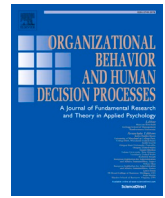




Contents lists available at ScienceDirect

Organizational Behavior and Human Decision Processes

journal homepage: www.elsevier.com/locate/obhdp

Divine inhibition: Does thinking about God make monotheistic believers less creative?

Verena Krause^{a,*}, Jack A. Goncalo^{b,1}, Carmit T. Tadmor^{c,1}

^a School of Management, University College London, 1 Canada Square, London E14 5AA, United Kingdom

^b Gies College of Business, University of Illinois, Urbana-Champaign, USA

^c Collier School of Management, Tel Aviv University, Israel

ARTICLE INFO

Keywords:

Belief in God
Creativity
Followership
Problem solving

ABSTRACT

As individuals are given wider latitude to openly practice and express their faith at work, it is likely that believers will spend at least part of their working life actively thinking about God. Yet, despite the central role that belief in God plays in people's lives, research has given little attention to the impact of actively thinking about God on task performance. The current research investigates the relationship between monotheistic believers' thinking about God and creativity. We conducted six studies using different populations, mixed methods and complementary measures of creativity. Our results, as well as meta-analyses of our experimental data, provide converging evidence that believers are less creative than non-believers and this effect is strengthened when they are actively thinking about God. Thinking about God activates the mindset of passive followership which inhibits the creativity of believers. We discuss potential implications for future research on religiosity, creativity and followership.

1. Introduction

Belief in God plays a central role in the lives of millions of people across the globe, with 71% worldwide reporting they believe in God (WIN/Gallup International, 2017). Human resource professionals have been handling an ever-rising number of requests for accommodation of religious practices and displays of faith while at work (Cash, Gray & Rood, 2000). There are increasing complaints about religious discrimination (U.S. Equal Employment Opportunity Commission, 2006) and there is an ever-growing insistence that workers be allowed to openly express their religious beliefs and engage in religious practices (King, 2008). Yet, despite the prominence of faith in the lives of the population at large, management scholars have largely remained mute on the subject of how belief in God might impact thoughts, feelings and behavior at work (Weaver & Agle, 2002; King & Williamson, 2005; King, 2008; Chan-Serafin, Brief & George, 2013). Considering that people are unlikely to check their faith at the organizational door, this is an important omission (Hicks, 2003; Lynn, Naughton & Vander Veen, 2010; Chan-Serafin, et al., 2013).

As individuals are given wider latitude to openly practice and express their faith at work, it is likely that believers will spend at least part of

their working life actively thinking about God. The growing intersection of faith and work raises the important question of whether and why thinking about God might impact believers' performance. Very little direct evidence exists but speculation has been somewhat skewed toward the positive. For example, some scholars have surmised that faith can give people a more internal locus of control (Koenig, McCullough, & Larson, 2001), help them develop good moral habits (Cavanagh & Bandsuch, 2002), and promote resilience in high stress contexts (Edward, 2005). Other researchers have even speculated that it could be related, at least in theory, to believers' creative potential (Day, 2005), suggesting that religious experiences may make people more open to new experiences and new ways of looking at the world (Bateson, Schoenrade, & Ventis, 1993) and that belief in God may allow people to develop more complex schemas (McIntosh, 1997).

Unfortunately, many of these assertions have yet to be tested empirically. Moreover, a balanced view requires a serious consideration of both the positive and negative consequences that belief in God might have at work (Chan-Serafin et al., 2013), especially given there is also logic pointing to a potential downside. Economists, for example, have demonstrated a consistently negative relationship between countries' religiosity and pro-innovation attitudes across the globe (Bénabou,

* Corresponding author.

E-mail addresses: v.krause@ucl.ac.uk (V. Krause), goncalo@illinois.edu (J.A. Goncalo), ctadmor@post.tau.ac.il (C.T. Tadmor).

¹ Jack A. Goncalo and Carmit T. Tadmor contributed equally to the paper. Their names are listed alphabetically.

<https://doi.org/10.1016/j.obhdp.2021.03.001>

Received 16 March 2018; Received in revised form 3 March 2021; Accepted 12 March 2021

Available online 8 April 2021

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Ticchi & Vindigni, 2015), raising the question of whether this would translate into diminished creative problem solving at the individual level. And even if belief in God does actually reduce creativity, it is unclear whether believers would always be less creative than non-believers or whether it depends on the context. In sum, important questions remain about whether, why and how a belief in God might impact creativity.

In the current research, we develop a theoretical perspective suggesting that monotheistic believers might be at a disadvantage on tasks that demand creative solutions and that this stifling effect on creativity is strengthened in contexts in which believers are actively thinking about God. We hypothesize that for believers, thinking about God activates a passive followership mindset that can, in turn, inhibit believers from advancing creative solutions in the moment (Van Vugt, Hogan & Kaiser, 2008). Because creative solutions are initially controversial (Mueller, Melwani & Goncalo, 2012; Staw, 1995), they are more likely to be voiced by individuals who are independent, rebellious and non-conforming (Goncalo & Staw, 2006) rather than by those in a mindset of passive followers of God, who are deferent and faithful to Him.

We focus specifically on monotheistic believers for several reasons. First, monotheistic believers, in terms of sheer numbers, are the most prominent in the western workforce (Newport, 2016; Religious Landscape Study, 2015). Second, the relationship between believers and their monotheistic God is clearly defined and highly consistent among all monotheistic believers irrespective of their religious affiliation (Norenzayan, 2016; Assmann, 2004). Specifically, the monotheistic God is uniformly described as omniscient, omnipotent, and omnipresent (Purzycki, 2013). And, third, in contrast to monotheistic believers, polytheistic believers are much more heterogeneous in their views (for a review see Norenzayan, 2016). Some polytheistic gods have almost no supernatural powers and are indifferent to humans, while others need to be appeased with offerings to avoid their wrath (Marlowe, 2010; Purzycki, 2013). The diversity in supernatural abilities and interest in human affairs is enormous among polytheistic gods and thus cannot be subsumed into one clear category (Norenzayan, 2016). Thus, by focusing on believers of a monotheistic God, we are able to clearly theorize how believers feel towards their God. We discuss the broader implications of our findings for future research on polytheistic religions in the general discussion.

We seek to extend the literatures on creativity, belief in God and problem solving in several important ways. First, we test the causal effect of belief in God on creativity as well as highlight the contextual nature of this effect and the underlying psychological mechanism—passive followership mindset—that reduces the creativity of monotheistic believers who think about God. As such, we compliment and extend correlational evidence that religiosity is associated with anti-innovation attitudes (Bénabou et al., 2015). Establishing causality and boundary conditions is critical at this early stage of research, given the many factors such as income and education that might be confounded with both belief in God and work performance (Bénabou et al., 2015; Lynn et al., 2010). Second, we establish the robustness and generalizability of this effect in two different countries (United States and Israel) and across different measures of creative output.

Finally, we present and test a parsimonious theoretical model in which thinking about God reduces creativity for believers by activating the mindset of passive followership, thus forging new links between the currently disparate literatures on creativity, belief in God and prototypes of followership. By providing some of the first evidence that thinking about God impacts believers' creative problem solving via a passive followership mindset, our findings set the stage for future research on a number of organizationally relevant questions, including the possibility that thinking about God at work might differentially impact believers' performance on other tasks that are facilitated or impeded by passive as opposed to proactive followership (Van Vugt et al., 2008). In sum, by heeding the call to investigate both the positive and negative consequences of belief in God on task performance (Chan-Serafin, et al.,

2013), in this case creative performance, we seek to contribute to a broader and more nuanced conversation about the potential implications of thinking about God at work for believers, who represent a majority of the workforce.

2. How monotheistic believers view themselves in relation to God

For monotheistic believers, God serves as the ultimate leader who is able to provide for three of the most fundamental human needs of order, security, and meaning (Popper, 2015; Shamir, 2004). In particular, God is thought of as possessing, at the very extreme, three key characteristics of a leader: He is omnipotent, omnipresent, and omniscient (Laurin, Kay, & Fitzsimons, 2012; Purzycki, Finkel, Shaver, Wales, Cohen, & Sosis, 2012; Purzycki, 2013). God's omnipotence implies that God is all-powerful, with authority and rulership over all creation, thus providing order, protection, and control in people's lives. God's omnipresence implies that God always looks upon mankind and watches over them. Finally, God's omniscience implies that God is all-knowing and thus can reduce uncertainty and provide complete meaning and moral guidance for people's existence and actions (e.g., Kay, Gaucher, Napier, Callan, & Laurin, 2008; Inzlicht & Tullett, 2010).

On the flip-side, the very idea of God as a leader calls for the existence of a followership. That is, the concept of leadership presupposes that people take a comparatively submissive position in relation to the leader, whereby they voluntarily comply with the leader who is seen as central to offering direction and guidance (Alvesson & Blom, 2015; DeRue & Ashford, 2010; Seers & Chopin, 2012; Shamir, 2007; Uhl-Bien & Pillai, 2007). Perhaps nowhere is this a more accurate characterization of followership than when the leader in question is a deity, to whom believers voluntarily submit, offering their devotion and faith in return. This emphasis on submission rooted in faith is echoed metaphorically in biblical parables with the Judeo-Christian God repeatedly referring to himself as the Shepherd and to his followers as a flock of sheep (e.g. Ezekiel 34:11–16, New International Version), and in Islam, with all prophets of God referred to as shepherds (Sahih Bukhari, Chapter 'Prophets', Volume 4, Book 55, Hadith 618). Importantly, unlike in the context of human relations, in which being characterized as 'a sheep' sometimes carries with it a pejorative connotation (Kelley, 1988), there is no such negative undertone in the context of faith. On the contrary, being one of God's sheep means being protected and cared for (e.g., Isaiah 40:11, New International Version).

Research suggests that followers of God accept his direction and guidance and, in turn, feel devoted and faithful (e.g., Gorsuch, 1968; Kunkel, Cook, Meshel, Daughtry, & Hauenstein, 1999; May & Fincham, 2018; Popper, 2015). Several psychological and behavioral consequences result from this view of God. For example, studies have shown that believers readily accept not being in control of their own lives and instead pass off compensatory control to God (Kay et al., 2008; Kay, Gaucher, McGregor, & Nash, 2010). Moreover, research has shown that believers appear to prefer a passive stance of conformity and tradition rather than autonomy and openness to change (Saroglou, Delpierre, & Dernelle, 2004; Hill, Pargament, Hood, McCullough, Swyers, Larson, & Zimbardo, 2000). Finally, God's omniscience implies that God can provide ultimate certainty (e.g., Kay et al., 2008; Inzlicht & Tullett, 2010), which is a desirable feeling to most people (Heider, 1958). Since believers have a particularly high need for closure and certainty (Brandt & Reyna, 2010; Saroglou, 2002), believers are more comfortable relying on God to provide them with direction, rather than leading an uncertain life high in experimentation and scientific discovery. Once again, such reliance on God to impose order and reduce ambiguity encourages believers to follow his guidance.

Believers of God have faith that, in exchange for their devotion, God will take care of them, protect them (Kupor, Laurin, & Levav, 2015), and guide them towards a moral life (Emmons & Paloutzian, 2003). This faith helps believers to cope with life stressors (Pargament, 1997;

Pargament, Smith, Koenig, & Perez, 1998; Newton & McIntosh, 2010; Zinnbauer, Pargament, Cole, et al., 1997), reduces their distress and anxiety (Inzlicht & Tullett, 2010), improves their general wellbeing and physical health (Hill & Pargament, 2008; Ironson, Stuetzle, Ironson, Balbin, Kremer, George, Schneiderman, & Fletcher, 2011; Whittington & Scher, 2010), and alleviates their fears of mortality (Vail, Rothschild, Weise, Solomon, Pyszczynski, & Greenberg, 2010). In sum, fully relinquishing control over one's life to God is quite desirable for believers and carries with it a number of psychological benefits.

3. Monotheistic belief in God and the passive followership mindset

In order to more precisely describe the kind of followership that monotheistic believers might have in mind, especially while actively thinking about God, we turned to the organizational literature on followership. Though God is not a human leader that one might find guiding an organization, the followership literature provides a framework for describing and defining how believers might view themselves in relation to God. Aligned with previous writings on the nature of followership (e.g., Antonakis, Bastardo, Jacquart, & Shamir, 2016; Bastardo & Van Vugt, 2019; Lapierre, 2014; Uhl-Bien, Riggio, Lowe, & Carsten, 2014), followers have been defined as individuals who at least to some degree freely accept the influence of the leader. As Uhl-Bien and Pillai (2007) state: “if leadership involves actively influencing others, then followership involves allowing oneself to be influenced” (p. 196). Moreover, unlike a standard manager—subordinate relationship, where a subordinate might follow orders out of fear (I will get fired if I do not obey) or because he has disengaged completely (I simply do not care what happens at this organization) (Van Dyne, Ang, & Botero, 2003), the motivation for followership may be rooted in a deep faith in the leader, accepting that the leader has superior knowledge, expertise, and ability not out of fear or disengagement. This echoes Shamir's (2004) observation that “followership is an act of faith. The followers accept the leader's influence and comply with his or her requests or instructions because they believe in the leader” (p. 503). And yet, although all followers show at least some willingness to defer to the leader, the nature of this deference may take very different forms (e.g., Carsten, Uhl-Bien, West, Patera, & McGregor, 2010; Carsten, Uhl-Bien, & Huang, 2018; Collinson, 2006; DeRue & Ashford, 2010; Kelley, 1988; Shamir, 2007).

