images of God as both clear in His will and fundamentally mysterious means that there is space for flexibly moving between these conceptions of God. Why would one do this? As we noted earlier, a perception that God is unpredictable may be appealing in many circumstances, particularly as an explanation for personal misfortune. Momentary pressure to see God as unpredictable, perhaps to account for some tragedy, is at odds with the goal-enhancing effects of seeing God's will as a firm foundation for future action. This tension presents an interesting avenue for future research on the tradeoffs of various beliefs about the nature of God.

Finally, the current study raises new questions about how individuals may maintain personal goal pursuit in a shifting religious landscape. Given that > 1 in 10 Americans no longer believes in God (Gervais & Najle, 2017), it would seem that the decline of religious conviction in some parts of the world may threaten individual achievement. Without a belief in a predictable, controlling God, people may lack a resource that could help them stop smoking, exercise more, or reach their financial goals. These individuals may be able to achieve some benefits through perceptions of a predictable secular order, but we found that this ultimately did not enhance commitment to the same degree as God. Future research should explore how individuals may find other sources of predictability (e.g., supportive close relationships; Hofmann, Finkel, & Fitzsimons, 2015) to ultimately ground goal pursuit without God.

## 9. Conclusion

The current studies help to illuminate the conditions under which God's perceived influence in daily life motivates personal goal pursuit. Resolving apparently contradicting views, we found that observing a controlling God motivates specifically when God is conceived as imposing predictable structure on the world, not when God is thought to intervene in mysterious ways. While we found overall evidence of that effect across domains, the work raises new questions about the processes through which God's predictable control ultimately benefits the individual and the relative motivating effect of divine versus secular

sources of structure.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jesp.2017.11.012>.

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