Drawing on and integrating the literatures on faith and followership, we suggest the type of followership of believers devoted to God might best be described as passive (Bjugstad, Thach, Thompson, & Morris, 2006; Carsten et al., 2010; Collinson, 2006; Kelley, 1988; Kelley, 1992; Oc & Bashshur, 2013; Uhl-bien et al., 2014). To elaborate, Kelley (1988) had originally theorized followership using two dimensions: (1) passive vs. active and (2) dependent/uncritical vs. independent/critical and defined passive-uncritical followers as “Sheep who are passive and uncritical, lacking in initiative and sense of responsibility. They perform the tasks given them and stop” (p. 143). Building on the work of Zalesnik (1965) and Kelley (1988), Carsten and colleagues (2010) were the first to actually collect empirical data on how followers socially construct their roles in terms of the different views they have about the responsibilities inherent to the role of follower and the best way to effectively carry them out. In that study, they found a single dimension of followership from passive to proactive. Those participants at the passive followership end of the continuum socially constructed followership definitions around passivity, deference and obedience—fitting with Kelley's (1988; 1992) passive and uncritical quadrant, while those at the proactive end of the continuum emphasized the importance of constructively questioning and actively challenging their leaders—fitting with Kelley's (1988; 1992) active and critical quadrant.

According to Carsten and colleagues (2010; 2018) and in line with other work on the concept of followership (Chaleff, 1995; Courpasson & Dany, 2003; Crossman & Crossman, 2011; de Cremer & Van Dijk, 2005; de Vries & van Gelder, 2005; Dixon & Westbrook, 2003; Hirschhorn,

1990; Lapierre, 2014; Tyler, 1997; Uhl-Bien & Pillai, 2007; Uhl-Bien et al., 2014; also see Popper, 2011), the underlying assumption of passive followers is that “hierarchical role differentials are legitimate and justified by differences in knowledge, expertise, and ability” (Carsten et al., 2018, p. 735). As such, passive followers view the leader as the one responsible for idea generation, information gathering and goal setting. They would not offer suggestions, even if they were given an opportunity. Instead, passive followers view their own responsibility as taking and following orders, doing things the leader's way, deferring to his or her knowledge and expertise, unquestioningly accepting the leader's ideas and initiatives, and remaining loyal and supportive to the leader (Carsten et al., 2010; Lapierre, 2014; Uhl-Bien et al., 2014). In the case of meaning-based followership, such as when God is the leader, this passive followership is rooted in a deep faith in the leader as opposed to pure fear or resignation (Shamir, 2004).²

Passive followership is conceptually distinct from a proactive form of followership (Carsten et al. 2010; Carsten et al., 2018; Hollander, 1992; Howell & Shamir, 2005; Shamir, 2007). Proactive followers are active agents in the leadership process, viewing themselves as co-producers or partners in the decision-making process. They accept the leader's influence, but they emphasize the importance of speaking up, offering opinions, and constructively challenging their leaders' direction. Which type of followership a person enacts in a specific situation is context dependent (Lapierre, 2014; Uhl-Bien et al., 2014). For example, when a leader adopts an autocratic/authoritarian leadership style, it reinforces the view that the leader has greater knowledge and expertise than followers, making him or her more capable and competent than others, leading to the corresponding assumption that the follower role is to unquestioningly carry out orders (Weber, 1968, Heckscher, Heckscher, & Donnellon, 1994). Consequently, it creates and maintains a schema of passive followership among subordinates (Courpasson & Dany, 2003; Hirschhorn, 1990; Popper, 2011; Tyler, 1997; Uhl-Bien and Pillai, 2007; Uhl-Bien et al., 2014).

Building on the followership literature thus helps to describe why thinking about God might put believers in the mindset of being passive followers. Our overarching view is that God, as the ultimate leader, having the key characteristics of omniscience, omnipotence and omnipresence, has complete authority, knowledge and control. Thus, passive deference to God is appropriate given God has all the answers. Notably, followers of God feel safe and secure in this context to be passive followers because they believe in him and truly trust that the leader – God—will not take advantage of them. In this sense, the view of God as benevolent and caring is key (Popper, 2015). This kind of relationship between God and his believers is therefore highly consistent with the passive followership concept that is rooted in passive deference as a result of having faith in an all-knowing leader (Kelley, 1988; Carsten et al., 2010; Lapierre, 2014; Uhl-Bien et al., 2014).

4. Divine inhibition: Why monotheistic believers' passive followership mindset stifles creativity

Monotheistic believers are likely to adopt a passive stance toward God and this type of passive followership toward God might inhibit the expression of creative ideas for several reasons. First, believers' passive followership mindset, in which they look at the world through a prism of God as the all powerful, all seeing, and all knowing leader, might inhibit creativity because it entails legitimately accepting God as inherently superior and therefore viewing one's own role as someone who carries out orders without question. This passive demeanor runs counter to advancing creative ideas which require independent thought—even

² Notably, although this type of followership has often been viewed somewhat pejoratively, recent scholarship suggests that, in many contexts, this kind of followership is essential to allowing leaders to feel supported and to effectively carry out their roles (Lapierre, 2014).

rebelliousness and a willingness to break rules (De Dreu & West, 2001; Gino & Wiltermuth, 2014; Kim, Vincent, & Goncalo, 2013; Nemeth & Staw, 1989). Given creative ideas can incite controversy (Staw, 1995), passive followers of God might actively avoid creative solutions that might be interpreted as critical or disrespectful.

Second, passive followership toward God not only discourages independent thinking but it might also prioritize the established worldview, making it less likely that people will be able to generate solutions that depart from or challenge the existing socio-cognitive lens (Galinsky, Magee, Gruenfeld, Whitson, & Liljenquist, 2008; Tadmor, Chao, Hong, & Polzer, 2013). Thus, whereas creative ideas often overturn the status quo, passive followers' sense of dependency on God for answers may thus translate into uncritical acceptance of conventional ideas and an unwillingness to break with an existing perspective (Eisenbeiß & Boerner, 2013; Cronin & Loewenstein, 2018). Consequently, passive followers' ideas are more likely to rely on salient knowledge structures and are less likely to break with convention (Kray, Galinsky, & Wong, 2006; Ward, 1994).

Finally, believers' sense of passive followership toward God affords them with a sense of certainty (Brandt & Reyna, 2010; Popper, 2015; Saroglou, 2002). Feelings of certainty may be comforting but not necessarily advantageous in the creative process—a process that demands a willingness to accept the legitimacy of potentially contradictory perspectives (Maddux, Galinsky, & Tadmor, 2010; Tadmor, Galinsky, & Maddux, 2012; Miron-Spektor, Gino, & Argote, 2011) as well as comfort with extended periods of uncertainty (Mueller et al., 2012). The creative process requires problem solvers to pursue novel ideas before their reliability, usefulness, feasibility, and ultimate success are proven (Amabile, 1996). And yet, from the point of view of a passive follower, because God will have all the answers, there may be little motivation to forgo certainty and undergo further exploration.

Taken together, it appears that a monotheistic believers' passive followership mindset is likely to be a disadvantage on tasks that demand creative solutions because it is intertwined with a range of interrelated orientations, such as the desire to please, follow rules, accept convention, and view things with certainty—orientations that are known to inhibit rather than stimulate creativity. In other words, attempting to be creative while feeling like a passive follower of God may be challenging for believers.

5. When will monotheistic believers be less creative? The moderating role of thinking about God

Although we propose that monotheistic believers might be at a creative disadvantage, this negative effect might be amplified during moments when believers are actively thinking about God. Simply because believers are faithful and devoted to God does not necessarily mean that their thoughts are always pre-occupied with God and as such, with a passive followership mindset. People have multiple, unique, and disparate social identities that are activated in different situations (e.g., Gaither, Remedios, Sanchez, & Sommers, 2015; Hong, Morris, Chiu, & Benet-Martinez, 2000; Tadmor, 2006; Tadmor & Tetlock, 2006; Tadmor, Tetlock, & Peng, 2009). Therefore, it is possible that for believers, reduced creative performance will be more pronounced in contexts that invoke a focus on God, because this more strongly activates a passive followership mindset.

There is in fact a great deal of evidence that the psychological impact of belief is moderated by cues that activate thoughts of God. For example, studies have shown that it is only when primed with thoughts of God that students reduced the pursuit of their active career goals (Laurin et al., 2012) and that believers reported lesser authorship over actions they had taken (Dijksterhuis, Preston, Wegner, & Aarts, 2008). Thus, believers seem to take a passive stance towards their own lives, allowing God to lead them, but this effect only occurred when they had first been primed with thoughts of God. Priming of faith was also needed in order to increase accessibility of submission-related concepts, such as

dependence and passivity, as well as conformity to others' influence—but these effects did not arise otherwise (Saroglou, Corneille, & Van Cappellen, 2009; Van Cappellen, Corneille, Cols, & Saroglou, 2011).

It is an open question as to how non-believers might be expected to react to thinking about God. On the one hand, it is possible that given God's ubiquity as a cultural notion, non-believers may become similarly uncreative when thinking about God because it would induce a habitual propensity to respond according to the stereotype of what God represents (Laurin et al., 2012). And yet, on the other hand, as is the case in other kinds of meaning-based followerships, passive followership is built on an underlying faith in the leader (Shamir, 2004). Thus, it is possible that thoughts of God would be more likely to impose a passive followership mindset in believers because such individuals are internally motivated to accept God's influence. It is notable in this regard that the effects of thinking about God have been found to be reliable for believers but not for people who do not believe in God (Shariff, Willard, Andersen, & Norenzayan, 2015). Thus, based on prior research, we expected that thinking about God should prompt a passive followership mindset for believers more than for non-believers. Our theorizing leads to the following formal predictions:

Hypothesis 1 (a-d):

- (1a) There will be a negative effect of belief in God on creativity.
- (1b) The negative effect of belief in God on creativity will be amplified when believers' actively think about God.
- (1c) Actively thinking about God induces a passive followership mindset among believers but not among non-believers.
- (1d) A passive followership mindset will lead to reduced creativity.

In sum, taking context into account offers a more accurate model linking belief in God to creativity via passive followership. As shown in Fig. 1, we expect that passive followership mindset should mediate the relationship between belief in God and creativity but that this psychological process should unfold more strongly among those actively thinking about God.

Following the logic of moderated mediation proposed by Edwards and Lambert (2007), this theoretical model leads to the following hypothesis:

Hypothesis 2: *The relationship between belief in God and creativity will be mediated by a passive followership mindset but this mediated relationship is moderated by actively thinking about God such that the relationship between belief in God and the passive followership mindset will be stronger when believers are actively thinking about God.*

6. Overview of studies

In six studies, we test our hypothesis about the impact of believing in God on creativity, the contextual boundary conditions of this effect and the underlying mechanism – a passive followership mindset– that explains this effect. In one correlational study, we sought to examine whether belief in God was negatively associated with creativity, measured by patent output per U.S. state (Study 1).³ Moving beyond this

³ In the Supplementary Material, we report results from an additional correlational study that demonstrates a significant negative relationship between a continuous measure of belief in God (Hoge, 1972) and creative potential at the individual level, measured by Gough's (1979) Creative Personality Scale (CPS), in a sample of American Mechanical Turk workers. Although not a measure of creativity per se, the CPS has been shown to predict actual creative performance in a wide range of occupations, as well as the number of patent disclosures written by employees (McCrae, 1987; Oldham & Cummings, 1996; Madjar, Oldham, & Pratt, 2002). As such, this relationship is consistent with our other findings. We report the results of this study in the supplementary material so that we can provide data on all studies and all measures we have conducted to test the model we are proposing.

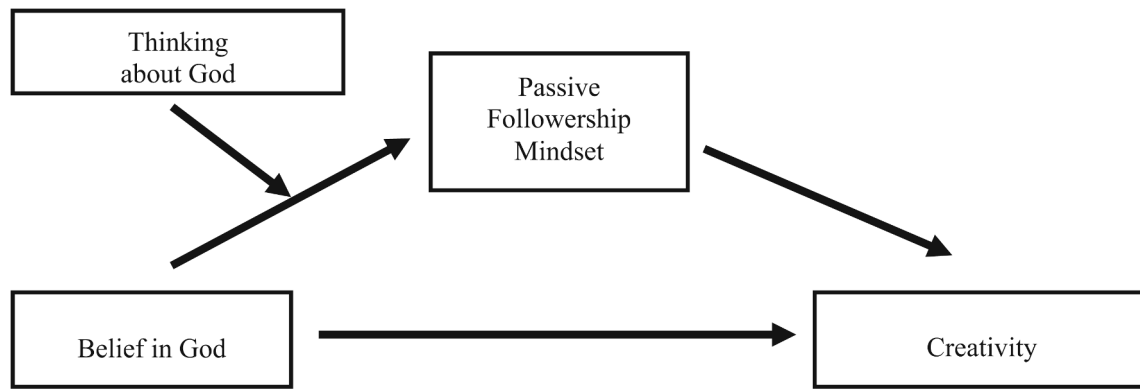


Fig. 1. The interactive effects of belief in God and thinking about God on reduction in creativity via passive followership mindset: A theoretical model of moderated mediation.

preliminary correlational evidence, we sought to establish causality, in a series of four experiments (Studies 2, 3a, 3b, and 4) in which we investigate the moderating effect of thinking about God on the creative output of believers by directly manipulating whether participants actively thought about God. In Study 4, we tested the full moderated mediation model, including the activation of a passive followership mindset among believers who actively think about God as an underlying psychological mechanism. Additionally, in a fifth experiment, we employed a moderation-of-process design (Spencer, Zanna, & Fong, 2005), in which we directly manipulated the hypothesized mediator of passive followership mindset to demonstrate a causal relationship between passive followership and creativity. To test the generalizability and reproducibility of the effects, we used different measures of creativity, different methods of priming thoughts about God, and different populations of participants as well as providing a direct replication. Finally, we pooled the individual effect sizes of all experimental studies into a single estimate and conducted a meta-analysis. The results corroborate the results of the individual experiments and demonstrate the robustness of the overall effect given that “the resulting pooled estimate generally is more trustworthy because it is based on far more data than each individual study” (Braver, Thoemmes, & Rosenthal, 2014, p. 344). The method section of study 1 describes where to find the archival data used in study 1 with the links to the data in the reference section. The data for all remaining studies can be found at the following Open Science Framework page: <https://osf.io/uagbs/>.

7. Study 1

As a first step into the exploration of the relationship between belief in God and creative output, we used panel data on patents granted in the United States from 2007 to 2012 to test whether the degree of belief in God at the state level predicts patent output in that state—a widely used measure of creative output because ideas must be determined to be both novel and useful in order to be patented—criteria that correspond directly to the most widely used definition of creativity (e.g. Audia & Goncalo, 2007).

7.1. Method

7.1.1. Belief in God

To construct our independent variable—state level belief in God—we obtained data on belief in God from the U.S. Religious Landscape Survey conducted by the Pew Forum on Religion and Public Life (Pew Research, 2007–2008). The survey consisted of a nationally representative sample of 35,957 adults (52% women; mean age = 52.29, SD = 18.58). In terms of religious affiliation, 78.4% of respondents identified as Christian, 16.1% as unaffiliated, and the remaining 5.5% of participants were split amongst different religions, none of which accounted for more than 1%

of the sample.⁴

To measure belief in God, we drew on data in which participants were asked to respond “yes” or “no” to the question, “Do you believe in God or a universal spirit?” Given that belief in God tends to be relatively stable and does not substantially vary over a short period of time (Kirkpatrick, 1998), we used this survey data on belief in God to create a measure of belief in God representing the entire 6-year time span (2007–2012). We constructed the independent variable by calculating the total number of respondents in a state that said “yes” to the question of whether they believe in God and divided it by the total number of respondents in that state.

7.1.2. Creativity

To construct our dependent variable of creative output at the state-level in a given year, we counted the number of patents granted in a state in that year and divided it by the number of residents in that state in that year. All patent data was obtained from official records published online by the U.S. Patent and Trademark Office (U.S. Patent and Trademark Office: Patent Technology Monitoring Team, 2013). Patents are a widely used measure of creative output, particularly in the innovation literature (Mansfield, 1986; Acs, Anselin, & Varga, 2002; Audia & Goncalo, 2007).

7.1.3. Control variables

Numerous variables have been found to be associated with the propensity to develop patents, thus it was important to control for these variables in our analysis. First, higher levels of graduate education are associated with more innovation because it provides people with a domain-relevant foundation of facts and skills discovered by the previous generation so that they can build upon earlier work to develop new ideas (Amabile, 1996; Jones, 2010; Marrocu, & Paci, 2012). Thus, we measured education level as the percent of state residents over 25 who reported having a graduate level degree in a given year. Second, income is also a resource associated with innovation because the process of innovation entails risk (Rindova & Petkova, 2007), patents may take a long time to become commercially viable products (Shenhar, Holzman,

⁴ In line with past work (Gorsuch, 1988; Hoge, 1996; Voas & Crockett, 2005; Voas, 2007), we draw a clear distinction between belonging to a religion and believing in God. For instance, Gorsuch (1988) stated that “Any study involving religion even as a non-focal variable should use more sophisticated measurement than religious membership or preference” (p. 219). Voas and Crockett (2005) provided empirical evidence that there are many more study participants that say they are affiliated with a religion than actually believe in God. Voas (2007) concluded by stating that “For some people, affiliation is purely nominal; others will have a serious personal commitment, seeing faith as important in their lives” (pp. 145–146). Thus, with this differentiation in mind, our variable of interest was belief in God.

Melamed & Zhao, 2016) and some innovations can even be costly failures (Kheessina, Goncalo & Krause, 2018). Thus, higher income regions are more likely to have the slack resources necessary to survive the innovation process and more willing to invest in the manpower and resources needed to see the innovations to fruition (Jacobs, 1969; Teitel, 1994). We measured income level as the median income in a state in a given year. Both education and income measures were obtained from the U.S. Census Bureau's American Community Surveys from 2007 to 2012 (U.S. Department of Commerce: United States Census Bureau, 2013a). Third, though results are not always consistent (Ng & Feldman, 2013), some research suggests that age is correlated with creative output because it takes some time to obtain the foundational education, training and skill needed to successfully build on prior innovation (Jones, 2010; Lehman, 1953). Thus, we added a control for the median age of the population in each state in each year. Fourth, we controlled for both the number of universities per million people in each state in each year (U.S. Department of Education, 2013) and the total amount of money each state invested each year in university research and development expenditures (as reported in National Science Foundation (NSF) Survey of Research and Development Expenditures at Universities and Colleges; U.S. Department of Commerce: United States Census Bureau, 2013b). Both of these variables have been associated with a greater number of workers who engage in creative work, higher propensity of knowledge being disseminated, and greater availability of innovation-related services ultimately yielding greater patent output (Fritsch, & Slavtchev, 2007; Florida, 2005). Notably, our measure of the amount invested in R&D included funding by the federal, state, and local government, as well as by the private sector and the universities themselves. Finally, it is not just the sheer number of universities and research money that impact innovative output but also the quality of these institutions because high quality universities attract more talent and more resources (Florida, 2014). Thus, we also controlled for academic quality, measured as the number of universities within each state that were rated as one of the top 100 universities in the corresponding year's U.S. World and News Report (US News and World Report, 2007–2012). For all variables, information about state population was obtained from the U.S. Census Bureau's American Community Surveys from 2007 to 2012.

7.1.4. Design and analytic procedure

Our data is structured as a balanced panel with multiple observations for each state. It includes observations on all 50 states and the District of Columbia for each year from 2007 to 2012, resulting in a total of 306 state-year observations. In terms of data analytic technique, the data is not appropriate for ordinary least squares regression analysis because observations across years and within states are likely to be correlated with each other, due to permanent yet unobserved state-level characteristics. A fixed-effects model is also not appropriate in situations where there are multiple observations per state. Moreover, to account for the potential skewness in our outcome variable well as the clustering inherent in our data, we opted to estimate multilevel negative binomial models. We rounded all numbers to the nearest integer as these models require. Consistent with recommendations by Bolger and Laurenceau (2013), we modelled the effect of time (year) to control for the possibility that our results could be attributed to growth in patent applications over time, as well as randomly varying intercepts to control for non-independent observations between states.

7.2. Results

As shown in Table 1, we observed a significant and negative effect of

belief in God (in 2007) on patent output in the years 2007 to 2012, supporting hypothesis 1a. This effect was statistically significant both in the model that excluded all covariates ($b = -0.11, p < 0.001, CI = [-0.18, -0.05]$; see Model 1 in Table 1) and in the model that included all covariates, $b = -0.09, p = 0.02, CI = [-0.18, -0.01]$ (see Model 3, Table 1), providing evidence for the robustness of the results.⁵ For comparison, Model 2 estimates the effect of only the covariates on patent output without including belief in God.

7.3. Discussion

In line with hypothesis 1a, the first study provided correlational evidence suggesting that belief in God is negatively associated with creativity, even when controlling for other important variables. Although promising, this study leaves several issues unresolved. First, correlational studies do not provide any guidance with regard to the direction of causality. Second, our study of state-level patenting output does not allow us to directly investigate whether diminished aggregate creative output at the state level follows a parallel process at the individual level. Third, though we controlled for a number of variables that might account for the negative relationship between belief in God and patenting output, such as the presence of universities and academic quality, other critical covariates have likely been overlooked. It is impossible to rule out all of the potential alternative explanations without an experimental design. Finally, a focus on the direct relationship between belief in God and creativity might be overly simplistic as it does not shed light on the scope of this relationship and the mechanisms that might generate it. Specifically, it does not take into account contextual factors that might diminish creativity among believers. We have proposed this would be a context that invokes a focus on God—a prediction we test in our subsequent studies.

With these limitations in mind, all of the studies that follow test our hypotheses in a series of experiments to test for causality, rule out alternative explanations via random assignment to treatment conditions (thinking about God vs. control topic) and a direct measurement of individual-level creative problem solving. Given the creative process is complex and multi-faceted and there are a number of ways to measure it (Cronin & Loewenstein, 2018), in designing our program of research, our aim was to test our hypotheses using different measures of creativity – both convergent and divergent—to provide a comprehensive test of our hypotheses.

8. Study 2

The goal of Study 2 is to provide direct evidence for hypothesis 1a as well as a first experimental test of hypothesis 1b, that the negative relationship between belief in God and creativity will be moderated by whether or not an individual is actively thinking about God, such that thinking about God will stifle the creativity of believers but not non-believers. In this first test of our model, we began by using one of the most widely cited measures of creative problem solving: the Remote Associates Test (RAT; see Huang, Gino & Galinsky, 2015 for a recent example), intending to replicate our findings in subsequent studies using alternative measures. The RAT requires participants to identify a single target word that is strongly associated with three distinct stimulus words (e.g., manners-round-tennis: TABLE). As such, the Remote Associates Test captures individuals' ability to make novel and meaningful connections between a set of seemingly unrelated stimuli (Mednick, 1968). Remote association requires both cognitive flexibility and a willingness to entertain solutions that are appropriate but that are not immediately

⁵ Removal of the one state with the highest and the one state with the lowest number of patents per capita did not change the significant pattern of results (Model 3: $b = -0.09, p = 0.03, CI = [-0.18, -0.01]$), providing further support for the robustness of the model.

Table 1
Multilevel negative binomial regression estimates for effect of belief in God on state patent output, study 1.

Predictor	Model 1		Model 2		Model 3	
	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	−147.50**	13.87	−107.50**	24.98	−113.64**	24.06
Year	0.08**	0.006	0.05**	0.01	0.06**	0.04
Belief in God	−0.11**	0.03			−0.09*	0.04
Education: Percent Graduate			0.05*	0.02	0.02	0.02
Median Income			<0.001	<0.001	<0.001	<0.001
Median Age			0.06*	0.03	0.04	0.03
Universities per Million			−0.02**	0.005	−0.02**	0.005
R&D Spending per Capita			<0.001	<0.001	<0.001	<0.001
Academic Quality			−0.01	0.01	−0.01	0.01
N of States (plus DC)	51		51		51	
N of State-Year Observations	306		306		306	
Log Pseudolikelihood	−1560.19		−1558.39		−1554.26	
Wald χ^2	200.45		229.59		265.92	

Note. * = $p < 0.05$, ** = $p < 0.005$.

obvious (Gupta, Jang, Mednick & Huber, 2012). Indeed, going beyond the obvious to generate a creative solution requires an ability to connect unusual elements that are farther afield. Yet, solutions that combine seemingly very disparate elements, even when appropriate, can seem unconventional (Kim et al., 2013; Mueller, Melwani & Goncalo, 2012).

Importantly, the process of solving the RAT parallels the creative process because many notably creative solutions have emerged from an inventor forming a useful connection between knowledge or perspectives that were previously seen as disconnected (Cronin & Loewenstein, 2018). For example, the invention of the Peking duck potato chip or the rice burger involved fusing elements of previously disconnected cultural cuisines. Similarly, Steve Jobs was able to make a non-obvious connection between his knowledge from one college course on calligraphy and his design of the Mac computer, thus making the design more unique and more user friendly (Isaacson, 2011). Indeed, prior research has supported these anecdotal observations, demonstrating that the RAT predicts creative performance at work (Oldham & Cummings, 1996). Thus, we predicted that, if prompting believers to think about God activates a passive followership mindset then this mindset should deter them from considering appropriate but nontraditional connections, diminishing RAT performance.

8.1. Method

8.1.1. Participants

One-hundred and twelve undergraduates at a university in Israel (48.2% women; $M_{age} = 22.97$, $SD = 2.08$) received course credit for participating in this study. To safeguard data quality and to remain consistent across all experimental studies, we excluded participants based on two criteria. First, given our research question, we limited our analysis to members of non-polytheistic religions who indicated being native speakers of the language used in the measures we employed. The latter was important because past research has demonstrated that fluent language skills are critical to correctly solve creative tasks such as RAT word puzzles (Chermahini, Hickendorff, & Hommel, 2012; Klein & Badia, 2015). Second, we decided prior to data collection to exclude participants whose responses were not possible to interpret: (1) by failing to pay attention to instructions; (2) by providing extreme data (e.g., taking more than two standard deviations above the rest of the sample to complete a priming study for which effects are short lived, Higgins, 1996); and (3) by failing to follow manipulation instructions (e.g., writing gibberish). In study 2, no participants needed to be excluded for these predetermined reasons. Specifically, the majority of the participants identified as being Jewish (83.0%), with the remainder identifying as Muslim (12.5%) and Christian (4.5%). Two participants failed to indicate their specific religious affiliation, but review of their responses revealed one was Jewish and the other Christian. Finally, all participants indicated being native speakers and no one gave

uninterpretable responses.

8.1.2. Procedure

As is typical of priming studies, the experimenter informed participants they would be working on two unrelated research projects: the first would deal with reading comprehension and parts of speech, and the second would investigate problem-solving abilities. The experimental manipulation was introduced during the “first project” and the creativity task was introduced during the “second project.”

8.1.3. Belief in God

At the very end of the study, as part of the demographic information that participants filled out in the last section of their questionnaire, we measured participants’ belief in God. In order to obtain a continuous measure of participants’ internal religiosity and as such, an indirect account of their belief in God, we used Hoge’s Intrinsic Religious Motivation Scale (Hoge, 1972), which has been used extensively to measure individual differences in devotion to religion and God (e.g., Gervais & Norenzayan, 2012). Sample statements include: “One should seek God’s guidance when making every important decision” and “Nothing is as important to me as serving God as best I know how.” This measure was translated into Hebrew by an Israeli-American bilingual. The Hebrew version was then back-translated into English by another bilingual individual. The few inconsistencies found in the translation were resolved through discussion between the bilinguals. The items showed a sufficient degree of internal reliability ($\alpha = 0.80$) and were averaged to create a composite measure. We employed this measure at the very end of the study because we did not want to alert and/or prime participants to thinking about God but rather wanted to experimentally control who would be thinking about God and who would not, irrespective of actual belief in God.

8.1.4. God prime

To manipulate thoughts of God, participants were randomly assigned to one of two conditions: a God-prime or a control-prime condition. Following previous research (Gervais & Norenzayan, 2012), all participants were presented with the same list of 12 adjectives (e.g., accepting, judging, loving), but were asked to rate them based on different criteria. In the God prime condition, participants rated how well each of the adjectives described God. In the control condition, participants rated the adjectives based on their perceived frequency of use in everyday speech. This was the first task presented to participants in the study. At the conclusion of part one, participants completed a brief survey with demographic information (e.g., age and gender).

8.1.5. Creativity

To measure creativity, participants were asked to complete a 7-item Hebrew version of the Remote Associates Test (RAT; Tadmor et al.,

2013). As noted before, this measure assesses the ability to form new and useful combinations from mentally distant associative elements (Mednick, 1962). Participants got two examples and then seven triads to solve.

8.1.6. Task equivalence across conditions

To ensure that participants in the God-prime and the control-prime conditions experienced the tasks similarly, participants were asked at the end of the survey to indicate on five-point scales: the difficulty of the tasks; how much they liked the tasks; how much effort they put into the tasks; and how happy, excited, enthusiastic, and proud they currently felt. The latter four items ($\alpha = 0.71$) were averaged to create a mean positive mood score.

8.2. Results and discussion

8.2.1. Task equivalence

As expected, participants in the two conditions did not significantly differ in their ratings of perceived task difficulty, $F(1, 110) = 0.07, p = 0.788, \eta^2 = 0.001$, task liking, $F(1, 110) = 0.16, p = 0.693, \eta^2 = 0.001$, task effort, $F(1, 109) = 0.49, p = 0.487, \eta^2 = 0.004$, or positive mood, $F(1, 110) = 0.67, p = 0.416, \eta^2 = 0.006$.

8.2.2. Creativity

In order to examine whether thinking about God reduces creativity, especially for believers, we ran a multiple regression analysis in which we included belief in God (standardized), God prime (thinking about God = 1, control = -1), and their interaction as predictors ($R^2 = 0.09, F(3, 108) = 3.365, p = 0.021$). As predicted in hypothesis 1a, there was a significant main effect for belief in God ($b = -0.38, SE = 0.17, p = 0.024, 95\% CI = [-0.710, -0.051]$), such that the stronger participants belief in God, the fewer RAT problems they solved correctly. Moreover, whereas the main effect for God Prime was not significant ($b = -0.16, SE = 0.17, p = 0.347, 95\% CI = [-0.484, 0.172]$), it was qualified by the predicted significant belief in God X God Prime interaction ($b = -0.37, SE = 0.17, p = 0.0276, 95\% CI = [-0.700, -0.042]$). Using Hayes' (2013) PROCESS Model 1 to analyze the conditional effects, we found that as predicted in hypothesis 1b, among participants who were in the thinking about God condition, belief in God was negatively associated with the number of correct RAT items solved ($b = -0.75, SE = 0.24, p = 0.002, 95\% CI = [-1.229, -0.275]$). In contrast, among participants in

the control condition, belief in God was unrelated to the number of RAT problems correctly solved ($b = -0.01, SE = 0.23, p = 0.967, 95\% CI = [-0.464, 0.445]$). Fig. 2 demonstrates that actively thinking about God moderates the effect of belief in God such that, although believers and non-believers did not differ in their creativity when not prompted to think about God, thinking about God had a stifling effect on creative problem solving as function of belief in God.

The results of Study 2 provided support for hypothesis 1a and hypothesis 1b that belief in God negatively impacts creativity especially when believers are actively thinking about God. Thus, reduced creativity is moderated by whether believers were actively thinking about God. Interestingly, we observed no difference between the creativity of believers and non-believers in the control condition when their attention was directed away from God.

9. Studies 3a and 3b

Our aim in Studies 3a and 3b was to conceptually replicate the effects we found in Study 2 using a different way to manipulate thinking about God and a different type of creativity task that is also directly applicable to the work context. Specifically, in Studies 3a and 3b, rather than rate how well different adjectives described God, we activated thoughts of God by having participants write an essay about God. We wanted to see if our findings would hold using a more immersive manipulation that gave participants the latitude to describe their own personal relationship with God in an open-ended response that did not rely on a set of pre-selected adjectives.

We also wanted to test hypothesis 1a and 1b using a different measure of creativity—creative idea generation. The RAT is a convergent creativity task—one that requires cognitive flexibility to reach a single correct solution (Dewhurst, Thorley, Hammond, & Ormerod, 2011). In contrast, idea generation is a divergent creativity task—one that asks problem solvers to think of a wide range of ideas. Generating multiple ideas is also highly relevant in organizational contexts where brainstorming is frequently used as a vehicle to stimulate creativity (Paulus & Yang, 2000; Sutton & Hargadon, 1996). Like the RAT, performance on brainstorming tasks should also be inhibited by a passive followership mindset given research showing that individuals generate a wider range of creative ideas when they are encouraged to think independently, break with convention and stand out rather than fall in line (De Dreu & West, 2001; Goncalo et al., 2018; Gino & Wiltermuth, 2014; Kim et al.,

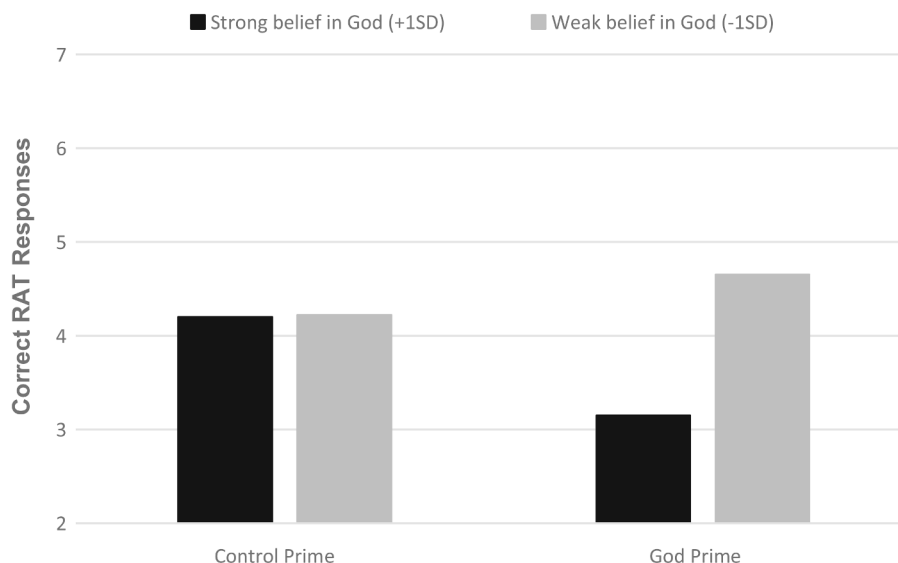


Fig. 2. Predicted mean values of RAT problems correctly solved as a function of belief in God (at 1 SD above and below the mean) and of God prime, Study 2.

2013; Nemeth & Staw, 1989).

Finally, to demonstrate a direct replication of the effect, we ran this study using the same exact design and materials across two participant populations: (a) American-based Amazon Mechanical Turk workers and (b) undergraduate students from an Israeli university.

9.1. Method

9.1.1. Participants

Four hundred and fifty-two participants living in the U.S. were recruited on Amazon's Mechanical Turk to take part in Study 3a. Notably, relative to typical samples collected from students, MTurk is an online platform that allows users to collect data from a larger and more diverse participant pool of working adults. It has been shown to be a reliable source of data for social science research (e.g., Buhrmester, Kwang, & Gosling, 2011; Casler, Bickel, & Hackett, 2013). Two hundred and twenty-four undergraduate students were asked to participate in Study 3b. Using the same exclusion criteria outlined in Study 2, the final sample in Study 3a included 391 participants (48.1% women; mean age = 36.88, SD = 11.57) who were paid \$1.50 for their participation, with participants identified as Christian (48.8%), Jewish (2%), agnostic or atheist (42.7%), or other non-polytheistic religions (6.4%). The final sample in Study 3b included 201 participants (55.2% women; mean age = 22.55, SD = 2.33) who were given course credit in exchange for their participation. These Israeli participants were either Jewish (69.2%), Muslim (20.4%), Christian (6%), agnostic or atheist (2.5%) or belonged to other non-polytheistic religions (2%).

9.1.2. Procedure and measures

Similar to Study 2, participants were told they would participate in two separate research projects. They were told the “first project” tested memory and recall. It was used to prime thoughts of God. They were told the “second project” was a problem-solving study and it was used to assess creativity. Both studies were conducted online.

9.1.3. Belief in God

One limitation of the Hoge (1972) measure we employed in Study 2 is that it includes items that measure belief in God but also items that tap more into motivation to engage in religious activities. This has led Saroglou (2011) to define intrinsic religion as a measure of believing + behaving. Because our focus here is specifically on belief in God, in our subsequent studies, we measured participants' belief in God as a “yes” or “no” response to the question “do you believe in God?” This question was asked at the very end of the study, as part of the demographic information that participants filled out in the last section of their questionnaire. Using this binary measure allowed us to cleanly partition the participants into two camps—of believers and non-believers—according to their own self-identification.

9.1.4. God prime

In this experiment, we manipulated thinking about God by randomly assigning participants to either write about God or write about a neutral topic. Specifically, those in the God prime condition were given the following prompt:

“When people talk about God, they could mean a lot of things. We're interested in your thoughts. What comes to mind when you think of God?”

Those in the control condition were given the following prompt:

“Please write about your day yesterday. For example, tell us where you were and what you did.”

All participants were asked to write at least 5 sentences about the topic in as much detail as they could. They were also told they would later be asked to recall the main topic and so they should try to

remember the central points they wrote about. This was the first task participants completed in the experiment.

9.1.5. Creativity

Following Goncalo and Staw (2006), participants were given a brainstorming task which was described as a problem-solving task based on an actual scenario that took place at a major university in the country. The problem was described as follows:

“After years of mismanagement and poor-quality food, a restaurant on campus has finally gone bankrupt and is being shut down. The university administration is trying to decide what new business should go into that space. You have 7 min to come up with as many ideas as you can for potential businesses that can help them solve the problem.”

They were told that in this task, we were looking for quantity. Therefore, they were asked to try to propose as many different ideas as they could in the time they had available and that the survey would move forward automatically at the end of the time period.

For each study (3a and 3b), different sets of two coders categorized the ideas and three well-established measures of creativity were generated (e.g. Nijstad, De Dreu, Rietzschel, & Baas, 2010). First, the sheer number of ideas participants generated was counted using the count function in Excel. This measure is considered a measure of *fluency* or ease with which participants could generate answers. Much research has suggested that creativity is a probabilistic consequence of sheer quantity—the more ideas that are generated, the higher the chance that more creative ideas will be among them (Campbell, 1960; Diehl & Stroebe, 1987; Guilford, 1967; Osborn, 1953; Parnes & Meadow, 1959; Rietzschel, Nijstad, & Stroebe, 2006; Simonton, 1999; Tadmor et al., 2012). Second, the *flexibility* measure was based on the raters' categorization of the ideas, which was counted as the number of different idea categories that were generated by participants—an indicator of divergent thinking. The raters were asked to look at all the different ways participants suggested using the empty space and to independently categorize them such that similar ideas were put into the same category, and then to give that category a descriptive name. Coders were given complete freedom to come up with as many categories as they wanted and they were asked to be as specific as possible when generating these category names. To improve their understanding of this request, they were given the following example. They were told that if the ideas were “The Gap” and “Pac-Sun,” they could categorize them into a “Clothing/apparel store” category. However, “a Halloween costume store” should not be included in that category even though costumes are technically also clothing. “Shoe store” should also be considered a separate category even though shoes are also a type of clothing. Finally, a third measure of creativity was *originality* which refers to the extent to which the ideas generated by a participant were common or unusual relative to the entire set of ideas generated by the sample of participants as a whole. Higher scores represent more common ideas whereas lower scores represent more original ideas. The measure is based on Nijstad's et al. (2010) measure of statistical frequency of a response, and calculating the measure required several steps. The first step required categorizing the ideas as was described above. Second, once raters finished assigning all ideas these specific categories, raters were asked to count the number of ideas that appeared in each category. For example, in Study 3a, 223 clothing store ideas were generated across the 392 participants. Third, coders were asked to give each idea within a category the overall count number. Thus, each one of the clothing store ideas was assigned the number 223. In contrast, an idea like bail bondsman or axe toss venue only came up once across all 392 participants. Thus, each of these two ideas was assigned a score of 1. Finally, once every idea was assigned such a score (based on the number of ideas in the category to which the idea belongs), these numbers were averaged to create an originality score for each participant. To illustrate, if one participant only came up

with two ideas, one was a clothing store idea (assigned a score of 223) and one was an axe toss venue (assigned a score of 1), this participant's average originality score was a $(223 + 1)/2 = 111.5$. Conversely, if one participant came up with only two ideas, one idea was "bail bondsman" (assigned a score of 1) and the other idea was "axe toss venue" (assigned a score of 1), this participant's average originality score was a $(1 + 1)/2 = 1.0$. Taken together, a score of 1 indicates a very high degree of originality. In contrast, the higher the score, the less original the participant, with him producing more common ideas. To ease the interpretation of this variable, we reverse scored the originality measure in all studies so that in the reporting of the results, higher scores indicate higher originality.

The interrater reliability (LeBreton & Senter, 2008; Hayes & Krippendorff, 2007) between each set of two raters was high (Study 3a flexibility: ICC(1) = 0.985, ICC(2) = 0.987; Krippendorff's $\alpha = 0.97$; originality: ICC(1) = 0.980, ICC(2) = 0.980; Krippendorff's $\alpha = 0.96$; Study 3b flexibility: ICC(1) = 0.990, ICC(2) = 0.990, Krippendorff's $\alpha = 0.97$; originality: ICC(1) = 0.957, ICC(2) = 0.960, Krippendorff's $\alpha = 0.86$).

Last, participants were asked to provide some demographic information, including age, gender, religious affiliation, and their native language.

9.1.6. Manipulation check

Using an open-essay writing technique allowed us to rectify a limitation of Study 2, which did not include a manipulation check. To ensure that our manipulation worked, we had a coder read all essays and indicate whether their content dealt with God, someone's day yesterday or another topic. All participants who saw the God prime wrote about God and all participants who saw the control prime wrote about their day yesterday. None of the latter mentioned God in their essays.

9.2. Results

In order to test hypothesis 1b that the negative relationship between belief in God and creativity is moderated by whether participants are actively thinking about God, we conducted a 2 (Belief in God: 1 = yes; -1 = no) \times 2 (God Prime: Thinking about God = 1; Control topic = -1) ANOVA. Separate ANOVAs were conducted on experiments 3a and 3b for each of the three measures of creativity. To account for unequal cell sizes, we conducted General Linear Model Univariate analyses with Type III sum of squares.

9.2.1. Study 3a fluency

Whereas there was neither a significant main effect for belief in God, $F(1, 387) = 0.07, p = 0.795, \eta^2 < 0.001$, thereby not supporting hypothesis 1a, nor a significant main effect for the God prime, $F(1, 387) = 0.80, p = 0.372, \eta^2 = 0.002$, we found the predicted significant interaction between belief in God and God prime, $F(1, 387) = 4.16, p = 0.042, \eta^2 = 0.011$. As shown in Fig. 3a and as predicted in hypothesis 1b, planned pairwise comparisons revealed that among those thinking about God, believers ($M = 11.53, SD = 6.60$) generated marginally fewer ideas than did non-believers ($M = 13.18, SD = 7.66$), $F(1, 387) = 2.77, p = 0.097, \eta^2 = 0.007$. In contrast, among those who were in the control condition, believers ($M = 13.64, SD = 6.43$) did not significantly differ from non-believers ($M = 12.36, SD = 7.57$; $F(1, 387) = 1.52, p = 0.219, \eta^2 = 0.004$) in the number of ideas they generated.

9.2.2. Study 3b fluency

In line with hypothesis 1a, there was a significant main effect for belief in God, $F(1, 197) = 17.28, p < 0.001, \eta^2 = 0.081$ and a non-significant main effect for the God prime, $F(1, 197) = 0.15, p = 0.698, \eta^2 = 0.001$. But this was qualified by the interaction between belief in God and God prime, $F(1, 197) = 7.51, p = 0.007, \eta^2 = 0.037$. As shown in Fig. 3b and as predicted in hypothesis 1b, planned pairwise comparisons revealed that among those who were thinking about God,

believers ($M = 14.05, SD = 8.18$) generated significantly fewer ideas than did non-believers ($M = 23.64, SD = 12.17$), $F(1, 197) = 23.46, p < 0.001, \eta^2 = 0.106$. In contrast, among those who were in the control condition, believers ($M = 17.32, SD = 9.27$) did not significantly differ from non-believers ($M = 19.29, SD = 9.41$; $F(1, 197) = 1.02, p = 0.314, \eta^2 = 0.005$) in the number of ideas they generated.

9.2.3. Study 3a flexibility

There was neither a significant main effect for belief in God, $F(1, 387) = 0.54, p = 0.461, \eta^2 < 0.001$, thereby not supporting hypothesis 1a, nor a significant main effect for the God prime, $F(1, 387) = 0.85, p = 0.356, \eta^2 = 0.002$. However, there was a significant interaction between belief in God and God prime, $F(1, 387) = 4.51, p = 0.034, \eta^2 = 0.012$. In support of hypothesis 1b, planned pairwise comparisons showed that among those who were thinking about God, believers ($M = 5.64, SD = 5.19$) generated ideas that covered significantly fewer categories than did non-believers ($M = 7.16, SD = 5.23$), $F(1, 387) = 4.29, p = 0.039, \eta^2 = 0.011$. In contrast, among those who were in the control condition, believers ($M = 7.26, SD = 5.23$) did not significantly differ in number of categories they generated from those of non-believers ($M = 6.52, SD = 5.12$), $F(1, 387) = 0.92, p = 0.338, \eta^2 = 0.002$.

9.2.4. Study 3b flexibility

There was a significant main effect for belief in God, $F(1, 197) = 19.61, p < 0.001, \eta^2 = 0.091$, supporting hypothesis 1a, and a non-significant main effect for the God prime, $F(1, 197) = 0.06, p = 0.809, \eta^2 < 0.001$. This was qualified by the predicted significant interaction between belief in God and God prime, $F(1, 197) = 7.91, p = 0.005, \eta^2 = 0.039$. As predicted in hypothesis 1b, planned pairwise comparisons showed that among participants who were thinking about God, believers ($M = 11.37, SD = 5.63$) generated ideas from significantly fewer categories than did non-believers ($M = 18.83, SD = 8.74$), $F(1, 197) = 25.85, p < 0.001, \eta^2 = 0.116$. In contrast, among those who were in the control condition, believers ($M = 14.52, SD = 7.34$) did not significantly differ from non-believers ($M = 16.18, SD = 7.15$; $F(1, 197) = 1.32, p = 0.251, \eta^2 = 0.007$) in terms of the number of categories they had generated ideas from.

9.2.5. Study 3a originality

There was a marginally significant main effect for belief in God, $F(1, 387) = 3.53, p = 0.061, \eta^2 = 0.009$, in line with hypothesis 1a, and there was a non-significant main effect for the God prime, $F(1, 387) = 2.62, p = 0.106, \eta^2 = 0.007$. This was qualified by a marginally significant interaction between belief in God and God prime, $F(1, 387) = 3.38, p = 0.067, \eta^2 = 0.009$. As predicted in hypothesis 1b, planned pairwise comparisons showed that among those who were thinking about God, believers ($M = 1061.48, SD = 844.23$) generated significantly less original ideas than did non-believers ($M = 1374.04251.96, SD = 830.82$), $F(1, 387) = 7.24, p = 0.007, \eta^2 = 0.018$. In contrast, among those who were in the control condition, believers ($M = 1352.32, SD = 810.80$) did not significantly differ in terms of their originality from that of non-believers ($M = 1355.56, SD = 808.47$), $F(1, 387) = 0.001, p = 0.979, \eta^2 < 0.001$.

9.2.6. Study 3b originality

There was a significant main effect for belief in God, $F(1, 197) = 4.52, p = 0.035, \eta^2 = 0.022$, supporting hypothesis 1a, and a non-significant main effect for the God prime, $F(1, 197) = 0.64, p = 0.424, \eta^2 = 0.003$. This was qualified by a significant interaction between belief in God and God prime, $F(1, 197) = 4.02, p = 0.046, \eta^2 = 0.020$. As predicted in hypothesis 1b, planned pairwise comparisons revealed that among those who were thinking about God, believers ($M = 679.83, SD = 238.64$) generated significantly less original ideas than did non-believers ($M = 813.46, SD = 226.15$), $F(1, 197) = 8.41, p = 0.004, \eta^2 = 0.041$. Conversely, among those who were in the control condition, believers ($M = 770.60, SD = 227.55$) were not significantly less

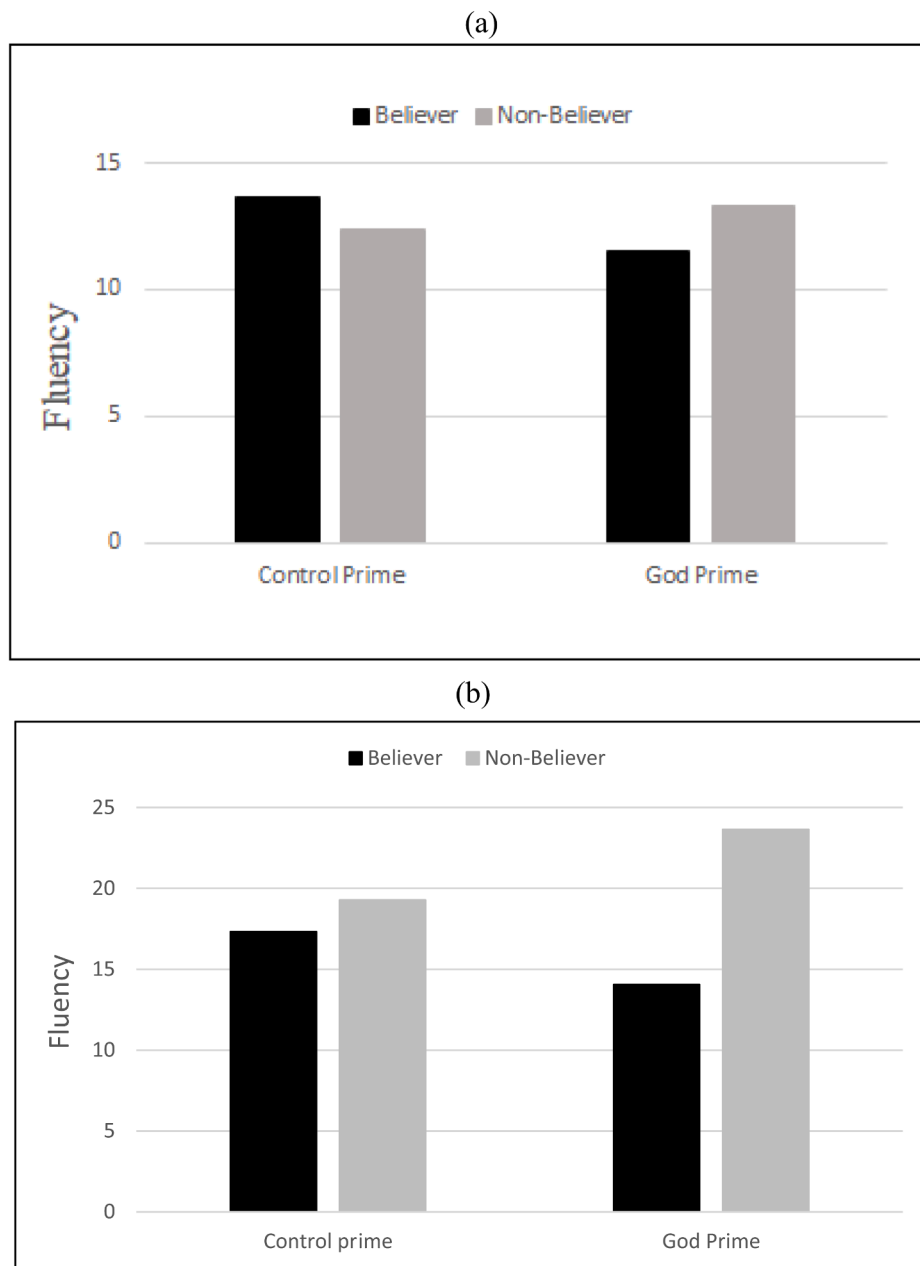


Fig. 3. (a) Fluency in Study 3a and for (b) Fluency in Study 3b as a function of belief in God and God prime.

original than were non-believers ($M = 774.52$, $SD = 203.35$), $F(1, 197) = 0.01$, $p = 0.931$, $\eta p^2 < 0.001$.

9.3. Discussion

The primary aim of Studies 3a and 3b was to replicate the results of Study 2 and to test our hypothesis that the negative relationship between belief in God and creativity will be moderated by whether or not an individual is actively thinking about God, such that thinking about God will stifle the creativity of believers but not that of non-believers. The pattern of our interaction between belief in God and God prime sheds further light on the contextual nature of creative inhibition among believers: believers were less creative than non-believers when they were prompted to actively think about God. Interestingly, when thinking about a neutral topic, no differences were found between believers and non-believers. We found support for this hypothesis with a measure of creativity and a manipulation of thinking about God that differed from

Study 2, thereby providing a conceptual replication of the effect. Moreover, this pattern emerged in two different sample populations (working adults in the United States and undergraduate students in Israel), thereby providing initial evidence for the generalizability and robustness of the effect. Finally, by running two identical studies – Study 3a and Study 3b—we are also able to provide a direct rather than merely a conceptual replication.

10. Study 4

Our results thus far have provided converging evidence that thinking about God stifles the creativity of believers. However, we have yet to demonstrate empirically any evidence of the underlying psychological process. In Study 4, we sought to test the complete moderated-mediation model that when thinking about God, a feeling of passive followership is induced in believers, which in turn will reduce their creativity.

10.1. Method

10.1.1. Participants

Nine hundred and twenty-nine participants living in the U.S. were recruited on Amazon's Mechanical Turk. Using the same exclusion criteria outlined in Study 2, the final sample included 859 participants (59.1% women; mean age = 33.25, SD = 11.05). Participants were paid \$1 for their participation. The majority of the participants identified themselves as Christian (51.3%), with the rest identifying as Jewish (2.2%), atheist or agnostic (40.3%), or as belonging to a number of other non-polytheistic religions (6.2%).

10.1.2. Procedure and measures

Participants were told they would participate in three separate research projects. The "first project" was used to prime thoughts of God, the "second project" was used to measure passive followership, and the "third project" was used to assess creativity.

10.1.3. Belief in God

Participants' belief in God was measured in the same way as in Studies 3a and 3b. This question was asked at the very end of the study, as part of the demographic information that participants filled out in the last section of their questionnaire.

10.1.4. God prime

Using the same materials described in Studies 3a and 3b, participants were randomly assigned either to write about God or to write about their day yesterday. This was the first task participants completed in the experiment.

10.1.5. Passive followership mindset

Participants were then presented with a validated measure of passive followership mindset (see Supplemental Studies 2a–2e for validity data). To capture the essence of passive followership mindset as described in previous research (e.g., Carsten et al., 2010; Chaleff, 1995; Courpasson & Dany, 2003; Crossman & Crossman, 2011; de Cremer & Van Dijk, 2005; de Vries & van Gelder, 2005; Dixon & Westbrook, 2003; Hirschhorn, 1990; Lapiere, 2014; Shamir, 2004; Tyler, 1997; Uhl-Bien & Pillai, 2007; Uhl-Bien et al., 2014; also see Popper, 2011), we sought to capture the foundational elements of passive deference as a result of having faith in the leader. The measure included five statements to capture this mindset: I feel directed, led, guided, devoted, and faithful.⁶ Participants were asked to indicate whether these statements described how they currently felt on a 7-point scale, ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*. Given acceptable reliability (Cronbach's $\alpha = 0.83$), all items were averaged to form our mediator of a passive followership mindset.

10.1.6. Creativity

As in Study 2, participants were given the RAT. Participants were

⁶ In our original measure of passive followership mindset, we had also included three additional adjectives (watched over, respectful, and accepting) but the validation studies indicated they did not properly load on the construct. Analyses that included all eight items demonstrated the same pattern of results. Specifically, based on bootstrapping 5,000 resamples, and in line with hypothesis 2, we estimated the indirect effect (using the full 8 item measure of passive followership mindset) to be significant at $p < 0.05$ (index of moderated mediation = -0.30 ; $SE_{boot} = 0.15$) as the bias-corrected 95% confidence interval did not include zero (95% CI [$-0.61, -0.001$]). Results from the conditional indirect effects of belief in God on creativity demonstrated that for participants who were thinking about God, the 8-item passive followership mindset mediated the relationship between belief in God and creativity ($b = -0.40$, $SE_{boot} = 0.20$, bias corrected 95% CI [$-0.801, -0.009$]). In contrast, for participants in the control condition, the relationship was weaker ($b = -0.11$, $SE_{boot} = 0.06$, bias corrected 95% CI [$-0.221, -0.002$]).

given two examples and then 14 triads to solve within seven minutes, after which the computer program automatically moved forward. The total number of triads they solved correctly constituted our measure of creativity.

Last, participants were asked to provide some demographic information, such as age, gender, their religious affiliation, as well as whether English was their native language.

10.1.7. Manipulation check

To ensure that our essay manipulation worked, we had a coder read all essays and indicate whether their content dealt with God, someone's day yesterday or another topic. The coder found that all participants in the God prime condition wrote about God and all participants in the control prime wrote about their day yesterday. None of the latter mentioned God in their essays.

10.2. Results and discussion

10.2.1. Creativity

In order to examine whether believers were less creative than non-believers when thinking about God, we conducted a 2 (Belief in God: 1 = yes; -1 = no) \times 2 (God Prime: Thinking about God = 1; Control topic = -1) ANOVA. To account for unequal cell sizes, we conducted a General Linear Model Univariate analysis with Type III sum of squares. We found a significant main effect for belief in God, $F(1, 855) = 4.55$, $p = 0.033$, $\eta^2 = 0.005$, supporting hypothesis 1a, and a non-significant main effect for the God prime, $F(1, 855) = 0.48$, $p = 0.489$, $\eta^2 = 0.001$. Interestingly, the interaction between belief in God and God prime ($F(1, 855) = 2.44$, $p = 0.118$, $\eta^2 = 0.003$) was not significant, thus failing to support hypothesis 1b. Nonetheless, it was in the expected direction. As shown in Fig. 4a and in line with our previous results, planned pairwise comparisons showed that among those who were thinking about God, believers solved significantly fewer RAT items correctly ($M = 6.04$, $SD = 3.34$) than did non-believers ($M = 6.91$, $SD = 3.39$), $F(1, 855) = 6.61$, $p = 0.010$, $\eta^2 = 0.008$. In contrast, among those in the control condition, believers ($M = 6.57$, $SD = 3.20$) did not differ from non-believers in the number of RAT items correctly solved ($M = 6.70$, $SD = 3.25$), $F(1, 855) = 0.17$, $p = 0.682$, $\eta^2 < 0.001$.

10.2.2. Passive followership mindset

There was a significant main effect for belief in God on passive followership mindset, $F(1, 855) = 251.15$, $p < 0.001$, $\eta^2 = 0.227$ and a significant main effect for God prime, $F(1, 855) = 9.90$, $p = 0.002$, $\eta^2 = 0.011$. There was also a significant interaction between belief in God and God prime, $F(1, 855) = 80.45$, $p < 0.001$, $\eta^2 = 0.086$. In support of hypothesis 1c, among participants thinking about God, believers ($M = 4.91$, $SD = 1.37$) reported a stronger passive followership mindset than did non-believers ($M = 2.78$, $SD = 1.20$), $F(1, 855) = 298.01$, $p < 0.001$, $\eta^2 = 0.258$ (see Fig. 4b). Notably, those in the control condition showed a similar pattern, with believers ($M = 4.41$, $SD = 1.15$) also reporting a stronger passive followership mindset than did non-believers ($M = 3.82$, $SD = 0.98$), $F(1, 855) = 24.47$, $p < 0.001$, $\eta^2 = 0.028$, though the effect was much weaker than it was in the condition in which participants were actively thinking about God.

10.2.3. Testing moderated mediation

Is a passive followership mindset the underlying psychological mechanism that explains why thinking about God reduces creative problem solving for believers? In line with hypothesis 1d, when the passive followership mindset was also included in the analysis of the believe in God \times God prime interaction on creativity, passive followership mindset emerged as a significant predictor of creativity ($F(1, 854) = 5.10$, $p = 0.024$, $\eta^2 = 0.006$) and the effect of the interaction was not significant ($F(1, 854) = 0.70$, $p = 0.403$, $\eta^2 = 0.001$). More formally, to test the indirect effects of belief in God on creativity via passive followership mindset, conditional on the God prime condition,

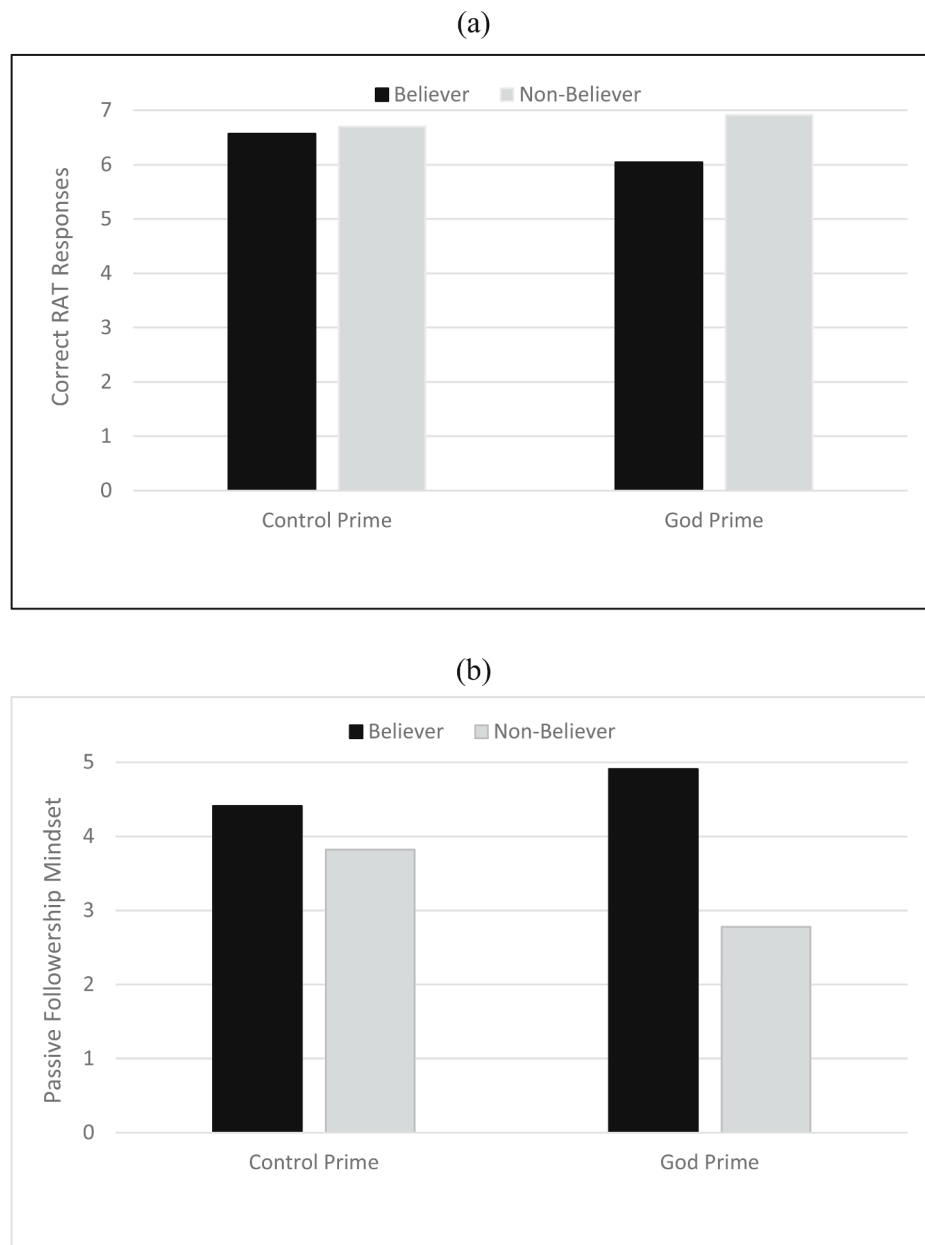


Fig. 4. (a) Number of RAT problems solved correctly and (b) Passive followership mindset as a function of belief in God and God prime, Study 4.

we used PROCESS macro (model 8) to calculate 95% percentile bootstrap confidence intervals using 5000 bootstrap samples. When the passive followership mindset was also included in the analysis of the believe in God \times God prime interaction on creativity, passive followership mindset emerged as a significant negative predictor of creativity ($b = -0.21$, $SE = 0.09$, $p = 0.024$; 95% CI = $[-0.393, -0.027]$) and the effect of the interaction was not significant ($b = -0.10$, $SE = 0.12$, $p = 0.404$; 95% CI = $[-0.343, 0.138]$). The index of moderated mediation was examined additionally to test for the moderation of the conditional indirect effects by God prime. In line with hypothesis 2, the results show that for participants who were thinking about God, the indirect effect of belief in God on creativity via passive followership mindset was negative and significant (confidence intervals do not include zero) ($b = -0.22$, $SE_{boot} = 0.10$, 95%CI = $[-0.432, -0.024]$). In contrast, for participants in the control condition, the relationship was weaker ($b = -0.06$, $SE_{boot} = 0.03$, 95%CI = $[-0.127, -0.006]$). The index of moderated mediation was negative and significant ($b = -0.16$, $SE_{boot} = 0.08$, 95%CI = $[-0.321, -0.017]$), indicating that conditional indirect effect of belief in

God on creativity via passive followership mindset was significantly more negative when thinking about God compared to the control condition.

Taken together, the moderated mediation analysis revealed that belief in God was negatively related to creativity through a passive followership mindset among those who were actively thinking about God, thus supporting hypothesis 2. The results of this study thus replicate the overall pattern of results found in the previous studies as well as provide support for the underlying mechanism, showing that believers who think about God are more likely to feel like passive followers, which, in turn, impairs their creativity.

11. Study 5

Study 4 provided support for the process of passive followership as the underlying mechanism responsible for the negative creative outcomes that occur when believers think about God. And yet, we were concerned that our only evidence of mediation is correlational using a

measure of passive followership (Study 4). Therefore, we thought it was important to bolster Study 4 with additional data using a moderation-of-process design in which we manipulated the mediator directly rather than only measuring it. That is, in this design, the approach is to manipulate the psychological process to moderate the relation between the independent variable and the dependent variable. Spencer et al. (2005) suggest it as an optimal strategy to provide causal evidence for a mediator as the underlying psychological process. In our case, this suggests that rather than measure the passive followership mindset that arises when believers think about God, we needed to manipulate the passive followership mindset directly to moderate the relationship between the independent variable of belief in God and the dependent variable of creativity.

Notably, as in previous studies, we predict the effect of a passive followership prime to differ depending on people's initial orientation towards God. Specifically, we had suggested that belief in God presupposes a state of passive followership in which believers voluntarily submit and offer their devotion to God. Thus, the activation of a passive followership mindset should echo and amplify this natural inclination among believers, placing them in a mindset that is un conducive for creative production. In contrast, non-believers may be less responsive to the demand to be passive followers because it is less consistent with their general orientation of not submitting to a higher power. These suggestions mesh well with the finding in Study 4 that believers felt more like passive followers than did non-believers even in the control condition.

11.1. Method

11.1.1. Participants

Three hundred forty-three participants living in the U.S. were recruited on Amazon's Mechanical Turk. Using the same exclusion criteria outlined in Study 2, the final sample included 287 participants (52.6% women; mean age = 35.62, SD = 11.17). Participants were paid \$1.50 for their participation. The majority of the participants identified as Christian (40.1%), with the rest identifying as Jewish (2.1%), atheist or agnostic (47.0%), or other non-polytheistic religions (10.8%).

11.1.2. Procedure and measures

As in previous studies, participants were told they would be participating in two separate research projects. The "first project" was used to prime thoughts of passive followership and the "second project" was used to assess creativity.

11.1.3. Belief in God

Belief in God was measured following the same methodology as in Studies 3a, 3b, and 4. Again, the question was asked at the very end of the study, as part of the demographic information that participants filled out in the last section of their questionnaire.

11.1.4. Followership prime

Participants were randomly assigned to either write an essay about passive followership or about a neutral topic. Using the same adjectives we used in Study 4 to measure passive followership, participants in the passive followership prime condition were told:

"Please recall a particular incident in which you were an obedient and respectful follower. Specifically, we mean a situation in which you willingly submitted to a leader's direction and guidance, while feeling faithful and devoted. This incident could be from any domain in your life including spiritual, social, or work-related."

As in Studies 3a, 3b, and 4, participants in the neutral control condition were asked to write about their day yesterday.

In both conditions, participants were asked: "Try to relive the experience in your imagination and describe with as much detail as possible what you experienced, how you felt, and what you thought

about." They were told to write at least 250 words and devote at least 5 min to this task, after which a button appeared at the bottom of the screen that allowed them to advance to the next page of the survey. This was the first task participants completed in the study.

11.1.5. Creativity

Participants were given the same restaurant brainstorming task described in Studies 3a and 3b. With the assistance of two coders, the ideas generated by participants were coded on the same three measures of creativity: (1) fluency, (2) flexibility (ICC(1) = 0.989, ICC(2) = 0.989; Krippendorff's α = 0.98), and (3) originality (ICC(1) = 0.906, ICC(2) = 0.909, Krippendorff's α = 0.83).

11.1.6. Manipulation check

To check the effectiveness of our passive followership prime, we had a coder read all essays and indicate whether their content dealt with passive followership, someone's day yesterday or another topic. All participants in passive followership prime condition wrote about a passive followership experience and all participants in the control prime condition wrote about their day yesterday. None of the latter mentioned passive followership in their essays.

11.2. Results and discussion

In order to examine whether directly invoking a passive followership mindset had a more negative impact on creativity among believers, we conducted a 2 (belief in God: 1 = yes; -1 = no) \times 2 (passive follower prime: 1 = yes; -1 = no) ANOVA on each of the three indices of creativity. To account for unequal cell sizes, we conducted General Linear Model Univariate analyses with Type III sum of squares.

11.2.1. Fluency

The main effect for belief in God, $F(1, 283) = 1.77, p = 0.185, \eta^2 < 0.006$, and the main effect for the passive followership prime, $F(1, 283) = 0.15, p = 0.699, \eta^2 < 0.001$ were not significant, thereby not providing support for hypothesis 1a. However, a significant interaction emerged between belief in God and passive followership prime, $F(1, 283) = 4.50, p = 0.035, \eta^2 = 0.016$. As shown in Fig. 5, planned pairwise comparisons reveal that among those who were in the passive followership mindset prime, believers ($M = 18.22, SD = 11.23$) generated significantly fewer ideas than did non-believers ($M = 23.09, SD = 12.99$), $F(1, 283) = 5.08, p = 0.025, \eta^2 = 0.018$. In contrast, among those who were in the control prime, believers ($M = 21.76, SD = 11.68$) did not significantly differ from non-believers ($M = 20.65, SD = 11.39$; $F(1, 283) = 0.38, p = 0.539, \eta^2 = 0.001$) in the sheer number of ideas they generated.

11.2.2. Flexibility

The main effect for belief in God, $F(1, 283) = 0.93, p = 0.335, \eta^2 = 0.003$, and the main effect for the passive followership prime, $F(1, 283) = 0.04, p = 0.848, \eta^2 < 0.001$ were not significant, thereby not providing support for hypothesis 1a. Nonetheless, there was a significant interaction between belief in God and passive followership prime, $F(1, 283) = 5.16, p = 0.024, \eta^2 = 0.018$. Planned pairwise comparisons showed that among those who were in the passive followership mindset prime, believers ($M = 14.78, SD = 8.57$) generated ideas from fewer categories than did non-believers ($M = 18.13, SD = 9.30$), $F(1, 283) = 4.47, p = 0.035, \eta^2 = 0.016$. In contrast, among those who were in the control prime, believers ($M = 17.33, SD = 8.74$) did not significantly differ from non-believers ($M = 15.98, SD = 8.11$), $F(1, 283) = 1.03, p = 0.312, \eta^2 = 0.004$ in the number of categories they generated.

11.2.3. Originality

The main effect for belief in God, $F(1, 283) = 0.004, p = 0.948, \eta^2 < 0.001$ and the main effect for the passive followership prime, $F(1, 283) = 0.08, p = 0.781, \eta^2 = 0.001$ were not significant, thereby not

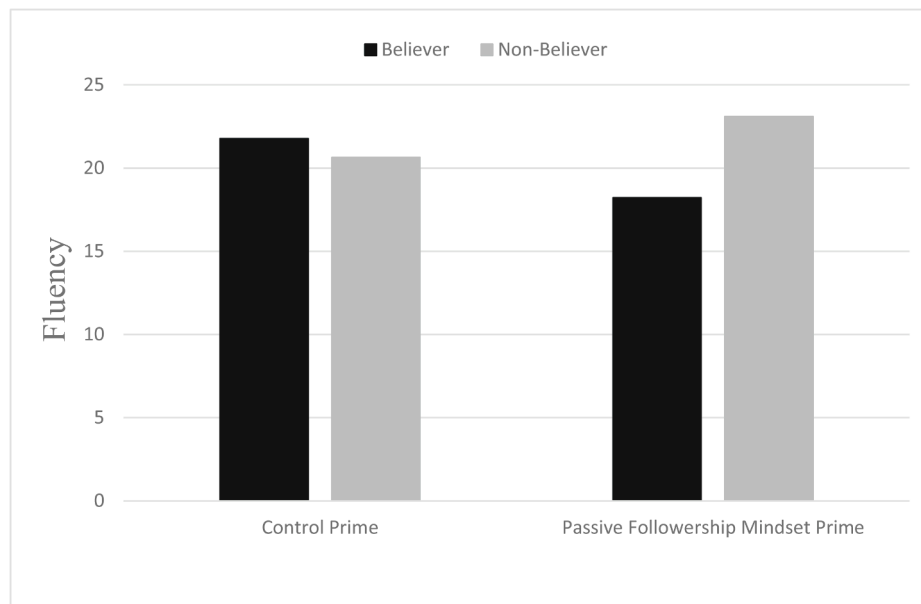


Fig. 5. Fluency as a function of belief in God and passive followership mindset prime, Study 5.

providing support for hypothesis 1a. Nonetheless, we did find the predicted significant interaction between belief in God and passive followership prime, $F(1, 283) = 4.23, p = 0.041, \eta^2 = 0.015$. Planned pairwise comparisons showed that among those who were in the passive followership mindset prime, believers ($M = 309.07, SD = 72.70$) generated less original ideas than did non-believers ($M = 325.25, SD = 60.96; F(1, 283) = 1.92, p = 0.167, \eta^2 = 0.008$) and among those who were in the control prime, believers ($M = 326.87, SD = 52.83$) generated more original ideas than non-believers ($M = 311.68, SD = 67.04$), $F(1, 283) = 2.40, p = 0.123, \eta^2 = 0.007$, but neither of these were statistically significant.

Across all three creativity indices the results showed that when primed with a passive followership mindset, believers show reduced creative problem-solving ability relative to non-believers. Consequently, through the use of a moderation-of-process design, these findings provide further support for hypothesis 1d, highlighting the direct causal role of a passive followership mindset as the underlying psychological mechanism explaining how belief in God impacts creativity when thinking about him. The results are also consistent with the notion that believers in God are more readily accepting of a passive followership mindset than are non-believers probably because the mindset of submitting to a higher power is one that is familiar to them through experience.

12. Meta-analysis

To examine the strength of the main effect across the five experimental studies (Studies 2, 3a, 3b, 4, and 5) as well as the belief in God X God prime interaction across the four experimental studies that included the God prime (Studies 2, 3a, 3b, and 4), we conducted meta-analyses using a modified version of the method described in Hedges and Olkin (1985). We began by converting the statistics for each main effect and each interaction effect into a common metric of a partial correlation coefficient (r), which is considered a common indicator of effect size (Aloe, 2014) and used Fisher's z transformation to avoid potential bias when pooling partial correlations across samples (Borenstein, Hedges, Higgins, & Rothstein, 2009). The original statistics already take into account unequal sample sizes per condition. For studies that included fluency, flexibility, and originality results, we first standardized each measure and then averaged across the three. Finally, rather than using fixed-effects models, we opted to run random-effects meta-analysis

models, because they take into account that population parameters may vary across studies (Borenstein, Hedges, Higgins, & Rothstein, 2010). All calculations were done using metacor function of meta R library (Balduzzi, Rucker & Schwarzer, 2019).

In line with hypothesis 1a, results from the main effect meta-analysis revealed a significant overall effect of belief in God, showing that believers were significantly less creative than were non-believers ($r = -0.126, 95\% \text{ CI} = [-0.210; -0.040], Z = -2.85, p = 0.004, k = 5$). Next, consistent with hypothesis 1b, results from the interaction meta-analysis revealed a significant and negative interaction between belief in God and the God prime ($r = -0.129, 95\% \text{ CI} = [-0.208; -0.048], Z = -3.11, p = 0.002, k = 4$). Follow up random-effects meta-analyses examining the effects for each condition demonstrated that among participants who were thinking about God, believers were less creative than were non-believers ($r = -0.203, 95\% \text{ CI} = [-0.321; -0.079], Z = -3.18, p = 0.002, k = 4$). In contrast, among participants in the control condition, there was no effect of belief in God on creativity ($r = -0.005, 95\% \text{ CI} = [-0.055; 0.045], Z = -0.19, p = 0.846, k = 4$).⁷

13. General discussion

The current research tied together the literatures on creativity, belief in God and followership to generate new theory about whether, when and how believing in God impacts creativity. The first study provided

⁷ Including religious affiliation as a control variable did not change the results of these meta-analyses. Specifically, religious affiliation was coded as 1 for the dominant religion in the sample (Christianity in Studies 3a and 4 and Judaism in Studies 2 and 3b) and as 0 for all other religions. We then re-ran the meta-analyses controlling for religious affiliation. In line with hypothesis 1a, results revealed a significant and negative main effect of belief in God on creativity ($r = -0.129, 95\% \text{ CI} = [-0.208; -0.048], Z = -3.11, p = 0.002, k = 5$). In addition, consistent with hypothesis 1b, the interaction between participants' belief in God and the God prime was significant across all four samples ($r = -0.119, 95\% \text{ CI} = [-0.191; -0.047], Z = -3.20, p = 0.001, k = 4$). Moreover, we found that among participants who were thinking about God, believers were less creative than were non-believers ($r = -0.145, 95\% \text{ CI} = [-0.239; -0.048], Z = -2.91, p = 0.004, k = 4$). Among participants in the control condition, there was no effect of belief in God on creativity ($r = 0.001, 95\% \text{ CI} = [-0.043, 0.057], Z = 0.29, k = 4$). Thus, we find the predicted pattern of results, even when controlling for religious affiliation.

correlational evidence that believing in God is negatively correlated with state-level innovative output. However, noting the limitations of correlational designs and given the state level of analysis, we next tested our hypotheses in a series of experiments conducted at the individual level of analysis. Studies 2, 3a, and 3b provided evidence in support of our hypothesis that the negative relationship between belief in God and creativity is moderated by whether or not an individual is actively thinking about God, such that thinking about God stifled the creativity of believers but not of non-believers. Our findings were replicated using different manipulations of thinking about God, different sample populations, and using both convergent and divergent measures of creativity, with both having important counterparts in the workplace. Study 4 builds on these findings by providing experimental evidence for the full moderated mediation model, underscoring the activation of a passive followership mindset as the underlying process responsible for the interactive effects of belief in God and God prime on creativity. Finally, in Study 5, we used a moderation-of-process design to test whether passive followership mindset mediated the relationship between belief in God and creativity. In accordance with our proposed psychological process, we found that passive followership prime led to reduced creativity among believers relative to non-believers.

13.1. Contributions

Our findings move research forward in several ways. First, by highlighting the importance of taking into account the potential effects of belief in God on creative performance and by providing new insights into the psychological consequences that thinking about God can have on monotheistic believers' creativity, we contribute to existing research by exploring domains previously untouched in this literature (Laurin et al., 2012). Of course, it must be emphasized that it is not that belief in God *always* negatively predicted creativity. Indeed, this was not the case when believers were placed in the control prime conditions. In those contexts, believers did not differ from non-believers in their creative capacity. This crucially suggests that it is not that believers are *inherently* less creative than people who do not believe in God. Rather, it implies that in order to let believers' creativity shine, they must be placed in contexts that do not elicit thoughts of God.

Second, by exploring how thinking about God may impact believers' creativity, our results contribute to existing organizational research which, with few exceptions, has avoided exploring belief in God in the workplace despite its central importance to both individual and organizational functioning (Chan-Serafin et al., 2013; Tracey, 2012). The little research that does exist has focused on the connections between religion and business ethics or prosocial behavior (e.g., Shariff & Norenzayan, 2007; Shariff et al., 2015; Weaver & Agle, 2002), but not on domains such as creative performance, which is often of vital importance to organizational viability and survival (Amabile, 1988; Woodman, Sawyer & Griffin, 1993; George, 2007). Yet, recent research suggesting that creativity and innovation can also have negative downstream consequences, raises the possibility that the stifling effect of belief in God on creativity might not be inherently negative, thus raising an interesting and complex set of tradeoffs (Khessina, Goncalo & Krause, 2018). Nevertheless, this omission is surprising given that just as individuals' attitudes, values, moods, skills and behaviors spill over to influence their thoughts and actions in the workplace, employees' faith is also bound to spill over to influence their thoughts and actions at work. Indeed, believers seek to sustain a habit of reflective faith in their everyday life (Pew Research Forum, 2016). As such, these tendencies likely do not stay outside organizational walls and thus, understanding how people's faith may interact with task performance is paramount. When would believers' thoughts of God harm performance? When could it help? How can we respectfully mitigate potential negative effects? Deeper exploration into these issues will leave managers in a more informed position to yield better organizational outcomes and will provide researchers with a richer understanding of employees, the

majority of whom are likely to believe in a monotheistic God.

Finally, the present research extends our understanding of the concept of followership and its potential implications. Indeed, although followership is an integral part of the leadership phenomenon, very few theoretical and empirical studies have attempted to focus on the followers' perspective (Junker & van Dick, 2014). And although we focus on a very specific kind of follower—the believers who follow a monotheistic God who for them serves as the ultimate leader—our results emphasize the importance of taking into account the expected mindset induced by different types of leaders. Indeed, our findings mesh well with the impact that an autocratic or paternalistic leader has on creativity through expectations of complete obedience and deference (e.g., Farh & Cheng, 2000; Zhang, Tsui, & Wang, 2011). Moreover, our results might also apply to employees of cult-like organizations who choose to passively follow their leaders' instructions without challenging or questioning them (Kelley, 1992; O'Reilly & Chatman, 1996). The creativity of such individuals may be hindered in much the same way, and for the same reasons, as monotheistic believers who think of God.

Yet, with human leaders, it may remain an open question as to how followership impacts creativity. What constitutes "good followership" for creativity may be context-dependent. For example, when followers have valuable expertise that would contribute to creative decision making but leaders do not, proactive followership may be most conducive to creative output. However, if the leader has creative ideas, then the company's creativity may be better served if the follower adopts a passive orientation and unquestioningly follows orders. The latter speculation dovetails with research by Miron-Spektor, Erez, and Naveh (2011) which highlights the important role of conformists in team creativity. Though our focus in this paper is squarely on the role that thinking about God plays in believers' creative idea generation in the moment, this discussion suggests there are many possibilities that await future research.

13.2. Limitations and future directions

Although it is encouraging that across different studies, methodologies, measures, and populations, we found consistent evidence of our predicted relationship between belief in God, thinking about God, and creativity, our results leave open a variety of important questions that might pave the way for future research. First, it is heartening that the direct replication we carried out in Studies 3a and 3b as well as the meta-analysis of our experimental data highlighted the significance of both the main effect of God and the belief in God X thinking about God interaction. Notably, however, although the interaction effect was robust and rigorous, our main effect did not always appear. We believe this effect is consistent with our theory suggesting that believers' reduced creativity is not ever-present but dependent on believers' activation of the passive followership mindset but future research should investigate this further. Second, in this set of studies, we have restricted our focus to exploring the impact of monotheistic believers' thoughts about God on creative performance. Looking forward, our findings could open a broader stream of research on how thinking about God might impact believers' problem-solving more generally. For instance, thinking about God may lead to a trade-off in terms of task performance by making believers less creative but more focused, allowing them to perform better on tasks that require persistence and rule-following (Duguid & Goncalo, 2015). In this regard, it is notable that religious priming has been found to lead to greater persistence on an unsolvable anagram task (Toburen & Meier, 2010).

Third, our findings highlight the fact that more research is needed to understand how exactly non-believers are affected by thinking about God. Indeed, in line with other research in this domain (e.g., Bushman, Ridge, Das, Key, & Busath, 2007; Dijksterhuis et al., 2008; Shariff & Norenzayan, 2007; Weisbuch-Remington, Mendes, Seery, & Blascovitch, 2005), we find that thinking about God has no effect on non-believers (Studies 2, 3a, 3b and 4). Even more intriguing is the unpredicted

result that emerged in Study 4, showing that non-believers who were primed to think of God felt significantly *less* like passive followers. Though we can only speculate on why this happened, it could possibly be due to a reactance effect (Brehm, 1989; Brehm & Brehm, 1981). When people are confronted with restrictions, they might react against them, by highlighting the importance of the freedom that these restrictions are limiting (Laurin et al., 2012). Thus, non-believers might react against the situation of being coaxed to think about God by declaring their freedom to *not* feel like a passive follower and, consequently, assert their independence (Galinsky et al., 2008).

Alternatively, it is possible that for believers and non-believers, a substantially different mental content is activated when they are asked to think about God. Although not much research has explored how God is represented in people’s minds, a review of existing work – which most typically involved work on believers – suggests that the prototypical map of the image of God includes concepts like (1) an omnipotent, all powerful entity that provides security, protection, guidance, and leadership; (2) an omnipresent deity that is everywhere and watching; (3) an omniscient entity that is the origin of all epistemic knowledge, provider of answers to the unknown as well as a morally invested entity that sets the rules for right and wrong; (4) a benevolent deity that is comforting and loving, (5) the creator of the world; and less typically, (6) a wrathful force, vengeful and punishing (e.g., Gorsuch, 1968; Kunkel et al., 1999; May & Fincham, 2018). Notably, more than one of these associations are typically generated when people are asked to spontaneously write down what comes to mind when they think about God.

In our content coding of participants’ essays, we found that believers and non-believers do indeed respond to the request to think about God in different ways and that these findings are consistent across the three studies in which we asked participants to write about God. Specifically, our additional coding revealed that whereas both believers and non-believers were equally likely to think about God’s image as omnipresent and omniscient, believers were significantly more likely to spontaneously mention God as omnipotent, benevolent, and the creator of the world. In contrast, non-believers were significantly more likely to view God as wrathful (though they used the idea not in the traditional sense as a punisher of sins but as a divisive force that is responsible for much discrimination and destruction among people). Moreover, in stark contrast to believers, non-believers were very likely to spontaneously write that God is a man-made invention that does not exist in real life. None of the believers mentioned this idea (see Table 2 below).

This latter point affords us with two important insights. First, it provides some evidence for the validity of our dichotomous measure of believe in God: those indicating at the end of the experiment that they did not believe in God were very likely to spontaneously say they did not believe in God in their open-ended essays. Second, the high percentage of non-believers who claimed in their essays that God does not exist can also provide a potentially good explanation why the God prime did not have a stifling effect on non-believers’ creativity. If non-believers view

God as a man-made concept which they do not believe exists, there is no reason for them to accept his influence or act as his passive followers. This is similar to other kinds of meaning-based followerships, in which followers would only accept the leader’s influence because they believe in him (Shamir, 2004; Uhl-Bien et al., 2014).

Importantly, this finding that believers’ typical image of God differs from that of non-believers should be further explored in future research because it may help explain inconsistent findings obtained in studies that prime God (Shariff et al., 2015; Willard, Shariff, & Norenzayan, 2016). Underscoring May and Fincham’s (2018) conclusion, our analysis of participants’ responses suggests that to truly understand the potency of the God prime requires opening the black box and unveiling what thoughts it elicits in the participants and how those, in turn, could differentially impact the outcomes under investigation.

Fourth, our results were restricted to participants from monotheistic religions (predominantly Christian, Jewish, and Muslim). It made sense to focus our research on these monotheistic religions given their historic and demographic significance in the western organizational workforce (Major Religions, 2005; Religious Landscape Study, 2015). More critically, our theoretical framework fit with a monotheistic view of God, in which he is portrayed as omnipotent, omnipresent, and omniscient (Laurin et al., 2012; Purzycki et al., 2012; Purzycki, 2013). In turn, we have suggested these qualities induce a sense of passive followership among his believers that will hinder creative expression. Yet, 22% of people worldwide practice either Hinduism or Buddhism (Major Religions, 2005). Buddhism, for example, does not subscribe to the view that there is a monotheistic God that created the world but rather believes in human agency and that the central goal of human beings is to pursue nirvana, and escape from the cycle of birth, death, and re-birth through enlightenment (for a review, see Harvey, 2013; Kyabgon, 2014). Future research might investigate whether similar effects hold for these groups as well or whether thoughts of faith would actually increase these Buddhist believers’ creative expression through proactive human agency. It is also noteworthy that given that our research focus was on comparing monotheistic believers to non-believers, we did not compare within different subgroups of monotheistic religions. And yet, given recent evidence about the differential routes of Protestantism versus Catholic to creativity (Kim & Cohen, 2017), future research would also benefit from investigating how the creativity of sub-religions within Christianity may be differentially affected by thinking about God.

Finally, it would be fruitful to examine potential moderators of the effect that passive followership of God may have on believers’ level of creativity. One potential moderator may be the task participants are asked to complete. In our research, we focused on tasks that did not have any spiritual or religious components. However, perhaps in religious tasks, when believers think about God, they can find more creative ways to follow his rules. For example, the New York Times reported a story about how Jewish Orthodox entrepreneurs find ways to make technology work while still adhering to the Jewish restrictions for Sabbath,

Table 2
Themes in God essays by believers versus non-believers, Studies 3a, 3b, and 4.

Theme	Study 3a (MTurk)		Study 3b (Israel)		Study 4 (MTurk)	
	% of non-believers	% of believers	% of non-believers	% of believers	% of non-believers	% of believers
Omnipotence	34.1%*	72.0%*	40.5%*	80.4%*	45.1%*	68.7%*
Omnipresence	20.5%	28.8%	26.2%	28.6%	13.2%	19.2%
Omniscience	43.2%	50.8%	59.5%	50.0%	43.1%	41.6%
Benevolence	38.6%*	80.5%*	35.7%*	75.0%*	49.3%*	66.9%*
Creator	11.4%*	36.4%*	0.0%*	44.6%*	13.2%*	44.1%*
Wrath	21.6%*	5.9%*	35.7%*	0.0%*	22.9%*	4.6%*
God as a man-made creation	81.8%*	0.0%*	95.2%*	0.0%*	67.4%*	0.0%*
Other (essay theme does not match any of the categories above)	1.1%		1%		2.1%	

Note. * indicates a significant difference between the propensity of believers and non-believers compared within, not across studies to mention the category, as indicated by Chi square tests (all χ^2 greater than 10.487, $ps < 0.001$).

requiring a combination of deep knowledge of Judaic legal codes and ingenuity (Levin, 2008).

A second potential moderator might be which facet of the God concept is activated while working on a creative task. Specifically, the concept of God is likely to be multi-faceted and there may be an associative hierarchy when believers think about God in which concepts associated with feeling like a passive follower of God might emerge more readily than other less central associations that might be more conducive to a creative mindset. To elaborate, drawing on prototype theory (Rosch, 1973, 1978), the God concept is not likely a singular concept but involves a graded categorization where some elements of the category are more central, and as such, more readily accessible than others. Indeed, more prototypical items – pre-existing knowledge structures that reflect expectations about the average characteristics held by people about a given category—are more likely to be generated first and more frequently than less prototypical items.

As noted above, our additional coding suggests that, at least for the monotheistic believers who participated in our research, when they were asked to write about what comes to mind when they think about God, they spontaneously generated a multi-faceted image of God, including elements such as him being omnipresent, omniscient, omnipotent, benevolent, and creator of the world. These specific images fit well with the induction of a passive followership orientation toward God, which we found is not compatible with creativity.

This is not to say, however, that creative idea expression and God will always be at odds in the minds of believers. Indeed, there are at least two ways in which believers' prototypical image of God could induce creativity (or at the very least not hinder it). First, if researchers were to prime specific components of the God prototype like God as unconditionally loving or God as forgiving, this might encourage exploration and risk-taking, which have been shown to boost creativity (Glover & Sautter, 1977; Dewett, 2006; Simmons & Ren, 2009). Second, it is possible that there are less central components of the God image that are conducive for creativity. For example, if believers view God as a source of creativity or that God works through them to unveil his creations, this may be compatible with creative expression. This is reminiscent of Galileo's (1610) letter to his daughter in which he said: "I render infinite thanks to God, for being so kind as to make me alone the first observer of marvels kept hidden in obscurity for all previous centuries" (cited in Sobel, 1999). Thus, if believers think that God wants them to be creative they might very well be able to think creatively and engage in creative behaviors. This suggestion meshes well with research showing that conformity may boost creativity if the norm people conform to is that of being independent-minded (Goncalo & Duguid, 2012). Future research can investigate these possibilities by attempting to shift more obscure associations with God toward other less central concepts that might inspire creativity.

14. Conclusion

As societies across the globe search for creative solutions to pressing problems, and innovation as opposed to rigid adherence to tradition is taking on ever greater importance all while the majority of the world's population demonstrates a high degree of belief in God, it is paramount to know when and how belief in God may trigger creative inhibition. We found that thinking about God reduces creativity for monotheistic believers because it induces a passive follower mindset. And yet, we do not mean to suggest that believers are necessarily less creative. Indeed, historically, some of the most creative individuals—from Galileo to Max Planck—were devout believers. Our findings, however, do seem to suggest that while believers can think of God and be creative, it might be prudent they not do both at the same time. This conclusion dovetails nicely with the observation made by the famous astronomer, Father Angelo Secchi, who had stated that: "When I study astronomy, I forget my priesthood and when I perform my priestly duties I forget astronomy" (Ha'am, 1912, p.100).

Declaration of Competing Interest

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

Acknowledgements

We would like to thank our associate editor, Chen-Bo Zhong, and the two anonymous reviewers for their invaluable feedback. We would also like to thank Olga Khessina and Blaine Landis for their help with data analysis as well as the members of the UCL SOM reading group and the members of the Creativity Collaboratorium for their invaluable input. We would also like to thank Ella Levinson, Omer Shemesh, Paige Kemp, and Naveera Ghulamhussain for their RA work, and Etti Doveh, head statistician at the Technion's Statistics Laboratory, for independent verification and validation of all experimental results.

This research was partially supported by grants awarded to Carmit T. Tadmor from the Coller Foundation, the Henry Crown Institute of Business Research in Israel, and the ISRAEL SCIENCE FOUNDATION (Ref No. 363/19).

A previous version of the paper was a finalist for the best paper award at the 2018 Israeli OB conference.

Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.obhdp.2021.03.001>.

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